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# Generic Crowdsourcing Model for Holistic Innovation Management

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**Julkaisun nimike**

Geneerinen joukkoistamismalli holistiselle innovaatiojohtamiselle

**Tiivistelmä**

Innovaatiot ovat merkittävässä roolissa nykypäivän organisaatioissa ja niitä tulee johtaa holistisesti, jotta ne saavuttaisivat riittävän markkinavetoisuuden. Tämän tutkimuksen päämääränä oli selvittää joukkoistamisen geneeristä hyödyntämistä holistisen innovaatiojohtamisen kontekstissa. Holistinen innovaatiojohtaminen kattaa strategisen sekä innovaatio- ja projektijohtamisen osa-alueet. Joukkoistaminen tarjoaa erilaisia mahdollisuuksia vuorovaikutukseen asiakkaiden, potentiaalisten asiakkaiden ja muiden sidosryhmien kanssa.

Tutkimus koostuu kuudesta vertaisarvioidusta tutkimusartikkelista, ja sen empiirinen osuus suoritettiin 18 case-organisaatiossa, jotka toimivat eri toimialoilla. Tutkimuksessa hyödynnettiin kvalitatiivisia ja kvantitatiivissa tutkimusmenetelmiä kokonaisvaltaisemman näkökulman saavuttamiseksi tutkimusaiheeseen.

Tutkimuksen kontribuutio olemassa olevaan innovaatiojohtamisen kirjallisuuteen ja tieteelliseen keskusteluun on monipuolinen. Ensinnäkin, tutkimus tarjoaa tietoa joukkoistamisesta ja sen hyödyntämisestä holistisen innovaatiojohtamisen kontekstissa. Toiseksi, tutkimus esittelee geneerisen joukkoistamismallin, joka on sovellettavissa tieteessä, liiketoiminnassa, innovaatiojohtamisessa sekä tuote- ja palvelukehityksessä. Kolmantena, geneerinen joukkoistamismalli on tutkimuksessa sovellettu holistiseen innovaatiojohtamiseen. Tutkimuksen pääkontribuutiona voidaan pitää tutkimuksen aikana kehitettyä holistisen innovaatiojohtamisen mallia, johon geneerinen joukkoistamismalli on sovellettu.

Tutkimus osoittaa, että joukkoistamisella on suuri vaikutus organisaation holistiseen innovaatiojohtamiseen, mikä tekee siitä asiakaslähtöisemmän ja siksi toteutetut innovaatiot ovat luonteeltaan markkinavetoisia. Lisäksi tutkimus osoittaa, että joukkoistamista on mahdollista hyödyntää teollisuuden alasta riippumatta erityyppisten innovaatioiden toteuttamisessa.

**Asiasanat**

Innovaatiojohtaminen, joukkoistaminen, joukkorahoitus, projektijohtaminen, strateginen johtaminen

**Title of publication**

Generic Crowdsourcing Model for Holistic Innovation Management

**Abstract**

Innovations are one of the most important economic drivers in modern businesses. An innovation management approach should be holistic within an organization to produce innovations which have demand on the markets. The objective of this study was to re-search how crowdsourcing is generically utilized in the holistic innovation management. The holistic innovation management approach covers strategic, innovation and project management areas in this study. Crowdsourcing provides several possibilities to interact with existing customers, potential customers and other individuals.

The dissertation is based on six peer-reviewed research articles and the empirical data of the study were collected from 18 case organizations which are acting in different indus-tries. Qualitative and quantitative approaches were employed to provide a more compre-hensive view of the research topic.

The research provides several contributions to existing innovation management litera-ture and discussions. Firstly, the study provides knowledge about crowdsourcing and its utilization in the holistic context of innovation management. Secondly, the study pro-vides a generic crowdsourcing model (GCM) which can be adapted in several ways in science and businesses. Thirdly, the GCM is applied in holistic innovation management and a new model is provided as a final outcome of the study.

This research demonstrates that crowdsourcing can have a significant impact on an or-ganization's holistic innovation management. Utilization of crowdsourcing makes an organization more customer-focused, and, therefore, implemented innovations have more demand on the markets. Moreover, this research indicates that crowdsourcing can be utilized in a wide range of industries when producing different types of innovations.

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have always supported me in my choices and encouraged me in many ways in my life. Your encouragement has always meant a lot to me. I would like to give my deepest gratitude to my lovely wife Johanna. You gave me time and understanding, and encouraged me when I needed it. Now that this doctoral journey has come to an end, I am happy to give my free time to you and still our very young sons.

I am happy to stand here and say that I did it! It was not an easy job but the journey to becoming a doctor was really rewarding. I learned a lot of new things which will benefit me and my family in the future.

Seinäjoki, June 2016

Ari Sivula

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# ARTICLES

This dissertation consists of a summary of the following original research articles:

A1      Sivula, A. & Kantola, J. (2016). Integrating Crowdsourcing with Holistic Innovation Management. *International Journal of Advanced Logistics*. In process.

A2      Sivula, A., Kantola, J., Vanharanta, H. & Salo, M. (2014). Crowdsourcing in Strategic Management. *Proceedings of the 11th International Conference on Innovation & Management*, 613-623. Nov 2014, Vaasa, Finland.

A3      Sivula, A. & Kantola, J. (2014). Combining Crowdsourcing and Porter's Value Chain. *International Journal of Advanced Logistics 3(1-2)*, 17-26.

A4      Sivula, A. & Kantola, J. (2014). Crowdsourcing Utilization in Innovation Management. *Proceedings of the 6th International Conference on Technology Innovation and Industrial Management*, S3:53-70. May 2014, Seoul, South Korea.

A5      Sivula, A. & Kantola, J. (2016). Adapting Crowdsourcing in Innovation Management. *International Journal of Innovation and Learning* 19(3), 314-334.

A6      Sivula, A. & Kantola, J. (2014). Crowdsourcing in a Project Lifecycle. In *Knowledge Management in Organizations. 9th International Conference, KMO2014, Proceedings. Lecture Notes in Business Information Processing, Volume 185*, 221-232. Ed. Uden, L., Fuenzaliza Oshee, D., Ting, I.-H. & Liberona, D. Switzerland: Springer International Publishing.

# GENERAL 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 2015). Can be knowledge, resource or funding focused. |
| Development | The systematic use of scientific and technical knowledge to meet specific objectives or requirements (Nnia 2014). |
| Innovation | Innovation is the specific instrument of an organization and is the act that provides resources with a new capacity to create wealth (Drucker 1985). Can be, for instance, a radically, discontinuously or incrementally new product, new service, new process or new phenomenon. Innovation commonly provides the opportunity to enhance profit of an organization. |
| Innovation diffusion | Widespread adoption of innovation (Tidd 2010). |
| Innovation management | A process of managing innovation which includes search, select, implement and capture phases (Tidd and Bessant 2013). |
| Knowledge | A fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information (Davenport and Prusak 1998). |
| Project | Temporary endeavor involving a connected sequence of activities and range of resources which are designed to achieve a predefined goal (Lake 1997). Commonly utilized in development of innovation. |
| Project management | A process of controlling project; generally includes initiation, planning, execution and closure phases (Project Management Institute 2013). |

| | |
|---|---|
| Organization | Organized group of people with a particular purpose, such as a business, public institution, university or government department. Can be micro, small, medium or large in size (Centre for Strategy & Evaluation Services 2012). |
| Pull innovation | Innovation which has a common demand on the markets (Peters et al. 2012). |
| Push innovation | Innovation which does not necessarily have demand on the markets (Brem and Voigt 2009). |
| Strategic management | Activity of an organization which includes identifying opportunities and threats in the business environment and attaching an estimate of risk to the discernible alternatives (Mintzberg and Quinn 1998). Strategy is first formulated and implemented after formulation. |
| Strategy | A plan to reach an organization's goal in the short or long term (Johnson et al. 2014). An organization can have several strategies or a single one. |
| Value chain | The process or activities by which a company adds value to an article, including production, marketing and the provision of after-sales service (Porter 1998). |
| Weak signal | Future-oriented information behind forthcoming trends, changes and emerging phenomena (Yoon 2012). |

*"If you always do what you always did, you will always get what you always got."*
- Albert Einstein

*"Business has only two functions - marketing and innovation."*
- Peter F. Drucker, *Management*

*"No decision-making system is going to guarantee corporate success. The strategic decisions that corporations have to make are of mind-numbing complexity. But we know that the more power you give a single individual in the face of complexity and uncertainty, the more likely it is that bad decisions will get made."*
- James Surowiecki, *The Wisdom of Crowds*

*"Victory is always possible for the person who refuses to stop fighting."*
- Napoleon Hill

*"To my lovely wife, Johanna, and our ever-inquisitive sons, Aleksi and Niko."*

Ari Sivula

# 1   INTRODUCTION

Innovations have a crucial role in a modern organization's activities. Innovations lead to economic growth for an organization, an entire industry and all of society (Abernathy and Clark 1985; Porter 1980; Schumpeter 2008). It is profitable for an organization to produce innovations which have demand on the markets. Innovation management is a demanding process and requires effective management which should utilize knowledge among other resources from a variety of sources (Trott 2005). An organization should be aware of the needs and opinions of customers, potential customers and other individuals if it wants to create innovations which have high demand on the markets. Christensen (2011) argues that suppliers and customers must discover new markets together. Customers and other individuals can have a role in innovation management.

Innovation management is a process which can lead, for instance, to a new product or service (Cormican and O'Sullivan 2004; Rogers 2003; Tidd and Bessant 2013). Innovation management should be comprehensive management of an organization and cover several management areas. This study highlights a holistic approach to innovation management which is constructed from three management areas: strategic management, innovation management and project management. Innovations should have demand on the markets in order to lead to higher profit for an organization. Organizations should, therefore, be constantly connected to customers, potential customers and other individuals when creating innovations.

Crowdsourcing has received a lot of attention in science and businesses after Howe published the first crowdsourcing article in Wired magazine in 2006. Crowdsourcing is a model for employing an undefined internal and external crowd in an organization's activities. The crowd can be utilized as a knowledge creator, a resource or a funder of an organization's activities (Sivula and Kantola 2016b). Moreover, crowdsourcing provides flexibility for innovation management when an organization is aware of the needs of the crowd.

## 1.1 Research background and motivation

An organization should be altogether innovative which, therefore, means that innovation is not the responsibility of a single function or department of an organization. Crowdsourcing provides knowledge, resources and funding for an organization's activities, and it can be adapted several ways in the context of holistic innovation management. More research and a new model is required for holistic and generic understanding of innovation management and crowdsourcing in an

organization's activities which is the key motivation of this study. Crowdsourcing is a way to implement interaction with the crowd which can consist, for instance, of customers, potential customers, employees and other individuals. Crowdsourcing could provide the required resources for implementing innovations.

Crowdsourcing is a relatively new concept and, therefore, requires more research to develop new models for science and businesses. This research focused on crowdsourcing and its utilization in several management areas and aimed for the development of a generic crowdsourcing model (GCM) for holistic innovation management which could be utilized in a wide range of industry sectors and in science. The model includes different elements of management and crowdsourcing.

## 1.2 Positioning of the study

This study crosses several research areas to provide a holistic view of crowdsourcing and its utilization in an organization's innovation management activities. The work overlaps different management areas: strategic management, innovation management and project management. Crowdsourcing's utilization in these management areas was studied and finally the GCM for the holistic innovation management model was developed as a final outcome. Figure 1 illustrates the position of the research.
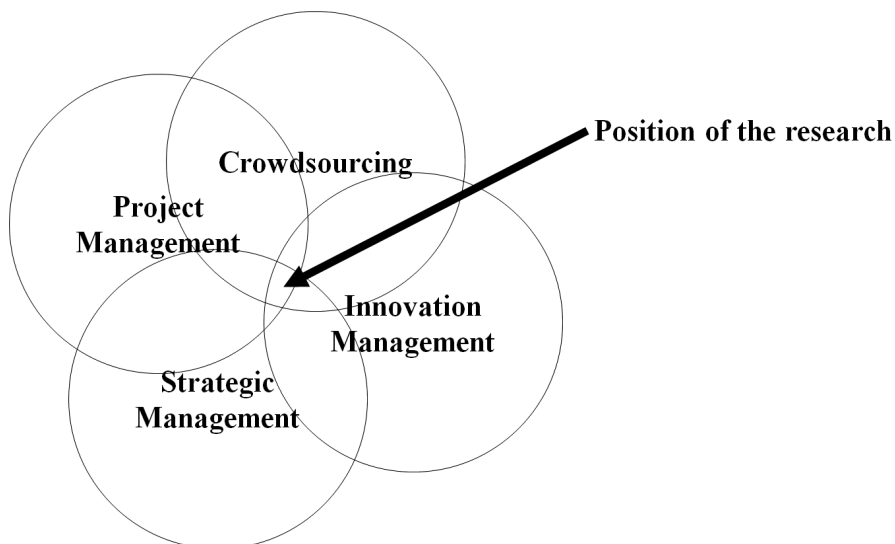


**Figure 1**.    Position of the research

Crossing the boundaries of several fields of management research has become a general approach in organizational studies as the phenomena examined have become increasingly complex (Eriksson 2013). This can be seen in this study as well. Crowdsourcing can be considered a still new and, moreover, complex phenomenon, and as an activity which crosses several management areas. Moreover, it can be utilized in various ways in organization activities, as this research emphasizes.

## 1.3 Research problem and objective

Every management book and research article emphasizes the need for innovations (Drucker 1993; Johnson et al. 2014; Kim and Mauborgne 2005). Innovations are vital; they provide a change to increase an organization's profit, among other advantages. Innovations can be either pushed in or pulled by the markets. Market demand does not exist in push innovations or new products, and services come from the research activities of an organization (Brem and Voigt 2009; Ottosson 2004; Stefano et al. 2012). Markets create demand in pull innovations which can be more beneficial for an organization (Caetano and Amaral 2011; Drury and Farhoomand 1999; Peters et al. 2012). Nevertheless, new products and services need to accurately respond to customer needs to succeed in the markets (Pantamo and Viassone 2014). Therefore, market pull innovations can be considered the more beneficial model for creating innovations.

This study highlights the requirement for pull innovations which have customer needs already available, and which can, therefore, lead to higher profit for an organization. It is profitable for an organization to understand the needs of the customers and other individuals in its activities in a holistic context. An organization should be constantly connected to customers, potential customers and other individuals. Crowdsourcing provides several ways of interacting with customers, potential customers and other individuals. Crowdsourcing is the act of going inside or outside the company's normal organizational setup to an undefined crowd (Brabham 2008a; Dawson and Bynghall 2012; Howe 2015). Crowdsourcing is still a relatively new model and an emerging area in science and businesses, but its feasibility has been noted in the context of an organization's activities.

Innovation management should cover several management areas within an organization, as earlier research has indicated (Tidd and Bessant 2013; Trott 2005). An organization should have a strategy which provides possibilities for generating innovations (Dasgupta et al. 2011; Love et al. 2014; Wu 2013). The creation of innovations can be included in different levels of strategy. Moreover, an organiza-

tion can have an innovation strategy of its own. Generally, innovation management covers searching, selecting, implementing and capturing value from innovations (Tidd and Bessant 2013). Innovations are commonly brought out with projects which, therefore, are a crucial part of innovation management (Shenhar 2001; Shenhar and Dvir 1996). Holistic innovation management is constructed from different management areas in this study.

The objective of this study is to research **how crowdsourcing is generically utilized in the holistic innovation management of an organization**. Several levels of knowledge are required about crowdsourcing and its utilization in holistic innovation management. Firstly, an organization's strategic management needs knowledge about the internal and external environments of an organization. Organizations' strategies provide the basis for innovation creation, because they act as guidelines for innovations. Secondly, innovation management should understand the needs of customers, potential customers and other individuals during the process. Thirdly, the development project can benefit from internal and external crowdsourcing in a project lifecycle.

## 1.4 Research questions

To accomplish the research objective and solve the research problem, this study addresses four research questions. The first question can be considered the main research question, and the other questions can be seen as sub-research questions. The research questions are as follows:

1. **How crowdsourcing is generically utilized in holistic innovation management?**

2. How crowdsourcing is utilized in strategic management?

3. How crowdsourcing is utilized in innovation management?

4. How crowdsourcing is utilized in project management?

Research questions two to four are answered based on empirical data which were collected from 18 case organizations. The first research question is answered based on the results gained from research questions two to four. The research questions were answered based on articles published in international peer-reviewed scientific journals and conferences. Table 1 presents research questions,

publications which answer the research questions, publication numbers and main contributions.

**Table 1**.         Research questions, publications, publication numbers and main contributions

| Research question | Publication answering the research question | Publication number | Publication's main contribution |
|---|---|---|---|
| RQ1: How crowdsourcing is generically utilized in holistic innovation management? | Sivula, A. & Kantola, J. (2016). Integrating Crowdsourcing with Holistic Innovation Management. *International Journal of Advanced Logistics*. In process. | A1 | This theoretical study contributes GCM for a holistic innovation management model and provides a holistic understanding of crowdsourcing in an organization's innovation management activities. |
| RQ2: How crowdsourcing is utilized in strategic management? | Sivula, A., Kantola, J., Vanharanta, H. & Salo, M. (2014). Crowdsourcing in Strategic Management. *Proceedings of the 11th International Conference on Innovation & Management*, 613-623. Nov 2014, Vaasa, Finland. | A2 | This empirical research contributes knowledge about the formulation and implementation of static and dynamic strategy for crowdsourcing utilization. |
| RQ2: How crowdsourcing is utilized in strategic management? | Sivula, A. & Kantola, J. (2014). Combining Crowdsourcing and Porter's Value Chain. *International Journal of Advanced Logistics* 3(1-2), 17-26. | A3 | This empirical study presents the employment of crowdsourcing as part of Porter's value chain. |

| RQ3: How crowdsourcing is utilized in innovation management? | Sivula, A. & Kantola, J. (2014). Crowdsourcing Utilization in Innovation Management. *Proceedings of the 6th International Conference on Technology Innovation and Industrial Management*, S3:53-70. May 2014, Seoul, South Korea. | A4 | This empirical research presents crowdsourcing usage as a generic term in an organization's innovation management activities, utilizing a four-phase innovation management model. |
|---|---|---|---|
| RQ3: How crowdsourcing is utilized in innovation management? | Sivula, A. & Kantola, J. (2016). Adapting Crowdsourcing in Innovation Management. *International Journal of Innovation and Learning* 19(3), 314-334. | A5 | Extended version of the article titled "Crowdsourcing Utilization in Innovation Management". Contributes deeper analysis of crowdsourcing utilization in innovation management and more empirical evidence for the topic. |
| RQ4: How crowdsourcing is utilized in project management? | Sivula, A. & Kantola, J. (2014). Crowdsourcing in a Project Lifecycle. In *Knowledge Management in Organizations. 9th International Conference, KMO2014, Proceedings. Lecture Notes in Business Information Processing, Volume 185*, 221-232. Ed. Uden, L., Fuenzaliza Oshee, D., Ting, I.-H. & Liberona, D. Switzerland: Springer International Publishing. | A6 | This empirical study contributes knowledge about crowdsourcing utilization as a generic term in an organization's project management. The empirical study is based on a four-phase project management model. |

The dissertation includes six scientific publications which were divided to answer the research questions as illustrated in Table 1. Sub-research questions aim to answer the main research question and are based on empirical data.

## 1.5 Research strategy and context

The research is a multi-case study and was carried out in 18 case organizations which are acting in a wide range of industry sectors. The industries are the product and service industries. The study can be considered mainly qualitative, but supporting quantitative elements are included as well. Triangulation was selected as an approach to gain a more comprehensive view of a relatively new and complex research topic. Empirical data for the study were collected utilizing semi-structured interviews and a survey which included closed- and open-ended questions. Triangulation was selected as an approach for achieving the research objective in relation to a new topic and to provide a new angle on holistic innovation management. Therefore, qualitative and quantitative methods were utilized on several levels in this research. Figure 2 presents a summary of the research strategy of the dissertation.
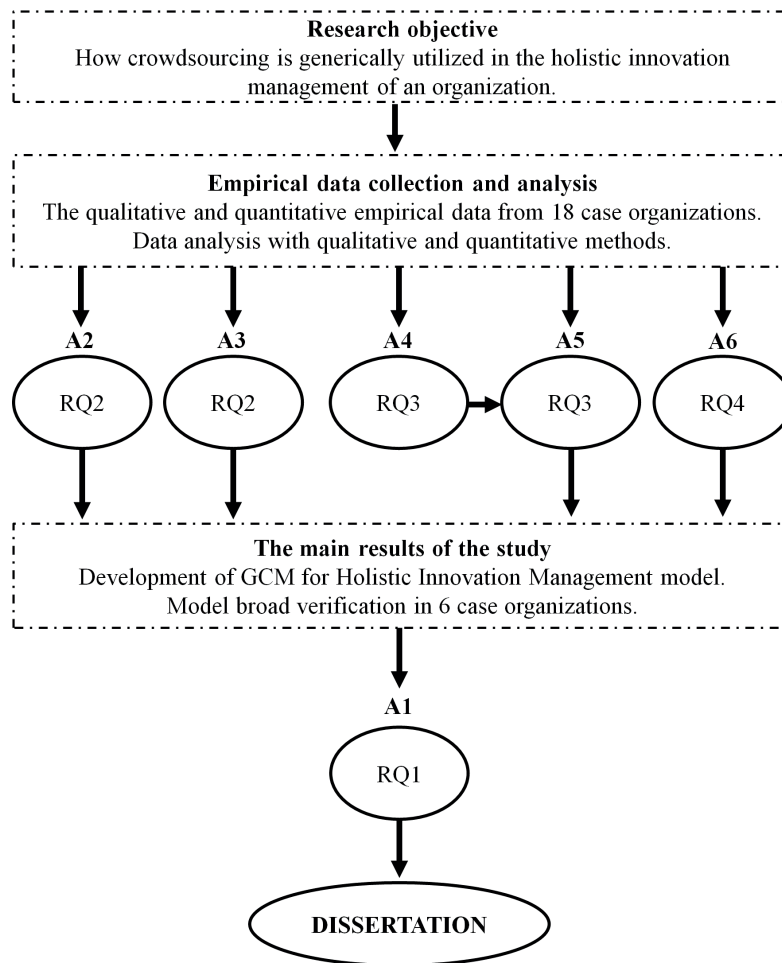
**Figure 2.**    Summary of research strategy of the dissertation

Empirical data were collected and analyzed utilizing qualitative and quantitative methods. Empirical results of the study were reported in several scientific forums, as illustrated in Table 1 and Figure 2. This research aimed to develop the GCM for holistic innovation management which is introduced as a final result of the study and in order to answer the main research question. The model highlights crowdsourcing's necessity and its utilization in holistic innovation management. A detailed description of the research methodology is provided in Chapter 3 which sheds light to the research approach, research process and overall quality of the research.

## 1.6 Structure of the dissertation

The dissertation consists of two independent parts. The first is an introductory part and the second is a publication part which includes scientific articles. The introductory part first highlights on relevant literature for the research. Research methodology is presented in Chapter 3 which describes the research background and research process. A summary of the results is given in Chapter 4, and the dissertation ends with conclusions and discussions in Chapter 5. The conclusions and discussions in the dissertation are based on qualitative and quantitative evidence collected from 18 case organizations from a wide range of industries.

# 2   THEORETICAL BACKGROUND

This chapter sheds light on relevant literature for the study. The study covers management areas which have important roles in the holistic innovation management activities of an organization. Strategic management has a crucial role when an organization is making decisions about the organization's innovations. Innovation management is management of innovation processes, and project management is an activity which in the final stage develops an innovation. Crowdsourcing is a useful model in all of these management areas when producing innovations.

## 2.1 Crowdsourcing

It is important to understand the opinion of customers, potential customers, employees and other individuals when implementing innovations. The opinion of individuals is important to organizations because it provides a better chance for making a profit, for example, when a new product or service enters the market. Managers and directors may think that they are in charge in their organizations and decide which innovations are the most profitable. However, it is customers, potential customers and other individuals who eventually decide and control what an organization can or cannot do (Christensen 2011). It might be a waste of an organization's resources if it decides to implement an innovation which does not have demand in the markets.

Crowdsourcing is constructed from two words: "crowd" and "sourcing". Crowdsourcing is a task taking place inside or outside the normal organization setup in an undefined crowd (Sivula and Kantola 2016a). Sourcing refers to outsourcing. Internal crowdsourcing can be implemented, for instance, between different departments, if the organization is large enough (Simula and Vuori 2012; Sivula and Kantola 2014a).

Howe published his original crowdsourcing article in Wired magazine in 2006 (Howe 2006). Howe defines crowdsourcing as follows (Howe 2015):

> "*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.*"

Crowdsourcing can be utilized in several situations and it has an effect on an organization's innovation activities when implemented holistically. Crowdsourcing activities may include online platforms, but this is not necessary. However,

Howe's definition is not the only definition crowdsourcing has been given in the scientific literature.

### 2.1.1 Defining crowdsourcing

Crowdsourcing can be defined in multiple ways based on crowdsourcing implementation method. However, all definitions share the same common element of crowdsourcing which is the utilization of an undefined crowd. Estelles-Arolas and Gonzalez-Ladron-de-Guevara (2012) have conducted a literature review which includes most of the crowdsourcing definitions. Table 2 highlights the most relevant crowdsourcing definitions in the literature.

**Table 2**.          Definitions of crowdsourcing (Estelles-Arolas and Gonzalez-Ladron-de-Guevara 2012 [adapted])

| Reference | Definition |
|---|---|
| Alonso and Lease (2011) | Crowdsourcing is the outsourcing of tasks to a large group of people instead of assigning such tasks to an in-house employee or contractor. |
| Bederson and Quinn (2011) | Crowdsourcing is people being paid to do web-based tasks posted by requestors. |
| Brabham (2008b) | Crowdsourcing is an online, distributed problem-solving and production model already in use by for-profit organizations such as Threadless, iStockphoto and InnoCentive. |
| Brabham (2008a) | Crowdsourcing is a strategic model to attract an interested, motivated crowd of individuals capable of providing solutions superior in quality and quantity to those that even traditional forms of business can. |
| Buecheler et al. (2010) | Crowdsourcing is a special case of such collective intelligence. |
| Burger-Helmchen and Penin (2010) | Crowdsourcing is one way for a firm to access external knowledge. |
| Chanal and Caron-Fasan (2008) | Crowdsourcing is the opening of the innovation process of a firm to integrate numerous and disseminated outside competencies through web facilities. These competences can be those of individuals (for example, |

| | creative people, scientists and engineers) or existing organized communities (for example, OSS communities). |
|---|---|
| Dawson and Bynghall (2012) | Tapping the minds of many. |
| DiPalantino and Vojnovic (2009) | Crowdsourcing is [a set of] methods for soliciting solutions to tasks via open calls to large-scale communities. |
| Doan et al. (2011) | Crowdsourcing is a general-purpose problem-solving method. |
| Grier (2011) | Crowdsourcing is a way of using the Internet to employ large numbers of dispersed workers. Crowdsourcing is an industry that is attempting to use human beings and machines in large production systems. |
| Heer and Bostock (2010) | Crowdsourcing is a relatively new phenomenon in which web workers complete one or more small tasks, often for micro-payments on the order of $0.01 to $0.10 per task. |
| Haymann and Garcia-Molina (2011) | Crowdsourcing is getting one or more remote Internet users to perform work via a marketplace. |
| Howe (2015) | 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. Crowdsourcing is the application of open source principles to fields outside of software. |
| Kazai (2011) | Crowdsourcing is an open call for contributions from members of the crowd to solve a problem or carry out human intelligence tasks, often in exchange for micro-payments, social recognition or entertainment value. |
| Kleeman et al. (2008) | Crowdsourcing is outsourcing of tasks to the general Internet public. Crowdsourcing is a profit-oriented form that outsources specific tasks essential for the making or sale of its product to the general public (the crowd) in the form of an open call over the Internet, with the intention of animating individuals to make a contribution to the firm's production process for free or for significantly less than that contribution is worth to the firm. |

| | |
|---|---|
| | Crowdsourcing is a form of integration of users or consumers in internal processes of value creation. The essence of crowdsourcing is the intentional mobilization for commercial exploitation of creative ideas and other forms of work performed by consumers. |
| La Vecchia and Cisternino (2010) | Crowdsourcing is a tool for addressing problems in organizations and business. |
| Peng and Zhang (2010) | Crowdsourcing is a new innovation business model operated through the Internet. |
| Liu and Porter (2010) | Crowdsourcing is the outsourcing of a task or a job, such as a new approach to packaging that extends the life of a product, to a large group of potential innovators and inviting a solution. It is essentially open in nature and invites collaboration within a community. |
| Mazzola and Distefano (2010) | Crowdsourcing is an intentional mobilization, through Web 2.0, of creative and innovative ideas or stimuli, to solve a problem, where voluntary users are included by a firm within the internal problem-solving process, not necessarily aiming to increase profit or to create product or market innovations, but in general, to solve a specific problem. |
| Oliveira et al. (2010) | Crowdsourcing is a way of outsourcing to the crowd tasks of intellectual asset creation, often collaboratively, with the aim of having easier access to a wide variety of skills and experience. |
| Poetz and Schreier (2012) | Crowdsourcing is outsourcing the phase of idea generation to a potentially large and unknown population in the form of an open call. |
| Porta et al. (2008) | Crowdsourcing is enlisting customers to directly help an enterprise in every aspect of the lifecycle of a product or service. |
| Reichwald and Piller (2006) | Crowdsourcing is interactive value creation, in terms of the isolated activity of the individual as directed toward one unit of the product, involving a cooperation between the firm and users in the development of a new product. |
| Ribiere and Tuggle (2010) | Crowdsourcing consists of making an open online call for a creative idea, or problem-solving, or evaluation or any other type of business issues, and to let anyone (in the crowd) submit solutions. |
| Sloane (2011) | Crowdsourcing is one particular manifestation of open innovation. It is |

| | the act of outsourcing a task to a large group of people outside your organization, often by making a public call for response. It is based on the open source philosophy which used a large crowd of developers to build the Linux operating system. |
|---|---|
| Vukovic (2009) | Crowdsourcing is a new online distributed problem-solving and production model in which networked people collaborate to complete a task. |
| Vukovic et al. (2009) | Crowdsourcing is a new online distributed production model in which people collaborate and may be rewarded by completing a task. |
| Wexler (2011) | Crowdsourcing is focal entity's use of an enthusiastic crowd or loosely bound public to provide solutions to problems. |
| Whitla (2009) | Crowdsourcing is a process of outsourcing activities by a firm to an online community or crowd in the form of an "open call". Crowdsourcing is a process of organizing labor, where firms parcel out work to some form of (normally online) community, offering payment for anyone within the "crowd" who completes the tasks the firm has set. |
| Yang et al. (2008) | Crowdsourcing is the use of an Internet-scale community to outsource a task. |

It can be concluded from Table 2 that crowdsourcing includes several elements and can be utilized widely in an organization's activities. Crowdsourcing activities generally include open call and online platforms. On the other hand, crowdsourcing can be implemented offline as well (Prpic et al. 2015). Online platforms can be used for task setting, but the actual crowdsourced work can be implemented offline.

*2.1.2 Generic crowdsourcing model*

Crowdsourcing has several implementation methods and organizations can use it in different ways in their activities. This section sheds light on generic crowdsourcing model (GCM) which can be utilized especially for an organization's innovation activities. Crowdsourcing can be categorized based on the implementation method and the results of the crowdsourcing activity. Figure 3 illustrates the GCM.
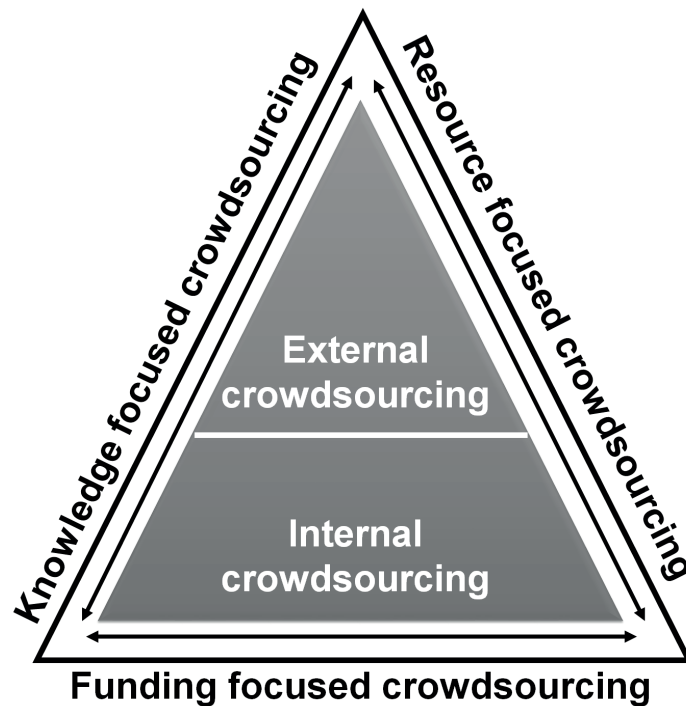
**Figure 3**.    The GCM (Sivula and Kantola 2016b)

The GCM shows that crowdsourcing can be divided into knowledge, resource and funding focused crowdsourcing activities which can be implemented internally or externally of an organization. An organization should consider which crowdsourcing implementation methods are appropriate for its activities. Knowledge focused crowdsourcing implementation methods utilize the crowd to create new knowledge about the area in which an organization is interested. This can involve, for example, finding new megatrends or weak signals, or finding ideas for specific market areas. Resource focused crowdsourcing implementation methods are concerned with how the crowd can be utilized as an organization's resource. This can involve, for example, implementing a project partly or entirely with the crowd.

Funding focused crowdsourcing implementation methods are used for the funding of an organization's activities. Funding focused crowdsourcing implementation methods provide a major opportunity for micro-, small- and medium-sized organizations to fund innovations. Table 3 presents crowdsourcing implementation methods, descriptions, examples of public platforms and examples of implementation methods.

**Table 3.**     GCM implementations (Sivula and Kantola 2016b)

| Implementation method | Description | Examples of public platforms using the implementation method | Example of implementation method |
|---|---|---|---|
| *Knowledge focused crowdsourcing (crowdknowledge)* | | | |
| Crowd wisdom | An organization employs a crowd to extend its knowledge in terms of crowd wisdom (Hopkins 2011; Howe 2009). Crowd can be employed, for example, to create a new idea or disperse knowledge inside an organization (Sivula & Kantola 2014b; Sivula & Kantola 2016a). | Community platforms, Dell IdeaStorm and Twitter | Product developers utilize crowd wisdom and the crowd participated in the development process of the car Fiat Mio (Solon, 2010). |
| Crowdvoting | Crowdvoting can be utilized for organizing large amounts of data (Sivula & Kantola 2014b; Sivula & Kantola 2016a). Crowdvoting can be used, for instance, to vote on the usability of an organization's new and old products or services (Hammon & Hippner 2012; Howe 2009). | Airbnb, Collaboration platforms generally and IMDb | Managers utilize crowdvoting in on an internal collaboration platform to find out organizational core values (Sivula et al. 2014). |
| Crowdevaluation | Crowdevaluation is a model for evaluation, for example, of an organization's products, services or development results in general (Sivula & Kantola 2014b; Sivula & Kantola 2016a). Crowdevaluation can be used, for example, for screening and evaluating new design concepts of new products (Chang & Chen 2015). | Collaboration platforms generally, TrendHunter and Tripadvisor | Managers measure strategy implementation with crowdevaluation repeatedly sending short surveys to stakeholders or by utilizing a web based collaboration platform (Sivula et al. 2014). |
| *Resource focused crowdsourcing (crowdresourcing)* | | | |
| Crowd creation | The crowd participates in implementing the tasks with the actual producers, such as employees (Geiger et al. 2011). Crowd creation tasks have generally loose definitions and there can be major differences between the qualities which the crowd produces (Sivula & Kantola 2014b; Sivula & Kantola 2016a). | IdeaConnection, TopCoder and Wikipedia | Managers utilize crowd creation in a web based programming competition at TopCoder to develop an entirely new software (Lakhani et al. 2010). |

| | | | |
|---|---|---|---|
| **Microtasking** | An organization can utilize the crowd to perform microwork which is achieved by the crowd's individuals (Franklin et al. 2011). Work can be paid or unpaid, but the task is commonly minor and anyone can implement it without any specific professionalism required. | Amazon Mechanical Turk, Clickworker and reCAPTCHA | Book digitalizers in Google Inc. utilize microtasking to digitalize text books with the crowdsourcing platform reCAPTCHA (Baecher et al. 2011). |
| **Macrotasking** | Macrotasking tasks commonly require special skills and might be precisely targeted (Reid 2013). Macrotasking is beneficial to an organization because the results are wider and more professional than that in microtasking. | 99designs, Freelancer and Innocentive | Software developers use macrotasking in a Freelancer platform to develop mobile software to meet the needs of an organization (Sivula & Kantola 2014c). |
| ***Funding focused crowdsourcing (crowdfunding)*** | | | |
| **Crowdfunding of a project** | With crowdfunding the reward given to the crowd can be monetary or non-monetary (Belleflamme et al. 2013). A crowdfunder could receive, for instance, the product which was developed and financed with crowdfunding. The reward might also be something which is not directly related to the developed product or service. | Indiegogo, Kickstarter and RocketHub | Managers utilize Indiegogo to fund their new technology development, for instance, new sensor development (Sivula & Kantola 2016a). An organization is usually sending the developed product to crowdfunders. |
| **Crowdfunding of an organization** | An organization gives equity stakes to crowdfunders (Mollick 2014). In general, shares of an organization are given to the crowdfunders who are funding the business, and in this way part of the profits will also go to the funders in the future. | EquityNet, Invesdor and StartUpValley | The CEO of a startup company is using a crowdfunding platform like Invesdor to start the activities of a company and provides equity stakes of the company to crowdfunders (Mitra 2012). |
| **Crowdfunding as a loan** | The crowd offers peer-to-peer lending for an organization. The loan is normally small but multiple lenders can raise the amount of money to a high level (Lin & Viswanathan 2014). The interest rates on the loans vary based on the crowdfunding event. | FundingCircle, Funding Tree and Prosper | The CEO of a startup company is utilizing a crowdfunding peer-to-peer lending platform like Funding Tree to provide the necessary loan for a startup company's activities (Bruton et al. 2015). The startup company provides interest on the loan to the crowdfunders. |

An organization should consider which crowdsourcing implementation methods it can utilize in its innovation activities. Crowdsourcing implementation methods can be internal or external to an organization. In general, organizations are using external crowdsourcing and it can be utilized in any size organization. Internal crowdsourcing requires an organization which is large enough to implement internal crowdsourcing activities, for instance, between departments. Moreover, internal crowdsourcing can increase knowledge flow between an organization's internal functions (Simula and Vuori 2012). Crowdsourcing can be implemented, for example, between departments or offices which are in different countries. This might lead to innovations because of the cultural differences. Thus, all crowdsourcing implementation methods which are presented in Table 3 can also be utilized internally.

Crowdsourcing platforms can be internal or external to an organization. External platforms can be, for instance, social networks or dedicated crowdsourcing platforms which are not on an organization's own servers. Private platforms are on an organization's own servers and are mostly collaboration-based IT environments (Sivula and Kantola 2014a). An organization should consider which kind of crowdsourcing task is to be used and what the crowd should perform. Based on this consideration an organization can decide which crowdsourcing platform it should utilize to achieve a particular task.

### 2.1.3 Crowdsourcing compared to open innovation

Crowdsourcing is a profitable model for an organization because it receives the results which the crowd generates. However, other types of collaboration exist as well. Crowdsourcing should be separated from open innovation because it is an activity where an organization seeks value from the crowd to support, for instance, innovation activities or common organizational activities. Ideas may be sent out in the research or in the development stages in open innovation (Chesbrough 2003). This is not generally profitable for an organization which is trying to compete in a changing and turbulent business environment. Crowdsourcing can be considered a more secure model for interacting with customers, potential customers and other individuals.

Brabham (2008a) argues that crowdsourcing is not open innovation. Open innovation can be seen as one form of product development. Open innovation is open to everyone which means that all the parts of the product or service are available for everyone. Open innovation does not provide the compensation models which crowdsourcing might have (Brabham 2008a). Crowdsourcing activities and re-

sults are owned by an organization which is not generally the case in open innovation.

## 2.2 Strategic management

Strategic management is the formulation and implementation of an organization's strategies. Strategic formulation is a logical activity which includes identifying opportunities and threats in the business environment and attaching an estimate of risk to the discernible alternatives (Mintzberg and Quinn 1998). The principal sub-activities of strategy formulation include, for example, capability and market segment identification. Sivula et al. (2014) argue that the strategic management of an organization can be static or dynamic. The static strategic management models aim for a process where the strategy is first planned and then strictly implemented after planning. Dynamic strategies are formulated and implemented based on the situation in the business environment. Dynamic strategic management is geared to constantly creating, executing and revising strategy, and it is essential for successful strategy-making (Greiner and Cummings 2009).

Innovations require strategic decisions from an organization. One of the crucial strategic decisions in the management of innovation is whether it is important to be a leader or whether it is acceptable to be a follower organization (Christensen 2011). Crowdsourcing can be utilized, for instance, to extend an organization's knowledge base in strategic formulation and when making strategic decisions for innovations. Generally, crowdsourcing can be utilized as a knowledge creator in planning and implementing any kinds of strategy.

### 2.2.1 Strategy formulation and implementation

Several strategic management models exist in the literature. Most of the models share the same common elements in terms of strategy formulation and implementation. Strategy can be created in short or long periods of time. Moreover, an organization can have several strategies or just one (Sivula et al. 2014). Strategic management concerns development of a strategies and their implementation in time. Figure 4 illustrates Wheelen and Hunger's approach to strategic management.

| Environmental Scanning: Gathering Information | Strategy Formulation: Developing Long-range Plans | Strategy Implementation: Putting Strategy into Action | Evaluation and Control: Monitoring Performance |

**External:**
Opportunities and Threats

**Natural Environment:**
Resources and climate

**Societal Environment:**
General forces

**Task Environment:**
Industry analysis

**Internal:**
Strengths and Weaknesses

**Structure:**
Chain of command

**Culture:**
Beliefs, expectations, values

**Resources:**
Assets, skills, competencies, knowledge

**Mission**
Reason for existence

**Objectives**
What results to accomplish by when

**Strategies**
Plan to achieve the mission & objectives

**Policies**
Broad guidelines for decision making

**Programs**
Activities needed to accomplish a plan

**Budgets**
Cost of the programs

**Procedures**
Sequence of steps needed to do the job

**Performance**
Actual results

Feedback/Learning: Make corrections as needed

**Figure 4**.   Strategic management model (Wheelen and Hunger 2012)

Wheelen and Hunger's approach is a generic model for strategic management and it can be adapted in several ways. Everything begins from environmental scanning which is the monitoring, evaluation and dissemination of information from the external and internal environments to key people within the organization (Wheelen and Hunger 2012). Moreover, possible opportunities and threats from an organization's internal and external environments should be identified in this phase. Strategy formulation is the strategic or long-range planning which concerns the development of an organization's mission, objectives, strategies and policies (Wheelen and Hunger 2012). Strategy implementation is the sum total of the activities and choices required for the execution of a strategic plan (Wheelen and Hunger 2012). Strategy is put into practice during strategy implementation. Moreover, Wheelen and Hunger emphasize evaluation and control in their strategic management model.

Evaluation and control information consists of performance data and activity reports (Wheelen and Hunger 2012). Strategy implementation should be measured to provide understanding of how well an organization is achieving. This information can be utilized to make adjustments for an organization's activities. More-

over, strategic management should have a continuous feedback and learning process, as illustrated in Figure 4. An organization can make major or minor adjustments to its activities utilizing the feedback and learning in strategic management.

### 2.2.2 Relationship between innovation and strategy

Johnson et al. (2014) define strategy as the long-term direction of an organization. Porter (1996) argues that competitive strategy is about being different which means deliberately choosing a different set of activities to deliver a unique mix of value. Strategies can be created for the short or long term and they can be formulated, for example, for different departments or functions of an organization. On the other hand, an organization should have a corporate strategy which all of the departments and organizational functions will follow. Thus, a corporate strategy addresses all of the strategies of the organization's business units (Porter 1998).

An organization can have an innovation strategy of its own. Effective innovation strategy provides an explanation of how it fits into and feeds into the overall business strategy; a definition of what is meant by innovation in general and further definition and information about different types and levels of innovation; an organization-wide portfolio that outlines what types and levels of innovation the organization wants to pursue and what kinds of resources, time frames, responsibilities and success criteria are associated with each of the different portfolio segments; and a structure through which innovation is managed and executed (Stamm 2008). Dodgson et al. (2008) highlights that innovation strategy should be the basis for corporate-level strategy.

Blue oceans strategy is one well-known form of innovation strategy. Blue oceans express potential markets which do not currently exist and can be created (Kim and Mauborge 2005). Drucker (1993) claims that innovation strategy is about creating a new business. An organization should constantly search for new business opportunities in its environment and formulate strategies based on these opportunities. Moreover, a combination of internal and external knowledge sources is a key element of a successful innovation strategy (Love and Roper 2009; Love et al. 2014). An organization should, therefore, understand the needs of the markets to create profitable strategies.

### 2.2.3 Porter's value chain

This study utilizes Porter's value chain for combining crowdsourcing with an organization's common activities. Porter's value chain can be considered as a

strategic management model because it includes several points of view for an organization's activities. The value chain includes all the operations which are necessary for a specific industry to deliver a valuable product or service to the markets and customers. Figure 5 illustrates Porter's value chain.
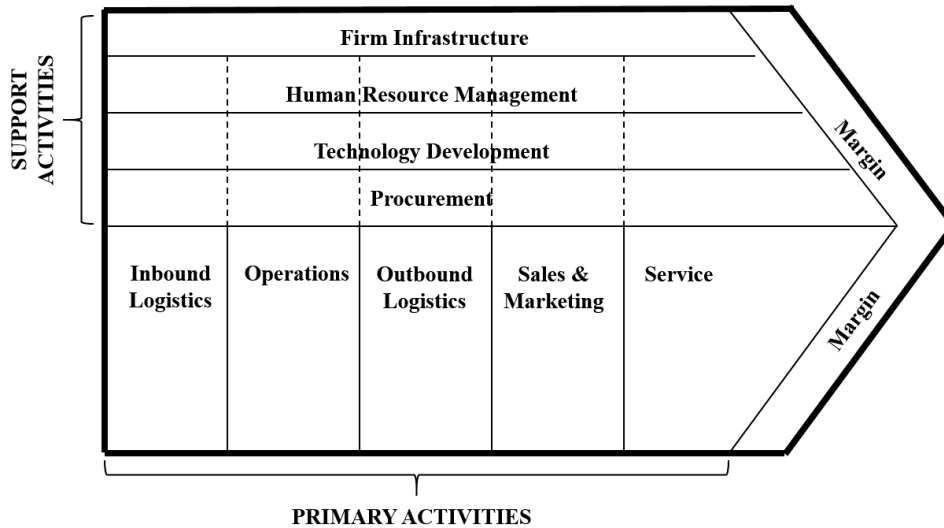


**Figure 5**.    Porter's value chain (Porter 1998)

Porter's value chain comprises primary and support activities. The value chain includes a margin which is the value that an organization receives from a product or service. Thus, it connects primary and support activities. Primary activities are defined as product- and market-related processes. These processes are required to provide the product for markets. Inbound logistics are, for example, processes which are necessary for receiving, storing and distributing. Operations are transformation activities that change all inputs into outputs. Output logistics consist of processes which are necessary for the delivery of a final product or service to the customer. Marketing and sales processes are required for making a product or service tempting to a customer. Service includes all processes which are required to keep a product or service valuable and tempting to a customer. Services are, for example, commonly offered for an organization's products in the form of customer service.

Support activities are classified as an organization's infrastructure, human resource management, technology development and procurement. Infrastructure includes an organization's functions which are required to maintain the daily operations. Human resource management includes operations of recruiting, training,

motivating and retaining the work force. Technology development activities are related to an organization's technological knowledge, hardware and software. Procurement is an organization's activity to gain the resources it needs to operate (Johnson et al. 2014).

## 2.3 Innovation management

Innovation management is the management of processes of the creation of innovation. This research adapted Tidd and Bessant's (2013) generic innovation management model. An organization can produce several types of innovation which are commonly based on an organization's strategy and capabilities. Innovations needs to have customers. Without a customer, innovation is an invention which, however, can lead to innovation in the future (Ortt 2010; Rogers 2003). Therefore, innovation diffusion can be considered to be a part of innovation management. End users of a product or service can have an active role in innovation management (Shum and Watanabe 2010). However, it is not necessarily possible to define precisely who the customer is and where the markets are. Moreover, organizations commonly wish to have more customers for their products and services, because this produces higher profit.

Customers, potential customers and other individuals can, for instance, generate advertising which provides new opportunities for an organization (Deighton and Kornfeld 2007; Wang 2010). An organization can employ customer generated advertising with crowdsourcing, for instance, in social networks, blogs and other crowdsourcing platforms. Customer generated advertising is effective practice when utilizing crowdsourcing as part of innovation management.

### 2.3.1 Innovations

Innovation as a word originates from the Latin word *innovare* and it stands for making something new (Johansson and Woodilla 2009). Innovation has several definitions based on the field of research. One thing remains the same in all the studies: it is something new or it has an element of newness. Schumpeter was one of the first researchers to draw attention to innovation in his book in 1942. Schumpeter (2008) defined innovation as creative destruction which occurs when a new product or service enters the markets and leaves some current product or service without customers. Schumpeter (2008) argues that creative destruction leads to an organization's economic growth. Modern innovation definitions are based on innovation types which makes innovation a more complex phenomenon for research. Trott (2005) defines innovation on a technological basis.

> "*Innovation is the management of all the activities involved in the process of idea generation, technology development, manufacturing and marketing of a new (or improved) product or manufacturing process or equipment.*"

Trott defines innovation as a management process which leads to a new or improved product, process or equipment. Innovations can also be existing products or services which are developed at the next stage. Moreover, innovations can be radical, really new (discontinuous) and incremental innovations. Based on Drucker (1993), innovation means more than just technology and it applies to every existing organization. Drucker (1985) argues that innovation brings the possibility for new business and is the specific instrument of entrepreneurship. Moreover, innovation, especially technological innovation, requires constant monitoring for new opportunities or changes, for example in technologies (Drucker 1993).

### 2.3.2 Push and pull innovations

Two major categories of innovations are market push and pull innovations. Market demand does not exist in push innovations, and new products and services come from the research of an organization (Brem and Voigt 2009; Ottosson 2004; Stefano et al. 2012). Market demand exists in pull innovations which can be more beneficial for an organization (Caetano and Amaral 2011; Drury and Farhoomand 1999; Peters et al. 2012). Therefore, an organization should always locate innovation opportunities in its business environment. Push and pull innovations have differences in essence as Table 4 illustrates.

**Table 4**.          Differentiation between push and pull innovations (Brem and
             Voigt 2009 [adapted])

| Attribute | Push innovation | Pull innovation |
|---|---|---|
| Technological uncertainty | High | Low |
| Research, development and innovation (RDI) expenses | High | Low |
| RDI duration | Long | Short |
| Sales market-related uncertainty | High | Low |
| Time-to-market | Uncertain or un-known | Certain or known |
| RDI customer integration | Difficult | Easy |
| Kinds of market research | Qualitative-discovering | Quantitative-verifying |
| Need for change of customer behavior | Extensive | Minimal |

Push innovations refer to technology push in a technological context and pull in-
novations refer to market pull innovations (Ulrich and Eppinger 2012). It can be
concluded from Table 4 that pull innovations are profitable for an organization
because the needs of the markets are known and demand exists. Walsh et al.
(2002) claim that pull innovations provide substitutes for existing products, while
push innovations, provide major improvements to innovations. Therefore, an or-
ganization which is developing its products and services can utilize both innova-
tion types in its activities. Pull innovations can be profitable but both innovation
categories are required in an organization's innovation activities.

### 2.3.3 Scopes for innovations

The literature describes several innovation types. An innovation is radical if a
new product or service satisfies a formerly unsatisfied customer need for the first
time (Gemünden et al. 2007). A completely new market area will be developed
and the organization will benefit economically from the radical innovation. Radi-
cal innovation may change customer behavior in the markets. An example of rad-

ical innovation is the mobile phone or the flat screen television (Sivula and Kantola 2014b).

A really new innovation (discontinuous) is in between a radical and incremental innovation. A really new innovation is a moderately innovative product or service (Garcia and Calantone 2002). A really new innovation upgrades a product or service by a great stride and it can evolve into a new product line or create new markets with existing technology. An incremental innovation presents a minor degree of departure from existing practices (Camisón-Zornoza et al. 2004). It enhances the capacities already present in the organization and develops them. Improvements can be minor or major for products or services. Incremental innovation makes an existing product or service more tempting to customers. Incremental innovation is the most common innovation type.

A technological innovation is a process which generates new or improves on current technology (Nieto 2004). Technological innovation requires research, development and learning-by-doing activities in an organization (Sagar and Zwaan 2006). Learning can lead to better results and changes in an organization. The development of new technology can require a significant amount of resources and capital.

A product innovation is a process which includes the technical design, RDI, manufacturing, management and commercial activities involved in the marketing of a new or improved product (Alegre et al. 2006). Product innovation can include technological and service solutions. Product innovation can include significant improvements in technical components or materials. A service innovation is a new, better or more effective service. Service innovations require creative activities like other innovations (Schwarz et al. 2012). A service innovation can be a new or improved service concept which adds value for the customer.

Process innovations are changes in the ways an organization acts (Tidd and Bessant 2013). Process innovation generates a new or significantly improved way to produce products or services or way to deliver them to customers. Process innovations can reduce production or delivery costs or significantly increase product or service quality. Drucker (1993) highlights the importance of social innovations. Social innovations are changes in economic and social environments and they have bigger role than, for instance, technological innovations (Drucker 1993). Moreover, Drucker (1993) argues that social innovations are opportunities for businesses and business managers. Thus, social innovations may create opportunities other innovations, because demand might appear from the social innovations.

*2.3.4 Management of innovations*

This study utilized Tidd and Bessant's (2013) generic innovation management model. Innovation processes generally vary in organizations but the same main phases exist (Sivula and Kantola 2016a). Tidd and Bessant (2013) highlight that the innovation process has four phases which are search, select, implement and capture. Tidd and Bessant's innovation management model can be considered a generic approach to innovation management. Figure 6 illustrates innovation management as a process.
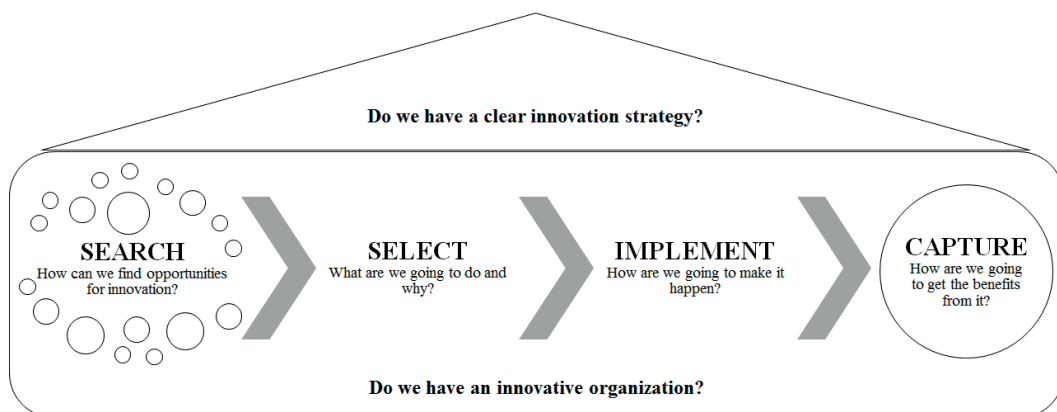


**Figure 6**.    Innovation management as a process (Tidd and Bessant 2013 [adapted])

Search, select, implement and capture are the main phases. Figure 6 includes relevant questions for an organization's managers to analyze specific innovation management phases. The search phase includes the scanning of an organization's internal and external environment and the processing of signals which are relevant and may be developed into new products or services. The signals can be, for example, new market opportunities or new product ideas.

An organization makes decisions as to which signal it will respond to in the select phase. This phase may include analysis of a new idea which is based on, for example, the organization's vision, strategy or values. The development process of an innovation can take a long period of time and demand a lot of the organizational resources. It is important, therefore, to analyze which innovation ideas will precede to the implement phase. The front end of innovation includes search and select phases. The front end innovation activities come before the formal product

development which includes opportunity identification, evaluation, idea genera-
tion, selection of ideas and new concept development (Peltomaa 2014).

The implement phase develops, for example, the new product, service or process.
The idea will be translated into innovation and launched to the organization's
internal and external markets. Implementation of an innovation requires
knowledge to develop an innovation and to execute the development project. The
implement phase requires knowledge about internal or external markets and
knowledge of the market area where the innovation will be launched.

The capture phase is the final stage of the innovation management process. Cap-
turing value from innovation includes sustaining the innovation's adoption and
diffusion. Organizations have a possibility to learn from innovations and innova-
tion management. This leads to the development of innovation management. All
experiences in innovation management should be processed and carefully ana-
lyzed. The result of future products or services is more inclusive if learning hap-
pens from former innovations and development processes.

Tidd and Bessant's innovation management model highlights important areas for
an innovative organization and the strategies it uses. Blue oceans strategy is one
form of innovation strategy. Blue oceans express potential markets which do not
currently exist and can be created (Kim and Mauborge 2005). The company's
organizational culture plays an important role in an innovative organization. In-
novation culture can, however, be hard to manage. Organizations such as Google
Inc. and P&G combine openness to new ideas with a healthy respect for the opin-
ions of customers to generate an innovation positive culture (Jaruzelski and Kat-
zenbach 2012).

## 2.4 Project management

Innovations are commonly implemented with projects which can be considered an
actual development stage of an innovation. Researchers have defined a project in
several ways. Definitions have, however, a clear consensus and the same elements
exist in each. Projects types are different. Thus, building a house is a different
kind of project than implementing a mobile application. Both are projects and
they share the same elements, but the outcomes are different. Lake (1997) defines
a project as follows:

> "*A project is a temporary endeavor involving a connected sequence of activi-
> ties and range of resources which is designed to achieve a specific and unique*

*outcome and which operates within time, cost and quality constraints and which is often used to introduce change.*"

A project implements a task that has been specified beforehand and is temporary. Every project is unique and is established to achieve specific outcomes. A project may have its own organization and might include specialists from several industry fields. Projects can be organized into a matrix organization, but this involves problems as well (Lewis 1998). On the other hand, matrix organization is one of the most common forms used for a project organization.

A project can be a research, development or innovation project. Research projects include, for example, studying new phenomena. Development projects implement, for example, a new product or service. Innovation projects target development of new products, services or processes (Moenkemeyer et al. 2012). Research projects can be a point of departure for development projects. Development projects are clearer to manage than research projects. The results are normally known beforehand in development projects. Research and development projects share the same common elements. On the other hand, every project is unique but has the same basic terms of time, costs and quality.

### 2.4.1 Project lifecycle

Project lifecycle commonly involves four phases for achieving project goals. Projects are implementing something that has not been created before and project results are normally unique (Project Management Institute 2013). The nature of a project is innovative because of the element of newness. Projects are undertaken in different organizational levels and can involve one or more employees. Figure 7 illustrates the Project Management Institute's approach to project management.
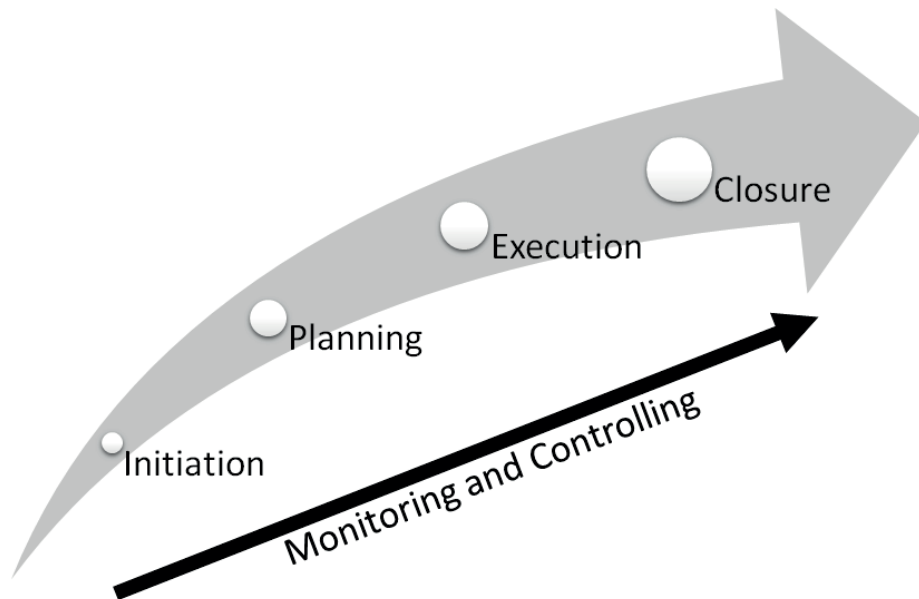
**Figure 7**.    Main phases of project management (Project Management Institute 2013 [adapted])

The project initiation phase is the first stage in the project lifecycle. A project gets its aim, scope and purpose, among other requirements. Project resources can be considered in this phase. Most projects have several stakeholder interests (Mok et al. 2014). Interests guide the project's scope in the project initiation phase. The customers', potential customers' or other individuals' points of view should be considered here. A project is planned more closely in the project planning phase. Resources are allocated for the project implementation. Written project plans can be either long or short, based on the project's scope. The project's scope and re-sults should be clear in this phase. Lake (1997) emphasizes the importance of project planning and the use of project management tools during this phase.

A project is implemented in the project execution phase using resources which can be internal or external to an organization. The project execution and planning phases are closely related to each other. There might be a need to get back to the planning phase during the execution phase. A project may require, for example, changes in expected activity durations. Changes may also occur in resource productivity and availability, or unanticipated risks may arise (Project Manage-ment Institute 2013). Nevertheless, a project may have iteration in all phases. Management and monitoring is required in the execution phase to keep the project in the predefined scope. The last state of a project lifecycle is the project closure. Evaluation is implemented in this phase. The project subscriber and other stake-

holders are normally evaluating the project. The success or failure of a project is decided based on stakeholders' evaluations.

*2.4.2 Management of projects*

Project management is management of a project lifecycle and includes several tasks (Sivula and Kantola 2014c). Lewis (1999) claims that project management involves three major categories which are planning, scheduling and controlling. Projects consume different resources of an organization which are, for instance, people, premises and equipment (Hornstein 2015). Therefore, scheduling has a crucial role in projects in order to receive correct resources just in time.

The Project Management Institute (2013) highlights that project management typically includes identifying requirements; addressing the various needs, concerns and expectations of the stakeholders in planning and executing the project; setting up, maintaining and carrying out communications among stakeholders that are active, effective and collaborative in nature; managing stakeholders towards meeting project requirements and creating project deliverables; and balancing the competing project constraints which include, for instance, scope, quality, schedule, budget, resources and risks. Therefore, several objectives need to be managed during a project lifecycle.

# 2.5 Synthesis of the conceptual framework

This research connects literature from several management fields to achieve the research objective. Therefore, general but broadly adapted management theories are applied in this study. Relevant management theories provide background for this study and are the departure point for implementing the research. Even though existing theories provide strong background for innovation and management of innovations, crowdsourcing insights do not exist in the literature which also explains the need for this study. Figure 8 illustrates the synthesis of the conceptual framework of the study.
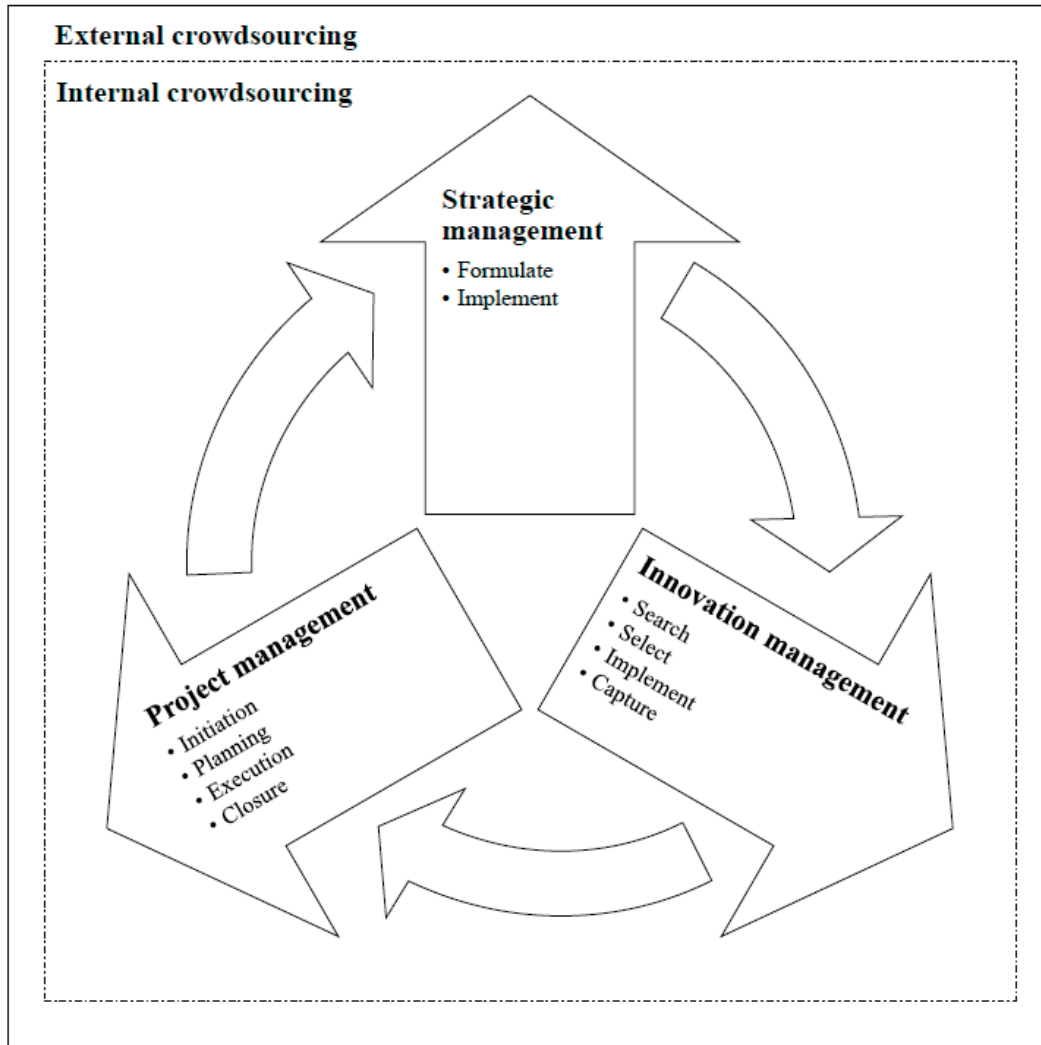
**Figure 8**.     Synthesis of the conceptual framework

Holistic innovation management is constructed from strategic management, innovation management and project management, as Figure 8 shows. Strategic management is an important management area when implementing innovations. An organization should formulate strategies which provide insights into innovations. An organization can have an innovation strategy of its own, but innovation-related alignments should include other strategies as well. Crowdsourcing can be a useful model for gaining knowledge from an organization's internal and external markets when formulating strategies. Moreover, crowdsourcing can be utilized when implementing strategies.

Innovation management should follow the guidelines which an organization's strategies provide. Innovation management has four different phases based on

Tidd and Bessant's (2013) generic innovation management model. All of these phases can employ crowdsourcing in several ways. Moreover, crowdsourcing provides knowledge, resources and funding to an organization to produce innovations which have demand on the markets.

Implementing innovations is generally done with projects. The project lifecycle consists of four common phases, according to the Project Management Institute (2013). Crowdsourcing can be a useful model for implementing innovations and connecting customers, potential customers and other individuals with the new product or service development in the research, development or innovation project. Therefore, innovation will be more customer-focused when innovation is produced with the crowd.

# 3   RESEARCH METHODOLOGY

This chapter sheds light on the research methodology of the study. The first subchapter covers the research approach. The second subchapter discusses the research process, and the third is about the quality of the research. Finally, the research methodology is synthesized.

## 3.1 Research approach

This subchapter sheds light on the research approach, the research methods used and the philosophical background assumptions of the study. Research is generally divided into qualitative and quantitative research. Qualitative research tends to be associated with participant observation and unstructured, in-depth interviewing, while quantitative research is typically taken to be exemplified by the social survey and by experimental investigations (Bryman 1993; Newman and Benz 1998). Both research methods can be utilized within a single study which can lead to a more comprehensive view of the research object. This study can be seen as a mainly qualitative study. However, quantitative research methods were employed during the research process as well.

### 3.1.1 Reasoning

Qualitative research is commonly connected to inductive reasoning, and quantitative research to deductive reasoning (Wilson 2010). Inductive reasoning moves from specific observations to broader generalization and theories, and deductive reasoning involves the testing of theoretical propositions, using a research strategy to perform this test (Hall and Hall 1996; Saunders and Lewis 2012). The same study can, however, use both reasoning types to provide a more holistic insight into the research object.

The reasoning of this study can be considered to be inductive because the theory is constructed from case studies and the study includes generalizations. However, the study included the testing of existing theories that are part of the GCM for the holistic innovation management model which has a connection to deductive reasoning. Nevertheless, inductive reasoning can be considered the main reasoning type in this study.

### 3.1.2 Research categories

Studies are generally classified into three main categories: explorative, descriptive and explanatory research (Blanche et al. 2006; Sue and Ritter 2012). Exploratory research involves studying what is happening, particularly in little-understood situations, and seeks new insights into specific phenomena (Robson 2005; Saunders and Lewis 2012). Wilson (2010) argues that explorative research relies on an inductive approach, is largely qualitative and employs focus groups, in-depth interviews, historical analysis and observations. Thus, exploratory research can be utilized for understanding a new research topic or gaining a new angle on the topic.

Robson (2005) argues that descriptive research offers an accurate profile of persons, events or situations. Saunders et al. (2009) highlight that it is necessary to have a clear picture of the phenomena on which data will be collected. Thus, descriptive research is utilized for describing the research object or phenomenon under study. Explanatory studies establish causal relationships between variables and the emphasis is on studying a situation or a problem in order to explain the relationships between variables (Saunders et al. 2009; Wilson 2010). Explanatory research studies how two or more research objects relate to each other. Sue and Ritter (2012) argue that an individual study can have multiple purposes that span two or all three research categories.

This study is mainly explorative and is supported by descriptive research. Strategic management, innovation management and project management are not new topics for research. However, studying crowdsourcing utilization in these management areas offers a new angle on these topics and, therefore, the work can be seen as explorative research. The research provided detailed information about how crowdsourcing is utilized in a wide range of industry sectors, and can also be seen as descriptive research. Thus, the GCM for holistic innovation management was developed utilizing explorative and descriptive research results.

### 3.1.3 Paradigm

The selection of the paradigm for the study is one of the most important decisions in academic research. Guba and Lincoln (2004) define a paradigm as the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways. An epistemology is a way of understanding and explaining how we know what we know (Crotty 1998). Gruber (1993) defines an ontology as an explicit specification of a conceptualization which is an abstract, simplified view of the world that we wish

to represent for some purpose. Axiology is the branch that studies judgments about value (Saunders et al. 2009). Table 5 compares four research paradigms which are common in management research.

**Table 5**.          Comparison of four research paradigms (Saunders et al. 2009)

|  | **Positivism** | **Realism** | **Interpretivism** | **Pragmatism** |
|---|---|---|---|---|
| **Ontology:** the researcher's view of the nature of reality or being. | External, objective and independent of social actors. | Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist). | Socially constructed, subjective, may change, multiple. | External, multiple view, chosen to best enable answering of research question. |
| **Epistemology:** the researcher's view regarding what constitutes acceptable knowledge. | Only observable phenomena can provide credible data, factors. Focus on causality and law-like generalizations, reducing phenomena to simplest elements. | Observable phenomena provide credible data, facts. Insufficient data mean inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts. | Subjective meanings and social phenomena. Focus on the details of a situation, a reality behind these details, subjective meanings motivating actions. | Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating deferent perspectives to help interpret the data. |
| **Axiology:** the | Research is | Research is value | Research is value- | Values play a |

| researcher's view of the role of values in research. | undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance. | laden; the researcher is biased by worldviews, cultural experiences and upbringing. These will impact on the research. | bound, the researcher is part of what is being researched, cannot be separated and so will be subjective. | large role in interpreting results, the researcher adopting both objective and subjective points of view. |
|---|---|---|---|---|
| **Data collection techniques most often used.** | Highly structured, large samples, measurement, quantitative, but can use qualitative. | Methods chosen must fit the subject matter, quantitative or qualitative. | Small samples, in-depth investigations, qualitative. | Mixed or multiple method designs, quantitative and qualitative. |

Two of the most common research paradigms are interpretivism and positivism (Smith 2006). Selection of paradigm reflects on researcher background and the philosophy of the study. Moreover, the research topic is impacted by the selection of a paradigm. Research can also have several paradigms based on the research topic and its complexity.

This research adopts a mainly interpretivism paradigm due the nature of the study. However, the research is supported by the positivism paradigm. Interpretivism covers qualitative parts of the study which is also a major paradigm in this research. Positivism covers the quantitative part and it can be seen as a supporting paradigm in the study. Nevertheless, both paradigms are part of the data collection, analysis and scientific articles in this study.

### 3.1.4 Data collection and analysis

This study utilizes triangulation at several levels during the research process. Denzin (1970) claims that triangulation is a method which combines multiple methods in the same study. The main advantage of using triangulation is that it can produce more complete and holistic information about the object of study and compensate for the limitations between the research methods (Ghauri and Gronhaug 2005; Hall and Hall 1996). Utilizing multiple methods can provide more holistic information about the research topic and object. Utilization of triangulation can be useful when studying complex or little-understood phenomena.

Triangulation is commonly divided into four types: methods triangulation, source triangulation, analyst triangulation and theory triangulation (Denzin 1970; Patton 1999). Methods or methodological triangulation employs qualitative and quantitative methods within the same research (Jick 1979; Wilson 2010). Source or data triangulation is data collection at different times or from different sources in the study of phenomena (Ashatu 2009; Wilson 2010). Different researchers independently collect data on the same phenomenon and compare the results in an analyst or investigator triangulation (Patton 1999; Wilson 2010). A theory is taken from one discipline and utilized to explain a phenomenon in another discipline in theory triangulation (Modell 2005; Wilson 2010). Moreover, triangulation can be utilized in data analysis for combining multiple analysis approaches (Humble 2009; Lauri 2011). Figure 9 illustrates triangulation approaches utilized in this study.



**Combined results of the study**

Methodological triangulation

Data triangulation

Theory triangulation

Analysis triangulation

**Qualitative**                                    **Quantitative**
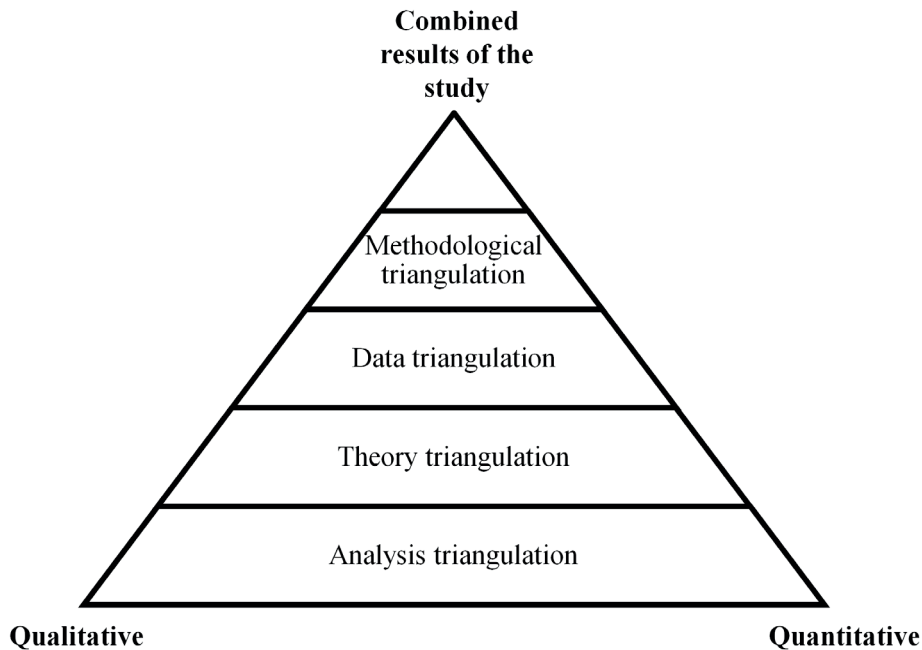
**Figure 9**.    Triangulation approaches of the study

This study utilized several triangulation types within the same study. Firstly, methodological triangulation was utilized in the collection of empirical data. Interviews and a survey were the main source for the empirical data. A research diary was kept during the entire research process and, therefore, those notes are

one source of empirical data as well. Moreover, supporting empirical data was collected from: the case organizations' web sites, news archives, emails exchanged with persons from the case organizations, social networking sites as well as public and private crowdsourcing platforms. Secondly, theory triangulation was utilized for combining the theory of crowdsourcing in several management areas. Thirdly, the research was a multi-case study which indicates utilization of data triangulation. Fourthly, triangulation was utilized in the data analysis phase for combining research data, and qualitative and quantitative methods were used to provide a more comprehensive view of the research topic.

### 3.1.5 A case study

Yin (2014) defines a case study as an empirical inquiry that investigates a contemporary phenomenon in-depth and within its real world context, especially when the boundaries between phenomenon and context may not be clearly evident. Yin (2014), moreover, claims that implementing a case study is a suitable method in a situation where the main research questions are "how" or "why" questions, a researcher has little or no control over behavioral events and the focus of the study is a contemporary phenomenon. Case studies generally combine several data collection methods such as interviews, surveys, archives and observations, and the evidence can be qualitative, quantitative or both (Eisenhardt 1989).

A research can be either single or multi-case study. A single case study can be utilized when a case represents a critical case or an extreme or unique case (Saunders et al. 2009). Saunders et al. (2009) argue that a single case can be selected because it is typical or because it provides an opportunity to observe and analyze a phenomenon that few have considered before. A multi-case study makes it possible to draw conclusions from a set of cases and is useful for examining phenomena that might occur in a variety of situations (Gagnon 2010). Multi-case studies share common elements with single case studies, but include multiple cases.

Case studies can be categorized for cross-sectional and longitudinal research. Cross-sectional studies research a phenomenon at a particular time (Saunders et al. 2009; Hair et al. 2011). Cross-sectional studies capture the specific state of the study object. Bouma and Atkinson (1995) claim that the longitudinal research involves two or more case studies of the same group with a period of time between each study, and the basic question in longitudinal study is whether there has been any change over a specific period of time. Longitudinal research studies have an impact on the time necessary to research an object in a specific period.

This study is a cross-sectional multi-case study. Research data were collected at single moment in an organization which makes this research a cross-sectional study. Research included 18 case organizations which are acting in a wide range of industry sectors, meaning that the research does not have any specific industry selected. The research provided more comprehensive information about crowdsourcing utilization in several management areas using multiple cases.

## 3.2 Research process

This subchapter discusses the research process of the study. Moreover, the subchapter provides discussion of how the research problem was solved. This research followed a common case study approach introduced by Yin (2014) which is illustrated in Figure 10.
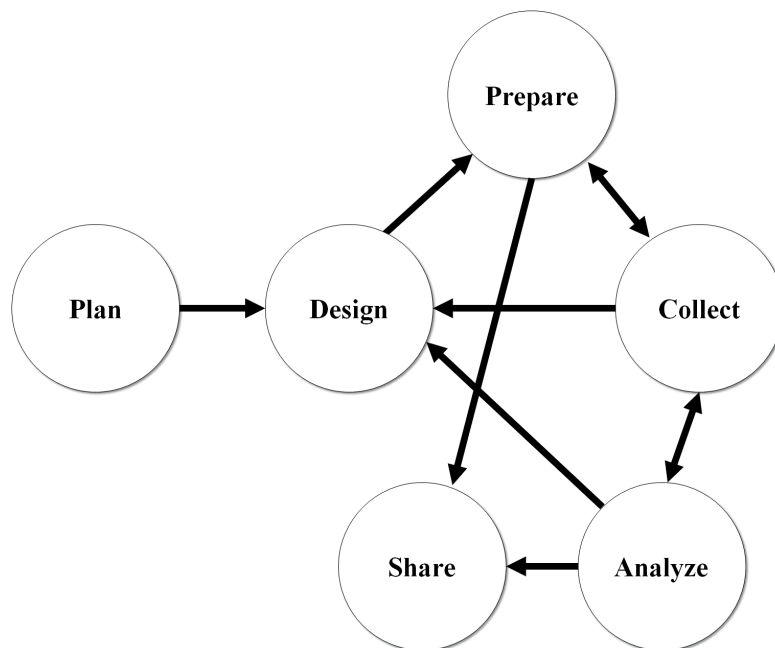


**Figure 10**.   Case study process (Yin 2014)

The case study begins by planning and design the research which were the two first phases in this study. Planning and designing research includes identifying the relevant case study situation and defining a unit of analysis. Preparing the research includes the creation of case study protocol and performing a pilot study. The collecting phase of the research involves data collection utilizing different

methods for answering research questions. The final phases in the case study are the analysis and sharing of the results. Analyses are based on collected case data. Implementing a case study is a linear but iterative process and might include moving between research phases (Yin 2014).

### 3.2.1 Planning

Yin (2014) argues that the planning of the research includes identifying the relevant situation for making a case study. Making a case study is appropriate in situations where the main research questions are "how" or "why" questions, the researcher has little or no control over behavioral events, and the focus of the study is a contemporary phenomenon (Yin 2014). A researcher should decide when to use a single or multi-case study.

This research is a multi-case study and the main research question is, "How crowdsourcing is generically utilized in holistic innovation management?" Moreover, the sub-research questions are "how" questions as well. Crowdsourcing can be seen as a contemporary phenomenon in the field of science and businesses. The first crowdsourcing article was published in 2006 (Howe 2006). Innovation-related activities are generally complex within an organization. This research is a cross-sectional study and, therefore, the researcher has no control over behavioral events which have been occurring in case organizations.

Thus, it can be concluded that a multi-case study is the appropriate choice for this study because it researches crowdsourcing utilization in an organization in a general context and is aiming to develop the GCM for holistic innovation management. Moreover, innovation-related activities are highlighted to provide more insights into how crowdsourcing is utilized generically in the innovation management of an organization. Both qualitative and quantitative approaches were used for gathering a comprehensive understanding of crowdsourcing and its utilization in an organization's activities.

### 3.2.2 Designing

Research design includes, for instance, defining unit of analysis, selecting cases which will be utilized in the study, identifying case studies and testing research design against different criteria which provide validity and reliability for the research (Yin 2014). The research design is the logic that links the data to be collected to the initial questions of the study (Yin 2014). Creating a research design

is a crucial step in the study, because it commonly includes several main choices which the researcher has to make during the research process.

This study was aiming for a holistic understanding of crowdsourcing and its utilization in an organization's innovation activities, and included one main research question and three sub-research questions. Innovation activities are part of a modern organization's management activities and should cover several areas of management which the research questions of this study also highlight. During the design of the research, the initial framework was implemented, as illustrated in Figure 11.
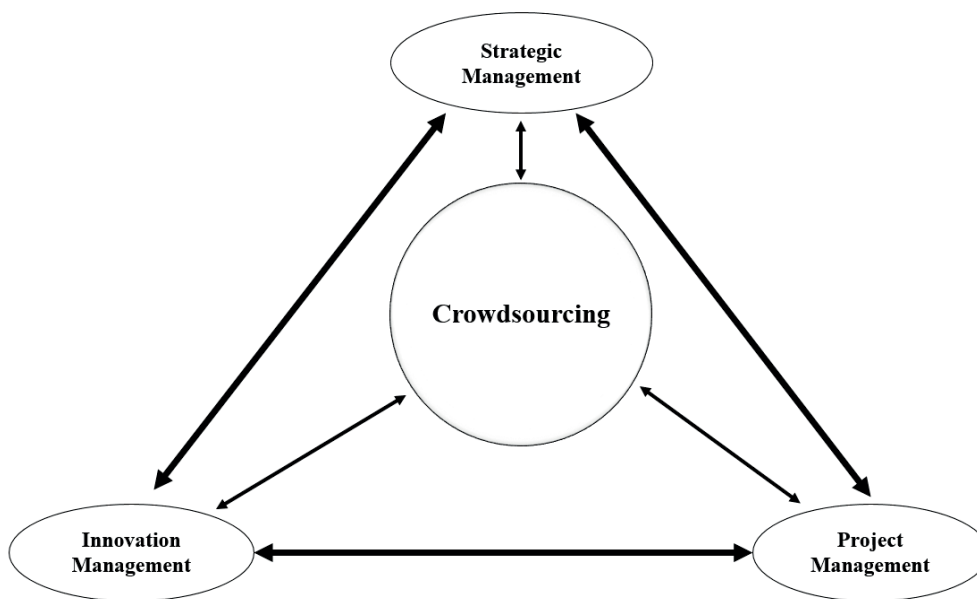
**Figure 11.**    The initial framework of the study

The initial framework of the study included strategic management, innovation management and project management areas which utilize crowdsourcing for creation of innovations which have demand in the markets. The assumptions of the study are that the selected management areas have connections to each other and that crowdsourcing is utilized in selected management areas. The empirical data collection, literature and selected case organizations were based on this initial framework. Therefore, the units of analysis in this study are management areas and crowdsourcing, as illustrated in Figure 11. The development of the GCM for the holistic innovation management model was based on the initial framework.

Case organizations were required to meet four criteria for crowdsourcing and its utilization in management areas and innovation-related activities. Moreover, management should have a clear focus in innovation-related matters. A case organization should fulfill the following criteria for participating in the study:

1. A case organization should have management for strategies, innovations and projects.

2. A case organization should have experience of implementation of innovations within its own industry.

3. A case organization should be customer-oriented.

4. A case organization should have experience of crowdsourcing and its utilization in an organization, and especially in innovation-related activities.

The case organizations' industries or size were not limiting factors in this study. Therefore, this research was implemented in a wide range of industry sectors. The amount of case organizations was not defined in the design stage. Collection of case data continued until a saturation point was reached. The saturation point is reached when no additional data are being found and full understanding about the object under study is reached (Glaser and Strauss 2009; Holzemer 2010; Legard et al. 2003). Case organizations were selected based on criteria, and the saturation point was the point at which the collection of the empirical data was concluded.

Crowdsourcing is a relatively new concept for science and businesses which can also be seen in case organizations. Qualitative and quantitative approaches were selected for forming a holistic understanding of crowdsourcing and its utilization in an organization's activities. The main case data of the study were collected in one cycle. Interviews were carried out as semi-structured interviews where management areas and crowdsourcing were discussed. The second data collection cycle was a broad verification of the developed model. These interviews were carried out as structured interviews.

Unstructured interviews provide qualitative depth by allowing interviewees to talk about the subject in terms of their own frames of reference and, thereby, it provides greater understanding of research topic (Arksey and Knight 1999; May 1997). Semi-structured interviews have same elements than unstructured interviews but includes list of questions that needs to be covered (Bernard 2006). Structured interviews are the opposite of unstructured interviews and are associated with survey research and includes standardized set of questions (May 1997).

This study included four research questions which the research should gain the answer to achieve the research objective. Some interview questions were defined beforehand but interviews were guided by the situation in case organization. This research was utilizing semi-structured interviews. A presentation was created to support the semi-structured interviews, and is illustrated in Appendix 1.

Collecting the quantitative data was the supporting data collection method in this study. Collection of quantitative data was implemented with the Webropol online survey system. The survey included closed- and open-ended questions for providing more in-depth information about a case organization's crowdsourcing utilization in selected management areas. The aim of the survey was to support the qualitative data and provide more points of view which semi-structured interviews cannot provide. Moreover, gaining access to all interesting case organizations is not always possible, because organizations might see it, for example, as time consuming. Utilizing a survey in the research can provide some information relating to these cases as well. Therefore, it can be useful to have several methods of collecting the case data. Semi-structured interviews and the survey included partly the same questions, because the research topic and aim are the same. The survey included the official research introduction letter which is presented in Appendix 2.

The final version of the survey included 109 questions in total, and included as well closed-ended six-point Likert scale questions. The Likert scale can provide the attitudes of a respondent towards a particular subject (Black 1999; Wilson 2010). The six-point Likert scale was selected to avoid central tendency bias error. Central tendency bias error occurs when respondents are reluctant to rate attributes at the extremes of the scale and tend to rate most attributes in the middle of the scale (Smith and Roodt 2003). Appendix 3 presents the online survey form questions as used in this study.

This study aimed for the development of the GCM for holistic innovation management which is a theoretical model. Development of the model was based on empirical results gained from case organizations. A second round of empirical data collection was implemented through structured phone interviews. A presentation was created to support the structured interviews. This presentation is illustrated in Appendix 4.

### 3.2.3 Preparing

Yin (2014) argues that preparing a case study includes, for example, developing case study protocol, screening candidates and selection of final cases, conducting

a pilot case study and gaining approval for human subjects' protection. Yin (2014) claims that the case study is one of the hardest types of research study and it requires personal skills of the researcher. These skills are, for instance, the ability to ask appropriate questions, listen and be adaptive.

This research included a pilot study which followed a preliminary case study protocol. A case study organization involved in the pilot study also participated in the final research. Modifications were made in the initial case study protocol as a result of the pilot study. Interviews were designed to be recorded where it was possible and allowed by case organizations. The amount of questions in the survey was reduced from 175 to 109 by combining and leaving out irrelevant questions out from the survey. The research introduction letter and presentation were modified to be more informative based on comments received from the pilot study. Thus, it can be concluded that the pilot study was useful in this research and provided information to develop the case study protocol. The final case study protocol is illustrated in Figure 12.



**Scan and select case organizations**
- Use contacts for finding case organizations
- Locate case organizations from the Internet
- Use news, news archives and literature

**Contact case organizations**
- Locate appropriate persons from case organizations
- Contact by phone or email and recruit organizations to the research

**Implement the research**
- Present the research topic for respondents
- Send the introduction letter and survey for respondents
- Interview and record (if possible)
- Make notes during interviews
- Support fulfilment of the survey (if required)

**Analyze and report the results**
- Transcribe the interviews (if recorded)
- Utilize qualitative and quantitative methods in analysis
- Implementation of journal and conference articles based on empirical results of the study

**Develop the model, verify and report the results**
- The GCM for holistic innovation management model development
- Broad verification of the model in several case organizations
- Implementation of the conceptual article

**Figure 12**.   Case study protocol of the research

It was crucial for the study to find appropriate cases which could provide data for answering the research questions. Criteria limited the amount of case organiza-

tions because it was not possible to participate in the research if an organization had not utilized crowdsourcing in its activities. Nevertheless, it was possible to find appropriate case organizations which fulfilled the criteria of the research and wished to participate in this study.

### 3.2.4 Collecting the case data

Empirical data in the case study can be collected from six sources: documents, archival records, interviews, direct observation, participant-observation and physical artifacts (Yin 2014). Moreover, Yin (2014) highlights the need for triangulation when implementing the case study and collecting data for combining several sources to providing a holistic view of the research topic. This study utilized interviews and results from the survey to provide a holistic view of the research topic.

The research was carried out in a wide range of industries, because industry was not a limiting factor in this study. Different product and service industries were part of the research. Collection of the main empirical data was implemented beginning in January 2014 and concluded at the beginning of May 2014. The research involved 18 case organizations which are micro, small, medium and large. An organization is micro when it has less than 10 employees, small when it has less than 50 employees and medium when it has less than 250 employees (Centre for Strategy & Evaluation Services 2012). Thus, an organization can be considered large if it has more than 250 employees. Table 6 illustrates the profiles of case organizations in the research.

**Table 6**.        Case organizations' profiles in the research

| Industry | Size | Industry | Size |
|---|---|---|---|
| Communications | Micro | Communications and financing | Small |
| Measurement device manufacturing | Micro | Consulting | Medium |
| Communications and relationships | Medium | Management consulting and business premises | Small |
| Consulting | Small | ICT | Large |
| Communications and networks | Large | Energy and environment | Medium |
| Logistics | Large | Consulting | Medium |
| Aviation | Large | Publishing | Medium |
| Software and systems | Small | Media and news | Small |
| Education | Large | Confectionary | Large |

Crowdsourcing can be utilized in multiple industries as can be seen in Table 6. Management areas in a case organization should be understood by the respondent and, therefore, most of the respondents were managers. Figure 13 illustrates respondent profiles in the research.
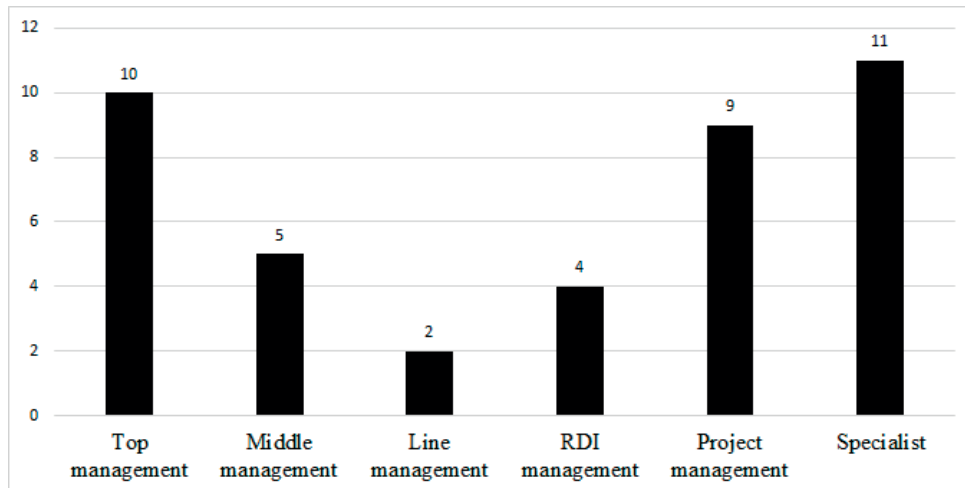


**Figure 13**.  Respondent profiles in the research

Figure 13 is based on data received from the survey, where the total amount of responses was 42. Figure 13 has 41 answers in total. One respondent did not answer the question concerning the respondent's position in the case organization. The research included two respondents who only participated for interviews. Thus, the total amount of respondents was 44 in the entire research. However, one respondent took the survey twice which, therefore, decreases the respondent count to 43. Both the responses of this respondent were utilized in the analysis of the case data. Moreover, not all respondents answered all 109 questions in the survey.

Respondents in case organizations participated in the research in two ways. Most respondents in case organizations participated for interviews and completed the survey to provide more holistic information about crowdsourcing and its utilization in the case organization. Some respondents only completed the survey without participating in interviews. Thus, both methods were utilized, in parallel or separately. Table 7 illustrates summary statistics of the respondents in the research.

**Table 7**.          Summary statistics of the case organizations and respondents

| Attribute | Number | Note |
|---|---|---|
| Amount of case organizations | 18 | 10 case organizations participated in interviews. |
| Total amount of respondents in interviews and the survey | 44 | One respondent took the survey twice and two respondents did not complete the survey. |
| Total amount of respondents in the survey | 42 | One respondent took the survey twice. |
| Total amount of respondents in interviews | 31 | 29 of these respondents also completed the survey. |
| Total amount of respondents *only* in the interviews | 2 | |
| Total amount of respondents who *only* completed the survey | 13 | |

Most respondents participated in interviews and completed the survey as presented in Table 7. Respondents were interviewed individually or in groups in their organizations. The number of respondents per case organization was one to nine persons. Moreover, interviews were carried out either face-to-face, by video conferencing or in phone interviews. Semi-structured interviews were guided by the situation of a case organization. The survey was completed during interview or after interview was completed. The researcher answered questions concerning answering the survey if requested to do so.

Thus, it can be concluded that this study utilized qualitative and quantitative data collection methods for providing a more holistic understanding of crowdsourcing and its utilization in several management areas. The research provided data which could not be used in this research because they were out of scope. This data can be utilized in other contexts and provide further research suggestions which are highlighted in Chapter 5.

### 3.2.5 Analyzing

Empirical data analysis consists of examining, categorizing, tabulating, testing or otherwise recombining evidence, to produce empirically based findings (Yin 2014). Qualitative and quantitative data analysis differ from each other. Qualitative non-numeric data analysis is generally based on the transcript text which can be analyzed with meaningful summaries, categories, coding and structuring (Saunders et al. 2009; Saunders and Lewis 2012). Quantitative numeric data analysis techniques are, for example, graphs, charts and overall statistics (Black 1999; Saunders et al. 2009).

This research employed both methods during data analysis. Interviews were transcribed, as appropriate, during data analysis, excluding one interview which was not recorded. The researcher made notes during interviews which were useful in data analysis. Thematic content analysis was employed to find patterns from qualitative data. Braun and Clarke (2008) argue that thematic content analysis is a method for identifying, analyzing and reporting patterns (themes) within the data. Moreover, thematic content analysis minimally organizes and describes the data in detail (Braun and Clarke 2008). Qualitative data were themed and categorized based on management areas after transcription to answer the research questions. Moreover, the survey included qualitative open-ended questions which were utilized in the qualitative analysis as well.

Quantitative data were analyzed and visualized with charts, tables, descriptive statistics and correlations. Quantitative data supported qualitative data in this study. Quantitative data provide new insights into crowdsourcing and its level of implementation. The GCM for holistic innovation management was broadly verified with structured interviews which were based on a five-point Likert scale and was analyzed with quantitative methods. Verification interviews provided further research suggestions which are highlighted in Chapter 5.

### 3.2.6 Sharing

Yin (2014) argues that sharing includes defining an audience for written or oral composition, sharing conclusions and displaying evidence for the reader to reach their own conclusions. Therefore, it can be concluded that sharing a case study results in more or less reporting. The scientific community is the main audience of this research. Reporting of results was implemented in peer-reviewed scientific forums. The scientific publications and publication forums are presented in Table 1 in Chapter 1. The dissertation consists of three journal articles and three conference articles. Research publications in this study were peer-reviewed to ensure the

quality of the articles. Scientific articles comprise the second independent part of this dissertation.

# 3.3 Quality of the research

It is widely accepted that triangulation increases the validity and reliability of research (Brannen 1992; Hall and Hall 1996; Ashatu 2009). Hall and Hall (1996) claim that the split is no longer as obvious as it used to be between qualitative and quantitative research. Yin (2014) highlights that case studies using multiple sources of evidence are rated more highly, in terms of overall quality, than those that rely on only single sources of data. It is valuable to utilize multiple methods rather than just a single one to provide more quality in the research. Jick (1979) argues that researchers can be more confident of their results when using triangulation.

Yin (2014) sheds light on three validity tests which can be utilized in case studies. Construct validity refers to the extent to which a study investigates what it claims to investigate (Dubois and Gibbert 2010; Yin 2014). Internal validity seeks to establish a causal relationship whereby certain conditions are believed to lead to other conditions (Dubois and Gibbert 2010; Yin 2014). External validity defines the domain to which a study's findings can be generalized (Dubois and Gibbert 2010; Yin 2014). Research reliability concerns the extent to which the measurement of a phenomenon provides stable and consistent results and, therefore, concerns the repeatability of the research (Wilson 2010).

Guba (1981) claims that internal validity is comparable to credibility, external validity to transferability, and reliability to dependability. Guba (1981), moreover, argues that research objectivity is comparable to confirmability. Research objectivity defines which findings are shaped by the respondents and are not the researcher's bias (Shenton 2004). Several strategies exist for dealing with case study validity and reliability. Table 8 presents tests and case study strategies which were utilized in this research.

**Table 8**.     Tests and case study strategies for ensuring quality in this research (Guba 1981 [adapted]; Eisenhardt 1989 [adapted]; Yin 2014 [adapted])

| Test | Case study strategies utilized in this |
|---|---|

| | **research** |
|---|---|
| Construct validity<br><br>*How well study measures what it claims to measure.* | Utilization of triangulation.<br><br>Establishment of chain of evidence to provide better understanding for following the derivation of initial research question to final conclusions.<br><br>Scientific publications were reviewed by peer-reviewers and co-author(s) who were part of the study. |
| Internal validity (credibility)<br><br>*Establishment of causal relationships.* | Utilization of triangulation.<br><br>Implementation of initial research framework.<br><br>Data analysis was reviewed by co-author(s) and peer-reviewers.<br><br>Development of GCM for holistic innovation management model. |
| External validity (transferability)<br><br>*Explains generalizability of the research results.* | Utilization of triangulation.<br><br>Generalization of the study was based on multiple case studies and was generalized to broader theory.<br><br>Multi-case study in several industries provides greater generalizability for the results of the study.<br><br>Utilization of theming of data from multiple cases (combining empirical results of the study).<br><br>Broad verification of GCM for holistic innovation management model. |
| Reliability (dependability)<br><br>*Repeatability of the research.* | Utilization of predefined case study protocol. |

| | |
|---|---|
| | Precise reporting of the case study implementation. Development of case study database for handling the data during the research process. |
| Objectivity (confirmability) *Findings are shaped by the respondents and are not researcher's bias.* | Utilization of triangulation. Researcher's reflexivity during the research process. Scientific publications were evaluated by peer-reviewers. Research results were evaluated by co-author(s). Broad verification of GCM for holistic innovation management model. |

This research utilized several levels of triangulation which can be considered to increase the overall quality of the study. The research process was described as precisely as possible in the dissertation. The research is a multi-case study and was implemented in a wide range of industries which increases the generalizability of the research results. The GCM for holistic innovation management was developed based on the empirical results of the study and was broadly verified in six case organizations which can be considered to increase the validity of the study.

Stenbacka (2001) argues that a systematic and careful description of the entire research process indicates good quality in qualitative and quantitative studies. Stenbacka (2001), moreover, claims that research validity is achieved when using the research method of non-forcing interviews with strategically well-chosen respondents. This study utilized semi-structured interviews to provide information about how crowdsourcing is utilized in several management areas. Respondents could speak freely about the research topic and its areas, and provide broad answers for the researcher.

# 3.4 Synthesis of the research methodology

This subchapter synthesizes the methodological choices of the research. The research has qualitative and quantitative elements. However, the qualitative part of the study can be considered the dominant part of the research which is the main choice of the study. A supporting choice of the study is quantitative. Figure 14 summarizes the research methodology.

| Main choices of the study | Supporting choices of the study |
|---|---|
| **Qualitative** | **Quantitative** |
| **Paradigm:** Interpretivism **Design:** Exploratory **Reasoning:** Inductive **Strategy:** Qualitative cross-sectional multi-case study **Data collection:** Semi-structured interviews **Data analysis:** Transcription, thematic content analysis | **Paradigm:** Positivism **Design:** Descriptive **Reasoning:** Deductive **Strategy:** Quantitative cross-sectional multi-case study **Data collection:** A survey **Data analysis:** Charts, tables, descriptive statistics, correlations |

**Data collection 18 case organizations**
Interviews and a survey

**Triangulation**
Methodological
Data
Theory
Analysis

**Contributions based on empirical evidence**
A2, A3, A4, A5, A6

**Model development and broad verification in 6 case organizations**
Structured interviews

**Theoretical contribution of the research**
A1

**Figure 14**.   Summary of research methodology

Data were collected by interviews and a survey as illustrated in Figure 14. Data analysis was implemented with triangulation approaches by combining the data. Interviews were transcribed, as appropriate, at the first stage and analyzed with

thematic content analysis. A survey was carried out with the Webropol (2015) online survey system. Quantitative data were analyzed with charts, tables, descriptive statistics and correlations. The survey included closed- and open-ended questions. Research data were combined and utilized in empirically based scientific publications. Moreover, the theoretical study provides a new model and its broad verification in six case organizations. The main contribution of the study is a new model which can be utilized in science and businesses in the development of innovations.

# 4   SUMMARY OF THE RESULTS

This chapter summarizes the results of the research. First, a summary of the publications and findings is briefly discussed. Second, the author's role in the scientific publications is described. Third, a summary of the research articles is discussed. Finally, theoretical implications are discussed and managerial implications are presented.

## 4.1 Summary of publications

The research included six publications which were published in peer-reviewed international journals and peer-reviewed international conferences. One of the articles was first published in an international conference (*6ᵗʰ International Conference on Technology Innovation and Industrial Management*) and after that extended and published in an international journal (*International Journal of Innovation and Learning*). Other scientific publications are individual publications and provide unique contributions on crowdsourcing and its utilization in specific management areas. The scientific publications and publication forums are presented in Table 1 in Chapter 1.

The six scientific publications each have their own on role in the dissertation and they aimed to develop the GCM for holistic innovation management. The publications were required for answering the research questions and making the final conclusions of the research. The research publications utilized the same qualitative and quantitative data set. The second data set was collected to broadly verifying the model. Answers to research questions are provided in the form of a research article, and are discussed in this chapter. Moreover, the research objectives are highlighted as well as the main research findings.

### *4.1.1 Author's contribution in the scientific publications*

The research article titled "Crowdsourcing in Strategic Management" was published in the *11ᵗʰ International Conference on Innovation & Management* (Sivula et al. 2014). The main author, Sivula, was responsible for research planning, research design, collection of case data, data analysis and writing the research article. The co-authors (Kantola, Vanharanta and Salo) provided comments on the manuscript and, therefore, provided valuable feedback which improved the research article.

The research article titled "Combining Crowdsourcing and Porter's Value Chain" was published in *International Journal of Advanced Logistics* (Sivula and Kantola 2014a). The main author, Sivula, was responsible for research planning, research design, collection of case data, data analysis and writing the research article. The co-author, Kantola, provided comments on the manuscript and provided valuable feedback which improved the research article.

The research article titled "Adapting Crowdsourcing in Innovation Management" was published in *International Journal of Innovation and Learning* (Sivula and Kantola 2016a). The main author, Sivula, was responsible for research planning, research design, collecting of case data, data analysis and writing the research article. The co-author, Kantola, provided comments on the manuscript and provided valuable feedback which improved the article. The conference version of this research article was published in the *6th International Conference on Technology Innovation and Industrial Management* and was titled "Crowdsourcing Utilization in Innovation Management" (Sivula and Kantola 2014b).

The research article titled "Crowdsourcing in a Project Lifecycle" was published in the *9th International Conference on Knowledge Management in Organizations.* (Sivula and Kantola 2014c). The main author, Sivula, was responsible for research planning, research design, collection of case data, data analysis and writing the research article. The co-author, Kantola, provided comments on the manuscript and, therefore, provided valuable feedback which improved the research article.

The research article titled "Integrating Crowdsourcing with Holistic Innovation Management" is in process in *International Journal of Advanced Logistics* (Sivula and Kantola 2016b). This research article can be considered a conceptual article which, however, also included broad verification of the GCM for holistic innovation management in several case organizations. The main author, Sivula, was responsible for research planning, research design, design of the GCM for holistic innovation management model, verifying the model and writing the research article. The co-author, Kantola, provided comments on the manuscript and provided valuable feedback during the process which improved the research article.

### 4.1.2 Crowdsourcing in strategic management (RQ2)

The first sub-question (research question 2) is, "How crowdsourcing is utilized in strategic management?" and it is answered and discussed in the publications titled "Crowdsourcing in Strategic Management" and "Combining Crowdsourcing and Porter's Value Chain" (Sivula et al. 2014; Sivula and Kantola 2014a). This sub-

chapter discusses the results of these two studies. Strategic management is commonly divided into strategy formulation and implementation. Several strategic management frameworks exist in the literature which are utilized in the publications. Moreover, detailed frameworks, for instance Porter's value chain, can be employed to describe an organization's strategic activities.

### *Objective*

The objective of the studies in strategic management publications was to research crowdsourcing utilization in an organization's strategic activities. A strategy is formulated and implemented based on a vision or goal of an organization. An organization can have several strategies or just a single one. The research was not focused on organizations' strategies themselves, but on static and dynamic strategic management and crowdsourcing utilization in them. Therefore, the actual structure of strategy was not studied, but rather crowdsourcing utilization in strategy formulation and implementation.

Porter's value chain was highlighted in the second strategic management study. The research studied how crowdsourcing is employed in Porter's value chain from the primary and support activities points of view. A value chain includes all of the activities which are relevant to providing a product or service to the customer. A value chain includes, for instance, the supply chain of a product or service. Thus, a scientific contribution is provided on crowdsourcing utilization in strategic management within a wide context in this study. These publications provide the first contribution to the GCM for a holistic innovation management model.

### *Summary of findings*

Strategies act as guidelines for an organization's activities. An organization can have several strategies or just one. The literature provides several models for strategic management which managers of an organization can utilize in strategy formulation and implementation (see, for instance, Johnson et al. 2014; Porter 1980; Porter 1998; Wheelen and Hunger 2012). Managers should have knowledge of several internal and external areas of an organization to produce strategies which are innovative and market-focused. Crowdsourcing can be utilized, for instance, as a knowledge creator when formulating and implementing strategies. Moreover,

crowdsourcing can be a strategic choice of an organization and it can be an internal or external activity.

An organization can utilize crowdsourcing in strategy formulation internally or externally. An organization can send short surveys to employees to find out which thematic areas are important to employees. This can create knowledge of how an organization should proceed in the future. Values can be crowdsourced in an organization. Moreover, employees are commonly more engaged in strategy when they are participating in the strategy formulation process. Crowdsourcing can provide weak signals for an organization which have relevance for an organization's strategies. Crowdsourcing can produce knowledge of which innovations have demand in the markets. Strategy implementation can be measured utilizing internal crowdsourcing. This creates knowledge of how well managers have communicated strategy to employees. This knowledge can be important for understanding the managerial performance of an organization. Moreover, external crowdsourcing can be utilized for adjusting the crowd's point of view on matters relating to an organization.

Porter's value chain (Porter 1998) is one strategic management model which was part of this research. Porter's value chain consists of primary and support activities which can employ crowdsourcing. Primary activities can employ crowdsourcing in co-operations, quality verification, monitoring, funding activities, screening of concepts and finding customer clusters. An organization can be in touch with clients' customers by utilizing crowdsourcing in primary activities. Support activities of an organization can utilize crowdsourcing for the collection of information from end users, testing products and services, testing ideas, collecting ideas, crowdsourcing campaigns, measurement of implementation strategy and funding of innovations. Thus, it can be concluded that crowdsourcing can be a useful part of an organization's strategic management activities based on the results of the study.

### *Answer to the research question*

The results of the two strategic management studies indicate that crowdsourcing is employed in several ways in strategic management activities. Directors, managers and shareholders commonly take strategic decisions in case organizations. Customers, potential customers and other individuals at the final stage decide what an organization can or cannot do. Therefore, managers should always understand the opinions of the crowd when making strategic decisions.

Crowdsourcing can be employed in strategic planning and formulation. An organization's directors, managers and owners can gain knowledge, for instance, about the values of employees, and scan the weak signals from the markets which may have a major effect on an organization's strategies. Moreover, crowdsourcing can be utilized in strategy implementation, for instance, to understand whether strategy is executed and whether the management of an organization communicates the strategy effectively enough. Thus, it can be concluded that if an organization is utilizing crowdsourcing in its strategic management, an organization's strategies are likely be more customer-focused.

Crowdsourcing can be either an internal or external activity of an organization. Crowdsourcing can be implemented in static or dynamic strategic management. Static strategic management can employ crowdsourcing as a knowledge creator, as the publications indicate. An organization could implement an IT-based crowdsourcing system. An organization could embed the crowd in its strategic management processes. Nevertheless, crowdsourcing can be adapted in multiple strategic management models and other management areas as well. This research combined Porter's value chain and crowdsourcing.

The case organizations are employing crowdsourcing, but they could utilize it more extensively based on this study. An organization's management should understand the usefulness of crowdsourcing in its strategic management. Crowdsourcing is still a relatively new concept for organizations. Thus, they are generally in a phase where crowdsourcing is implemented on a small scale in strategic management. Nevertheless, crowdsourcing can be a really useful model in any size organization, and it can be utilized in several industries.

### 4.1.3 Crowdsourcing in innovation management (RQ3)

The second sub-question (research question 3) is, "How crowdsourcing is utilized in innovation management?" This subchapter discusses and answers the research question based on the publications titled "Adapting Crowdsourcing in Innovation Management" and "Crowdsourcing Utilization in Innovation Management" (Sivula and Kantola 2014b; Sivula and Kantola 2016a). This research adapted Tidd and Bessant's (2013) generic innovation management model which includes four phases.

## *Objective*

The objective of this innovation management research was to study crowdsourcing utilization in an organization's innovation management. An organization should implement innovations which have demand on the markets because of the higher profits that would come. Moreover, innovations have a crucial role in the entire of society because they commonly generate wellbeing. Knowledge, resources and funding can be collected from the markets by utilizing crowdsourcing. External and internal knowledge, resources or funding can be a part of an organization's innovation activities with the use of crowdsourcing. Innovation management is the management of the innovation creation process, and it has four main phases: search, select, implement and capture. Every phase is unique, and ways of utilizing crowdsourcing in innovation management phases vary based on the organization and industry. Publications provide a second contribution to the GCM for the holistic innovation management model.

## *Summary of findings*

Innovation management commonly consists of four main generic phases (Tidd and Bessant 2013). Innovation management phases can utilize crowdsourcing implementation methods in several ways. The search phase can include, for instance, scanning the environment to receive ideas for innovation. The crowdsourcing implementation methods most often utilized in this phase are crowd wisdom and crowd creation. Crowdfunding is useful, especially for micro, small and medium size organizations for gathering knowledge and funding an innovation. Crowdfunding campaigns can produce valuable knowledge about whether an innovation has demand on the markets. Open platforms (e.g. Facebook and Twitter) can be utilized for idea generation to provide knowledge of which innovations would be useful for the crowd.

Organizations utilize crowdsourcing for commenting on innovative ideas in the select phase. Thus, evaluation of market demand for an innovation can be implemented with crowdsourcing. Social media tools can be useful for this activity. However, crowdsourcing platforms exist in these activities as well. Even though crowdsourcing is a useful model to support the selection of the innovation which will be implemented, managers of an organization should make the final decisions. The implementation phase develops, for example, the new product or service. Crowd creation can be utilized for carrying out the project either entirely or partly. Moreover, a new product or service can be tested with the crowd. An or-

ganization can select individuals from the crowd to participate in the final product or service testing. Crowdsourcing can be used for evaluating the innovation management process in the capture phase. An organization can learn from the process and improve it. Ideas can be gathered to improve an innovation and produce further innovations. Moreover, crowdsourcing can be utilized for marketing purposes of new products or services.

### *Answer to the research question*

An organization can produce innovations which have demand in the markets by employing crowdsourcing in their innovation management activities. Research results shows that crowdsourcing is widely utilized in case organizations' innovation activities. An organization should be customer-focused to gain value from crowdsourcing activities. Crowdsourcing is utilized to attach customers, potential customers or other individuals to the innovation management processes. Development of innovations can be financed with crowdfunding which is a useful model, especially for micro, small and medium size organizations. Moreover, crowdsourcing can provide several benefits when implementing innovation and capturing its value, as the results present.

An organization should consider compensation models for motivating the crowd. Compensation can be tangible or intangible depending on the scope of the task. Crowdsourcing platforms should also be considered. An organization can employ its own crowdsourcing platforms if it has enough of a crowd involved in the platform. Organizations are utilizing social networks to gain knowledge from the crowd in implementing innovations. Moreover, these platforms can be utilized to support the actual crowdsourcing activity which can be achieved in an organization's own crowdsourcing platform during innovation implementation.

In conclusion, when crowdsourcing is utilized in innovation management new products and services have more demand on the markets, as the results of the study show. On the other hand, an organization should always consider when to use crowdsourcing because the results can be hard to know in advance. An organization should be carefully considered which tasks should be crowdsourced in innovation production. Nevertheless, crowdsourcing can be utilized in multiple ways in innovation management to provide value, for instance, for a new product or service which it would not receive otherwise.

*4.1.4 Crowdsourcing in project management (RQ4)*

The third sub-question (research question 4) is, "How crowdsourcing is utilized in project management?" This subchapter discusses and answers the research question based on the publication titled "Crowdsourcing in a Project Lifecycle" (Sivula and Kantola 2014c). This research adapted the Project Management Institute's (2013) four-phase project management model. The research indicates that crowdsourcing can be utilized in a project lifecycle in several ways.

### *Objective*

Project management is an essential part of an organization's research, development and innovation activities. New products and services are commonly developed with projects in a wide range of industries. Moreover, research and other innovation activities employ projects to implement a specific outcome. It is important to understand how customers, potential customers and other individuals can provide a contribution, for instance, to new products and services which an organization is developing with projects. Thus, the crowd can be seen as a project resource which can have an active role in projects.

The objective of this study was to research how crowdsourcing is utilized in a project lifecycle through four project management phases. Project management can employ crowdsourcing in knowledge focused, resource focused and funding focused ways. The publication provides the third and final contribution to the GCM for a holistic innovation management model.

### *Summary of findings*

Project management is management of a project's lifecycle and it consists of four generic main phases: initiation, planning, execution and closure (Project Management Institute 2013). Innovations are generally developed with projects which have, therefore, a crucial role in an organization. The project management initiation phase can employ internal and external crowdsourcing in several ways. Project ideas can be evaluated internally and externally by an organization. This can be implemented with crowdvoting or crowdevaluation. The evaluation offers the possibility for an organization to understand the market demand of a new product or service. A client's customer can be part of a project's initiation phase in several industries. Internal crowd wisdom and crowd creation can be utilized in project planning to create more realistic project plans. External crowdsourcing can be

utilized in the planning phase for reporting, for instance, about a new product or service. Project plans can be evaluated with crowdsourcing. An organization can recruit employees to a project using crowdsourcing and find talent that has the skills to develop, for instance, a new product or service.

The crowd can participate in a project's execution phase in several ways. The crowd can, for instance, provide development ideas for innovation. Ideas may also lead to new projects. Crowdsourcing can be utilized to execute projects partly or entirely, based on organizational resources and the crowdsourced task. The project closure phase finalizes the project. Crowdsourcing can be utilized as a marketing tool in this phase. The end results of a project can be evaluated with crowdsourcing. The crowd can give either positive or negative feedback on an organization. It is common to send the final product to crowdfunders in the closure phase if an organization has utilized crowdfunding in its activities. Crowdfunders are, therefore, the first customers for the final product or service.

### *Answer to the research question*

Crowdsourcing can appear in multiple forms in projects, as the results of the study indicate. The crowd can be a project's resource and can have a major effect, for instance, on the final product or service. It can be concluded that a new product or service is more crowd-focused when an organization is utilizing crowdsourcing in project activities. Moreover, project management shares common crowdsourcing implementation methods with other management areas.

Quality control and monitoring are required in crowdsourcing activities in project execution. An organization should be aware that the crowd's individuals are not normally professionals. Usually the crowd's individuals are product or service end users. The service industries gain the most benefit from crowdsourcing, according to this study. The developed services can be changed more quickly based on crowdsourcing results in the service industry. However, every industry could benefit from crowdsourcing in several ways.

Projects do not necessarily end after the closure phase. Crowdsourcing can provide new ideas for the next innovation which is carried out with a new project. Therefore, project management can be seen as an incremental process when crowdsourcing is employed in the development of a new product or service. An organization can utilize crowdsourcing to implement the entire innovation. Thus, an organization does not need to have the knowledge or capabilities for every specific development area. The project can be carried out entirely or partly with

crowdsourcing. An organization may utilize crowdsourcing to fund projects which can be considered beneficial, especially in micro, small and medium size organizations.

### 4.1.5 Crowdsourcing in holistic innovation management (RQ1)

The main question (research question 1) is, "How crowdsourcing is generically utilized in holistic innovation management?" This subchapter discusses and answers the research question based on the publication titled "Integrating Crowdsourcing with Holistic Innovation Management" (Sivula and Kantola 2016b). The publication is a conceptual article; it summarizes the results and constructs the GCM for holistic innovation management. Moreover, the publication includes broad verification of the model which was carried out in six different sized organizations which are acting in several industries.

### Objective

Innovations are drivers of modern businesses and innovations cannot exist without customers who are willing to buy the new product or service. Crowdsourcing can be employed to create innovations which have more demand on the markets. The objective of the study was to develop the GCM for a holistic innovation management model. The model is constructed using the management areas which are crucial for an organization's innovation activities and is constructed from earlier empirical research conducted by Sivula and Kantola (2014a; 2014b; 2014c; 2016a) and Sivula et al. (2014). This publication can be considered mainly conceptual. However, the second objective of this research was to broadly verify the developed model. This publication provides the main contribution of the dissertation and answers the main research question of the study.

### Summary of findings

The GCM for the holistic innovation management model is constructed with the empirical results from earlier studies which were implemented as a part of the dissertation. The model includes three management areas and crowdsourcing utilization in these areas. The model highlights the holistic aspect of innovation management. Producing innovation is not the responsibility of one function of an organization. Thus, all innovation-related activities should be capable of innovation; in this study these activities are strategic management, innovation manage-

ment and project management. Moreover, crowdsourcing can be utilized effectively in these management areas as the empirical results of the study indicate. The GCM for holistic innovation management is illustrated in Figure 15.
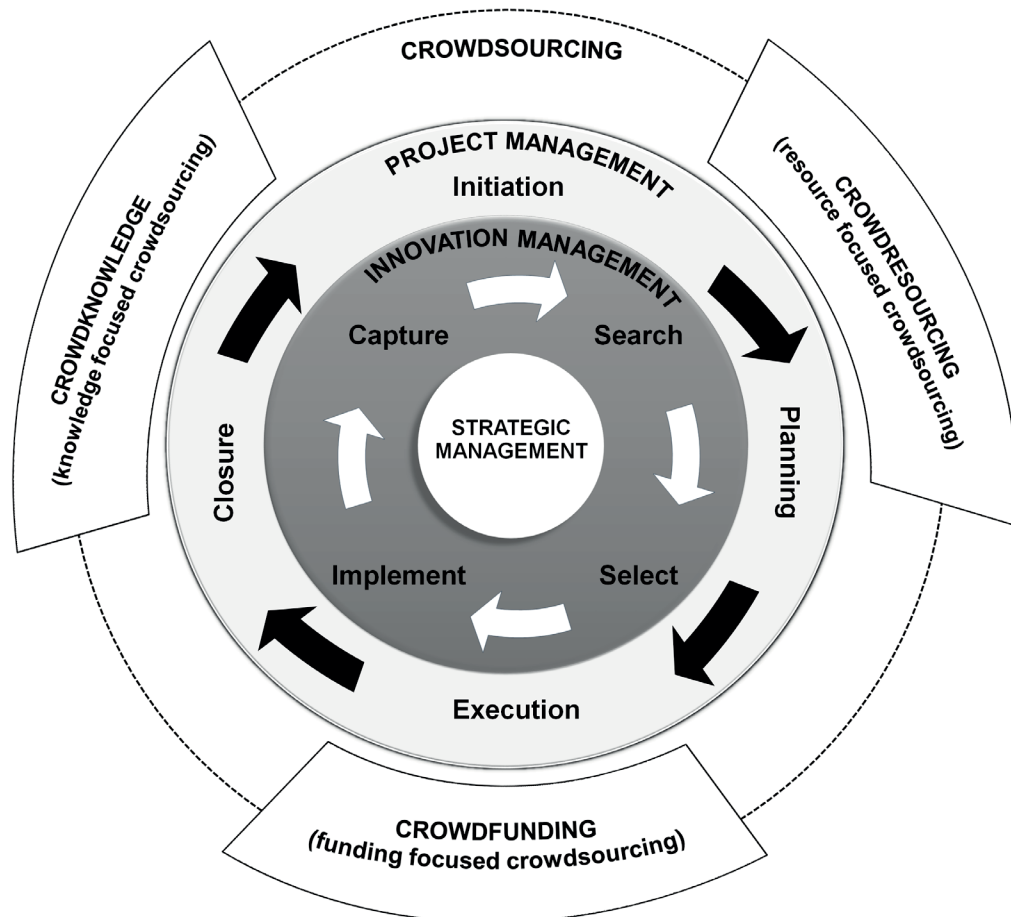


**Figure 15**. The GCM for holistic innovation management (Sivula and Kantola 2016b)

The model highlights continuous improvement and development as illustrated in Figure 15. Innovations and projects lead to subsequent innovations and projects. Innovation development will not stop as long as the organization exists. The heart of the model is strategic management which can be divided into strategy formulation and implementation. Strategy is formulated dynamically or statically, and implemented after formulation. The actions of an organization should follow strategies. Strategy formulators and executors can utilize internal and external crowdsourcing, for example, to extend their knowledge.

Every innovation management phase can utilize crowdsourcing in several ways during the process, as the results indicate. An organization can implement multiple innovations at the same time and they are usually implemented as projects. Project management is the management of the lifecycle of a project and it includes four main phases. Every phase may be iterative and move back to a previous phase. Project management can utilize crowdsourcing in several ways during a project lifecycle, as earlier subchapters have presented.

Utilized crowdsourcing implementation methods are related to the organization, its industry and its products and services. The GCM for holistic innovation management is a generic model and it can be utilized in every organization. On the other hand, an organization should consider which parts of the model could be useful in its activities. Thus, not every crowdsourcing implementation method will fit every organization. On the other hand, every organization requires knowledge, resources and funding in its innovation activities, and crowdsourcing can be the answer to several challenges raised in these areas.

### *Answer to the research question*

The main and most important research question for the dissertation is, "How crowdsourcing is generically utilized in holistic innovation management?" Crowdsourcing can be utilized in multiple ways in an organization's activities in a wide range of industry sectors, as the results in the study has presented. An organization should utilize crowdsourcing in different management areas, internally and externally, to produce value for holistic innovation management.

Crowdsourcing implementation methods can be divided into three different categories. Knowledge focused crowdsourcing implementation methods provides new knowledge from the crowd for an organization. Resource focused crowdsourcing provides a required contribution from the crowd to an organization's project, for instance. Moreover, crowdsourcing can be funding focused where the crowd is funding, for example, an organization's development project. Nevertheless, all of these implementations can be utilized in the innovation management areas of an organization.

The GCM for holistic innovation management highlights three different management areas: strategic management, innovation management and project management. Strategy is the most important aspect of an organization; which innovation activities should as well acknowledge. Crowdsourcing can be utilized in several ways in strategy formulation and implementation, as the results of this study pre-

sent. Innovation management highlights the process of innovation creation. Project management is utilized for implementing, for instance, a new product or service.

The management models utilized in this study are generic and can be used in several industries and organizations. The GCM for the holistic innovation management model is generic and it can be employed in a wide range of industries. On the other hand, an organization should consider which tasks are possible to crowdsource and utilize the model in a way that would produce the most value for an organization and its holistic innovation management.

## 4.2 Theoretical implications

This research integrated crowdsourcing into several management areas and provided the GCM for a holistic innovation management model as an outcome. The research has connected several management areas together to generate understanding of crowdsourcing utilization in holistic innovation management. Moreover, crowdsourcing has been researched as a holistic concept to understand its usability in an organization. Therefore, several insights were provided for the crowdsourcing and management literature.

Crowdsourcing is a relatively new concept for science and businesses and, therefore, it requires more defining. This research has developed a generic crowdsourcing model (GCM) which includes three main crowdsourcing implementation categories: knowledge, resource and funding focused crowdsourcing. The model can be utilized in several ways to categorize crowdsourcing subtypes which are, for instance, crowd wisdom, macrotasking and crowdfunding of a project.

Moreover, this research has developed the GCM for a holistic innovation management model which provides insights into how crowdsourcing can be utilized in the innovation activities of an organization. Not every crowdsourcing implementation method can be adapted in any organization. On the other hand, organizations can adapt individual crowdsourcing implementation methods in every industry.

The study has provided knowledge about crowdsourcing utilization in strategic management, innovation management and project management. Crowdsourcing can be employed in multiple ways, as the results of the study present. On the other hand, crowdsourcing implementation methods can be carried out in the same ways whatever the management area. Thus, it can be concluded that crowdsourc-

ing may be utilized in other management areas which are not part of this research. Crowdsourcing can be either an internal or external activity of an organization depending on an organization's size. Both crowdsourcing implementation methods can be utilized in several ways in different sized organizations.

## 4.3 Managerial implications

Even though crowdsourcing is a relatively new concept for businesses, its usability has been noted in several industries. Moreover, organizations are utilizing crowdsourcing and its different implementation methods in several ways. This research examined crowdsourcing utilization in activities related to innovations and innovation management. The GCM for holistic innovation management was implemented based on empirical evidence. The model can be adapted in different organizations acting in a wide range of industries. Several managerial implications can be discussed based on the findings of this research.

First of all, the results indicate that an organization should be customer-focused to utilize crowdsourcing holistically and gain benefit of it. An organization should understand that ultimately the customer is guiding the innovation activities of an organization. Therefore, crowdsourcing is a model which provides, for instance, knowledge about markets which an organization can use in its innovation activities. The crowd consists of customers, potential customers and other individuals who affect an organization and its products and services. Crowdsourcing activities are not generally clearly targeted which can lead to innovative solutions.

Second, an organization should consider which tasks could be crowdsourced. An organization should carefully analyze which tasks are appropriate and bring value for its activities. This research highlighted and studied crowdsourcing and its utilization in innovation-related activities through strategic management, innovation management and project management areas. However, crowdsourced tasks can be implemented in other management areas as well. For example, human resource management could also gain benefits from crowdsourcing. Therefore, crowdsourcing can be a solution to several challenges that an organization is facing.

Third, crowdsourcing compensation models have an important role in motivating the crowd to achieve a crowdsourced task. Compensation models can be either tangible or intangible. Tangible compensations can be more effective in motivating the crowd if the task is broad in scope. On the other hand, intangible compensations can be sufficient if the task is small enough. An organization should un-

derstand that even small contributions from the crowd can lead to major profits because of innovative ideas.

Fourth, crowdsourcing can be either an internal or external activity. Some tasks can be crowdsourced more easily internally, and others externally. Internal crowdsourcing can be considered an organization's first step to crowdsourcing. Some tasks cannot be crowdsourced externally and, therefore, internal crowdsourcing can be an appropriate choice for these situations. An organization should analyze which crowdsourcing implementation methods are the most suitable for the industry where it is currently acting.

Finally, customers, potential customers and other individuals can provide valuable insights, resources and funding for an organization's holistic innovation management activities. Utilizing crowdsourcing makes an organization more customer-focused, as the results of the study indicate. Crowdsourcing can be utilized in every industry and in any size organization. Nevertheless, an organization should consider the crowd as one of its resources which can act as a knowledge creator, resource or funder.

# 5   CONCLUSIONS

This chapter provides discussions of the dissertation and concludes the study. Discussions of the research are provided in the first subsection and limitations of the study are highlighted in second. Finally, suggestions for future research are provided which are partly based on the limitations of this study.

## 5.1 Discussions of the research

The research concerned crowdsourcing and its utilization in holistic innovation management. The researched management areas were strategic management, innovation management and project management. Eighteen case organizations were studied using qualitative and quantitative methods. The case organizations act in a wide range of industries and are micro, small, medium and large in size. The research included one main research question and three sub-questions. The research questions were answered based on articles which were published in international peer-reviewed journals and conferences.

Crowdsourcing can be utilized in several ways in organizations, and it can be either knowledge, resource or funding focused. The crowd includes an organization's customers, potential customers and other individuals. Crowdsourcing should be utilized holistically, internally and externally to an organization's innovation management. On the other hand, an organization should also consider when crowdsourcing is the appropriate choice to complete the task.

The GCM for holistic innovation management was developed based on empirical evidence. Organizations can widely utilize GCM for holistic innovation management in their innovation activities. Strategic management is the heart of the model, in which crowdsourcing can be commonly utilized as a knowledge creator to create strategies which are more customer-focused. Innovation management is management of innovation process and it consists of four phases. Utilization of crowdsourcing produces value in all these phases and makes innovation more customer-focused. Innovations are commonly implemented with projects. Project management is the management of a project lifecycle and it includes four phases. The results of the study show that crowdsourcing can be employed in several ways in these phases as well.

The GCM for holistic innovation management highlights the continuous development of innovations. The results of this study demonstrate that innovations can lead to further innovation when utilizing crowdsourcing in holistic innovation management. However, an organization should be customer-focused to utilize the

model and understand the value which internal and external crowds can produce for an organization in these management areas.

Crowdsourcing can be a beneficial model in an organization, as the results of this study indicate. Crowdsourcing can provide value for an organization's processes in innovation production. Innovations have more demand in the markets when crowdsourcing is utilized holistically in strategic management, innovation management and project management. Moreover, crowdsourcing can guide the innovation development of an organization, and new products and services are more customer-focused because of this.

Crowdsourcing is still an emerging area in science and business and, therefore, new frameworks and models are required. Organizations could utilize crowdsourcing more diversely based on this research. Crowdsourcing models are still evolving and, therefore, more models in innovation management are required. Nevertheless, an organization can create value by utilizing crowdsourcing and implement innovations which have demand on the markets.

## 5.2 Limitations of the research

This study has limitations which need to be acknowledged. First, the research was carried out in several industries and the aim was to develop the GCM for holistic innovation management. The research was implemented in multiple industries and, therefore, empirical data are diverse and not focused on a specific industry. Thus, it would be beneficial to understand and compare differences between industry sectors in crowdsourcing's utilization in innovation activities.

Second, the crowd's point of view is excluded from the research. The crowd could provide more insights for the GCM for holistic innovation management and its utilization. This study was organization-based research and, therefore, the research object was the different management areas of an organization.

Third, more empirical evidence would be beneficial. This research included 18 case organizations which provided their insights for crowdsourcing. However, it is not always possible to conduct the study with all interesting cases. Sometimes locating appropriate case organizations can be challenging. Moreover, innovation management is a topic which is sensitive for an organization because one of their competitive advantages is being researched. Therefore, researchers cannot gain access to all interesting cases.

Finally, it can be seen from the results of this study that crowdfunding is not utilized as much it could be in case organizations. More understanding of minor crowdfunding usage in innovation activities would be beneficial. The following subsection discusses suggestions for future research based on the presented limitations of this study.

# 5.3 Suggestions for future research

The empirical evidence of this study provides an excellent starting point for further research. Firstly, the GCM for holistic innovation management model was broadly verified in this research. It would be beneficial to validate the model with longitudinal research in several industries which are developing products and services.

Second, launching the GCM for holistic innovation management in an organization would require further research. Research is required into responsibilities in context of the model. The model includes several management areas, and therefore several managers. Thus, research should consider what the interfaces between the management areas and managers are, and who is responsible for the crowdsourcing activities in the context of GCM for holistic innovation management.

Third, research about the GCM model for holistic innovation management in relation to legal matters is required. Customers, potential customers and other individuals have an important role in innovation production in the GCM for holistic innovation management. Therefore, it is necessary to study ownership of innovations which are produced through the model. It would be beneficial to understand what the rights of the crowd and rights of an organization are when utilizing the GCM model for holistic innovation management in their activities.

Fourth, further studies are required about an organization's culture and crowdsourcing. Tidd and Bessant (2013) highlight an innovative culture in their innovation management model. Therefore, further research is required about crowdsourcing and its effect on an organization's culture. The culture of an organization can define the usability of crowdsourcing. It might be that an organization would react negatively to crowdsourcing and its results, and could not utilize crowdsourcing because of this.

Finally, more research is required about innovation diffusion and crowdsourcing which can be considered part of innovation management. This research provided several insights into crowdsourcing's utilization in innovation management, but it

did not aim to research innovation diffusion which would be beneficial for further research. Moreover, further research is required about crowdsourcing and its effects on the pace of innovation diffusion in the case of new products and services.

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# APPENDICES

## Appendix 1: Interview presentation

# Interview and survey

- The interview and survey includes several point of views about innovation management and crowdsourcing
  - The point of view of a case organization and respondent
  - The survey includes 109 questions
- The interview and the survey include four different areas (three independent areas)
  - Basic information (about 15 minutes)
  - Innovation management (about 60 minutes)
  - Project management (about 40 minutes)
  - Strategic management (about 35 minutes)
- The interview and survey include some of the same questions
  - Survey questions are also utilized in the interview
  - Some questions are only in the survey and some only in the interview
  - The survey includes matrixes which are repeated in different areas of the research
- The survey is in English but it could be also be answered in Finnish
- Link to survey: http://goo.gl/NHeX4E

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3

# What is innovation?

- Innovation can be defined as a process **which leads to something new and produces value for a user of the innovation** (O'Sullivan and Dooley 2009)
- Literature includes several innovation types
  - All innovation types share the same understanding of the element of newness
  - Innovations can lead an organization to the **blue ocean** (Kim and Mauborgne 2005)
- However, not all innovative ideas are in the head of one person and not even in a single organization
  - Innovative ideas are all around us in the heads of customers, potential customers and other individuals

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4

# Innovation types

- Main types of innovation can be considered as:
  - Radical innovations
  - Really new innovations (discontinuous innovations)
  - Incremental innovations
- Innovations can also be divided into market push and market pull innovations
- Closed and open innovations

- Innovation types are also
  - Technological innovations
  - Product innovations
  - Service innovations
  - Process innovations
  - Social innovations
  - Etc...

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5

# Crowdsourcing

- According to Jeff Howe crowdsourcing is (Howe 2006)
  - *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*
  - **Crowdsourcing can involve internal or external individuals of an organization**
  - Crowdsourcing can be utilized in several ways to support an organization's research, development and innovation (RDI) activities
- Crowdsourcing can be an internal or external activity of an organization
  - Crowdsourcing platforms can be private or public
- Crowdsourcing is not open innovation but it includes some elements of open innovation (Brabham 2008)
- More about crowdsourcing: http://archive.wired.com/wired/archive/14.06/crowds.html

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# Crowdsourcing types in innovation activities

- Crowd wisdom (Wisdom of the Crowd)
  - https://www.facebook.com/, https://www.linkedin.com/ & https://plus.google.com/ (social networks)
  - http://www.youtube.com/watch?v=iOucwX7Z1HU ← Document: BBC The Code
- Crowd Creation
  - http://sourceforge.net/ & http://en.wikipedia.org/
- Microtasking
  - http://www.google.com/recaptcha & http://www.microtask.com/
- Macrotasking
  - https://www.innocentive.com & http://www.freelancer.com/
- Crowdvoting
  - http://digg.com/ & http://www.wiggle.co.uk/ (internet stores in general)
- Crowdevaluation
  - http://www.chainreactioncycles.com/ & http://www.tripadvisor.com/ (internet stores in general)
- Crowdfunding
  - https://www.kickstarter.com/ & https://www.indiegogo.com/
- **Something else or other crowdsourcing types in your organization as a part of innovation activities?**
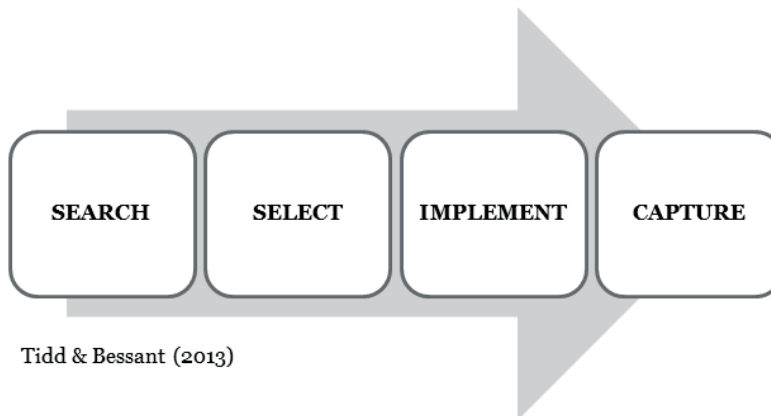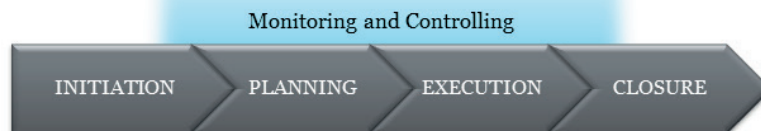
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# Innovation management

SEARCH    SELECT    IMPLEMENT    CAPTURE

Tidd & Bessant (2013)

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# Project management

Monitoring and Controlling

INITIATION  PLANNING  EXECUTION  CLOSURE

Project Management Institute (2013)

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# Strategy

- Strategy is an **organizational instrument** which guides an organization's operations
  - Johnson, Whittington, Scholes, Angwim, and Regnér (2014) define strategy as **the long term direction of an organization**
- Briefly: strategy is **a plan** which is **implemented** in a organization's daily activities
  - Organizations can have several strategies or just a corporate strategy
- Innovation management and crowdsourcing can be a part of an organization's strategy as well as its planning and implementation
  - Crowdsourcing can be the strategic choice of an organization
  - Crowdsourcing may be used in strategic planning and implementation

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# Thank you!

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# Appendix 2: Research introduction letter

Dear Recipient,

Organizations are developing innovation management in a wide range of industry sectors to increase an organization's innovation capability and to get better products and services to their customers. Success in innovation generates profit for an organization and improves its position in the markets. Innovations create wellbeing in society in the form of, for example, new products and services. Innovative products and services establish new possibilities for organizations.

External knowledge can be a part of an organization's research, development, and innovation (RDI) activities with the use of crowdsourcing. Crowdsourcing is constructed from two words: "Crowd" and "Sourcing". Sourcing refers to outsourcing. Customers, potential customers, employees, and other parties are part of the crowd. Organizations can utilize crowdsourcing in several ways: for example crowdsourcing can be utilized to evaluate an organization's new products or services.

My name is Ari Sivula and I am implementing my dissertation about crowdsourcing in innovation management. I am developing a model for organization's innovation management where crowdsourcing is utilized. With empirical data I will substantiate my models functionality. Crowdsourcing can be a crucial part of an organization's innovation management and it has an effect on the organization's RDI strategy. I am currently working as a project manager at Seinäjoki University of Applied Sciences. I will publish the results of the study in international forums in the form of research articles.

Answers to the questionnaire will be handled confidentially. Answers are published in the form of a summary without the names of the organizations or of those that answered the questions. Please distribute this questionnaire internally in your organization.

Select the best options which fit your organization in the questionnaire. Some questions are open because of the nature of this study. The questionnaire has different research areas. There is text which leads you to the topic in every research area. Please read the texts carefully.

You will receive a link to the published article if you leave your contact information on the questionnaire form. Organization's RDI manager will get the results

from own organizations answers with email within two weeks after the questionnaire is closed. Results can be used to develop organization's RDI activities. A researcher could be in touch afterwards if needed. Your contact information will not be used in other way and shall not be passed onto third parties.

Please forward this questionnaire to as many levels as possible in your organization. The results will be more inclusive when there are many people who answer the questionnaire.

Feel free to get in touch if you have any questions about my research or this questionnaire.

With best regards,

Ari Sivula
ari.sivula@gmail.com

Professor Jussi Kantola
Head of Department, D.Tech, PhD
jussi.kantola@uva.fi

University of Vaasa
Department of Production
Industrial Management

# Appendix 3: Online survey form questions

## BASIC INFORMATION

Name of your organization?

_____

Your name?

_____

Your email address?

_____

Your age?
○ Below 30
○ 30-40
○ 40-45
○ 46-50
○ 51-55
○ Over 55

What is your position in the organization?
○ Top management
○ Middle management
○ Line management
○ RDI management
○ Project management

○ Specialists

○ Other. What?

What is your title?

_____

How long you have worked in your current position (in years)?

_____

How long you have worked in your organization (in years)?

_____

Your organizations structure?

○ Project organization

○ Functional organization

○ Decentralize organization

○ Matrix organization

○ Network organization

○ Hybrid organization

○ Other. What?

Size of your organization?

○ Micro (< 10 employees)

○ Small (< 50 employees)

○ Medium (< 250 employees)

○ Large (> 250 employees)

Your organization's area in industry?

○ Software

○ Machine

○ Food

○ Education

○ Consulting

○ Service

○ News

○ Other. What?

Your organizations exact industry?

_____

_____

_____

Do you have research, development, and innovation (RDI) activities in your organization?

○ Yes

○ No

Do you have had crowdsourcing activities in your organization?

○ Yes

○ No

Which of the following parties is a part of your organization's crowd?

☐ Customers

☐ Potential customers

☐ Owners

☐ Financiers

☐ Employees

☐ Partners

☐ Competitors

☐ Universities

☐ Government

   Other. What?

☐

_____

Which products or services is your organization developing and producing?

_____

_____

_____

# INNOVATION MANAGEMENT

Innovation management can be defined as, for example, a process which leads to new technology, products, services or processes (radical innovation). Really new innovation can introduce new products or services in great leaps and bounds. Innovation can also bring both small and large improvements to current products or services (incremental innovation). One thing remains the same in all innovations: innovation has an element of newness.

Innovation management is the management of the innovation process. Generally the process includes four different phases which are: **search, select, implement, and capture**. All phases have an important role in innovation management but the most crucial phases are search and select. An organization decides which idea is going to be developed for innovation in the search and select phases. An organization develops innovation in the implementation phase which, for example, could be a new product or service. Organizations capture the benefits of innovation in the capture phase. Benefits can be, for example, revenue, new knowledge, or some kind of effect on markets where the organization is acting.

Terms introduced in this section:

| Term | Description |
|---|---|
| Technological innovation | A process which generates new or improves current technology. |
| Product innovation | A process which includes the technical design, RDI, manufacturing, management and commercial activities involved in the marketing of a new or improved product. |
| Service innovation | New, better, or more effective service as well as the creative activities necessary to develop them. |
| Process innovation | Changes in the ways an organization acts. |
| Social innovation | Connects at least two different social environments which generate innovation. |

| Market pull innovation | Innovation comes from the needs of the market where it proceeds to development and finally to manufacturing and sales. |
|---|---|
| Market push innovation | Innovation comes from basic science and proceeds to development or applied science and from there to manufacturing and marketing. |
| Open innovation | RDI projects and ideas can proceed outside or inside an organization. RDI projects go beyond an organization's boundaries. |
| Closed innovation | All RDI projects and ideas are proceeding inside the organization. |

What is innovation from your organization's point of view?

_____

_____

_____

Does your organization implement innovations in phases?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Does your organization implement

☐ Incremental innovations

☐ Really new innovations

☐ Radical innovations

Which types of innovation does your organization implement?

☐ Technological

☐ Product

☐ Service

☐ Process

☐ Social

☐ Something else. What?

Does your organization implement

☐ Market pull innovations

☐ Market push innovations

Do you have a process for innovation management in your organization?

○ Yes. Can you recognize search, select, implement, and capture phases from your process?

○ No

Are innovation activities in your organization open or closed?

☐ Open

☐ Closed

What indicators does your organization have for innovation success or failure?

_____

_____

_____

What indicators does your organization have for innovation management?

_____

_____

_____

Does your organization have a high innovation capability?

○ We do not have innovation capability at all

○ Really low

○ Low

○ Moderate

○ High

○ Very high


Whose responsibility is it for innovation management in your organization (e.g. RDI manager)?

_____

_____

_____


Is your organization producing

☐ Local innovations

☐ National innovations

☐ Global innovations


# CROWDSOURCING IN INNOVATION MANAGEMENT

Crowdsourcing can be used, for example, for sharing the tasks among an undefined crowd. Crowdsourcing is not outsourcing because the organization is not defining the author for the task. Crowdsourcing is not open innovation either because it has a different scope to what open innovation has. An organization can use crowdsourcing results in its business and profit from the results.

There are many types of crowdsourcing and the types can be utilized in different ways based on the organization and its industry. Crowdsourcing activities can be either private or public. If an organization is large enough it can implement, for example, private crowdsourcing between its departments. However, crowdsourcing activities are mainly public, where anyone can participate in the activities. Crowdsourcing platforms can belong to the organization or be public. Organizations should consider the amount of possible crowdsourcing participants needed when selecting the platform.

Terms introduced in this section:

| Term | Description |
|------|-------------|

| Crowd wisdom | Organization uses crowd to extend its knowledge. It merges collaboration, collective efforts, and competition from many individuals. Crowd wisdom is also known as wisdom of the crowd. |
|---|---|
| Crowd creation | The crowd is participating in the organization's activities producing like employees. |
| Crowdvoting | Crowdvoting is used to organize large amounts of data. Crowdvoting can be used to judge new or old products or services for example. |
| Crowdevaluation | Crowdevaluation is encompassing forms of crowd analytics. Crowdevaluation can be used as part of RDI activities for evaluating results for example. |
| Crowdfunding | Crowdfunding is a way to collect micro or macro amounts of capital from the crowd. |
| Microtasking | Microtasking enables hundreds of thousands of people to perform microwork for the organization. Work can be paid or unpaid. |
| Macrotasking | Macrotasking is a second crowdsourcing task type. Macrotasks are wider than microtasks and they may require special skills. Macrotasks can be more targeted than microtasks. |

How many employees are participating in innovation activities within your organization?

○ < 10

○ 10-30

○ 31-50

○ 51-100

○ 101-500

○ 501-1000

○ > 1001

What is crowdsourcing from your organization's point of view?

_____

_____

_____

Does your organization see crowdsourcing as being useful in RDI activities?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Is your organization implementing crowdsourcing internally?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Which of the following crowdsourcing types are utilized commonly in your organization?

|  | Not at all | Little | Somewhat | Moderately | A lot | A very lot |
|---|---|---|---|---|---|---|
| Crowd wisdom. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowd creation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdvoting. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdevaluation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdfunding. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Microtasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Macrotasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Something else. What? | ○ | ○ | ○ | ○ | ○ | ○ |

Do you have a process for crowdsourcing in your organization?

○ Yes. Which kind of?

○ No

Does your organization have private crowdsourcing platforms or services?

○ Yes. Which kind of?

○ No

Your organizations crowdsourcing activities are

☐ Private

☐ Public

Your organizations crowdsourcing platforms are

☐ Private

☐ Public

Whose responsibility is it managing crowdsourcing in your organization (e.g. RDI manager)?

_____

_____

_____

Which kind of risks do you see in crowdsourcing in your organization?

| | Not at all | Little | Somewhat | Moderately | A lot | A very lot |
|---|---|---|---|---|---|---|
| Results are not known beforehand | ○ | ○ | ○ | ○ | ○ | ○ |
| Reliability is low | ○ | ○ | ○ | ○ | ○ | ○ |
| Weak quality of the results | ○ | ○ | ○ | ○ | ○ | ○ |
| Schedule | ○ | ○ | ○ | ○ | ○ | ○ |
| It is expensive | ○ | ○ | ○ | ○ | ○ | ○ |
| Schedule is too long | ○ | ○ | ○ | ○ | ○ | ○ |
| Maintenance | ○ | ○ | ○ | ○ | ○ | ○ |
| Idea behind the innovation may be exposed | ○ | ○ | ○ | ○ | ○ | ○ |
| Organization may get negative reputation | ○ | ○ | ○ | ○ | ○ | ○ |

Crowd won't commit          ○    ○  ○      ○      ○  ○

Something else. What?        ○    ○  ○      ○      ○  ○


How is risk realization monitored in your organization?

_____

_____

_____


Which kind of quality effect does crowdsourcing activities have on developed products or services in your organization?

○ Positive. Result is better.

○ Negative. Result is worse.


What motivates the crowd to participate to your organization's crowdsourcing activities?

☐ Reward

☐ Lottery

☐ Development of personal knowledge

☐ Implementing tasks together

☐ Upkeep of social network

☐ New information about organization activities like new products or services

☐ Something else. What?


How should persons be rewarded who are participating in your organization's crowdsourcing activities?

_____

_____

_____


## Search phase

An organization can find ideas from the environment which may lead to innovations. Ideas can be developed into new products or services for example. Innovations create value for organizations in best case scenarios. RDI strategy has influence on the ideas which will be selected and developed for innovation. Crowdsourcing can be utilized in innovation management search and select phases in different ways based on the industry and organization.

Which of the following crowdsourcing types are utilized in innovation management search phase in your organization?

|  | Not at all | Little | Somewhat | Moderately | A lot | A very lot |
|---|---|---|---|---|---|---|
| Crowd wisdom. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowd creation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdvoting. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdevaluation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdfunding. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Microtasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Macrotasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Something else. What? | ○ | ○ | ○ | ○ | ○ | ○ |

Does your organization scan the environment for ideas which may lead to innovations?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

How does your organization find out about megatrends and weak signals?

_____

_____

_____

Is your organization measuring the innovation management search phase?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

What indicators does your organization use for the innovation management search phase?

_____

_____

_____

How often do innovation ideas come to your organization from outside using crowdsourcing?

○ Never

○ Rarely

○ Often

○ Always

## *Select phase*

Which of the following crowdsourcing types are utilized in the innovation management select phase in your organization?

|  | Not at all | Little | Somewhat | Moderately | A lot | A very lot |
|---|---|---|---|---|---|---|
| Crowd wisdom. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowd creation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdvoting. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdevaluation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdfunding. How? | ○ | ○ | ○ | ○ | ○ | ○ |

| | Not at all | Little | Somewhat | Moderately | A lot | A very lot |
|---|---|---|---|---|---|---|
| Microtasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Macrotasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Something else. What? | ○ | ○ | ○ | ○ | ○ | ○ |

Who is participating in the innovation management select phase in your organization?

☐ Management

☐ Employees

☐ Financiers

☐ Customers

☐ Suppliers

☐ Owners

☐ Government

☐ Crowd outside of the organization

☐ Others. Whom?

## *Implement phase*

If your organization develops new products or services, for example, in the innovation management implement phase is the implementing of the innovation normally carried out in projects. Crowdsourcing types can be utilized in many ways in the implement phase. Crowdsourcing could add value to a new product or service.

Which of the following crowdsourcing types are utilized in the innovation management implement phase in your organization?

| | Not at all | Little | Somewhat | Moderately | A lot | A very lot |
|---|---|---|---|---|---|---|
| Crowd wisdom. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowd creation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdvoting. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdevaluation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdfunding. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Microtasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Macrotasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |

Something else. What?     ○          ○    ○          ○          ○    ○

How is your organization selecting persons who are participating in PRIVATE crowdsourcing activities?

_____

_____

_____

How is your organization selecting persons who are participating in PUBLIC crowdsourcing activities?

_____

_____

_____

Are innovations implemented with projects in your organization?

○ Yes

○ No. How implementing is done?

What is the quality of the results in crowdsourcing activities in your organization?

○ Weak

○ Really low

○ Low

○ Moderate

○ Good

○ Very good

How is your organization ensuring quality in crowdsourcing activities?

_____

_____

---

Is crowdsourcing utilized in knowledge acquirement in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Is crowdsourcing utilized in innovation launching and sustaining in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

How is crowdsourcing utilized in innovation launching and sustaining in your organization?

_____

_____

_____

## *Capture phase*

An organization is obtaining values from the innovation in the innovation management capture phase. An organization receives value normally in the form of profit along with other benefits such as new knowledge. An organization can try to find new development ideas for implemented innovation in, for example, the capture phase. An organization can also evaluate the innovation impact on the environment in this phase.

Which of the following crowdsourcing types are utilized in innovation management capture phase in your organization?

| | Not at all | Little | Somewhat | Moderately | A lot | A very lot |
|---|---|---|---|---|---|---|
| Crowd wisdom. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowd creation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdvoting. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdevaluation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdfunding. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Microtasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Macrotasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Something else. What? | ○ | ○ | ○ | ○ | ○ | ○ |

Does your organization measure innovation adoption?

○ Yes. How?

○ No

How your organization is securing the innovation?

☐ Patents

☐ Copyrights

☐ Trademarks

☐ Some other way. How?

What are the benefits of crowdsourcing activities in innovation management in your organization?

☐ Costs are smaller

☐ Innovation has market pull effect

☐ Profit is higher

☐ Position in the markets gets better

☐ Social effect

☐ Something else. What?

Does crowdsourcing in innovation management reduce product pullbacks in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Does crowdsourcing in innovation management create economic value for your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Does crowdsourcing in innovation management increases your organizations performance?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Does crowdsourcing create new knowledge for your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot


Which kind of knowledge is created with crowdsourcing in your organization?

_____

_____

_____


How is this knowledge turned to innovation in your organization?

_____

_____

_____


# CROWDSOURCING IN PROJECT MANAGEMENT

RDI activities are often project basis in organizations. A project can create a new product or service for example. Projects implement predefined tasks. Project results are normally known in advance. Every project has its own resources and aims. Projects can bring external funding to an organization. A project has four different main phases which are **initiation, planning, execution, and closure phases**. Most projects pass these four phases. Phases have connections. It is normal to have at least small modifications to project plans during the execution phase.

Terms introduced in this section

| Term | Description |
|---|---|
| Avainklubi | Crowdsourcing platform which enables organizations and consumers to meet and translate everyday ideas into innovative products or services. |
| Mikrotask | Crowdsourcing platform which enables the sharing of tasks to smaller assignments and distributing them around the world. |
| xTune | Crowdsourcing platform which is oriented to finding new knowledge and sharing it inside the organization. |
| InnoCentive | Crowdsourcing platform for an organization's research and development activities in a wide range of industries. Projects can be either micro- or macrotasks. Platform includes a wide range of users from different industry sectors. |

| Indiegogo | International crowdfunding platform. |
|---|---|
| Kickstarter | Crowdfunding platform for project funding. |
| Amazon Mechanical Turk | Crowdsourcing platform which enables distribution work to external individuals. |
| Freelancer | Crowdsourcing platform for outsourcing organization's projects to individual freelance workers. |
| 99designs | Crowdsourcing platform for logo design. |

## *Project initiation*

The project initiation phase is the first stage in a project lifecycle. A project gets its aim, scope, and purpose among other points or interests in the initiation phase. Project resources, like employees, can be considered during this phase.

Which of the following crowdsourcing types are utilized in the project management initiation phase in your organization?

|  | Not at all | Little | Somewhat | Moderately | A lot | A very lot |
|---|---|---|---|---|---|---|
| Crowd wisdom. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowd creation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdvoting. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdevaluation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdfunding. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Microtasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Macrotasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Something else. What? | ○ | ○ | ○ | ○ | ○ | ○ |

Does your organization consider the organization of INTERNAL crowd as a project resource?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Does your organization consider the organization of EXTERNAL crowd as a project resource?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

## *Project planning*

A project is planned more closely in the project planning phase. Resources are cleared out for the execution of the project. The project planning phase can be long in time. Written plans can be either long or short. A project's scope and results should be clear in this phase. This phase can be called also the project orientation phase.

Which of the following crowdsourcing types are utilized in project management planning phase in your organization?

|  | Not at all | Little | Somewhat | Moderately | A lot | A very lot |
|---|---|---|---|---|---|---|
| Crowd wisdom. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowd creation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdvoting. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdevaluation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdfunding. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Microtasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Macrotasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Something else. What? | ○ | ○ | ○ | ○ | ○ | ○ |

## *Project execution*

A project is implemented in the project execution phase using resources which can be either internal or external. The project execution and planning phases are close to each other. There might be a need to go back to the planning phase

during the execution. Management and monitoring is needed during the execution phase to keep the project in the defined scope. The project manager is the single point of responsibility for the project.

Which of the following crowdsourcing types are utilized in the project management execution phase in your organization?

|  | Not at all | Little | Somewhat | Moderately | A lot | A very lot |
|---|---|---|---|---|---|---|
| Crowd wisdom. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowd creation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdvoting. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdevaluation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdfunding. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Microtasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Macrotasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Something else. What? | ○ | ○ | ○ | ○ | ○ | ○ |

Which of the following public crowdsourcing platforms are utilized in your organizations projects?

☐ Avainklubi

☐ Microtask

☐ xTune

☐ InnoCentive

☐ Mesenaatti.me

☐ Indiegogo

☐ Kickstarter

☐ Amazon Mechanical Turk

☐ Freelancer

☐ 99designs

☐ iStockphoto

☐ Facebook

☐ Twitter

☐ LinkedIn

☐ GooglePlus

☐ Instagram

☐ SourceForge

☐ Wikipedia

☐ Digg

☐ Some other platform. What?

How are crowdsourcing platforms utilized in your organization's projects?

_____

_____

_____

Which private crowdsourcing platforms are utilized in your organizations projects?

_____

_____

_____

## *Project closure*

Last state of the project is the project closure. Evaluation is done during this phase. Generally the project subscriber and other stakeholders are evaluating the project. In this phase the success or failure of a project is defined. Failure or success of the projects are influenced with many external and internal factors. These can be administrative, contractual, team behavioral, and budget factors for example. The closure phase may also include the final product delivery to the customer. This phase may also include a new product or service launching.

Which of the following crowdsourcing types are utilized in the project management closure phase in your organization?

|  | Not at all | Little | Somewhat | Moderately | A lot | A very lot |
|---|---|---|---|---|---|---|
| Crowd wisdom. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowd creation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdvoting. How? | ○ | ○ | ○ | ○ | ○ | ○ |

| | | | | | | |
|---|---|---|---|---|---|---|
| Crowdevaluation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdfunding. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Microtasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Macrotasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Something else. What? | ○ | ○ | ○ | ○ | ○ | ○ |

Is crowdsourcing an effective way to implement projects or parts of projects in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Is something else done with crowdsourcing in your organization's projects?

_____

_____

_____

# INNOVATION MANAGEMENT AND CROWDSOURCING IN ORGANIZATIONS STRATEGY

Strategy is either a short or long term plan for an organization's activities. An organization may have multiple levels of strategies or just a single one. If an organization is implementing RDI it may have its own strategy. Organizations' owners have an impact on how strategy is formed and how it will be implemented. The crowd can be essential part of the strategy because the crowd includes customers, potential customers, employees and other stakeholders, which can also be, for example, possible users for the new product or service. Crowdsourcing can be used in strategy planning and implementation.

Innovation management and crowdsourcing have an effect on strategy. It is possible to implement innovations which have more pull on the markets if the organization is able to find weak signals and megatrends in the environment. Crowdsourcing can be an appropriate tool for these kinds of organizational activities.

Which strategy or strategies defines RDI in your organization?

_____

_____

_____

Your organizations vision is clear to all your employees working with RDI?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Your organizations strategy is clear to all your employees working with RDI?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Crowdsourcing is a part of your organization's vision?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Does crowdsourcing have an effect on strategy in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

## *Crowdsourcing*

Which of the following crowdsourcing types are utilized in strategy PLANNING in your organization?

|  | Not at all | Little | Somewhat | Moderately | A lot | A very lot |
|---|---|---|---|---|---|---|
| Crowd wisdom. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowd creation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdvoting. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdevaluation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdfunding. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Microtasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Macrotasking. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Something else. What? | ○ | ○ | ○ | ○ | ○ | ○ |

Which of the following crowdsourcing types are utilized in strategy IMPLEMENTATION in your organization?

|  | Not at all | Little | Somewhat | Moderately | A lot | A very lot |
|---|---|---|---|---|---|---|
| Crowd wisdom. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowd creation. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdvoting. How? | ○ | ○ | ○ | ○ | ○ | ○ |
| Crowdevaluation. How? | ○ | ○ | ○ | ○ | ○ | ○ |

| | | | | | |
|---|---|---|---|---|---|
| Crowdfunding. How? | ○ | ○ ○ | ○ | ○ ○ |
| Microtasking. How? | ○ | ○ ○ | ○ | ○ ○ |
| Macrotasking. How? | ○ | ○ ○ | ○ | ○ ○ |
| Something else. What? | ○ | ○ ○ | ○ | ○ ○ |

Which indicators are used for monitoring strategy in your organization?

_____

_____

_____

Is crowdsourcing used for analyzing the environment in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

How is crowdsourcing used for environment analysis in your organization?

_____

_____

_____

Is crowdsourcing a strategic choice in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot


Are results better if crowdsourcing is used in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot


Do innovations have more of a market pull if your organization is using crowdsourcing in strategy planning and implementation?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot


## *Crowdsourcing and Innovation Management*


Does innovation management have a clear link to strategy in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Does innovation management follow strategy in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Your organization implements new innovative openings with RDI activities?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Your organization is following other organization's products and services?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Following the external crowd has an effect on your organization's strategy?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot


When utilizing crowdsourcing your organization's innovations have effect to organizations

☐ Business environment

☐ Profit

☐ Knowledge

☐ Position in the markets

☐ Performance

☐ Products or services

☐ Management

☐ Strategy

☐ Other effect. What?


Are profits higher when using crowdsourcing in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot


Does innovation management and crowdsourcing have links to strategy in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Does your organization have prepared for the failure of innovations?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

How is the preparation of failure made in your organization?

_____

_____

_____

Has the implement of innovations succeeded in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Does strategy have a clear connection to succeeded innovations in your organization?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Your organization has utilized crowdsourcing in innovation management and it has had an effect on strategy PLANNING?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

Your organization has utilized crowdsourcing in innovation management and it has had an effect on strategy IMPLEMENTATION?

○ Not at all

○ Little

○ Somewhat

○ Moderately

○ A lot

○ A very lot

This effect has been mainly

○ Positive in your organization

○ Negative in your organization

## Appendix 4: Verification presentation

Innovation
and
Crowdsourcing

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# Crowdsourcing

- According to Jeff Howe (Howe 2006):
  - *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*
  - **Crowdsourcing can involve internal or external individuals of an organization**
- Crowdsourcing can be an internal or external activity of an organization
  - Crowdsourcing platforms can be private or public
- Crowdsourcing is not open innovation but it includes some elements of open innovation (Brabham 2008)
- More about crowdsourcing: http://archive.wired.com/wired/archive/14.06/crowds.html

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# What is innovation?

- Innovation can be defined as a process **which leads to something new and produces value for the user of the innovation** (O'Sullivan and Dooley 2009)
- Literature includes several innovation types
  - All innovation types share the same understanding of the element of newness
  - Innovations can lead an organization to the **blue ocean** (Kim and Mauborgne 2005)
- However, not all innovative ideas are in the head of one person and not even in a single organization
  - Innovative ideas are all around us in the head's of customers, potential customers, and other individuals

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# Management Themes in the GCM for holistic innovation management

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## Strategic Management

- Strategy is an **organizational instrument** which guides an organization's operations
  - Johnson, Whittington, Scholes, Angwim, and Regnér (2014) define strategy as **the long term direction of an organization**
- Briefly: strategy is **a plan** which is **implemented** in a organization's daily activities
  - Organizations can have several strategies or just one corporate strategy
- Multiple models of strategic management exists in literature
  - Static models
  - Dynamic models

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## Innovation Management

Do we have a clear innovation strategy?

SEARCH
How can we find opportunities for innovation?

SELECT
What are we going to do and why?

IMPLEMENT
How are we going to make it happen?

CAPTURE
How are we going to get the benefits from it?

Do we have an innovative organization?

Tidd and Bessant 2013

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# Crowdsourcing in Strategic Management

**STRATEGY FORMULATION**

**Internal crowdsourcing**
- Involvement of employees' in the strategy formulation process
- Changing the assumptions of managers, directors, and owners in organization related matters (e.g. products and services)
- Knowledge creation about future trends
- Value creation process (new values or voting on existing ones)
- Open executive board

**External crowdsourcing**
- Sustainable innovations for an organization
- Identifying weak signals and forming megatrends
- Market research (e.g. market reaction in different situations)
- Finding new business areas
- Defining an organization's products and services more closely

**STRATEGY IMPLEMENTATION**
- Changing the opinions of employees in organization related matters
- Communication of a strategy and getting feedback
- Strategy implementation measurement
- Adjusting the crowd's (customers, potential customers, and other individuals) point of view in organization related matters
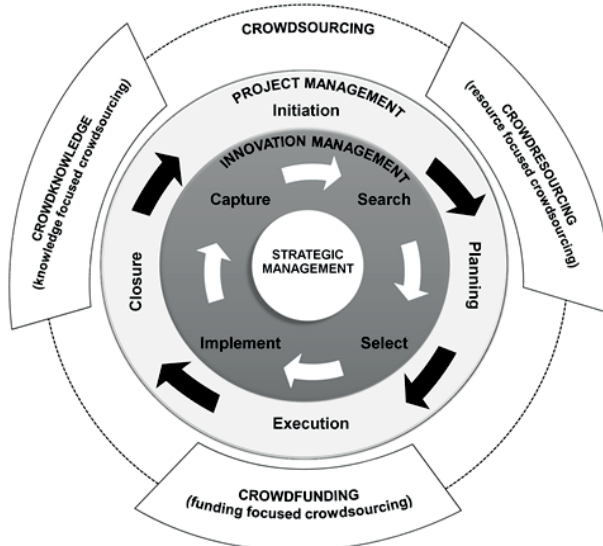
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# Crowdsourcing in Innovation Management

**SEARCH**
- Idea diversification and testing
- Identifying forming megatrends
- Identifying weak signals
- Collecting ideas generally with a formal web form (easy to analyse and introduce to the board)
- Get the funding for a project
- Opening new discussions to see which innovations would have pull on the markets

**SELECT**
- Validating the selected idea
- Testing the market pull of the idea
- Diversifying the idea
- Crowdsourcing internally in an organization for selecting the best possible solution
- Voting and evaluation of multiple choices (selecting which idea will be implemented)

**IMPLEMENT**
- Testing and piloting of a new product or service
- Part implementation of an innovation
- Evaluation of a new product or service
- Implementing a new product entirely
- Creating a project plan partly
- Co-operating with clients' customers

**CAPTURE**
- Development of ideas for new products or service
- Ideas for the next innovation
- New ways to apply the innovation (e.g. new business areas)
- Detect the effects of innovations on the business environment
- Improve an organization's reputation
- Innovation management process evaluation
- Put the results into practice

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# Crowdsourcing in Project Management

| INITIATION | PLANNING | EXECUTION | CLOSURE |
|---|---|---|---|
| •Evaluation of a project idea<br>•Evaluation of the market situation<br>•Modifying a project idea to be more market oriented<br>•Finding new business opportunities<br>•Finding weak signals which can lead to new projects<br>•Creating "hype" around a project, for instance, with crowdfunding | •Project planning with an internal crowd for creating more feasible project plans<br>•Modifying an existing project plan<br>•Voting on implementation opportunities<br>•Distribution of knowledge about a new project<br>•Finding workers for projects internally or externally<br>•Crowdfunding a project entirely or partly | •Gaining development ideas for a project which will develop a new product or service<br>•Execution of a project entirely or partly<br>•Finding workers for a new business area<br>•Evaluation of a new product or service<br>•Utilizing a workforce between departments of an organization<br>•Monitoring project execution<br>•Testing new products and services | •Marketing of new products or services (crowd generated advertising)<br>•Evaluation of a project's success<br>•Finding new product or service ideas<br>•Getting a positive reputation for an organization<br>•Continuous improvement of a new product or service (after the project implementation)<br>•Sending a new product or service for crowdfunders<br>•Implementing the final report of a project with crowdsourcing (e.g. between departments) |

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# Research
# Broad Verification

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# Integrating Crowdsourcing with Holistic Innovation Management

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**Integrating Crowdsourcing with Holistic Innovation Management**

**Abstract**

The purpose of this conceptual study is to introduce a generic crowdsourcing model and apply it to an organization's holistic innovation management. Organizations are in innovation competition and they need to manage innovations holistically and provide innovations which have a demand in the markets. Earlier empirical studies have indicated the effectiveness of crowdsourcing in producing innovations. Crowdsourcing and its utilization in innovation related management areas exists; however a holistic approach to innovation management and crowdsourcing has not been presented. This article is filling the research gap providing a theoretical model based on earlier empirical research. The conceptual model was broadly verified in six case organizations which indicate the conceptual model's usefulness in practice. Organizations may utilize crowdsourcing in several ways to provide innovations with customer based values.

## 1. INTRODUCTION

Organizations are part of the social system and they cannot exist without customers and their needs. Innovations should be produced for customers who are willing to pay for them. Innovation is usually something new, which can be, for instance: a product, a technology, a service, a process or even a paradigm (Tidd & Bessant, 2013; Trott, 2005). Examples of lately introduced innovations are 3D printing of human organs, cyborg plants, robo-bees, and Tesla electric cars. It can be said that all of these products have required several types of innovations to provide the final product for the markets.

Innovations are not the responsibility of a single function of an organization and, therefore, the management of innovations should be holistic and cover the entire organization. Holistic innovation management covers several management areas, which in this conceptual study are: strategic management, innovation management and project management. These can be thought of as the most crucial management areas in innovation production based on earlier research (see Nagano, Stefanovitz, & Vick, 2014; Oke, 2004; Tidd & Bessant, 2013). Holistic innovation management should be customer focused and, therefore, customers and other individuals should be part of an organization's innovation production.

It is widely accepted that innovation can be democratized and customers and other individuals can provide value for innovations and other management processes in an organization (Escoffier & McKelvey, 2014; Howe, 2009; Ulrich & Eppinger, 2012; Von Hippel, 2005). On the other hand, the opposite point of view and critique also exists that customers cannot predict future innovation demands (Skibsted & Hansen, 2014). However, it can be said that the risk of innovations failing can be decreased when utilizing customers in new product development processes (Franke & Piller, 2004; Tucker, 2014). Crowdsourcing provides possibilities to integrate customers and other individuals into an organization's holistic innovation management. Crowdsourcing involves taking a task to a small or large group of people either inside or outside of an organization (Howe, 2006).

Sivula and Kantola (2014a) argue that crowdsourcing can be a crucial element in all of an organization's activities, but especially so in research, development and innovation activities. Poetz and Schreier (2012) claim that crowdsourcing is a useful method in the development of new product and for generating new ideas. Moreover, crowdsourcing can assist in innovation development, for example, in customer verification and validation of a new product's usability (Sivula & Kantola, 2016). This conceptual study proposes that crowdsourcing can be utilized more extensively and holistically during innovation development with knowledge, resource and funding focused crowdsourcing.

Individual research exists about different management areas and crowdsourcing (see Sivula & Kantola, 2014a; Sivula & Kantola, 2014b; Sivula & Kantola, 2016; Sivula, Kantola, Vanharanta, & Salo, 2014). However, understanding of crowdsourcing and its relationship to an organization's holistic innovation management has not been presented. Thus, the first objective of this conceptual study is to provide a generic crowdsourcing model (GCM) and apply it to holistic innovation management and, therefore, also research how crowdsourcing is generically utilized in holistic innovation management. The second objective of the study is to broadly verify the conceptual model in six case organizations.

This conceptual paper is organized as follows: the most relevant and up-to-date literature is presented in the second section. The third section deals with the theoretical model; which is constructed from three management areas and concerns the utilization of crowdsourcing. The forth section presents the model verification methodology used to verify the conceptual model and the fifth section presents the results of the verification. Finally, the paper ends with a conclusions section where the conclusions and their discussion are presented along with further research suggestions.

## 2. THEORETICAL BACKGROUND

Holistic innovation management in this conceptual study is a comprehensive definition for innovation management and is constructed from three management areas, which are: strategic management, innovation management and project management. Based on earlier innovation management research these include the most important management areas (see Nagano et al., 2014; Oke, 2004; Tidd & Bessant, 2013). It can be said that the aspect is holistic when several management areas are highlighted instead of a single one. Strategy reflects management's assumptions about what customers want and how an organization is going to meet those assumptions (Teece, 2010). Strategic management has an important role in holistic innovation management; it can be seen in the management of the entire organization including all of its management functions, for instance: human resource, financial, research, development and supply chain management.

Innovation management is a process for the creation of innovations which begins with searching for an innovative idea and ends with the capturing of value from the innovation. Furthermore, innovations are commonly developed using projects; which requires project management. Holistic innovation management is not the responsibility of a single department in an organization; it should cover all functions within an organization. This conceptual study argues that crowdsourcing can be utilized in several ways in the context of holistic innovation management and discusses it from a strategic management, innovation management and project management point of view.

## 2.1. Crowdsourcing

The basic activity of an organization is to deliver its products and services to customers and therefore it is important to stay in touch with customers, potential customers and other individuals. The opinions of customers, potential customers and other individuals are important to organizations because they give them a better opportunity to make a profit. These other individuals can comprise of, for instance, an organization's own employees, universities scientists, government officials, product or service end users or even a competitor's employees.

Crowdsourcing is an activity which takes place inside or outside of an organization with a small or large group of people. Crowdsourcing is constructed from two words: 'crowd' and 'sourcing'. The crowd includes customers, potential customers and other individuals while sourcing refers to outsourcing activities. The organization does not precisely define who will implement crowdsourced tasks. However, the organization does define the goal or the results required of the crowdsourcing activity that the crowd is to perform. Crowdsourcing can be used, for instance, for generating ideas which might lead to innovations (Poetz & Schreier, 2012; Kosonen, Gan, Olander, & Blomqvis, 2013). Howe (2015) defines crowdsourcing as follows:

*"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."*

Crowdsourcing activities commonly include collaborative online platforms; however, it is not absolutely necessary. Crowdsourcing activities can include compensation for the crowd such as money, products or other compensation; however, they do not have to be a part of crowdsourcing activities. Nevertheless, in some situations it might be useful to have tangible compensation for motivating the crowd. Crowdsourcing is constructed from three elements: crowd, outsourcing and a social network (Saxton, Oh, & Kishore, 2013). Crowdsourcing can utilize online social web technologies such as Facebook and Twitter. Dedicated crowdsourcing platforms exist as well; which can be either public or private.

## 2.2. Innovations and strategic management

Strategies are formulated and implemented based on the vision of an organization; which can have multiple strategies or a single one. Johnson, Whittington, Scholes, Angwim, & Regnér (2014) defined strategy as "the long-term direction of an organization". Company strategy is a plan to achieve the vision that the directors, managers and shareholders of an organization have specified. Modern organizations are forced to compete through marketing and product strategies; which provides value to the customer (Horn & Salvendy, 2006).

Strategies can be created for the short or long term and they can be formulated, for example, for different departments or functions within an organization. An organization may have a corporate strategy; which includes its most crucial activities. Multiple strategic management frameworks exist in literature and one example is Mintzberg's basic design school model, which sheds light on internal and external appraisals used in strategy formulation (Mintzberg, Ahlstrand, & Lampel, 1998). This is also a common approach in other strategic management models (see Kaplan & Norton, 2004; Porter, 1980; Wheelen, Hunger, Hoffman, & Bamford, 2015). Strategy formulation begins with the analysis and defining of several strategic matters, including threats to and opportunities for an organization. Moreover, analysis includes key success factors and distinctive

competences. Thus, external and internal analysis plays a critical role in the strategy formulation processes.

According to Shum and Lin (2007) innovation is the strategic objective of an organization. Moreover, Shum and Lin (2007) highlight that innovation is more than a strategy; it is a way of life in innovative organizations such as 3M and Apple. Strategic management is a holistic approach that includes the planning, implementation, evaluation, and updating of a strategic agenda aimed at maintaining the most viable fit between an organization and its internal and external environment while moving purposefully into the future (Poister, 2005). Strategic management is a key element in holistic innovation management because strategies define the goals of an organization in the long or short term and how an organization is going to resource its innovation activities. Moreover, it has been presented that stakeholders' participation can provide value for an organization's strategic management (Simpson, 2001).

## 2.3. Innovation management

Innovation management is a managerial process which leads, for instance, to a new or improved product or service. Tidd's and Bessant's (2013) innovation management model can be considered as a generic approach to innovation management and it includes search, select, implement and capture phases. The *search* phase includes the scanning of an organization's internal and external environment and observing those signals which are relevant and can be developed into new products or services. The signals can be new market opportunities or ideas. An organization makes decisions as to which signal it will respond to in the *select* phase. This phase includes the analysis of a new idea which can be based on the organization's vision, strategy or its values. The development process of an innovation can take a long time and demand a lot of resources.

The *implement* phase develops, for instance, the new product, service or process. The implementation of an innovation requires knowledge and other resources to develop an innovation and to execute the development project. *Capturing* value from innovation requires sustaining the innovation's adoption and diffusion. Organizations have a chance to learn from innovations and innovation management and this leads to the development of innovation management activities as well as other management areas. All experiences in innovation management should be processed and analyzed because the results of future innovations are more inclusive if learning occurs as a result of prior innovations and development processes.

Tidd and Bessant's innovation management model highlights important areas for an innovative organization and the strategies it uses. Innovation culture plays an important part in an organization. Organizations like Google Inc. and P&G combine openness to new ideas with a healthy respect for the opinions of customers to generate an innovation-positive culture (Jaruzelski & Katzenbach, 2012). An organization's ability to generate product and service innovations relies on new product knowledge gained through external channels (Rothwell, 1991). Innovative products should meet the customers' needs in order to secure market acceptance (Su, Chen, & Sha, 2006). It is required that the product satisfies customer needs, and therefore it is important that an organization keeps in touch with its customers, potential customers and other individuals during innovation development.

## 2.4. Innovations and project management

Project management is an essential part of innovation management. Projects are generally different but in generic terms the same common project management phases exists in every project,

which are: initiation, planning, execution and closure. A project receives its aim, scope and purpose, along with other requirements, in the *initiation* phase. Resources required for the project are considered in this phase. Most projects involve several stakeholder interests, which guide the projects scope (Kloppenborg, Tesch, Manopolis, & Heitkamp, 2006). The customers', potential customers' or end-user's points of view should be considered as well. A project is planned more thoroughly during the *planning* phase where resources are allocated for implementation. The project's scope and results should be clarified during the planning phase.

A project is implemented in its *execution* phase using the resources; which can be internal or external to an organization. The execution and planning phases are closely related to each other and therefore there might be a need to go back to the planning phase during the execution phase. A project may require changes in expected activity durations; which can occur in terms of resource productivity and availability and so unanticipated risks may arise (Project Management Institute, 2013). Thus, a project may have iterations in all phases. Management and monitoring are required during the execution phase to keep the project on track. An evaluation of a project is carried out in the *closure* phase. The project subscriber and other stakeholders commonly evaluate the project.

Tidd and Bessant (2013) highlight a stage gate model for new product development in the innovation management implementation phase. The stage gate model is a good fit for product development, however, the holistic innovation management model includes a project management model because it is more suitable in generic terms for developing innovations. Moreover, it has been presented by Newcombe (2003) that stakeholders have an impact on projects and, therefore, stakeholders can provide value, for instance, new product development project in every project phase.

## 3. A GENERIC CROWDSOURCING MODEL (GCM) FOR HOLISTIC INNOVATION MANAGEMENT

This section discusses the GCM for holistic innovation management as an approach to manage innovations. First, this section presents the GCM and, second, the GCM is applied to holistic innovation management.

### 3.1. Generic Crowdsourcing Model

Crowdsourcing has several implementation methods and organizations can utilize it in multiple ways. This section presents crowdsourcing implementation methods which are used especially for an organization's innovation activities. Crowdsourcing types can be categorized based on the crowdsourcing implementation method or the end result of the activity. Figure 1 illustrates the Generic Crowdsourcing Model.
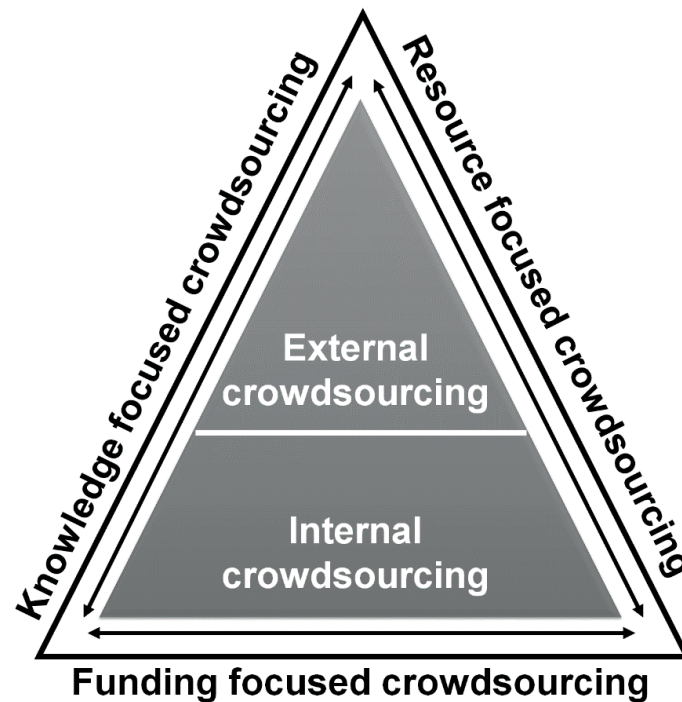
**Figure 1.** Generic Crowdsourcing Model.

Knowledge focused crowdsourcing can be used for creating knowledge for an organization utilizing different crowdsourcing implementation methods. Knowledge can be new megatrends, weak signals or ideas for specific market areas (Chiu, Liang, & Turban, 2014; Simula & Ahola, 2014; Sivula & Kantola, 2016). Knowledge focused crowdsourcing provides, for instance, ideas for developing or proceeding with new technology. Resource focused crowdsourcing is a more extensive form of crowdsourcing where the crowd is employed to produce a specific outcome for an organization. The crowd needs to utilize its own resources more extensively to achieve the crowdsourced task. The crowd's resources can be, for example, devices, software, material or premises. The outcome of resource focused crowdsourcing can be a new module for an existing product, new software, new technology or even a new business model for an organization (Feller, Finnegan, Hayes, & O'Reilly, 2012; Howe, 2009; Richard & Davis, 2014).

Funding focused crowdsourcing implementation methods are used for funding different activities in an organization, these can be development projects or any other activity (Belleflamme, Lambert, & Schwienbacher, 2014; Parker, 2014; Vasileiadou, Huijben, & Raven, 2015). At the bottom of the model is the funding focused crowdsourcing because it provides necessary fund resources to implement, for example, new technology. Funding focused crowdsourcing implementation methods can provide a major opportunity for micro, small and medium sized organizations to produce innovations which have demand in the markets. Table 1 presents the GCM including crowdsourcing implementation methods, descriptions, examples of public platforms and an example of the implementation method in an organization's innovation activities.

**Table 1.** GCM implementations.

| Implementation method | Description | Examples of public platforms using the implementation method | An example of the implementation method |
|---|---|---|---|
| *Knowledge focused crowdsourcing (crowdknowledge)* | | | |
| **Crowd wisdom** | An organization employs a crowd to extend its knowledge in terms of crowd wisdom (Hopkins, 2011). Crowd can be employed, for example, to create a new idea or disperse knowledge inside an organization (Sivula & Kantola, 2016). | Community platforms, Dell IdeaStorm and Twitter | Product developers utilize crowd wisdom and the crowd participated in the development process of the car Fiat Mio (Solon, 2010). |
| **Crowdvoting** | Crowdvoting can be utilized for organizing large amounts of data (Sivula & Kantola, 2016). Crowdvoting can be used, for instance, to vote on the usability of an organization's new and old products or services (Hammon & Hippner, 2012). | Airbnb, Collaboration platforms generally and IMDb | Managers utilize crowdvoting in on an internal collaboration platform to find out organizational core values (Sivula et al., 2014). |
| **Crowdevaluation** | Crowdevaluation is a model for evaluation, for example, of an organization's products, services or development results in general (Sivula & Kantola, 2016). Crowdevaluation can be used, for example, for screening and evaluating new design concepts of new products (Chang & Chen, 2015). | Collaboration platforms generally, TrendHunter and Tripadvisor | Managers measure strategy implementation with crowdevaluation repeatedly sending short surveys to stakeholders or by utilizing a web based collaboration platform (Sivula et al., 2014). |
| *Resource focused crowdsourcing (crowdresourcing)* | | | |
| **Crowd creation** | The crowd participates in implementing the tasks with the actual producers, such as employees (Geiger, Seedorf, Schulze, Nickerson, & Schader, 2011). Crowd creation tasks have generally loose definitions and there can be major differences between the qualities which the crowd produces (Sivula & Kantola, 2016). | IdeaConnection, TopCoder and Wikipedia | Managers utilize crowd creation in a web based programming competition at TopCoder to develop an entirely new software (Lakhani, Garvin, & Lonstein, 2010). |
| **Microtasking** | An organization can utilize the crowd to perform microwork which is achieved by the crowd's individuals (Franklin, Kossmann, Kraska, Ramesh, & Xin, 2011). Work can be paid or unpaid, but the task is commonly minor and anyone can implement it without any specific professionalism required. | Amazon Mechanical Turk, Clickworker and reCAPTCHA | Book digitalizers in Google Inc. utilize microtasking to digitalize text books with the crowdsourcing platform reCAPTCHA (Baecher, Buscher, Fischlin, & Milde, 2011). |
| **Macrotasking** | Macrotasking tasks commonly require special skills and might be precisely targeted (Reid, | 99designs, Freelancer and Innocentive | Software developers use macrotasking in a Freelancer |

| | | | |
|---|---|---|---|
| | 2013). Macrotasking is therefore beneficial to an organization because the results are wider and more professional than that in microtasking. | | platform to develop entirely mobile software to meet the needs of an organization (Sivula & Kantola, 2014b). |
| ***Funding focused crowdsourcing (crowdfunding)*** | | | |
| **Crowdfunding of a project** | With crowdfunding the reward given to the crowd can be monetary or non-monetary (Belleflamme et al., 2013). A crowdfunder could receive, for instance, the product which was developed and financed with crowdfunding. The reward might also be something which is not directly related to the developed product or service. | Indiegogo, Kickstarter and RocketHub | Managers utilize Indiegogo to fund their new technology development, for instance, new sensor development (Sivula & Kantola, 2016). An organization is usually sending the developed product to crowdfunders. |
| **Crowdfunding of an organization** | An organization gives equity stakes to crowdfunders (Mollick, 2014). In general, shares of an organization are given to the crowdfunders who are funding the business, and in this way part of the profits will also go to the funders in the future. | EquityNet, Invesdor and StartUpValley | The CEO of a startup company is using a crowdfunding platform like Invesdor to start the activities of a company and provides equity stakes of the company to crowdfunders (Mitra, 2012). |
| **Crowdfunding as a loan** | The crowd offers peer-to-peer lending for an organization. The loan is normally small but multiple lenders can raise the amount of money to a high level (Lin & Viswanathan, 2014). The interest rates on the loans vary based on the crowdfunding event. | FundingCircle, Funding Tree and Prosper | The CEO of a startup company is utilizing a crowdfunding peer-to-peer lending platform like Funding Tree to provide the necessary loan for a startup company's activities (Bruton, Khavul, Siegel, & Wright, 2015). The startup company provides interest on the loan to the crowdfunders. |

Crowdevaluation and crowdvoting are close to each other and are usually combined, however, they can also be implemented independently. Crowdsourcing implementation methods can be internal or external to an organization. In general, organizations use external crowdsourcing and it can be utilized by any size of organization. Internal crowdsourcing requires a large organization which has enough internal crowd to implement the crowdsourced activity. Internal crowdsourcing can increase the knowledge flow between an organization's internal functions (Simula & Vuori, 2012). Crowdsourcing can be implemented between departments or offices which are in different countries. Thus, all the crowdsourcing implementation methods which are in Table 1 can also be utilized internally by an organization.

Crowdsourcing platforms can be internal or external to an organization. External platforms can be social networks or dedicated crowdsourcing platforms which are not on an organization's own servers. Private platforms are on an organization's own servers and are mostly collaboration-based online environments (Sivula & Kantola, 2014a). An organization should consider what the crowd should perform and based on this consideration an organization can decide which crowdsourcing platform it should utilize to accomplish a particular crowdsourcing task.

## 3.2. GCM for holistic innovation management

The GCM is applied to holistic innovation management in this subsection. The GCM for holistic innovation management is constructed from three management areas and generic crowdsourcing elements. Figure 2 illustrates the GCM for holistic innovation management.
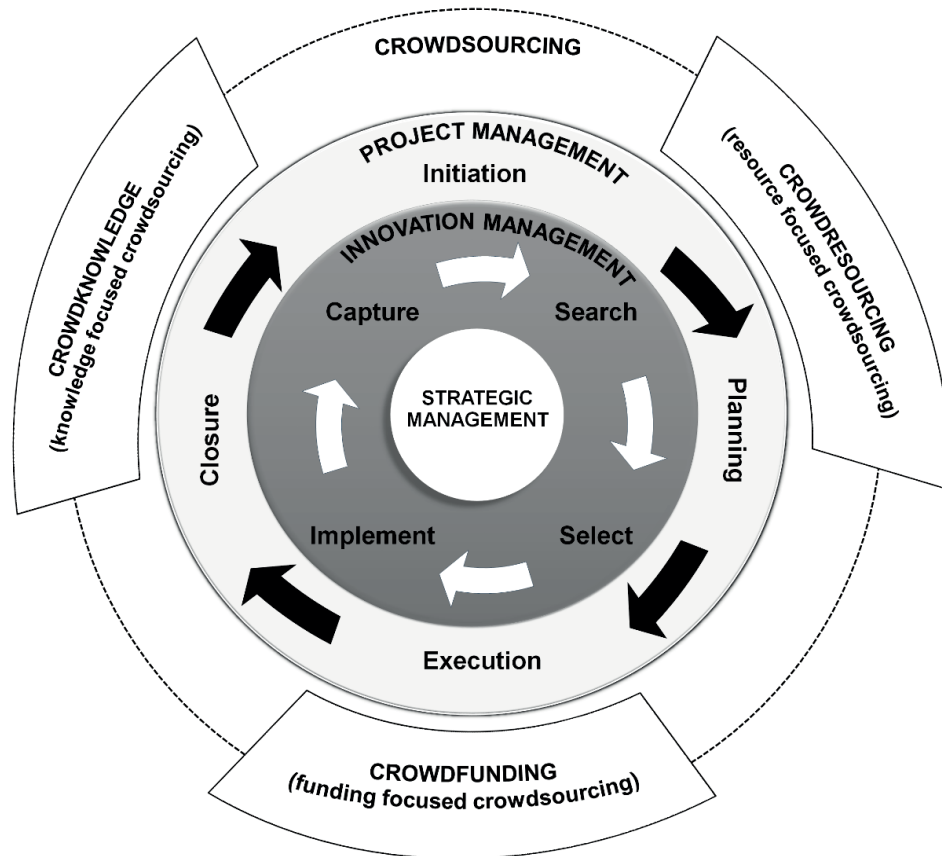
**Figure 2.** The GCM for holistic innovation management.

The GCM for holistic innovation management includes management areas which play a key role in innovation activities. The GCM for holistic innovation management highlights continuous improvement and development where innovations and projects lead to the next innovations and projects, thus, the creating of innovations does not stop so long as the organization exists. The heart of the model is strategic management; which can be divided into strategy formulation and implementation. Strategy formulators and executors can utilize internal and external crowdsourcing to extend their knowledge.

Innovation management is about the management of the process of creating innovations. An organization can implement multiple innovations at the same time with projects. The crowdsourcing implementation methods used are related to the organization, its industry and its products and services. An organization should consider which parts of the model could be used in its activities. Nevertheless, every organization requires knowledge, resources and funding in its innovation activities and crowdsourcing can be the answer to several issues raised in these areas.

The GCM for the holistic innovation management model can be considered like a process that is constantly proceeding and evolving. Strategies are changing based on innovations that an organization develops. An organization may have several innovation management processes going on at the same time which are in different stages. Moreover, an organization can have multiple innovation projects in different stages of development in the process of, for instance, making a new

product or service. Based on activity in the process and the stage of strategic management, innovation management and project management utilizes different crowdsourcing implementation methods in a way that creates the most value for an organization and its innovations.

### 3.2.1. Crowdsourcing in strategic management

Sivula et al. (2014) highlights that internal and external crowdsourcing can be useful in strategic management. Strategic formulation can especially benefit from crowdsourcing but strategic implementation activities can employ crowdsourcing as well. The GCM for holistic innovation management highlights the fact that all of the strategies of an organization should include innovation related guidelines as to which kind of innovations an organization should produce. All of which can be affected by the crowdsourcing activities of the organization.

Internal crowdsourcing activities are implemented within an organization (c.f. Simula & Vuori, 2012). An organization's size might limit the utilization of internal crowdsourcing activities in strategic management. An organization can use crowdsourcing to discover which thematic areas are important to the internal crowd. These can be simple surveys to strengthen or change the assumptions which directors and managers have: this process can include creating new values for an organization. The executive board can be open to the internal crowd, thus, anyone can participate in open executive board meetings and introduce new points of view for an organization. On the other hand, an organization should consider when to utilize an open executive board since the size of the meetings might grow large and, therefore, be challenging to manage (Sivula et al., 2014).

Employee participation increases their commitment to the implementation of a strategy when crowdsourcing is utilized (Sivula et al., 2014). This way knowledge is distributed within an organization before the strategy is completely formulated and assumptions are modified between employees and managers. The execution of a strategy is normally measured and crowdsourcing is one way to measure it. Crowdsourcing can be used to measure how well managers have communicated the strategy-related matters inside and outside of an organization. This knowledge can be used to comprehend the overall performance of the management and can be used as a part of an executive reward system (Sivula et al., 2014).

External crowdsourcing can be used in any organization's strategic management. Crowdsourcing can be utilized for scanning weak signals from the markets. This might be part of an environment analysis and these signals can have an effect on an organization's strategy. Crowdsourcing produces knowledge about the demands of the markets (c.f. Hopkins, 2011). Thus, external crowdsourcing can be useful in market research for collecting information from the crowd. Moreover, crowdsourcing assists an organization to gain knowledge about how the crowd uses an organization's products and services. This is useful when an organization is seeking markets where it can expand (Sivula et al., 2014).

### 3.2.2. Crowdsourcing in innovation management

The innovation management search phase can utilize crowdsourcing to find new ideas and forming megatrends which can then be used to implement new products and services (Sivula & Kantola, 2016). An organization should consider which ideas fall within its strategies and its capabilities before implementing an innovation. Crowdfunding an innovation can be used in micro, small and medium sized organizations to gain funding for developing products and services, moreover, market demand is tested during the crowdfunding campaign. Crowdsourcing can also be

utilized for commenting on and getting feedback about ideas and so ascertain whether an idea should be developed to innovation (Sivula & Kantola, 2016). The crowd can validate the need for a product or service which might be developed (c.f. Ulrich & Eppinger, 2012). An idea can be, therefore, diversified using crowdsourcing during the select phase. An organization might have several ideas which could lead to innovations and crowdsourcing could be used to find the innovations which have demand in the markets.

Product or service testing can be implemented using crowdsourcing during an innovation's implementation (Sivula & Kantola, 2016). However, not all products or services can be tested with crowdsourcing. In the IT industry it is easier to test products and services with crowdsourcing than in, for instance, the machine industry. Crowdsourcing can be utilized for implementing a development project either entirely or partly. This creates a situation where an organization should guide the crowd during the implementation and includes several tasks, which are for example: motivating, coordinating and rewarding. An organization can acquire ideas for developing a new product or service with crowdsourcing which might lead to the next innovation in the capture phase (Sivula & Kantola, 2016). Crowdsourcing can be utilized to create a new business area or a new product or service can be applied in new ways; which can then lead to the next innovations. Crowdsourcing can be used to increase an organization's reputation in the capture phase. An organization should always be active in discussions which the crowd generates because it can lead to negative feedback and, therefore, a negative reputation (Sivula & Kantola, 2016).

### 3.2.3. Crowdsourcing in project management

The initiation phase can include an evaluation of a project idea and an evaluation of the market situation for a forthcoming innovation; this evaluation can be implemented using crowdsourcing (Sivula & Kantola, 2014b). An organization can create interest around a forthcoming product or service with crowdsourcing and this way market the innovation in advance. This generates customers for the innovation which will be developed. The planning phase commonly includes more internal crowdsourcing than external crowdsourcing. Internal crowdsourcing can be utilized to create project plans. Modifying and commenting on a project plan is possible with internal crowdsourcing and can be achieved with crowdvoting or crowdevaluation (Sivula & Kantola, 2014b). A project can also be crowdfunded and, moreover, crowdsourcing can be utilized to find appropriate workers for a project (Sivula & Kantola, 2014b). These can be the external or internal activities of an organization.

The crowd can be kept as a part of the product or service development in the project execution phase (Sivula & Kantola, 2014b). This leads to more customer-focused products and services. The executing of a project can be implemented either entirely or partly by the crowd (c.f. Zhang, Wu, & Wu, 2015). An organization should coordinate a project's activities continuously during the development process. The testing or piloting of a new product or service can be implemented with crowdsourcing during the early stages of the development project. This provides knowledge of what are the possible shortcomings of an upcoming innovation and who are the end users. An organization may utilize crowdsourcing in the crowdgenerated advertising of an innovation in the closure phase (Sivula & Kantola, 2014b; c.f. Wang, 2010). A project's results can be evaluated through crowdsourcing which can lead to new products or services. A new product is usually sent to the funders if an organization has utilized crowdfunding to finance innovation development. Internal crowdsourcing can be used to implement the final project report (Sivula & Kantola, 2014b). Crowdsourcing can produce knowledge for the continuous improvement of a developed product or service, which might then launch a new project or improve a current product or service.

## 4. MODEL VERIFICATION METHODOLOGY

The developed model from this conceptual study was broadly verified in six case organizations which are acting in several industries. The main objective of the structured verification interviews was to research the usability and generalisation of the model in the organizations' holistic innovation management. The selection criteria were that the case organization should have implemented innovations and that crowdsourcing was utilized in their activities. Moreover, these six case organizations represent typical industries which are utilizing crowdsourcing in innovation production.

The respondents evaluated the model as a whole. Thus, all elements and the structure of the model were evaluated; including its usability. The research material, the results of earlier studies and the information about the model was sent to the respondents before the structured phone interviews took place. The respondents were familiar with innovation management and crowdsourcing utilization in their organizations and were acting in managerial positions. Therefore, these respondents have knowledge of how their organizations manage innovations holistically and, moreover, how crowdsourcing is applied in their holistic innovation management processes. The structured phone interviews were transcribed and carefully analysed and they provided the required information about: the model, an evaluation of adaptability and further research suggestions. The respondents evaluated the model using seven claims using a Likert scale. In the Likert scale the number 5 indicates the strongest agreement with the statement and number 1 is indicating the least.

## 5. VERIFICATION RESULTS OF THE MODEL

Verification of the model included seven claims which respondents rated to with a number on the Likert scale and by providing comments and feedback about the conceptual model. The claims which the respondents were required to assess were based on the earlier empirical research results (see Sivula & Kantola, 2014a; Sivula & Kantola, 2014b; Sivula & Kantola, 2016; Sivula et al., 2014). Moreover, innovation management and crowdsourcing literature was utilized to construct the verification claims. These claims were selected because the aim of the verification was also to understand the models adaptability from different angles. Results are presented in Table 2.

**Table 2.** Broad verification of the GCM for the holistic innovation management model.

| Industry | The model is useful | The model is easy to understand | The model is easy to adapt | The model creates agility for innovation management | The model enhances implementation of market pull innovations | The model matches the real world situation | The model fits my organization's innovation activities | Mean |
|---|---|---|---|---|---|---|---|---|
| Environment and energy technology | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 4.57 |
| ISP and other network services | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 3.71 |
| Management consulting | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4.71 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Media and publishing | 4 | 5 | 4 | 4 | 4 | 4 | 3 | 4.00 |
| Retail and consumer goods | 4 | 5 | 4 | 4 | 4 | 4 | 3 | 4.00 |
| Education | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 4.86 |
| **Mean** | **4.33** | **4.33** | **4.50** | **4.33** | **4.50** | **4.33** | **3.83** | **4.31** |

The first claim was about the model's usefulness and a high mean figure indicates that the model is useful in several industries. The second claim concerned understandability of the model and shows the model is easy to learn and, based on the interviews, does not require external consultation. The third claim concerned adaptability of the model and based on the interviews the model is adaptable in the case organizations. However, not all crowdsourcing implementation methods fit into every industry; although the model provides several ways to utilize crowdsourcing in innovation activities.

The fourth claim was about the agility of the model. An agile organization is using opportunities in its environment and is bright, flexible, intelligence and shrewd (Trzcielinski & Trzcielinska, 2011). The high mean indicates that the model creates agility for innovation management. In the interviews the respondents highlighted that an organization's agility is constructed from several activities and this model creates agility in innovation management. The fifth claim concerned the enhancement of market pull innovations and the respondents acknowledged that the model is market-oriented and that innovations which are implemented with the model could have higher demand in the markets.

The sixth claim concerned the relationship between the model and the real-world situation. The respondents acknowledge that the model matches the real-world situation. Some of the case organizations are already acting in this way in their innovation activities. Moreover, the respondents highlighted that the model will be useful in their industry in the future. The seventh claim concerned the model's usability in the case organizations and the model fitted in most of the case organizations. Innovation processes are not necessarily straightforward in organizations; there might be changes made between the phases in innovation and project management.

The respondents highlighted that the model can be adapted in their organizations. Firstly, utilization of the model provides a broader view for an organization's innovation activities. Secondly, customers and potential customers can be analyzed more closely and so provide more comprehensive information and links between the customers and an organization. Thirdly, the model provides new ways to create new products or services for an organization. This can be, for instance, building new mobile applications which would also create a link between the crowd and an organization. Fourthly, it was highlighted that it is important that the management of an organization is committed to the utilization of the model.

The respondents highlighted that crowdsourcing implementation methods which have been presented in the different phases in the model can be used widely and not just in a single phase of innovation management. Moreover, respondents highlighted that they acted in a similar fashion to that presented by the model. Finally, it can be concluded, based on the broad verification, that the GCM for holistic innovation management is generic and that it can be utilized and adapted in different industries and organizations.

# 6. CONCLUSIONS

This conceptual study focused on how crowdsourcing is generically utilized in holistic innovation management and as a result provided a GCM for the holistic innovation management model based on earlier empirical studies. This conceptual study provided a new model which includes three different crowdsourcing implementation categories: crowdknowledge, crowdresourcing and crowdfunding. The model could be utilized to create innovations which have more demand in the markets, because the crowd is a part of the holistic innovation management during every step. The model was broadly verified in six case organizations operating in different industries. The verification of the GCM for the holistic innovation management model indicates that the model can be utilized in several industries. Crowdsourcing can be employed in multiple management areas to provide knowledge, resources and funding for an organization.

This conceptual study provided theoretical implications. The GCM is a new model for science and can be utilized to categorize the crowdsourcing implementation methods which were in this conceptual study, for instance, crowd wisdom and macrotasking. The GCM can be applied to other research areas such as human resource management to categorize the crowdsourcing activities there as well. The GCM was applied to holistic innovation management in this conceptual study. A new approach has been provided for strategic management, innovation management and project management discussions in holistic terms.

Several managerial implications can be discussed based on this study. Firstly, an organization should be customer focused to utilize the model. Moreover, an organization should consider which crowdsourcing implementation methods perform best in their own industry's innovation activities. Secondly, managers should consider which tasks can be crowdsourced and provide value for an organization's innovations. Thirdly, crowdsourcing can be an organization's internal or external activity. Fourthly, the model's usability in an organization is broad. This research highlighted holistic innovation management, but the model can be adapted to other organizational functions as well. Every function in an organization, such as human resource management, operation management and marketing, should advance innovations and, therefore, the GCM for holistic innovation management can be adapted in any other area of an organization as well. However, an organization should consider which crowdsourcing activities would create value internally, externally or even both.

The limitation of the study is that it focuses only on an organization's holistic innovation management. The GCM could be applied in other management areas as well. More research is required into model utilization in management areas which are not directly involved in holistic innovation management. These can be, for instance, human resource or financial management. Research is also required into how the GCM for holistic innovation management should be launched in an organization where it does not exist. Holistic innovation management is not the concern of a single department in an organization, it should pass through an entire organization and this is also what the GCM for holistic innovation management highlights. Tidd and Bessant's generic innovation management model highlights the importance of an innovation culture in organizations. This study did not focus on innovation culture which therefore requires more research. Even though the model was verified broadly in six case organizations it would require longitudinal study to validate the model in the long run.

In conclusion, crowdsourcing offers a major potential for developing innovations which have demand in the markets. This research considered the GCM for the holistic innovation management model and which organizations might utilize it in their innovation activities. Moreover, the GCM can be utilized in science to categorize crowdsourcing implementation methods now and in the future.

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# Crowdsourcing in Strategic Management

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**Abstract:** A strategy is formulated and implemented based on a vision or goal of an organization. It is important that the strategy is constructed based on an organization's operative capabilities. An organization can have several strategies or just one.Strategic management can benefit from crowdsourcing in strategy formulation and implementation. Crowdsourcing is outsourcing a task to an undefined crowd and it can be an organization's internal or external activity. This paper contributesto how crowdsourcing is utilized in strategic management in modern organizations. The research is a multi-case study and includes organizations from a wide range of industries. The amount of crowdsourcing utilization varies based on the industry and organization. The effect of crowdsourcing activities is positive in strategic management and thus seems to be a useful way to act.
**Key words:** Crowdsourcing; Strategic management; Strategy; Strategy formulation; Strategy implementation

## 1 Introduction

Strategies act as guidelines for an organization's operations. An organization can have several strategies or just one.A main strategy is often said to be a corporate strategy and it can be considered the most important strategy of an organization[12]. An organization may have, for example, business strategies, technology strategies, and research, development, and innovation (RDI) strategies. Strategies of an organization can be static or dynamic.

An organization should produce products and services which add value for customers, possible customers, and other stakeholders. An organization should formulate and implement strategies which are more or less customer oriented. On the other hand, an organization should implement a corporate strategy which is defined mostly by the owners. Thus, formulation and implementing organizational strategies means combining knowledge from a variety of sources.

Crowdsourcing is an outsourcing activity where an undefined crowd performs a crowdsourced task [4]. Among strategic management an organization can benefit from crowdsourcing, for example, in innovation activities. Strategic management can benefit from crowdsourcingin various ways. Crowdsourcing can be an organization's external or internal activity and it can be more focused or less focused.

This research explores an organization's strategic management from a crowdsourcing point of view. The research isa multi-case study and includes 18 case organizations from a wide range of industry sectors. The research does not focus on organizations' strategies themselves but on static and dynamic strategic management and crowdsourcing utilization in them.

The results of the study indicate that organizations utilize crowdsourcing in several ways in strategic management. The results of crowdsourcing activities are seen as positive and add useful elements to strategies. Crowdsourcing adds value to strategy formulationand implementation processes. Organizations see strategic management mainly as the task of directors, managers, and owners. However, crowdsourcing can support these activities widely. Crowdsourcing can be utilized in strategy implementation to distribute knowledge and have the crowd commit more to, for example, an organization's products and services.

## 2 Theoretical Background

This section brings outthe theoretical framework of the study and it has up-to-date literature which is relevant tothis study. The research has two main focuses; which are an organization's strategic management and crowdsourcing. An organization's strategic management includes strategyformulation and implementation processes and can be static or dynamic.

### 2.1 Crowdsourcing

An organization is connected to customers and other stakeholders in multiple ways in its operations. The basic operation of an organization is to deliver itsproducts or services to customers and other organizations. It is important to stay in touch with customers, possible customers, employees, and other

individuals when formulating and implementing an organization's strategy. The opinion of stakeholders is important to organizations because it gives them a better chance of making a profit.

Crowdsourcing is constructed from two words: "crowd" and "sourcing". The crowd is constructedfrom customers, possible customers, and other individuals. Sourcing refers to outsourcing. Crowdsourcing is a task taking place inside or outside an organization in anundefined crowd. The crowd can be small or large. An organization does not define who is going to implement crowdsourced tasks. However, an organization does define the goal of the crowdsourcing activity which the crowd needs to pursue. Crowdsourcing can,for example,be implemented between different departments if the organization is large enough. Howe published his original crowdsourcing article in Wired magazine in 2006 [5]. Howe defines crowdsourcing as follows [4]:

*"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."*

Crowdsourcing can be used in different situations and can beutilized in an organization's strategic management. Crowdsourcing activities may include collaborative web platforms, but it is not necessary.Dawson has defined crowdsourcing as follows: *"Tapping the minds of many"*[3]. Dawson's definition is wider than Howe's definition and it includes all crowdsourcing types which are usingcrowds'knowledge somehow. Crowdfunding is not part of Dawson's definition from this point of view. Thus, Howe's definition seems to be moreinclusivebecause it includes more crowdsourcing types.

Brabham[1] claims that crowdsourcing is not open innovation. Open innovation can be seen as one form of product development. Open innovation is open to everyone. An example of open innovation is open source. Anyone can modify a source code and create a new product based on it. Linux is an open source product which anyone can use and modify freely. All the parts of a product are made available to everyone in open innovation. Open innovation collects and releases projects outside of an organization.

Crowdsourcing is an act taking place inside or outside of an organization and involves collecting results from the crowd. An organization can receive innovation, profit and results based on knowledge collected with crowdsourcing activities. Unlike in open innovation projects or possible project ideas are not released to the outside in crowdsourcing. A common example of crowdsourcing is Wikipedia where anyone can write an article and modify existing ones. An example of crowdsourced RDI activities is the InnoCentive service where the crowd is working with organizations' RDI problems[6]. The motivation for solving the problem is a reward; which changes based on the difficultyof the problem.

Crowdfunding can be used for collecting micro or macro amounts of capital; for example, for an organization or a project [11]. Anyone can participate and donate capital to a crowdfunded project. Commonly the funder receives the product which will be developed if the organization receives enough funding for the project's implementation. Other compensation types can be, for example, royalties or shares in the company which will be established when a product is ready. Crowdfunding alwaysneeds tohave an objective. If the crowd is funding a product or servicetheorganization should implement it and fulfill all of the promises the organization has made.

## 2.2 Strategy

Strategy is an organizational instrument which guides an organization's operations. The main strategy of an organization isdefined as itscorporate strategy. Organizations can have multiple strategies. Johnson, Whittington, Scholes, Angwim, and Regnér[7] define strategy as the long term direction of an organization. Thus, strategy is the plan to reach thevision or goal that the directors, managers, and owners of an organization have specified.

Strategies can be also be created for a short term and they can be formulated, for example,for different departments or functions of an organization. On the other hand, an organization should have a corporate strategy which all of the departments and organizational functions will follow. Thus, a corporate strategy addresses all of the organization's business units strategies [12]**.** An organization may have a corporate strategy which includes the most crucial activities of the organization. A corporate strategy may be implemented over a short or long time period of time.

A business strategy is formed for a single industry or business area and is focusing on improving an organization's position within a specific industry or market segment [16]. Business strategy can be competitive or cooperative. Competitive business strategy is implemented when an organization is battling against all of its competitors for advancement. Cooperative business strategy is created when an organization wants to work with other competitors to gain benefits.

Operative strategies are lower level strategies and they are concerned with how an organization can deliver effectively the corporate and business strategies in the terms of resources, processes, and

employees [7]. An organization's operative strategy brings out the ways how an organization is going to implement what it is pursuing.

An organization may also have a separate RDI strategy. Still, it is quite common that RDI definitions are included in other strategies. A common way in a technological organization is to implement a technology strategy. A technology strategy is an organization's way to the development and use of technology [16]. On the other hand, strategic choices can be defined also in corporate or business strategies. Thus, there is not a single or best way to produce a strategy or strategies for an organization.

**2.3 Strategic management**

Strategic management is the formulation and implementation of an organization's strategies. Strategic formulation is a logical activity which includes identifying opportunities and treatsin the business environment and attaching an estimate of risk to the discernible alternatives [10]. The principal sub activitiesof strategy formulation include, for example, capability and market segment identification. This section brings out three strategic management models. Two models are static and one is dynamic. The static strategic management modelsaim for a process wherethe strategy is first planned and then strictly implemented after planning. Dynamic strategic management is refreshing strategy constantly if change occurs, for example, in business environment.

First model is Porter's wheel of competitive strategy and it is said to be the classic approach for strategy formulation. Porter's approach to strategy formulation is based on a combination of goals which an organization is striving for and the policies by which it is seeking to get there [12]. Porter's model involves in essence different tracks to a competitive advantage combining choices about the type of competitive advantage sought with the scope of the strategic destination in which the competitive advantage is to be achieved [12]. Figure 1 is illustrating Porter's wheel of competitive strategy.



**Figure 1    Porter's Wheel of Competitive Strategy [13]**

Porter argues that the wheel of competitive strategy is a device for articulating the key aspects of an organization on competitive strategy on a single page. In the center of the wheel are an organization's goals which can be widely defined. The spokes of the wheel are the key operating policies. Policies must radiate and reflect the goals and must be connected to each other [13]. Porter stresses that management can be more specific or less specific when articulating these key operating policies.

The second model is Day's integrated pattern of choices. The model includes four directions, which are: arena, advantage, access, and activities. Day highlights that change in one will affect other directions[2]. Change one and all of the other elements of the strategy have to be changed. An organization should select the best direction from the model. The choice depends on making sense of a myriad of events, trends, cross-currents, and how the business will spread[2]. Figure 2 is illustrating Day's model of an integrated pattern of choices.
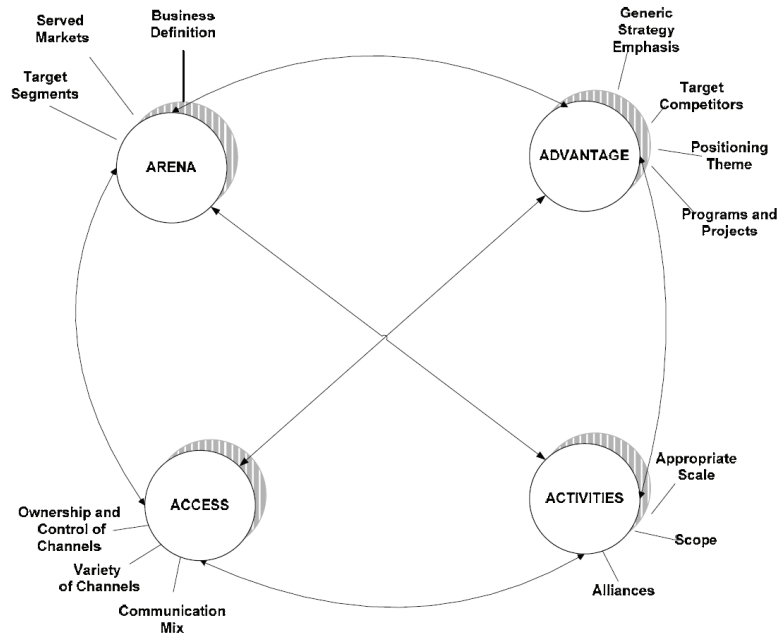
**Figure 2    Strategy as an Integrated Pattern of Choices** [2]

Day emphasis that the strategy direction is set by four choices. Arena consistsof the markets which an organizationis serving, business definition, and target segments. Advantage is the position theme that differentiates the business from its competitors. Access is the communication and distribution channels used to reach the markets. Activities consist of appropriate scale, scope of activities to be performed, and alliances [2].



The External World Metaphor          The Business World Metaphor          The Company World Metaphor

The Product World Metaphor          The Buyer World Metaphor

**Figure 3    Five Metaphors of Continuous Strategy Ontology** [15, 8]

The modern business environment is changing faster than ever.Strategy formulators are trying to predict the future and its happenings as precisely as they can [8]. Strategies should change when, for

example, the business environment changes. Dynamic strategies are supporting an organization's managers to understand the rapidly changing business environment more closely. Dynamic strategies are formulated and implemented based on the situation in the business environment. The third model is dynamic and it is introduced by Vanharanta [15]. Vanharanta's model is based on ontology and it has six different metaphors which forms an organizations' dynamic strategy.One metaphor includes three dimensions and three projections. Figure 3 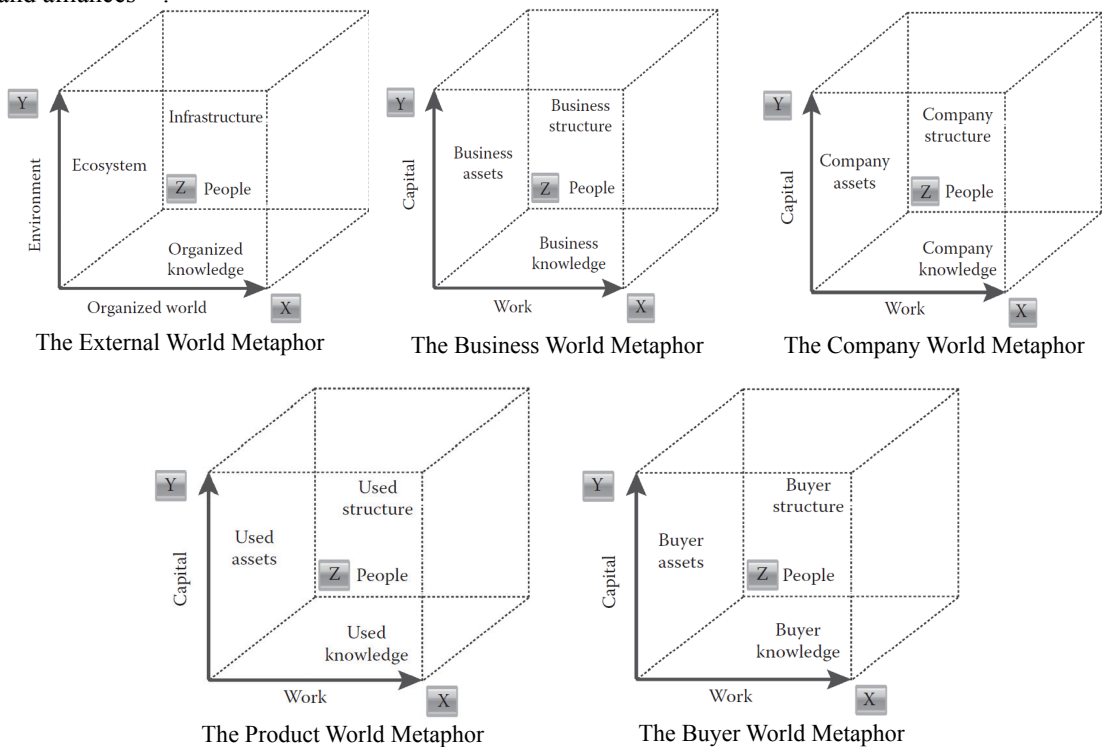is illustrating the external world metaphor, the business world metaphor, the company world metaphor, the product world metaphor, and the buyer world metaphor.

The metaphors illustrated in figure 3 are presenting the matters which are important for an organization's business activities. An organization can manage the metaphors and add value to its businesses with the metaphors. Metaphors also facilitate holistic understanding of management issues, business interrelationships, and company characteristics [15]. The external world metaphor is the largest-scale link in the metaphor chain that support continuous strategy.Environment, organized world, and people are the most important components in the metaphor [15]. The business world metaphor is constructed with the three fundamental components of businesses: capital, work, and people [15].

The company world metaphor defines an organization's characteristics, capital, and work. People and their activities are placed on the metaphor which includes, for example, financing, operations, and management[15]. The company world metaphor is the most crucial link in the metaphor chain. The product world metaphor includes all of the projections that characterizes the creation of a product which are: quantity of assets (used assets), activities inside and outside of an organization (structure used), and activities for creating the product with a finite amount of knowledge (knowledge used) [15]. The buyer world metaphor highlights the relationships between producer, product, and buyer [15]. The sixth metaphor depicts the metaphor chain of the five in active use. The sixth metaphor of the chain is the company continuum metaphor and it is illustrated in figure 4.
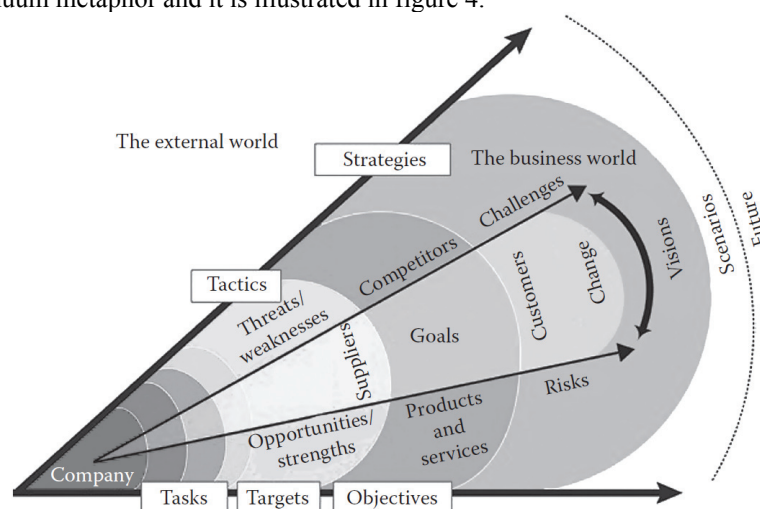


**Figure 4    The Company Continuum Metaphor of Continuous Strategy Ontology [15, 8]**

The company continuum metaphor's aim is combine the dynamic contents of data, information and knowledge in the metaphors chain [15]. The flags in the company continuum metaphors illustrates people who accomplish an organization's growth. The continuous strategy ontology is holistic understanding for managing and value creation for an organization.The company continuum metaphor can be imaged to be an integrated implementation method using a knowledge oriented environment or a concept map for navigating in and combining the dynamic contents of metaphors in the metaphor chain [15].

The continuous strategy ontology is constructed with metaphorical insight in the company which is seen as part of the living system. Metaphors illustrate conceptual models and they are utilized to implement a coherent picture of the real world that exists inside and outsideof an organization[15]. The model can be used for formulating and implementing dynamic strategies which are changing constantly. Vanharanta highlights that these metaphors can be supported with an organization's information technology (IT) systems.

The continuous strategy ontology model is one of the most usefulmodelsfrom a crowdsourcing point of view because crowdsourcing can be utilized for constantly revising strategy by using internal

and external individuals in the crowd.Market demands are affecting an organization's strategies through the crowd which leads to more market oriented strategies. Thus, this creates pressure inside an organization to implement more valuable products and services to the crowd which are, in the final stage, sold to the crowds' individuals.

## 3 Methodology

The research is based on case studies. The case organizations are implementing strategic management activities in their organizations and are familiar with crowdsourcing. Multiple persons were invited to research sessions. The number of respondents per organization was from one to nine persons. The case organizations are micro, small, medium, and large. The respondents were operating in top management, middle management, line management, RDI management, project management, or were specialists.

The empirical data of this study was collected using interviews and a web survey. The study included 18 case organizations from a wide range of industry sectors. The total number of respondents for the interviews and survey was 44 persons. In total, 31 persons participated in interview sessions where they were group interviewed in their organizations. Of the 31 persons who took part in the interviews 29 also responded to the survey which means that two only participated in the interviews. The survey had 42 respondents in total. The industries involved included communications, measurement device manufacturing, communications and relationships, consulting, communications and networks, logistics, aviation, communications and financing, information technology, energy and the environment, publishing, software and systems, education, news, and confectionary.

The researcher introduced the research area to the respondents. The survey had 109 questions which were qualitative and quantitative questions. The survey included questions and answers which are not relevant to this study. These questions and answers were excluded from this paper. The terms used in this study were introduced to the respondents. A common understanding of the study was required in the case organizations before answering the web survey and taking part in the interview.

The study is qualitative and the analysis of the answers was implemented using qualitative methods. The results include an analysis of crowdsourcing utilization fromastrategy formulation and implementation point of view. Crowdsourcing is discussed and analyzed via static and dynamic strategic management and incorporatedinto strategic management.

## 4 Findings

This section sheds lighton the results of the study. First the results are divided into internal and external crowdsourcing activities in strategic management. Second the results are embedded into existing knowledge of static and dynamic strategic management.

Strategic management is about the formulation and implementation of an organization's strategy. Managers and employeesexecute strategy based on an organization's interests. An organization can have multiple level strategies or just a single one. This is commonly based on an organization's size. Strategyformulation and implementation can benefit from crowdsourcing. Thus, crowdsourcing creates knowledge in an organization, for example, about markets and customers. Crowd includes customers, possible customers, and other individuals including an organization's own employees.

Crowdsourcing can be the strategic choice of an organization because it brings new knowledge to directors, managers, and other shareholders to support strategic management. Based on this study internal and external crowdsourcing exists in an organization's strategic management. However, crowdsourcing is not utilized in every organization. These organizations point out that formulation and implementationof strategy is the task of directors, managers, and executive groups. Still, most case organizations are utilizing crowdsourcing in several ways based on this study.

### 4.1 Internal crowdsourcing activities in strategic management

Internal crowdsourcing tasks are carried out inside of an organization. Internal crowdsourcing activities are targeted mainly at employees. However, an organization should be large enough so that internal crowdsourcing tasks could be implemented as a part of strategic management. On the other hand, all size organizations can benefit from external crowdsourcing.

An organization can involve employees in the strategic formulation process with crowdsourcing. An organization can send questionnaires to employees, for example, to find out which thematic areas are important from an employees' point of view. These can be, for example, simple queries to strengthen or change assumptions which directorsand managers have. On the other hand, this can create new

knowledge for directorsand managers about how an organization should proceed in the future. Employees' can keep strategy based questionnaires as trivial and do not see the point of the questionnaires. Thus, managers should always pay attention and highlight the importance of theinternal crowdsourcing activities.

Values are important to an organization'sstrategic management. It is common that employees participate in the value creation process. Values are requested from all employees in an organization. Directors and managers get a lot of different values which describe an organization and its activities. On the other hand, directors and managers can implement voting of predefined values to employees. This is common when the directors and managers of an organization want to define values but want to know which values are most important to employees.

Crowdsourcing can also be used for changing the employee'sperceptionoforganization related matters. This supports communication and implementation of strategy. Employees can be more committed to strategy when they have participated in the strategy formulation process. On the other hand, directors and managers should understand that the opinion of owners always comes first and it should be followed in strategy formulation. Nevertheless, engagement of employees makes strategy communication and implementation easier. However, an organization should consider which channels to use in communications.

Open executive board is utilized in organizations and it can be identified as an internal crowdsourcing activity. Anyone inside of an organization can participate in open executive board meetings. Meetings enablethe possibility for employees to bring ideas to the executive board which may lead to innovations inside and outside of an organization. On the other hand, open executive board meetings can grow too big if all can access them. Thus, an organization should consider when to use open access executive boardsand which businesses would benefit from these activities.

Strategy implementation can be measured with internal crowdsourcing. The results of measurements create knowledge of how well employees of an organization have understood strategy. On the other hand, measures also create knowledge of how well managers have communicated strategy and its aspects in an organization. This information could be used for understanding overall management performance in an organization. Management compensation systems could be based in part on this knowledge.

Crowdsourcing, in its nature, is at least partly anIT based activity. Some organizations have its own crowdsourcing IT systems. However, common IT systems, such as email and internal collaboration tools, are used for crowdsourcing activities.Still, an organization could implement crowdsourcing tasks in part with IT systems. Frequently organizationsare utilizing IT systems to gain knowledge of which individuals from the crowd arethe active onesand are participating or could participate in an organization's activities.

### 4.2 External crowdsourcing activities in strategic management

External crowdsourcing tasks are executed outside of an organization and can be implemented in every size of organization to create knowledge. External knowledge may also create new innovations for an organization. These innovations normally have a high demand on the markets. Thus, an organization is lowering the risk ofthe possible failure of an innovation launch when ideas are also collectedfrom outside of an organization. External crowdsourcing activities support strategic management in several ways.

Crowdsourcing is utilized to scan weak signals and forming megatrends in the markets. Crowd can have more knowledge than a single individual or a group of people inside an organization. An organization should recognizemegatrends and weak signals in strategic management because these have an influence on an organization's strategies. Corporate strategy may stay the interest of an organization's owners but, for example, RDI strategy could have a major effect on new technologies or competitors' products and services. However, an organization should analyze carefully which signals it will respond to,based onits operational capabilities.

Market research is important for collecting information about markets and customers. Crowdsourcing can be useful in market research. The crowd can give advice on how marketscould actin specific situations. A crowd's individuals can create knowledge where an organization's products or services would performthe best. This can open up new markets for an organization and support market penetration. The knowledgeis useful when an organization is implementing or refreshing its strategies. An organization can use this knowledge for finding new business areas which may have a wide effect on an organization's strategic management.

Strategies can guide an organization to a new position in the markets. Strategies include

development steps for an organization and can include new product or service development plans. An organization can utilize crowdsourcing to gain knowledge about which innovations could have a demand in the markets. Organizationsthat gain knowledge about the products and services which it offers can use this knowledge in strategic management when formulating strategyInnovations can be incremental, really new, or radical. However, an organization should consider which relevant development ideas are best to develop. Crowd can give ideas which an organization is not able to implement within its capabilities.

The crowdsourcing can be used for defining what an organization's products and services are and what they mean for the crowd. An organization could gain knowledge about a product's or service's usage in the markets. The crowd could experience an organization's products and services in another way than the organization which is producing the products and services thought they would. This knowledge can be utilized when formulating and implementing strategy. In strategy formulation an organization can create strategy which is more customer focused because of this knowledge. On the other hand, implementation of strategy becomes easier because managershave knowledgeabout how the markets are experiencingan organization's products and services.

Crowdsourcing is also adjustingthe crowd's point of view to an organization's products and servicesduring strategy implementation. Crowdsourcing is an enabler for these activities. It can be utilized for opening discussions for the crowd and justifying crowds' point of view. An organization should carefully analyze the responses of the crowd. However, organizations should not argue with the crowds' individuals.An organization should understand why the crowd is acting as it does and alter the crowds' point of view. This might also be a threat to an organization. An organization's reputation is on the line in these activities. Thus, an organization should always be active in the IT environments and social networks that it selects.

External crowdsourcing is implemented in several web based IT systems. Organizations owningexternal crowdsourcing platforms are mostly collaboration based. External crowd can give opinions for specific matters through the web platforms. Organizations are using, for example, blog platforms to activate the crowd. An organization's employee can write a blog entry where the crowd can comment on matters related to what is written. An organization can gain benefit from these comments in strategic management. Organizations are also using external social network platforms like Facebook and Twitter to gaining knowledge from the crowd.

**4.3 Embedding findings to static and dynamic strategic management**

Two main crowdsourcing implementations were identified in this study: internal and external. Both can be valuable to an organization's strategic management. However, an organization's size limits internal crowdsourcing activities. Three different strategic management models were introduced in this study. Porter's and Day's models are defined in this study as static. Vanharanta's model is defined as a dynamic one. This section discusses crowdsourcing utilization in static and dynamic strategic management.
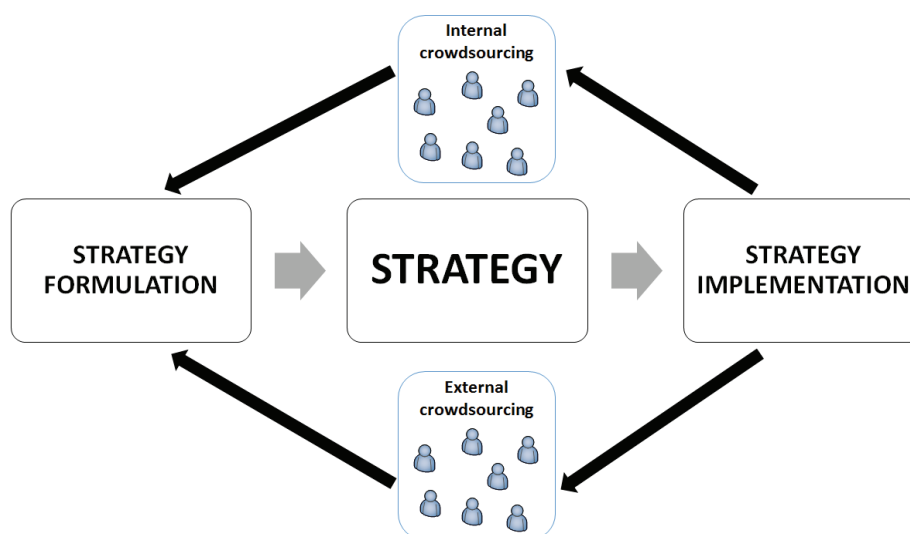


**Figure 5    Crowdsourcing Usage in Static Strategic Management**

Crowdsourcing can be utilized in static strategic management. Static strategic management models include several tasks which can be implemented in strategy formulation. These tasks include, for example, analyzing business opportunities, internal capabilities of an organization, and environment analysis. An organization should collect knowledge widely both inside and outside of an organization before strategy formulation and during strategy implementation. Markets can be analyzed using crowdsourcing to find appropriate or totally new market segments. On the other hand, an organization should consider which markets are appropriate for its capabilities. Figure 5 is illustrating crowdsourcing usage in static strategic management.

External crowd can be also be used as workers in an organization as figure 5 is illustrating. This can mean, for example in the IT industry, using crowd to implemented modules for an IT system. This is quite common in the field of open source. An organization can partly rely on the crowds' knowledge. This can mean a smaller amount of resources being required inside the organization. However, platforms like Freelancer can provide crowd employees which can implement a project in part or completely. On the other hand, an organization should consider the quality of the results and be precise in its requirements. Crowd employeescan require reward for the work they implement. On the other hand, the motivation can also be learning and knowledge about an organization's forthcoming products or services. Other motivations are, for example, altruism, fun, becoming an expert in some minor field, as well as other social rewards [9]. An organization can affect the crowd and its knowledge with crowdsourcing during strategy implementation as illustrated in figure 5. Thus, an organization can change the crowds' opinions of its products and services during strategy implementation.

Dynamic strategic management models can benefit crowdsourcing more than static models. Dynamic strategies are changed when changes occurs, for example, in an organization's business environment. Vanharanta's model highlights metaphors which are relevant to an organization's strategies. Based on the metaphors it is possible to implement a crowdsourcing IT system which, for example, analyses markets using crowdsourcing. Crowd can, for example, answer questions which are related to an organization's metaphors.Dynamic strategy is then constantly changing based on the crowds' answers. An organization should be extremely versatilewhen adapting new manners to gain benefit from dynamic strategy. Figure 6 is illustrating crowdsourcing utilization in dynamic strategic management.
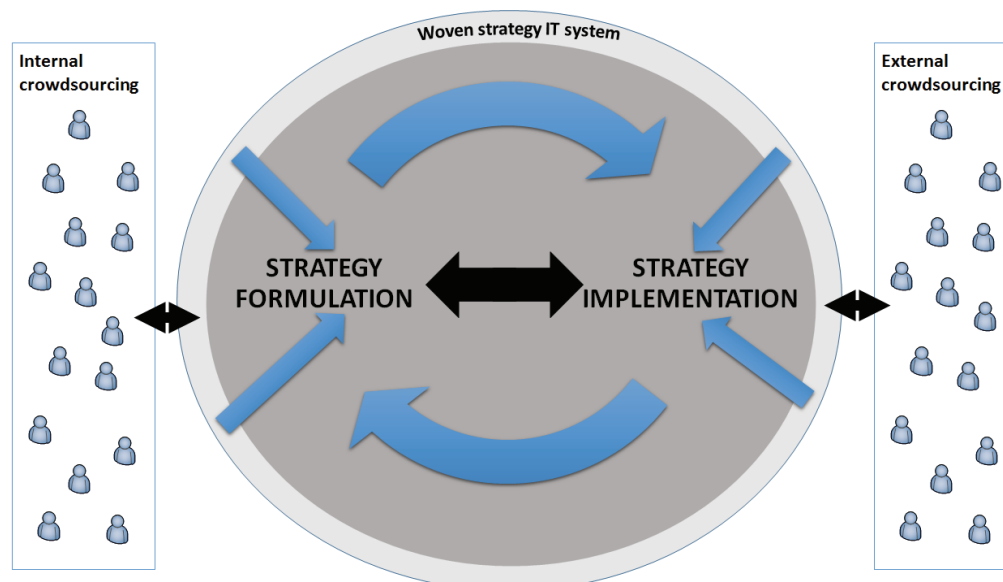


**Figure 6　Crowdsourcing Usage in Dynamic Strategic Management**

Dynamic strategies can also be called woven strategies. Salo argues that ITsystems can support strategic management [14]. Crowdsourcing can be utilized for collecting knowledge from the crowd using IT systems. An organization can implement a questionnaire where the crowd can give answers. The questionnaire should be simple enough so that an organization could gain more knowledge from the crowd. If questions are too difficult or the questionnaire is too long it might lead to a failure in knowledge collection. Crowd can give input to IT system which then processes the data and generates output for directors and managers. Directors and managers can then use this knowledge to make more

profitable decisions. As presented in figure 6the crowd can have an effect on an organization's dynamic strategy through the woven strategy IT system. An organization can also affect the crowd's opinion of its products and services through crowdsourcing in dynamic strategic management. Nevertheless, an organization can have dynamic and static strategies which makes an organization more stable.

**4.4 Discussions**

Crowdsourcing can be an internal or external activity of an organization and it can be used in both static and dynamic strategic management. Crowdsourcing is defined by the directors and managers of an organization. Crowdsourcing iswidely definedin organizations and it is utilized inthe formulation and implementation processes of different level strategies. Thus, an organization should recognize what crowdsourcing really means in their organization. This way directors and managers can utilize crowdsourcing more effectively. Some case organizations consider crowdsourcing to be a part of an organization's culture. Thus, it cannot be separated from an organization's activities and it has a crucial role in everyday operations.

Directors and managers formulateand implementstrategies. Strategy formulation and implementation can be supported with crowdsourcing. Strategy formulators and executorsplay a crucial role in an organization. Directors and managers should be aware that they do not necessarily understand everything that is happening in the markets. Crowdsourcing can be a model for collecting new knowledge to support strategic management. Nevertheless, static and dynamic strategic management can benefit from crowdsourcingin several ways.

Based on this study, strategy is easier to put into practice with internal crowdsourcing. An organization's employees are more committed to the strategy if they have the possibility to take part in the strategy formulation. Thus, communication of the strategy becomes easier with crowdsourcing because employees already have knowledge about the strategy before implementation. An organization should utilize internal and external knowledge while formulating and implementing strategies. This knowledge gives an organization understanding about the markets along with other key themes which are required to formulate the strategy.

## 5 Conclusions

This paper has researched how crowdsourcing is utilized in strategic management. The results indicate that crowdsourcing can be utilized in several ways. However, the benefits of crowdsourcingin an organization's strategic management should be considered carefully. This research highlightedwhich crowdsourcing implementationsorganizations can use in the strategy formulation and implementation processes.

Strategy implementation encompassesexecutinga strategy. This means several things inside and outside of an organization. Crowdsourcing utilization in strategy implementation adds to an employee's commitment to the strategy inside an organization. Thus, employees should participate in strategyformulation. However, some parts of the strategy cannot be crowdsourced. Crowdsourcing can be utilized for gathering customers, possible customers, or other individuals to participate in an organization's activities. This means more than just buying an organization's products and services.

Crowdsourcing is not necessarily a formally recognized operation in organizations based on this research. However, organizations are using crowdsourcing internally and externally in several ways to gathering knowledge to support strategic management. On the other hand, crowdsourcing can also be a strategic choice in organizations. An organization can see crowdsourcing as a valuable tool for understanding the needs of the markets.

Crowdsourcing is tapping an organization's internal and external crowds' mind. The crowd consists of multiple individuals who are interested in an organization's products and services. An organization's crowd may consist of only those persons who might be already customers. Thus, an organization should find individuals who are not part of the crowd already. These individuals can give ideas for an organization which might lead to innovative products and services or even to new markets.

This research has focused on crowdsourcing utilization in strategic management in a wide range of industry sectors. More industry specific research is required on crowdsourcing utilization in an organization's activities. Moreover, research is required on organizations' strategic choices and crowdsourcing. Based on this research crowdsourcing can be an organization's strategic choice and it can be seen as vital in an organization's activities.Nevertheless, proper use of crowdsourcing can be an organization's competitive advantage.

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# Combining crowdsourcing and Porter's value chain

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Porter's value chain consists of operations which are required to provide a product or service to the customer. Customers, possible customers, and other individuals can be a part of Porter's value chain in several ways. Crowdsourcing is a task taking place inside or outside the normal organizational setup in an undefined crowd. This paper introduces the application of crowdsourcing to Porter's value chain which consists of primary and support activities. The research is a multi-case study and includes 18 organizations from a wide range of industry sectors. The organizations are micro, small, medium, and large size corporations.

**Keywords:** crowdsourcing; industrial management; Porter's value chain; supply chain

## 1. Introduction

A customer is an important role in the value chain because the customer is the end user of the product or service. A value chain can be either simple or complex. A value chain may include downloading an image from a web server or producing a totally new technology for a customer. Both of these value chains include multiple steps to make a product or service available to the markets. A value chain and supply chain include the same elements. Wang [1] highlights that a supply chain includes two or more parties linked by a flow of goods, information, and funds. The length of the value chain is based on, for example, the organization, industry, and customer. Modern value chains include IT systems which are networked with each other. The end user or possible end user can take part in an organization's value chain.

An organization is connected to customers in many ways. Mainly organizations are selling their products or services to customers. It is important to obtain the opinion of customers, potential customers, employees, and other stakeholders when delivering a product or service to the customer. The opinion of the customer is important to organizations because it can improve a product or service and achieve innovations for an organization.

Crowdsourcing is taking a task either inside or outside of an organization to an undefined crowd.[2] In general a task is implemented by a designated agent who is normally an employee of the organization. Crowdsourcing is constructed from two words: "crowd" and "sourcing." Sourcing refers to outsourcing. Customers, potential customers, employees, and other individuals are a part of the crowd. Organizations can utilize crowdsourcing in several ways in their value chains.

Products and services are produced commonly for customers and this also can be seen in Porter's value chain. However, customers, possible customers, and other individuals are not necessarily part of Porter's value chain and its processes. Thus, crowdsourcing can be utilized for including undefined crowd to an organization's value chain. This paper is extending Porter's value chain with crowdsourcing points of view.

The research studies how crowdsourcing is used in Porter's value chain from the primary and support activities point of view. A value chain includes all of the activities which are relevant to provide a product or service to the customer.[3] A value chain includes the supply chain of a product or service which also includes logistics. Research exists about Porter's value chain and crowdsourcing. However, research about crowdsourcing utilization in Porter's value chain does not exist. This study is filling the gap in the research.

## 2. Theoretical background

The theoretical framework of the study is highlighted in this section. The section brings out literature which is relevant to the study. The first section introduces Porter's value chain and the second crowdsourcing from an organization's point of view.

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### 2.1. Porter's value chain

Porter's value chain varies, for example, based on the organization and industry and it includes the supply chain. De Waart and Kemper [4] defines a supply chain as all the processes and activities involved in the planning, movement, and repair of materials to enable after-sales support of the company's product. Porter introduced the value chain in 1985.[3] The value chain includes all the operations which are necessary for a specific industry to deliver a valuable product or service to the markets and customer. Figure 1 is illustrating Porter's value chain.

Product and service industries can take advantage of Porter's value chain. This research is focusing on both industries and value chains. Porter's value chain comprises primary and support activities. The value chain includes a margin which is the value that an organization receives from a product or service. Thus, it connects primary and support activities.

Primary activities are defined as product and market-related processes. These processes are required to provide the product to markets. Inbound logistics are, for example, processes which are necessary for receiving, storing, and distributing. Operations are transformation activities that change all inputs into outputs. Output logistics consist of processes which are necessary for delivery of a final product or service to the customer. Marketing and sales processes are required for making a product or service tempting to a customer. The aim of marketing is to satisfy customers' needs.[5] Service includes all processes which are required to keep a product or service valuable and tempting to a customer. Services are, for example, commonly offered for an organization's products in the form of customer service.

Support activities are classified as an organization's infrastructure, human resource management, technology development, and procurement. Infrastructure includes an organization's functions which are required to maintain the daily operations. Human resource management includes operations of recruiting, training, motivating, and retaining the work force. Technology development activities are related to an organization's technological knowledge, hardware, and software. Procurement is an organization's activity to gain the resources it needs to operate.[6]

### 2.2. Crowdsourcing

An organization is constantly connected to customers. At least organizations are selling their products or services to customers. It is important to stay in touch with customers, possible customers, employees, or other individuals when an organization's products and services are delivered to them. The opinion of stakeholders is important to an organization because of the better chance of profit.

Crowdsourcing is constructed from two words: "crowd" and "sourcing." Sourcing refers to outsourcing. Crowdsourcing is a task taking place inside or outside of the organization in an undefined crowd. Crowdsourcing can be implemented, for example, between different departments if the organization is large enough. Howe published his original crowdsourcing article in Wired magazine in 2006.[2] Howe defines crowdsourcing as follows:[7]
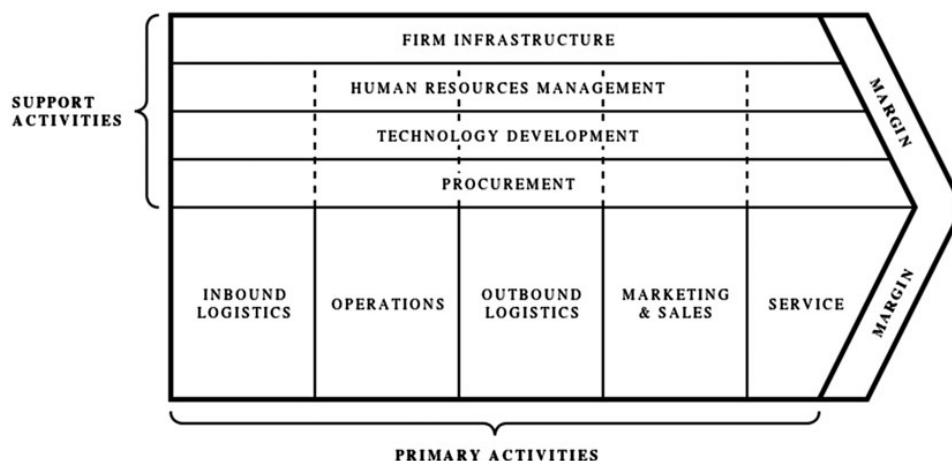


Figure 1.   Porter's value chain.[3]

"*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.*"

Crowdsourcing can be used in various situations and it can be contained in Porter's value chain. Crowdsourcing activities may include IT systems, but it is not necessary. Dawson has defined crowdsourcing as follows: *"Tapping the minds of many"*.[8] From one point of view Dawson's definition is more extensive because it includes crowdsourcing types which are using the crowds' knowledge somehow and from another point of view Howe's definition is more extensive because it includes more crowdsourcing types.

Brabham [9] argues that crowdsourcing should not be confused with open innovation. Open innovation can be seen as one form of a product's or service's development. Open innovation is open to everyone. An example of open innovation is open source. Anyone can modify the source code and create a new product based on it. Linux is an open source product which anyone can utilize freely. All the parts of a product are made available to everyone in open innovation. Open innovation collects and releases research, development, and innovation (RDI) projects outside of an organization.

Crowdsourcing is also about collecting results from the crowd. An organization receives profit and results from crowdsourcing activities and its implementations. Projects or possible projects are not released to the outside in crowdsourcing. A common example of crowdsourcing is Wikipedia where anyone can write an article and modify existing ones. Crowd wisdom, crowd creation, and crowdfunding are types of crowdsourcing.

Crowd wisdom is one of the most commonly utilized crowdsourcing types.[10] Crowd wisdom can be utilized, for example, to extend a new product or service features during product or service development. An organization's employee's knowledge can be extended with the use of crowdsourcing which can be either internal or external. Generally development of a product or service includes a testing phase. Crowd wisdom generates knowledge for an organization for improvements to a new product or service. Crowd can collectively give opinions which make a product or service more useful and tempting for a customer.

Crowd creation is a second type of crowdsourcing. Customers, potential customers, or other individuals are participating in an organization's activities the same as employees.[11] A crowd creation task can have a loose definition and the nature of the task is creative.[12] Crowd can, for example, partly implement projects. This can be, for example, programming an IT system for an organization. This is quite common in open source communities. An organization should monitor constantly the crowd creation activities and estimate its quality during implementation.

A third type of crowdsourcing is crowdfunding and it can be utilized for collecting micro or macro amounts of capital, for example, for an organization or project.[13] Anyone can participate and donate capital to a crowdfunded project or even an organization. Commonly the funder receives the product which will be developed if the organization receives enough funding for the project's implementation. Other compensation types can be, for example, royalties or shares in the company which will be established when the product is ready. An example of a crowdfunding platform is Indiegogo where projects can be financed by the crowd with crowdfunding campaigns.[14] Crowdfunding campaigns need to have a goal. If the crowd is funding a project an organization should implement it and bring out all the results which the organization has promised in the crowdfunding campaign.

## 3. Methodology

This paper is a multi-case study and it includes several industries. Research sessions were carried out in the case study organizations. Multiple persons were invited to research sessions. The number of respondents per organization was from one to nine persons. The case study organizations are micro, small, medium, and large. The respondents were in top management, middle management, line management, RDI management, project management, or were specialists. Figure 2 is illustrating the respondent distribution of the study.

The empirical data of this study was collected using interviews and a web survey. The study included 18 case study organizations from a wide range of industry sectors. The total number of respondents for the interviews and survey was 44 persons. In total, 31 persons participated in the interview sessions where they were group interviewed in their organizations; of the 31 persons who took part in the interviews 29 also responded to the survey which means that two only participated in the interviews. Thus, the survey had 42 respondents in total.

The industries involved included communications, measurement device manufacturing, communications and relationships, consulting, communications and networks, logistics, aviation, communications and financing, information technology, energy and the environment, publishing, software and systems, education, news, and confectionary. Thus both product and service industries were involved in the study.

The researcher introduced the research area to the respondents. The survey had 109 questions which were qualitative and quantitative questions. The survey included questions and answers which are not relevant to this study. These
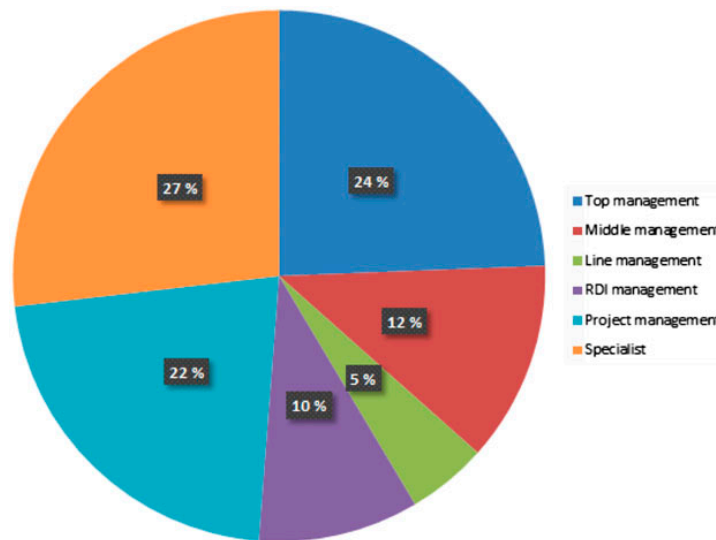
Figure 2.    Respondent distribution of the study.

questions and answers were excluded from this paper. Question types which are included in this paper are mainly open and are brought out in the findings section.

The terms used were likewise introduced to the respondents. A common understanding of the study was required in the case study organizations before answering the web survey and taking part in the interview. Crowdsourcing types are discussed from Porter's value chain point of view. Taxonomy is implemented using the value chain's two main categories; which are primary and support activities. The study contains qualitative methods in data gathering and analysis.

## 4. Findings

This section highlights crowdsourcing implementations which were realized in the case study organizations. The section discusses crowdsourcing implementations via Porter's value chain. The taxonomy is implemented based on the value chain and it is divided into two parts: primary and support activities. Both activities can benefit from crowdsourcing based on this study. Two crowdsourcing implementations where identified in this study. Figure 3 is illustrating internal and external crowdsourcing usage in case study organizations based on the survey.

Case study organizations are utilizing internal and external crowdsourcing which can be identified as private and public activities of an organization. Based on this study internal crowdsourcing is utilized more, however, both crowdsourcing implementations are used and seen as useful. Figure 4 is illustrating crowdsourcing usefulness in the case study organizations.

Crowdsourcing in a useful model in the case study organizations as presented in figure 4. Crowdsourcing can be a crucial part of an organization's activities which raises its importance. Some organizations utilize crowdsourcing less and could use it more. Still, crowdsourcing is a new model for some industries and organizations. However, it enables, for example, innovations which have demand in the markets.

Innovations keep modern businesses alive. Organizations should implement innovations which have customers in the market. This means that an organization should always keep customers, possible customers, and other individuals as a part of its activities. Crowdsourcing imports internal and external knowledge more extensively to an organization's activities. An organization can benefit from crowdsourcing, for example, when implementing innovations. An organization can receive information about the market situation of a forthcoming product or service before it is carried out using crowdsourcing. This can conserve an organization's resources.

Based on this study, marketing and RDI departments are utilizing crowdsourcing more than other departments. Thus, marketing and RDI departments are playing a crucial role in knowledge transfer inside an organization because they have the best knowledge about the crowd. Based on the case study organizations crowdsourcing could be either the marketing or RDI departments' activity. However, both departments can implement crowdsourcing activities. An organization can utilize crowdsourcing in strategy implementation and it might be used for gaining knowledge of how well employees of an organization understand the strategy.
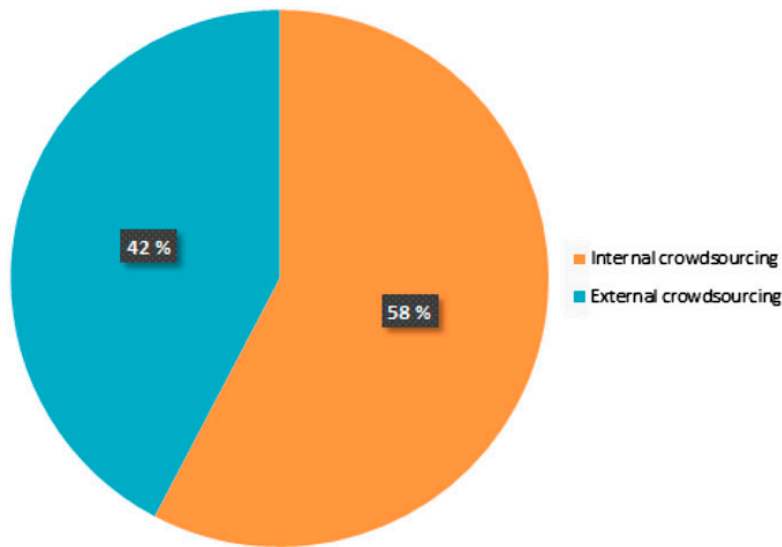
Figure 3.   Internal and external crowdsourcing utilization in the case study organizations.
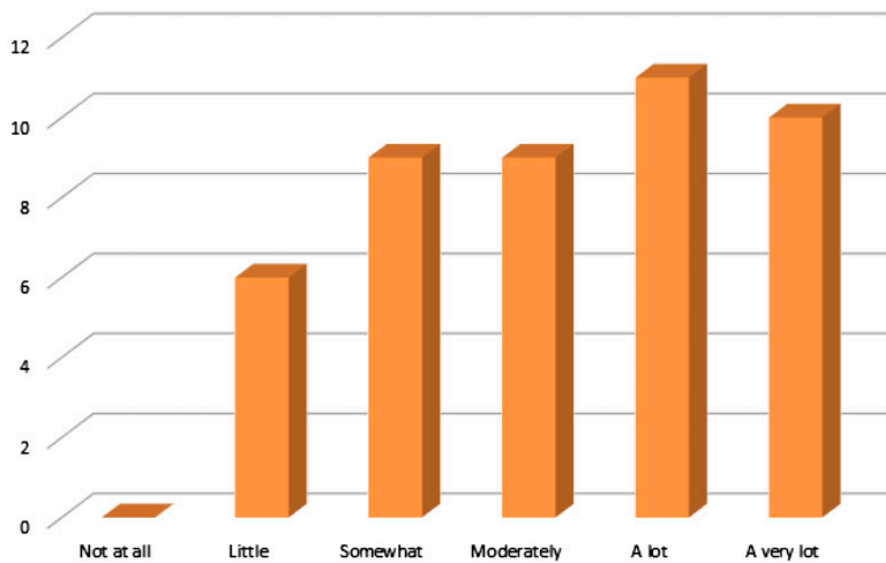


Figure 4.   Usefulness of crowdsourcing in the case study organizations.

### 4.1. Primary activities

Porter's value chain's primary activities involve the supply chain of a product or service. Primary activities are mainly related to implementing a product or service and delivering it to the customer. Thus, an organization is connected to the customer during this process. The value chain differs from the supply chain but it contains supply chain elements. Based on this research crowdsourcing can be utilized in various ways. Figure 5 is illustrating crowdsourcing implementations in Porter's value chain's primary activities.

Crowdsourcing can be utilized for co-operation with customers and other stakeholders which are part of the value chain's primary activities. This includes requesting comments about the value chain of a product or service or even receiving ideas on how the value chain could be improved. Crowdsourcing is a channel between the customers'

customer if an organization is producing products or services which are not directly sold to the end user. An organization should always consider which ideas are appropriate for an organization and its products or services.

When an organization is delivering products or services to a customer it can verify the quality of the product or service with crowdsourcing. This gives feedback to an organization on how the value chain is operating based on the customers' point of view. The case study organizations were utilizing social networks, such as Facebook, for receiving feedback about a product or service's quality and how the products or services should be improved.

An organization can implement crowdsourcing based on monitoring systems. These systems can be utilized for gaining knowledge about how an organization has succeeded in the value chain. Customers, possible customers, and other individuals are participating in these activities. Several crowdsourcing systems are available in the markets nowadays, but organizations are using mostly social networks for these operations.

Crowdfunding is utilized for partly financing an organization's activities. Crowdfunding can be used for receiving knowledge about which products or services would perform well in the markets. If crowd is funding an organization's activities this means that they believe in the forthcoming product or service. Crowdfunding can be an organization's internal activity. Crowdfunding generates silent marketers to support an organization. If the crowd is funding an organization's activities it imparts information to other persons. However, crowdfunding is not a commonly used crowdsourcing type in organizations.

An organization's internal crowdsourcing is used for the screening of concepts in transformation operations. An organization can utilize internal crowdsourcing to gain knowledge of which would be the best possible solution in the case of a specific customer when it is delivering a product or service. An organization can have several possibilities for delivering a product or service and crowdsourcing can be utilized to gain knowledge of which would be appropriate for the specific customer. However, an organization needs to be large enough to perform internal crowdsourcing implementations.

Crowdsourcing is utilized for gaining and finding customer clusters and appropriate markets. If an organization is active in multiple web communities it can use crowdsourcing for finding customers for its products or services. Commonly this includes utilizing several Internet platforms and social networks. It can also include different crowdfunding platforms, such as Indiegogo. On the other hand, this is not the common case in organizations, but it is used by organizations which are active in several Internet communities. Crowdsourcing platforms can be an organization's own private platform or public platforms. Figure 6 is illustrating distribution of crowdsourcing platforms which are utilized in the case study organizations.

Private platforms are on an organization's own servers and are mostly collaboration based IT environments. Public platforms are mainly social networks which are used in crowdsourcing. Facebook is the most commonly utilized social network in organizations. Customers, possible customers, and other individuals can give comments on how an organization's products or services are performing. On the other hand, not every organization is using Facebook or it is using Facebook but has disabled the commenting feature for end users on their Facebook pages. Thus, they are closing a channel for generating discussions with customers, possible customers, or other individuals. Other commonly used social networks are, for example, GooglePlus, Twitter, and Instagram. An organization can use these tools also internally in their operations.
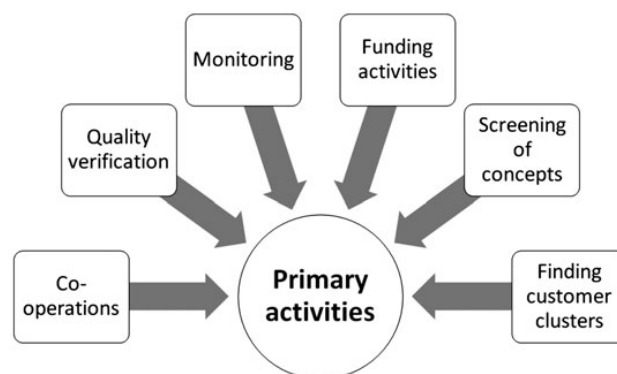


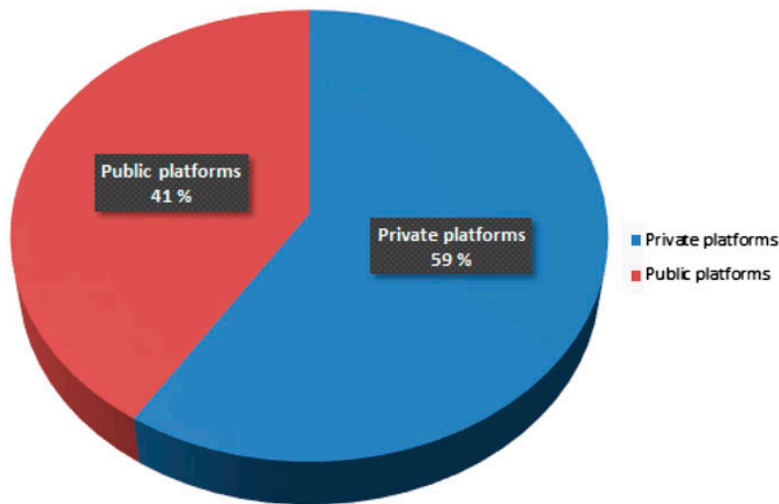Figure 5.   Crowdsourcing usage in primary activities.

Figure 6.   Distribution of public and private crowdsourcing platforms.

Based on this study crowdsourcing is mainly external in Porter's value chain's primary activities. Primary activities contain operations which are required to deliver a product or service to a customer. Thus, external crowdsourcing is more beneficial in primary activities. However, crowdsourcing implementations which have been conducted in primary activities have a connection to support activities.

### 4.2.  Support activities

Porter's value chain's support activities include operations which are relevant to support primary activities. Support activities include, for example, technology development which is an activity of the RDI function of an organization. This function can gain benefit from crowdsourcing when implementing innovations. On the other hand, all other support activates can benefit from crowdsourcing as well. Figure 7 is illustrating crowdsourcing implementations in Porter's value chain's support activities.

An organization can collect information with crowdsourcing from end users to improve its products and services. Thus, end users are a part of the technology development in an organization. This raises an organization's innovation capability and generates new knowledge about which innovations could have demand in the markets. This knowledge is also used for improving products and services. However, an organization should understand that comments and feedback is coming from the crowd which is interested in an organization's products and services. This includes the crowd's point of view, which might already be common knowledge. Thus, if an organization is able to find a crowd which is not using an organization's products or services it might receive ideas which can lead to innovations.

An organization is developing its products and services constantly. An organization needs to test and pilot its products and services with end users. However, it could be challenging to find persons which provide new ideas on how to improve products or services. Crowdsourcing is utilized for gaining wide-ranging knowledge from the crowd. Crowd also includes persons who are not an organization's customers. Testing can be implemented, for example, via social networks. However, this is not possible in all industries. Some industries are locating product or service testers with crowdsourcing and performing testing in the normal way. This is common if the innovation includes technology. Software, like web-based IT systems, are easier to test with crowdsourcing because the final product is easy to make available to the crowd.

An organization can test ideas internally with crowdsourcing. The idea can be, for example, a new product or service, improvements to processes, or which new IT system could be developed in an organization. These operations are performed internally in an organization through collaboration tools and social networks such as GooglePlus. Normally ideas do not come only from the managers. Thus, employees and other stakeholders contribute development ideas which can be implemented in an organization.

Ideas can be collected using an IT system, but this is not necessary. Organizations are using internal idea meetings with employees to generate innovations. Everyone in an organization can participate in these meetings. This is also
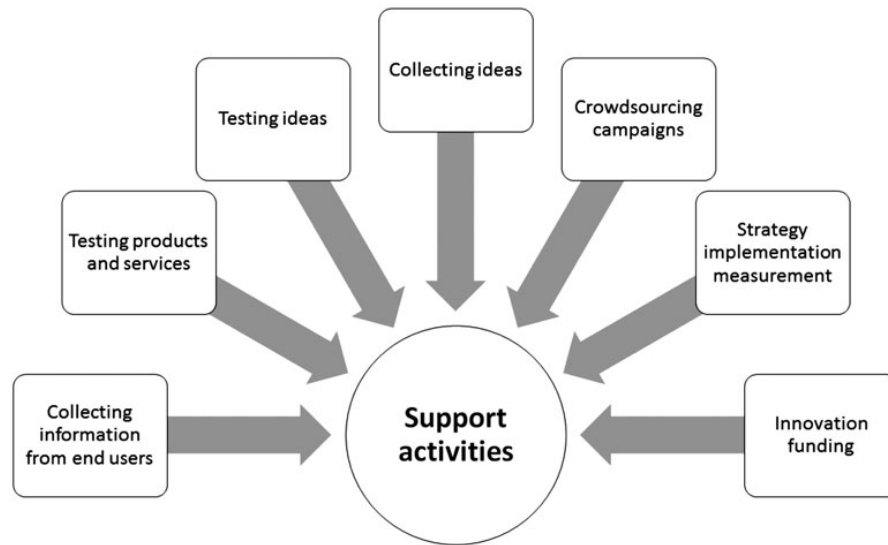
Figure 7. Crowdsourcing usage in support activities.

implemented with external actors of an organization using crowdsourcing. Generally organizations have idea banks. Crowd can give ideas to an organization, for example, through web based IT systems. The web forms, where ideas are entered, are strictly defined and so an organization can analyze the collected ideas easily.

An organization can also implement crowdsourcing campaigns which are fuel for RDI activities. Crowdsourcing campaigns are implemented generally in a specific time frame. If an organization is collecting ideas using a crowdsourcing campaign the best one is rewarded with a prize which can be, for example, the organization's product or service. Idea contests can be utilized, for example, to obtain the name for a new product or service. However, campaigns can also be used for development purposes. An organization can give out a problem which the crowd should solve in a specific time frame.

It is important that an organization is heading in the direction which is specified in its strategies. Internal crowdsourcing is utilized for the measurement of strategy implementation. An organization can send out short queries to employees from time to time to gain knowledge about what employees understand about the strategy. Thus, this tells how well managers have communicated the strategy around an organization. However, an organization should be large enough so that this crowdsourcing implementation could be utilized.

Innovations could be financed with crowdfunding. An organization receives knowledge about the market situation the same as in primary activities with crowdfunding. Crowdfunding is a most beneficial crowdsourcing implementation in micro, small, and medium sized corporations. An organization could implement innovation which would not be possible under normal conditions. This gives the possibility for an organization to enter a new market area with a new product or service. However, an organization should consider which innovation could be implemented with crowdfunding and what compensation to use.

Blogs are used in support activities. Some persons in the crowd are more active than others. This can mean that they want to tell more about an organization's products or services. These persons are mostly using blogs to generate discussions about an organization's products or services. An organization can gain benefit from this. They can use comments for improving the value chain. On the other hand, an organization should always consider the comments and feedback that they are receiving from the crowd and bloggers carefully.

Crowdsourcing is mainly internal in Porter's value chain's support activities. Support activities include operations which are basically internal to an organization. Thus, internal crowdsourcing is used more in support activities. Still, both internal and external crowdsourcing types can be utilized in an organization's activities.

### 4.3. Discussions

This section discusses more closely crowdsourcing utilization in Porter's value chain. Primary activities of the value chain consist of inbound logistics, operations, outbound logistics, marketing and sales, and service. Crowdsourcing is

directly useful in a value chain's operations, marketing and sales, and service processes. An organization can employ crowdsourcing in its operations to implement more customer oriented products or services. On the other hand, an organization can use the crowd to implement its activities partly or even totally. However, an organization should consider which operation processes could gain benefit from crowdsourcing. Knowledge is valuable but an organization should carefully analyze it before proceeding, for example, with the manufacturing of products.

Crowdsourcing is about communication with crowd and marketing is a key position in crowd interaction. Marketing can benefit from crowdsourcing, for example, to open discussions with external crowd to implement silent marketing operations. Sales, on the other hand, can utilize crowdsourcing to get knowledge about how products and services are performing in the markets. Sales can, for example, request crowd to evaluate the products or services. Thus, an organization receives customers' points of view on products and services. This knowledge should be transferred to different functions of an organization.

It is common that an organization is offering services for its products. Crowdsourcing can be utilized for collecting the development ideas for services and collecting knowledge about how products should be developed. Thus, this also generates more customer focused products. The logistics function of an organization is indirectly affected by the crowdsourcing activities of an organization but it cannot be directly supported with crowdsourcing based on this study. Thus, primary activities are connected to each other and are affected by other functions of an organization.

Support activities are: firm infrastructure, human resources management, technology development, and procurement. Firm infrastructure consists of processes which are mainly private in an organization. An organization can benefit from internal crowdsourcing, for example, to gathering knowledge of infrastructure development. External crowd is excluded if an organization is implementing only internal crowdsourcing activities. Human resources management can utilize crowdsourcing to find new talented employees for an organization. Work can be paid or unpaid. If work is unpaid the key motivation for implementing the task is something other than money which can be, for example, social benefits.

Technology development can gain the most benefit from crowdsourcing. During a product or service's development an organization could more closely collect knowledge about how the product should be implemented. An organization can use crowds' individuals as workers of the organization. Even entire development projects can be crowdsourced using environments like Innocentive. An organization can also have its own crowdsourcing platforms to implement these activities. Product or service testing can be crowdsourced. This is common in IT industry where a product is easy to send to the customer. However, not every industry can benefit from crowdsourcing in technology development. An organization should consider when to use crowdsourcing since innovation can also be exposed to competitors.

Procurement can benefit from crowdsourcing, for example, in finding partners which under normal conditions it would not find. This can also be an indirect activity which can come from other activities in an organization. Crowd can offer wide knowledge about which could be the best partners for an organization. This can be very useful when finding innovative partners. Therefore, crowdsourcing is an activity in an organization which can affect all of its operations.

## 5. Conclusions and further work

This research was studying how crowdsourcing is used in Porter's value chain. The value chain includes primary and support activities which were utilized in this study. Crowdsourcing can be a beneficial model in a wide range of industries. An organization should understand which tasks could be crowdsourced. Marketing and RDI departments gain most benefit from crowdsourcing. However, all departments of an organization can receive value from crowdsourcing because of its diversification. Crowdsourcing is used more in service industries. A service industry organization can expose their forthcoming services at an early stage. This is not possible in all industries. Still, every industry can benefit from crowdsourcing.

This study utilized Porter's value chain and handled it in two parts: primary and support activities. Both activities can use internal and external crowdsourcing. However, there is a clear allocation of crowdsourcing utilization in primary and support activities. Primary activities are using more external crowdsourcing and support activities are utilizing internal crowdsourcing. Primary and support activities have a connection from a crowdsourcing point of view. The same crowdsourcing implementations are used in primary and support activities. Thus, an organization is one entity which is the sum of its parts.

Crowdsourcing could be utilized more widely in organizations because an organization could receive knowledge which could be appropriate to the markets for an organization's products and services. An organization's products and services could be applied to multiple markets not just a single one. Crowd can give its opinion as to where an organization's products or service would perform best.

Crowdfunding was not a commonly utilized crowdsourcing type. Micro, small, and medium size corporations can benefit from crowdfunding. On the other hand, any size of corporation could use crowdfunding. It can be utilized for

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financing an organization's activities and innovations which could not be implemented under normal conditions. It is possible to implement innovations which have a demand in the markets with a crowdfunding campaign. However, the campaign needs to be a success so that the innovation could be implemented.

This research was focusing on Porter's value chain's primary and support activities and dealt with them as a whole. The study created knowledge about how crowdsourcing is combined with Porter's value chain. However, more thorough research is required about crowdsourcing utilization in an organization's activities. Based on the case study organizations crowdsourcing is still a new way to act and requires more research, for example, as a part of an organization's innovation activities. Moreover, research is required about logistics and crowdsourcing applications.

Crowdfunding is an enabler in micro, small, and medium-size organizations. An organization could implement innovations which are not necessarily possible to create under normal conditions. More research is required about crowdfunding at the frontend of innovation. This includes searching and selecting appropriate innovation for an organization. If crowd is funding an organization's technology development it also believes that the forthcoming product or service is useful.

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# CROWDSOURCING UTILIZATION IN INNOVATION MANAGE-
MENT

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## ABSTRACT

*Purpose: Innovation is one of the most important economic drivers in modern businesses. Organizations should be more and more capable in innovation. A market pull innovation lowers the launching costs of new products and services. An organization's management of innovations can benefit from external and internal knowledge. A wide range of industries can utilize crowdsourcing in innovation management. Crowdsourcing imports external and internal knowledge to an organization's innovation management more extensively. This study is focusing on and analyzes the utilization of crowdsourcing in innovation management.*

*Design/methodology/approach: This research is a case study. The research includes product and service industries with the case study organizations operating over a wide range of industry sectors. Empirical data was collected from 14 case study organizations using interviews and a web survey. This research utilizes the four phase innovation management model: search, select, implement, and capture.*

*Findings: Crowdsourcing is utilized in innovation management in a wide range of industry sectors. The study states that crowdsourcing can be a crucial part of innovation management. The research highlights the crowdsourcing types which can be utilized in innovation management. Crowdsourcing utilization in innovation management can support the creation of innovations which have a pull on the markets. From this point of view the crowd is also acting as a marketer for an organization.*

*Limitations: Research is studying crowdsourcing utilization in innovation management in a wide range of industries with a common innovation management model. Innovation management processes in organizations requires more research. Innovations are implemented mainly with projects. Project management requires more research from a crowdsourcing point of view.*

*Originality/value: Based on this study: crowdsourcing can be a crucial part of an organization's innovation management. This study contributes to the taxonomy of crowdsourcing utilization in innovation management. The study brings out crowdsourcing types which can be*

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*utilized in a wide range of industry sectors. Innovation management will benefit from the use of crowdsourcing in search, select, implement, and capture phases.*

**Keywords**: Crowdsourcing; industrial management; innovation management;

**Classification:** Case study

## INTRODUCTION

Organizations are developing innovation management in a wide range of industry sectors to increase their innovation capability and to get more useful products and services to their customers. Success in innovation generates profit for an organization and improves its position in the markets. Innovations create wellbeing in society in the form of new products and services. Innovative products and services establish new possibilities for organizations.

External knowledge can be a part of an organization research, development, and innovation (RDI) activities with the use of crowdsourcing. Crowdsourcing is constructed from two words: "crowd" and "sourcing". Sourcing refers to outsourcing. Customers, potential customers, employees, and other known or unknown persons are a part of the crowd. Organizations can utilize crowdsourcing in several ways; for example crowdsourcing can be utilized to evaluate an organization's new products or services.

Innovation management is the management of the innovation implementation process and it has four main phases: search, select, implement, and capture. Every phase is unique and ways of utilizing the innovation management phase's varies based on the organization and industry. Crowdsourcing types can be a part of the innovation management phases in several ways. Crowdsourcing utilization in an organization's innovation management creates value for a new product or service.

Currently crowdsourcing systems are limited to specific crowdsourcing types and these systems do not necessarily specifically support an organization's innovation activities. Results of this study can be utilized in the implementation of a new crowdsourcing information system which can be used in a part of an organization's innovation management in a wide range of industrial sectors.

## LITERATURE REVIEW

This section brings out the theoretical framework of this study. Section highlights literature which is relevant for this present study. The research has two main focuses which are an innovation management and crowdsourcing.

**Innovation Management**

Innovations are vital in modern organizations. Innovation as a word originates from the Latin word *innovare* and it stands for making something new (Johansson and Woodilla, 2009). Innovation has several definitions based on the field of study. One thing remains the same in all the studies: it is something new or it has an element of newness. The purpose of this section is to highlight innovation definitions which are relevant this study.

Joseph Schumpeter was one of the first researchers who draw attention to innovation in his book in 1942 (Schumpeter, 2008). Schumpeter can be thought of as a godfather of innovation. Schumpeter defined innovation as a *creative destruction*. Creative destruction occurs when a new product or service enters the markets and leaves some current product or service without customers. Schumpeter highlighted that creative destruction leads to an organization's economic growth.

Modern innovation definitions are based on the innovation type which makes innovation a more complex phenomenon for research. Trott (2008) defines innovation as follows

*"Innovation is the management of all the activities involved in the process of idea generation, technology development, manufacturing and marketing of a new (or improved) product or manufacturing process or equipment".*

Trott defines innovation as a management process which leads to new technology. The definition includes the development of existing products. We define innovation based on Trott's definition, but we add elements to this definition. Innovation is defined in this study as follows:

*"Innovation is the management of all the activities involved in the process of idea generation, technology, service, or process development, manufacturing and marketing of a new (or improved) product, service, manufacturing process or equipment".*

The definition includes point of views for innovation types which are radial, really new, and of incremental innovation. The enhanced definition highlights service and process innovations. Thus, innovations can also be seen as social and product innovations. Types of innovations are discussed more closely in the section on typology of innovation.

An innovation can be a push or market pull innovation. In the push innovation model every innovation comes from basic sciences, proceeds to development or applied sciences and from there to manufacturing and marketing (Godin and Lane, 2013). Pull innovations come from the needs of the markets where it proceeds to development and finally to manufacturing and sales (Godin and Lane, 2013).

## 2.2. Typology of Innovation

Literature describes several innovation types which, for example, are technological, social, and service innovation. Innovation types are connected to an organization type. This section highlights innovation types which are relevant to this study.

An innovation is radical if a new product or service satisfies a former unsatisfied customer need for the first time (Gemünden *et al.*, 2007). A completely new market area will be developed and the organization will benefit from the radical innovation economically. Radical innovation may change customer behavior in the markets. An example of radical innovation is the mobile phone and the flat screen television.

A really new innovation is between radial and incremental innovation. A really new innovation is a moderately innovative product or service (Garcia and Calantone, 2002). A really new innovation upgrades a product or service by a great leap. Really new innovations can evolve into a new product line or create new markets with existing technology. An example of a really new innovation is the fax machine. Really new innovations are also called discontinuous innovations.

An incremental innovation presents a minor degree of departure from existing practices (Camisón-Zornoza *et al.,* 2004). It enhances the capacities already present in the organization and develops them. Improvements can be minor or major for products or services. Incremental innovation makes an existing product or service more tempting to customers. Incremental innovation is the most common innovation type.

A technological innovation is a process which generates new or improves on current technology (Nieto, 2004). Technological innovation requires research, development and learning-by-doing activities in an organization (Sagar and Zwaan, 2006). Learning can lead to better results and changes in an organization. The development of new technology can require a significant amount of resources and capital.

A service innovation is a new, better, or more effective service. Service innovations require creative activities like other innovations (Schwarz *et al.,* 2012). A service innovation can be a new or improved service concept which adds value to the customer. Service is not technological but organizations can offer services which are technology based. A service can be seen as a product of the organization.

A product innovation is a process which includes the technical design, RDI, manufacturing, management, and commercial activities involved in the marketing of a new or improved product (Alegre *et al.,* 2006). Product innovation can include technological and service solutions. Product innovation can include significant improvements in technical components or materials. The customer gains value from product innovation.

A social innovation combines several social environments which implements a new product or service (Saarnio and Hamilo, 2013). The innovation can be for example technology, product, or service. Nokia Dream Team was a social innovation. The Dream Team brought out innovations which had a wide economic effect on the Nokia Corporation. Social innovation combines two different departments or groups of professionals to develop, for example, a new product or service. Social Innovations can be created inside or outside of an organization.

Process innovations are changes in the way an organization acts (Tidd and Bessant, 2013). Process innovation generates a new or significantly improved way to produce products or services or a way to deliver them to customers. Process innovations can reduce production or delivery costs or significantly increase product or service quality.

### 2.3. Innovation as a Management Process

Innovation management is a process of managing innovation creation. Innovation processes vary in organizations generally but based on this research's empirical data the same main processes exist. Tidd and Bessant (2013) stress that the innovation process has four phases which are search, select, implement, and capture. Figure 1 is illustrating innovation management as a process.



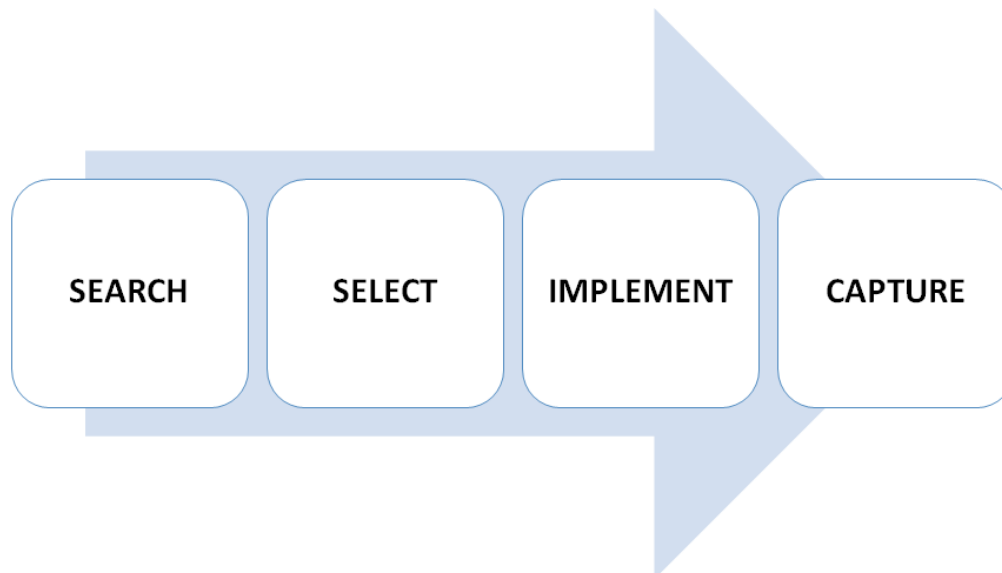**Figure 1.** Innovation management four phase model (Tidd and Bessant, 2013)

Search, select, implement, and capture are the main phases. The search phase includes the scanning of an organization's internal and external environment and processing the signals which are relevant and may be developed into new products or services. The signals can be, for example, new market opportunities or ideas.

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An organization makes decisions as to which signal it will response to in the select phase. This phase may include analysis of a new idea which is based on, for example, the organizations vision, strategy, or its values. The development process of an innovation can take a long time and demand the organization's resources. It is important therefore to analyze which innovation ideas will precede to the implement phase.

The implement phase carries out the new product, service, or process. The idea will be translated into innovation and launched to the organization's internal and external markets. Implementation of an innovation requires knowledge resources to develop an innovation and to execute the innovation project. The implement phase requires knowledge about internal or external markets and knowledge of the market area where the innovation will be launched.

The capture phase is the final stage of the innovation management process. Capturing value from innovation includes sustaining the innovation adoption and diffusion. Capturing is also about learning. Organizations have a possibility to learn from innovations and innovation management. This leads to the development of innovation management. All experiences in innovation management should be processed and carefully analyzed. The result of future innovative products or services is more inclusive if learning happens from former innovations and development processes.

## 2.4. Crowdsourcing

An organization is constantly connected to customers. At least organizations are constantly selling their products or services to customers. It is important to get the opinion of customers, potential customers, employees, and other stakeholders when implementing a new product or service. The opinion of stakeholders is important to organizations because of the better chance of making a profit when a new product or service enters the market.

Crowdsourcing is constructed from two words: "crowd" and "sourcing". Crowdsourcing is a task taking place inside or outside the normal organization setup in an undefined crowd. Crowdsourcing can be implemented, for example, between different departments, if the organization is large enough. Jeff Howe published his original crowdsourcing article in *Wired* magazine in 2006 (Howe, 2006). Howe defines crowdsourcing as follows (Howe, 2014)

> *"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."*

Crowdsourcing can be utilized in different situations and it has an effect on an organization's innovation activities when implemented as a part of innovation management. Crowdsourcing activities may include web platforms but it is not necessary.

Brabham (2008) claims that crowdsourcing is not open innovation. Open innovation can be seen as one form of product development. Open innovation is open to everyone. An example of open innovation is open source. Anyone can modify a source code and create a new product based on it. Linux is an open source product which anyone can use freely. All the parts of a product are made available to everyone in open innovation. Open innovation collects and releases RDI projects outside of an organization.

Crowdsourcing is an act taking place inside or outside of an organization and collecting the results from the crowd. An organization receives the profit and results based on crowdsourcing activities from this point of view. Projects or possible projects are not released to the outside in crowdsourcing. A common example of crowdsourcing is Wikipedia where anyone can write an article and modify existing ones. An example of crowdsourced RDI activities is InnoCentive service where the crowd is working with organizations on RDI problems.

### 2.5. Crowdsourcing Types

Crowdsourcing has multiple types in literature. All crowdsourcing types relevant to this study are brought out in this section. Crowdsourcing types can be overlapping. Researcher's defines crowdsourcing types in various ways based on their theories and studies.

*Crowd wisdom* is one of the most common forms of crowdsourcing (Sloane, 2011). An organization is using the crowd to extend its knowledge. Crowd wisdom can be utilized to extend a product's features in organization's innovation activities. This means using the crowd to construct a new idea for example. Knowledge is also dispensed within the organization in this way.

*Crowd creation* is the second crowd type of crowdsourcing. Customers are participating in the tasks with the actual producers; like employees (Geiger *et al.,* 2011b). The crowd can be utilized for implementing a task which benefits an organization. The problem to be solved or the task to be performed in crowd creation can have a loose definition and the task's type is generally creative (Geiger *et al.,* 2011a). There can be differences in the quality of the work which individuals create. An organization should monitor crowdsourcing activities and estimate the quality.

*Microtasking* enables hundreds of people to perform microwork for an organization (Franklin *et al.,* 2011). Work can be paid or unpaid. Microtasking systems, like Amazon Mechanical Turk, enable the use of the crowd in an organization's innovation activities. An organization may have its own system for microtasking. Microtasking needs verification for quality the same as other crowdsourcing implementations. Verification is typically carried out by comparing multiple responses to the same task (Gupta *et al.,* 2012).

*Macrotasking* is the second crowdsourcing tasking type. Macrotasking is a more extensive type of tasking and requires usually special skills and might be precisely targeted (Reid,

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2013). The crowd could use a web platform for implementing a task but this is not mandatory. An organization can donate a reward to the person or persons who are implementing the task. InnoCentive is an example of a platform for this kind of activity. It is normal that the problem solver or project achiever needs to have proof of concept of the solution (Schenk and Guittard, 2010). Macrotasking can be a small part of a project, sub project, or even the entire project may be macrotasked.

*Crowdvoting* is utilized to organize large amounts of data. Crowdvoting can be used, for example, to judge new or old products or services (Hammon and Hippner, 2012). Crowdvoting is generally implemented through the Internet. Internet stores are commonly using crowdvoting for products and services. Customers can, for example, give stars for products or give a thump up or down opinion for an article.

*Crowdevaluation* is a more extensive form of crowd analytics. Crowdevaluation can be utilized, for example, as part of an organization's innovation activities for evaluating the results. Crowdevaluation may be repeatable but ranking quality should be considered (Blanco *et al.,* 2011). There can be differences between the crowd and the professionals in the quality of the evaluation.

*Crowdfunding* is one way to collect micro amounts of capital from the crowd (Prive, 2012). Anyone can give funding for crowdfunded project or even to a corporation. An example of a crowdfunding service is Kickstarter where anyone can finance the projects. A project called Double Fine collected 1,229,015 dollars for their PC tactical strategy game using the crowdfunding model (Kickstarter, 2014).

### 2.6. Crowdsourcing Utilization in Innovation Management

Tidd and Bessant (2013) allocate innovation management in four main phases which are search, select, implement, and capture. Crowdsourcing can be utilized in several ways in every phase. It should be considered which crowdsourcing task creates value for innovation. The idea behind the innovation may become exposed when crowdsourcing is utilized in innovation management. Crowdsourcing, for example, cannot necessarily be utilized in every phase in the technological innovation development process. This study is highlighting the organization's point of view in innovation management and crowdsourcing. Crowdsourcing can be utilized in organization's innovation management activities.

Crowdsourcing can be used for generating new ideas in the *search phase*. Organizations professionals can generate ideas which can be evaluated through crowdsourcing. A second way to generate a new idea and evaluate it is to use crowdsourcing and follow which ideas could have pull in the market. Product users or crowd can be utilized for generating new product or service ideas (Poetz and Schreier, 2012). Organizations are using idea management platforms which crowd can access to generate ideas about an organization's products and services. Organizations can create idea competitions where the best ideas are selected and implemented.

Dell has a service called IdeaStorm where product users can suggest product improvements or new product ideas (Dell, 2014). Public and open tools for idea generation can be used to gather information from the crowd. Examples of idea based crowdsourcing services are IdeaConnection, My Starbucks Idea, and Ideaken. Social networks can be utilized as crowdsourcing platforms to find new ideas and for forming megatrends. Social networks may be also utilized to formulate an idea.

Crowdsourcing can be used for idea or innovation evaluation in the *select phase*. There should be a rating scale indicator, prediction markets, and comparison between the rating scales when using crowdsourcing to evaluate an idea (Blohm *et al.,* 2011). Indicators tell about the quality of an idea. Crowdsourced idea evaluation aims at filtering the best ideas from the weaker ones. Nowadays, for example, idea testing can be implemented through social networks. Public crowdsourcing tools exist for the innovation management select phase.
Most of the crowdsourcing types can be utilized from an organization's point of view in the *implementation phase*. Innovation implementation is commonly done with projects. An idea is turned into a project which develops an innovation or prototype of the new technology (Trott, 2008). The project can be financed with crowdfunding. Micro- or macrotasking can be used in small project tasks. Crowdvoting or evaluation can be used at the final stage of implementation to find out the usefulness of a new product or service. Which crowdsourcing forms are utilized is based on need and the type of project being carried out. Even entire projects can be crowdsourced.

Crowdsourcing can be utilized as a tool for obtaining value in the *capture phase*. An organization receives value commonly in the form of profit along with other benefits such as new knowledge. An organization can try to find new development ideas for new innovation in the capture phase. An organization can also evaluate an innovation's impact on the business environment in the capture phase. Crowd can be used for evaluating the impact of a new product or service. Crowd creation can be utilized for gathering new ideas for innovations. This way an organization may implement improvements for new products or services.

## METHODOLOGY

The research is based on case studies. The case organizations have RDI activities and crowdsourcing was utilized in the organizations. Multiple persons were invited to research sessions. The amount of responders per organization was from one to nine persons. The case organizations are small, medium, and large. The responders were in: top management, line management, RDI management, project management, or were specialists.

The empirical data of this study was collected using interviews and a web survey. The study included 14 case organizations from a wide range of industry sectors. The total number of responders for the interviews and survey was 37 persons. 27 persons participated in interview sessions where they were group interviewed in their organizations. 25 of the 27 persons who

took part in the interviews also responded to the survey and two of the persons only participated in the interviews. The survey had 35 responders in total. The industries involved included for example: consulting, publishing, education, networking, automation, energy, and public relations. The study includes qualitative and quantitative methods and it can be considered a mixed research as both methods were utilized in data gathering and analysis.

The researcher introduced the research area to the responders. The survey had 109 questions which were qualitative and quantitative questions. The survey included questions and answers which are not relevant to this study. These questions and answers were excluded from this study. The terms utilized in this study were introduced to the responders. A common understanding of the study was required in the case organizations before answering the web survey and taking part in the interview.

Analyzing the answers was implemented using quantitative and qualitative methods. The results were summarized and illustrated with charts and texts. The text includes an analysis of crowdsourcing utilization in the innovation management phases. The result of this study is the innovation management based crowdsourcing taxonomy.

This study can be identified as a positivistic research. The study is built on empirical data which was collected from organizations which are acting in wide range of industry sectors. The inductive reasoning method is utilized in this study. Inductive reasoning ("bottom up") is building a theory from observations (Trochim, 2006). The inductive reasoning approach is utilized for finding the patterns of crowdsourcing utilization in innovation management. The theory is constructed by applying existing crowdsourcing theories and validating them.

## RESULTS OF THE STUDY

Innovation management is managing the process of innovation from the idea searching phase to the value capture phase. This research is applying Tidd's and Bessant's (2013) innovation management model which has four phases. The focus of this study was to research which crowdsourcing types are part of an organization's innovation management activities in the search, select, implement, and capture phases. The case organizations were able to find the search, select, implement, and capture phases from their innovation management processes. This leads to the conclusion that these innovation management phases are common and can be utilized in a wide range of industry sectors. On the other hand, every industry is acting in a variety of ways and because of this these processes have differences.

The first stage of innovation management is *search*. The search phase includes the scanning of an environment for getting ideas for new products and services. Utilized crowdsourcing types in this phase are crowd wisdom, crowd creation, microtasking, macrotasking, and crowdfunding. Figure 2 is illustrating crowdsourcing utilization in the innovation manage-

ment search phase in the case organizations which are taking place in wide range of industry sectors.



**Figure 2.** Crowdsourcing in innovation management search phase

Crowdfunding is one of the least utilized crowdsourcing types in the innovation management search phase. Thus, crowdfunding could be utilized for searching for innovations and finding products or services which might have pull in the markets; based on the micro amount of funding received. Crowdsourcing types which are utilizing the knowledge of the crowd are used mostly. These are crowd wisdom, crowd creation, microtasking, macrotasking, crowdvoting, and crowdevaluation. Crowdsourcing is utilized to gathering new ideas about an organization's products or services. Crowd wisdom is utilized for opening new discussions to detect which innovations could have pull on the market. This is implemented, for example, with social networks and blogs.

Knowledge based crowdsourcing types are commonly utilized for tracking ideas which could lead to innovation. Open platforms are utilized for idea generation and management. Ideas are gathered from an organization's internal and external crowd. Crowdevaluation and crowdvoting are utilized to obtain knowledge about useful products and services. This makes it easier to analyze which are the most popular products or services on the market. Crowd wisdom and creation are utilized in idea formulation. Crowd can give opinions about an idea. An organization may use this knowledge in product or service development. This could be either a small or large task or it may require special skills. On the other hand, this can be seen as a micro- or macrotask.

The next phase in innovation management is *select*. Decisions about selecting the innovation can be based on existing products or services or the organization's strategy. An organization's strategy has an impact on selecting the innovations which will be implemented. Crowdsourcing can be utilized in various ways when an organization is selecting the idea for innovation. Figure 3 is illustrating crowdsourcing types which were identified in case organizations in the innovation management select phase.
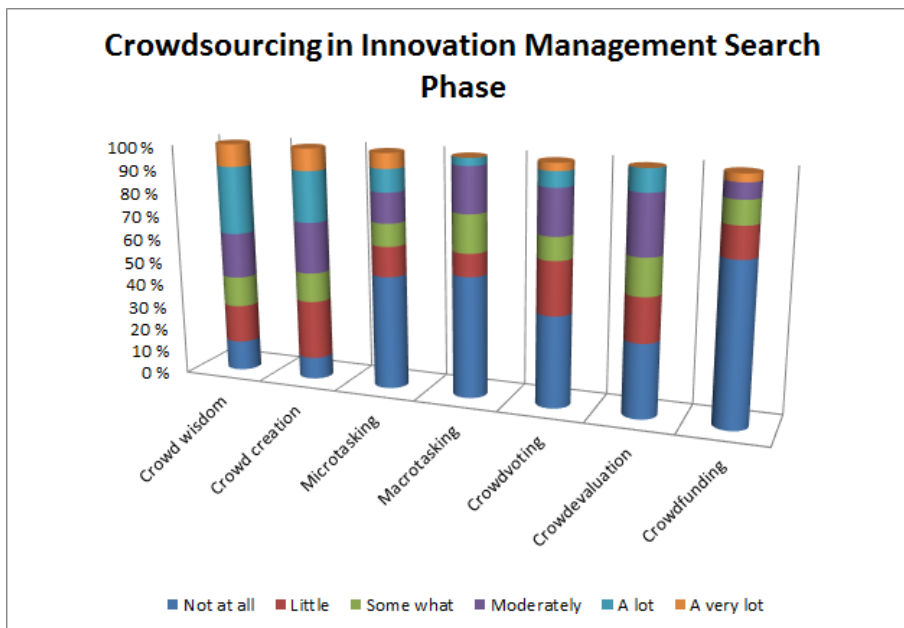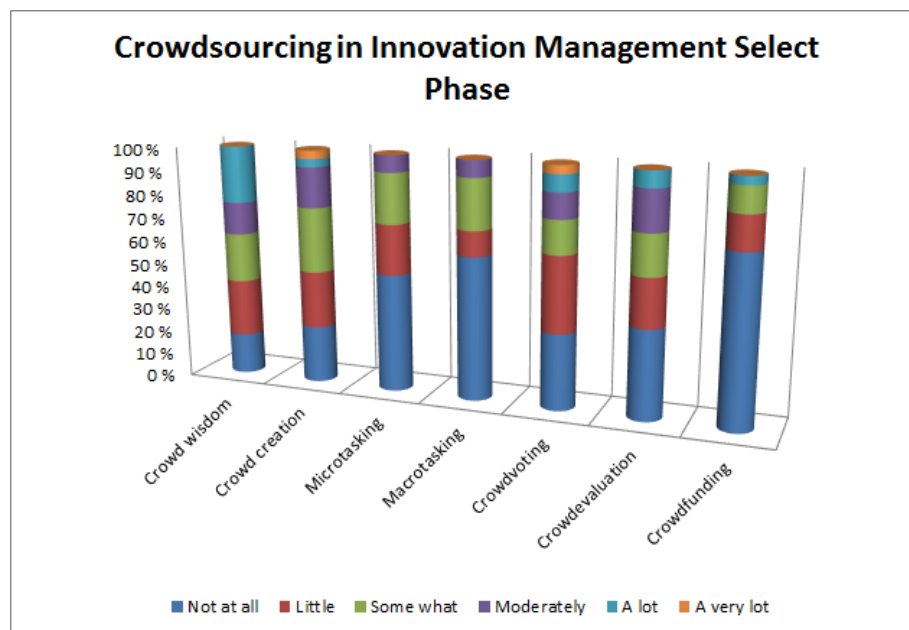


**Figure 3.** Crowdsourcing in innovation management select phase

Crowdfunding is one of the less utilized crowdsourcing types in the innovation management select phase. Other crowdsourcing types are utilized during this phase. Crowdsourcing is utilized for commenting on innovative ideas. Large or small crowds can give feedback about new ideas. This way an organization gets knowledge about which products or services have pull in the market. This can be crowd wisdom, crowd creation, microtasking, macrotasking, crowdvoting, or even crowdevaluation. On the other hand, it is not possible to know if a product or service has pull on the market before the new product or service is launched. Thus, this only gives the prediction; does the new product or service have customers at all. Crowdvoting is utilized for voting for the best solutions from several possibilities. This separates the good ideas from the bad ones.

Crowdsourcing is utilized in the testing of new products or services. A product's or a service's upcoming customers are involved in the development process at an early stage so as to make the correct decisions about the product or service's development. An organization's internal crowd wisdom and crowd creation are utilized in team discussions and process evaluations. Social media is utilized to obtain the knowledge from an external crowd when select-

ing the idea. Social media tools like Facebook, Twitter, LinkedIn, and GooglePlus are utilized in this phase. External crowdsourcing platforms like InnoCentive and Amazon Mechanical Turk were not utilized in case organizations. Organizations have their own crowdsourcing platforms which were widely utilized in the case organizations activities. Final selection decisions are made by management, employees, financiers, and owners but the crowd can support these decisions.

The next phase in innovation management is *implement*. This phase includes the development of new products or services. Development of a product or service is implemented commonly using projects. Organizations are utilizing crowd creation for planning in part the new product or service. Organization's internal crowd creation was utilized in project planning to generate a more realistic project plan. Figure 4 is illustrating crowdsourcing usage in the innovation management implement phase.
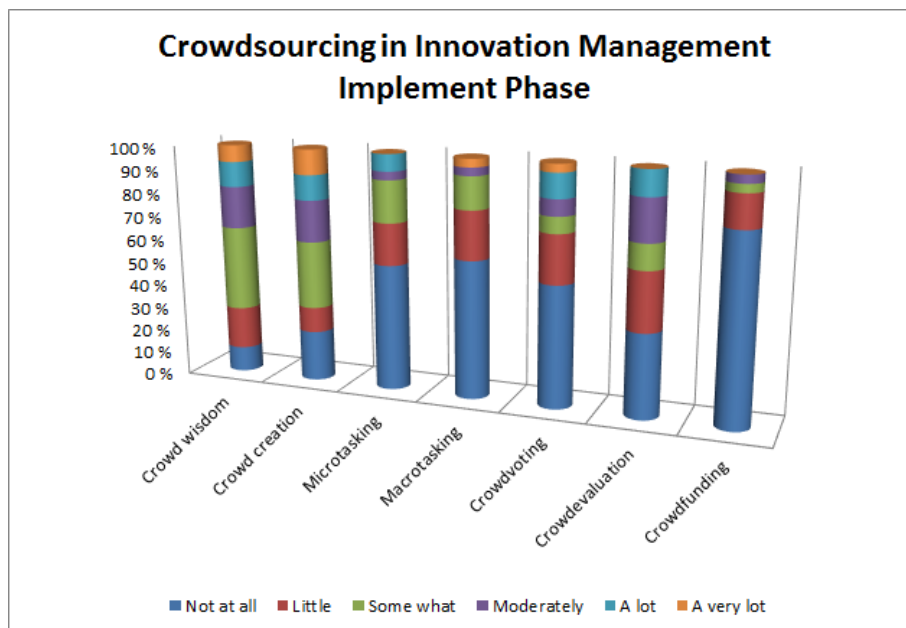


**Figure 4.** Crowdsourcing in innovation management implement phase

Knowledge based crowdsourcing types are the most utilized crowdsourcing types in innovation management implement phase. Crowdfunding is again the less utilized crowdsourcing type. Other crowdsourcing types can be utilized during the innovation management implement phase. Social networks are commonly utilized in organization's crowdsourcing activities. Organizations have development groups in social networks which are seen to be useful during the innovation implement process.

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Crowdsourcing activities can be either internal or external during this phase. Recruitment to product testing is implemented using crowdsourcing. However, an organization is selecting the persons who are participating in the product or service testing. Crowdvoting and evaluation are common crowdsourcing types for judging a new product or service in the innovation management implement phase. This can be seen as crowd wisdom, crowd creation, microtasking, or macrotasking depending upon the scope of the activity.

Product or service testers can give grades to indicate the best product or service. This can be seen as crowdvoting or evaluation based on the scope of analyzes which the crowd implements. A product or service is improved through crowdsourcing. The case organizations have tools for this process. The crowd will crucially affect the development process. Some organizations have carried out beta testing using crowd wisdom and crowd creation. This is common in industries where IT is strongly involved. A public link is sent to social networks where testing can be done by a limited amount of users and feedback given about the new product or service. Organizations can be in touch with client's customers during this phase using crowdsourcing. This makes a new product or service more tempting for customers because the development process is affected by the upcoming customer. This could lead to better products or services which may have more pull on the market.

The last stage of innovation management is *capture*. An organization is capturing value from the innovation in this phase. The value can be for example: financial reward, an effect on the business environment, a social effect, or ideas for new innovations. Crowdsourcing is utilized during the innovation management capture phase. Figure 4 is illustrating crowdsourcing utilization in the innovation management capture phase.



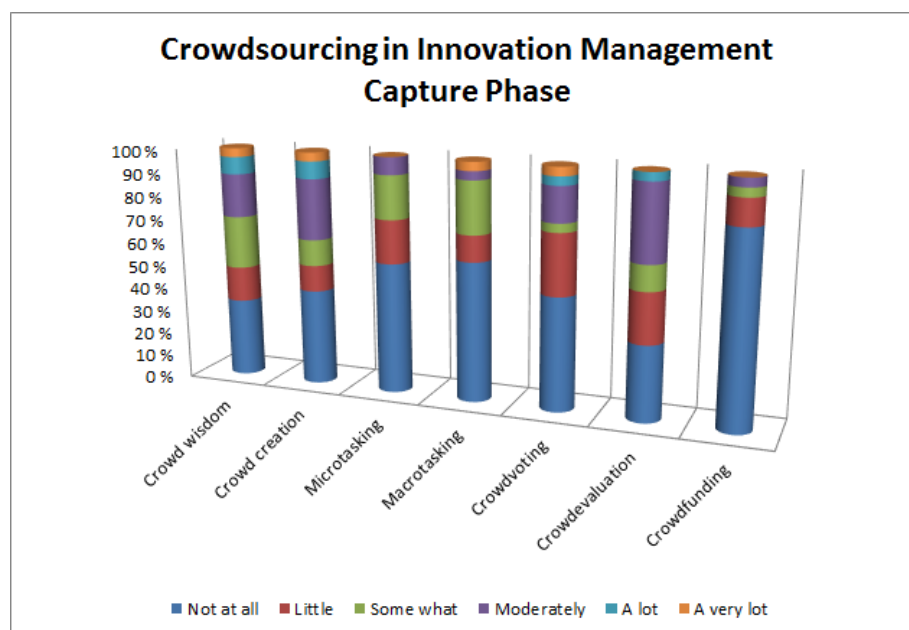**Figure 5.** Crowdsourcing in the innovation management capture phase

Crowdfunding is less utilized in the innovation management capture phase. Organizations are using crowdsourcing to evaluate innovation implementation. This can be seen as crowdvoting or evaluation. Crowdsourcing is utilized mainly for knowledge creation using crowd wisdom or crowd creation. Knowledge is created through a network of actors from the different sectors of industry. The results are analyzed using crowdsourcing. Knowledge of the corporate actors is used in the form of crowd wisdom in this situation.

New ideas which may lead to innovation are gathered from the crowd during this phase with crowdsourcing. Feedback from the crowd can lead to new business solutions and innovation can be applied to other business environments as well. This leads an organization to new markets and creates opportunities. Organizations are collecting new feature ideas for their products or services during the capture phase. Innovations change organizations reputation in a positive way. Crowdsourcing can be utilized for managing a companies' reputation.

Crowdsourcing is utilized for innovation management process evaluation. Crowdsourcing is used for marketing purposes and for the company to get feedback on a new product or service. The crowd is acting as marketers in this case. The innovation management capture phase is the last stage of innovation management. However, this leads to new innovations and development activities. This creates a loop for innovation management.

## CONCLUSIONS

This research was focusing on how crowdsourcing is utilized in organizations' innovation management within a wide range of industry sectors. The study was applying the four phase innovation management model. Crowdsourcing is utilized in the case organizations in innovation management. Utilized crowdsourcing types are common and can be used in a wide range of industry sectors. Crowdsourcing utilization accelerates an organization's production of innovations.

Crowdsourcing increases innovation capability and the possibility to create innovations with more market pull. Crowdsourcing brings customers, possible customers, and other known or unknown persons more closely and intensively to an organization's innovation activities. On the other hand, crowdsourcing includes risks which organizations should consider before implementing crowdsourcing activities. Risks associated with crowdsourcing needs more research.

Crowdsourcing was seen as vital in the case organizations. More and more external and internal knowledge is needed in an organization's innovation management when the nature of that organization's business area is to be creative. However every innovative idea cannot be implemented in an organization. An organization always needs to consider resources and internal knowledge before innovation implementation. On the other hand, in some case or-

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ganizations crowdsourcing was not the standard way to act. However, in some case organizations crowdsourcing was a part of the organization's culture and it cannot be separated from innovation activities.

Crowdfunding was the least utilized crowdsourcing type in all case organizations. More research is needed about crowdfunding into why it is used less during the innovation management process. Crowdfunding makes it possible for anyone to be involved in the funding and development of a new product or service. Crowdfunding may work also as a channel for marketing upcoming products or services. Crowdfunding creates hype around new products or services which makes it easier to market them. Innovations are generally developed with projects. Crowdsourcing can be utilized during the project lifecycle. More research is needed into crowdsourcing types used in the project lifecycle.

Crowdsourcing was utilized in the case organization's innovation management but not as widely as it could be used. On the other hand, crowdsourcing is a new way to act for many organizations and it needs development so that it could be utilized more closely in innovation activities. Organizations can use internal and external crowd in innovation activities in many ways. However, it should be considered carefully which types and phases in the innovation management process that could utilize crowdsourcing and create value for new products and services.

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# Adapting crowdsourcing in innovation management

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**Abstract:** Innovation is one of the most important economic drivers in modern businesses. A market pull innovation lowers the launching costs of new products and services. Crowdsourcing imports external and internal knowledge to an organisation's innovation management more extensively. This multi-case study focuses on and analyses the utilisation of crowdsourcing in innovation management. This research utilises the four phase innovation management model: search, select, implement, and capture. This study contributes to understanding the crowdsourcing types which are utilised in innovation management. Its second contribution is the correlation analysis between crowdsourcing types in innovation management phases. Crowdsourcing utilisation in innovation management can support the production of innovations.

**Keywords:** crowdfunding; crowdsourcing; crowdsourcing adaption; crowd creation; crowd wisdom; industrial management; innovation; innovation management; innovation production.

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## 1 Introduction

Organisations are developing innovation management in a wide range of industry sectors to increase their innovation capability and to get more useful products and services to their customers. Success in innovation generates profit for an organisation and improves its position in the markets. Innovations create wellbeing in society in the form of new products and services. Innovative products and services establish new possibilities for organisations.

External and internal knowledge can be a part of an organisation's research, development, and innovation (RDI) activities with the use of crowdsourcing. Crowdsourcing is constructed from two words: 'crowd' and 'sourcing'. Sourcing refers to outsourcing. Customers, potential customers, employees, and other citizens are a part of the crowd. Organisations can utilise crowdsourcing in several ways; for example crowdsourcing can be utilised to evaluate an organisation's new products or services.

Innovation management is the management of the innovation implementation process and it has four main phases: search, select, implement, and capture. Every phase is unique and ways of utilising the innovation management phases varies based on the organisation and industry.

There has been research into innovation management and crowdsourcing separately. There is however a gap in the literature in crowdsourcing utilisation in an organisation's innovation activities. This study fills the gap. Crowdsourcing types can be a part of the innovation management phases in several ways. Crowdsourcing utilisation in an organisation's innovation management creates value for a new product or service.

## 2 Literature review

This section brings out the theoretical framework of this study. The section highlights literature which is relevant to this present study. The research has two main focuses, which are: innovation management and crowdsourcing.

### 2.1 Innovation management

Innovations are vital in modern organisations. Innovation as a word originates from the Latin word innovare and it stands for making something new (Johansson and Woodilla, 2009). Innovation has several definitions based on the field of study. One thing remains the same in all the studies: it is something new or it has an element of newness. The purpose of this section is to highlight innovation definitions which are relevant to this study.

Joseph Schumpeter was one of the first researchers who draw attention to innovation in his book in 1942 (Schumpeter, 2008). Schumpeter can be thought of as the godfather

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of innovation. Schumpeter defined innovation as creative destruction. Creative destruction occurs when a new product or service enters the markets and leaves some current product or service without customers. Schumpeter highlighted that creative destruction leads to an organisation's economic growth.

Modern innovation definitions are based on the innovation type; which makes innovation a more complex phenomenon to research. Trott (2008) defines innovation as follows

> "Innovation is the management of all the activities involved in the process of idea generation, technology development, manufacturing and marketing of a new (or improved) product or manufacturing process or equipment."

Trott defines innovation as a management process which leads to new technology. Trott's definition could be complete from the radical, really new, and incremental innovation points of view. An innovation can also be a social and product innovation.

An innovation can be a push or market pull innovation. In the push innovation model every innovation comes from basic sciences, proceeds to development or applied sciences, and from there to manufacturing and marketing (Godin and Lane, 2013). Pull innovations come from the needs of the markets where it proceeds to development and finally to manufacturing and sales (Godin and Lane, 2013).

### 2.2   Innovation as a management process

Innovation management is a process of managing innovation creation. Innovation processes vary in organisations generally but based on this research's empirical data the same main processes exist. Tidd and Bessant (2013) stress that the innovation process has four phases which are search, select, implement, and capture. Figure 1 is illustrating continuous loop of innovation management process which was adapted from Tidd's and Bessant's (2013) innovation management model.

**Figure 1**   Continuous loop of innovation management
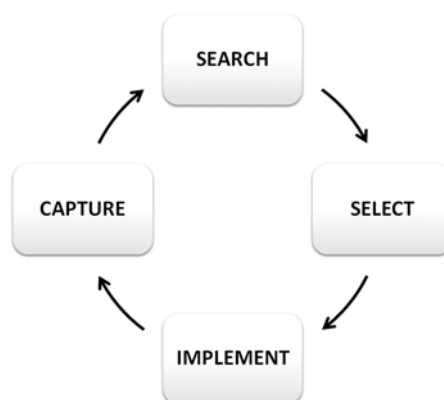


*Source:*   Tidd and Bessant (2013)

Search, select, implement, and capture are the main phases. Innovation management can be seen as a continuous loop. An organisation continues to the next innovation implementation from the capture phase. The search phase includes the scanning of an

organisation's internal and external environment and processing the signals which are relevant and may be developed into new products or services. The signals can be, for example, new market opportunities or ideas.

An organisation makes decisions as to which signal it will response to in the select phase. This phase may include analysis of a new idea which is based on, for example, the organisations vision, strategy, or its values. The development process of an innovation can take a long time and demand the organisation's resources. It is important therefore to analyse which innovation ideas will precede to the implement phase.

The implement phase carries out the new product, service, or process. The idea will be translated into innovation and launched to the markets. Implementation of an innovation requires knowledge resources to develop an innovation and to execute the innovation project. The implement phase requires knowledge about the markets and knowledge of the market area where the innovation will be launched.

The capture phase is the final stage of the innovation management process. Capturing value from innovation includes sustaining the innovation adoption and diffusion. Capturing is also about learning. Organisations have a possibility to learn from innovations and innovation management. This leads to the development of innovation management. All experiences in innovation management should be processed and carefully analysed. The result of future innovative products or services is more inclusive if learning happens from former innovations and development processes.

## 2.3 Crowdsourcing

An organisation is constantly connected to customers. At least organisations are regularly selling their products or services to customers. It is important to get the opinion of customers, potential customers, employees, and other stakeholders when implementing a new product or service. The opinion of stakeholders is important to organisations because of the better chance of making a profit when a new product or service enters the market.

Crowdsourcing is constructed from two words: 'crowd' and 'sourcing'. Crowdsourcing is a task taking place inside or outside the normal organisation setup in an undefined crowd. Crowdsourcing can be implemented, for example, between different departments if the organisation is large enough. Jeff Howe published his original crowdsourcing article in Wired magazine in 2006 (Howe, 2006). Howe defines crowdsourcing as follows (Howe, 2014)

> "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."

Crowdsourcing can be utilised in different situations and it has an effect on an organisation's innovation activities when implemented as a part of innovation management. Dawson and Bynghall (2012) define crowdsourcing as *tapping the minds of many*. Howe's and Dawson and Bynghall's definitions include the same elements but Howe's definition is more precise. Crowdsourcing activities may include web platforms but it is not necessary.

Brabham (2008) claims that crowdsourcing is not open innovation. Open innovation can be seen as one form of product development. Open innovation is open to everyone. An example of open innovation is open source. Anyone can modify a source code and create a new product based on it. Linux is an open source product which anyone can use

freely. All the parts of a product are made available to everyone in open innovation. Open innovation collects and releases RDI projects outside of an organisation.

Crowdsourcing is also about collecting results from the crowd. An organisation, from this point of view receives the profits and results based on crowdsourcing activities. Projects or possible projects are not released to the outside in crowdsourcing. A common example of crowdsourcing is Wikipedia where anyone can write an article and modify existing ones. An example of crowdsourced RDI activities is InnoCentive service where the crowd is working with organisations on RDI problems.

## 2.4   *Crowdsourcing types*

Crowdsourcing is an umbrella term and it has multiple types in literature. All crowdsourcing types relevant to this study are brought out in this section. Crowdsourcing types can be overlapping. Crowdsourcing types can be shared for knowledge-based and finance-based crowdsourcing. Figure 2 is illustrating crowdsourcing types which can be utilised in innovation management.

**Figure 2**    Crowdsourcing types in innovation management (see online version for colours)
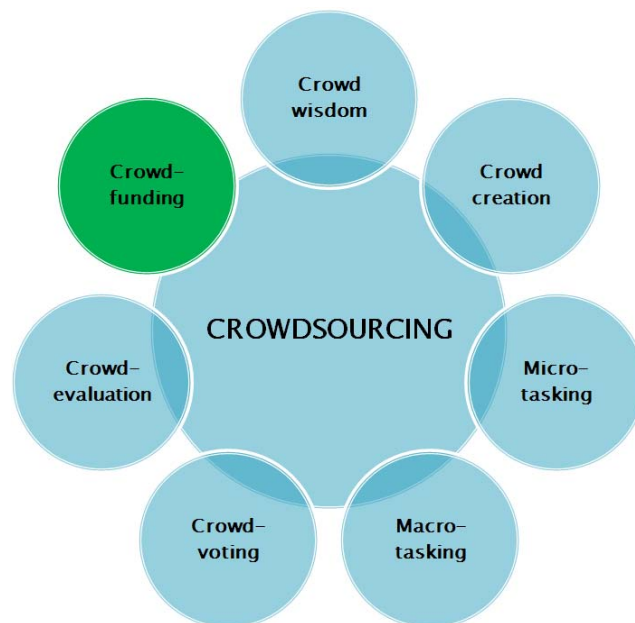


Figure 2 is illustrating crowdsourcing types which can be utilised in innovation management. Most of crowdsourcing types are knowledge-based but crowdfunding is finance-based.

Crowd wisdom is one of the most common forms of crowdsourcing (Sloane, 2011). An organisation is using the crowd to extend its knowledge. Crowd wisdom can be utilised to extend a product's features in an organisation's innovation activities. This means for example using the crowd to construct a new idea. Knowledge is also dispensed within the organisation in this way.

Crowd creation is the second type of crowdsourcing. Customers are participating in the tasks with the actual producers; like employees (Geiger et al., 2011b). The crowd can be utilised for implementing a task which benefits an organisation. The problem to be solved or the task to be performed in crowd creation can have a loose definition and the task's type is generally creative (Geiger et al., 2011a). There can be differences in the quality of the work which individuals create. An organisation should monitor crowdsourcing activities and estimate the quality.

Microtasking enables hundreds of people to perform microwork for an organisation (Franklin et al., 2011). Work can be paid or unpaid. Microtasking systems, like Amazon Mechanical Turk, enable the use of the crowd in an organisation's innovation activities. An organisation may have its own system for microtasking. Microtasking needs verification for quality, the same as other crowdsourcing implementations. Verification is typically carried out by comparing multiple responses to the same task (Gupta et al., 2012).

Macrotasking is the second crowdsourcing tasking type. Macrotasking is a more extensive type of tasking and requires usually special skills and might be precisely targeted (Reid, 2013). The crowd could use a web platform for implementing a task but this is not mandatory. An organisation can donate a reward to the person or persons who are implementing the task. InnoCentive is an example of a platform for this kind of activity. It is normal that the problem solver or project achiever needs to have proof of concept of the solution (Schenk and Guittard, 2011). Macrotasking can be a small part of a project, sub project, or even the entire project may be macrotasked.

Crowdvoting is utilised to organise large amounts of data. Crowdvoting can be used, for example, to judge new or old products or services (Hammon and Hippner, 2012). Crowdvoting is generally implemented through the internet. Internet stores are commonly using crowdvoting for products and services. Customers can, for example, give stars for products or give a thump up or down opinion for an article.

Crowdevaluation is a more analytical form of crowdsourcing. Crowdevaluation can be utilised, for example, as part of an organisation's innovation activities for evaluating the results. Crowdevaluation may be repeatable but ranking quality should be considered (Blanco et al., 2011). There can be differences between the crowd and the professionals in the quality of the evaluation.

Crowdfunding is one way to collect micro amounts of capital from the crowd (Prive, 2012). Anyone can give funding for a crowdfunded project or even to a corporation. An example of a crowdfunding service is Kickstarter where anyone can finance the projects. A project called double fine collected 1,229,015 dollars for their PC tactical strategy game using the crowdfunding model (Kickstarter, 2014).

## 2.5 Crowdsourcing utilisation in innovation management

Tidd and Bessant (2013) allocate innovation management in four main phases which are search, select, implement, and capture. Crowdsourcing can be utilised in several ways in every phase. It should be considered which crowdsourcing task creates value for innovation. The idea behind the innovation may become exposed when crowdsourcing is applied. Crowdsourcing, for example, cannot necessarily be utilised in every phase in the technological innovation development process. This study is highlighting the organisation's point of view in innovation management and crowdsourcing.

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Crowdsourcing can be used for generating new ideas in the search phase. An organisation's professionals can generate ideas which can be evaluated through crowdsourcing. A second way to generate a new idea and evaluate it is to use crowdsourcing and follow which ideas could have pull in the market. Product users or crowd can be utilised for generating new product or service ideas (Poetz and Schreier, 2012). Organisations are using idea management platforms which crowd can access to generate ideas about an organisation's products and services. Organisations can create idea competitions where the best ideas are selected and implemented.

Dell has a service called IdeaStorm where product users can suggest product improvements or new product ideas (Dell, 2014). Public and open tools for idea generation can be used to gather information from the crowd. Examples of idea-based crowdsourcing services are IdeaConnection, My Starbucks Idea and Ideaken. Social networks can be utilised as crowdsourcing platforms to find new ideas and for forming megatrends. Social networks may also be utilised to formulate an idea.

Crowdsourcing can be used for idea or innovation evaluation in the select phase. There should be a rating scale indicator, prediction markets and a comparison between the rating scales when using crowdsourcing to evaluate an idea (Blohm et al., 2011). Indicators tell about the quality of an idea. Crowdsourced idea evaluation aims at filtering the best ideas from the weaker ones. Nowadays, for example, idea testing can be implemented through social networks. Public crowdsourcing tools exist for the innovation management select phase.

Most of the crowdsourcing types can be utilised from an organisation's point of view in the implementation phase. Innovation implementation is commonly done with projects. An idea is turned into a project which develops an innovation or prototype of the new technology (Trott, 2008). The project can be financed with crowdfunding. Micro- or macrotasking can be used in small project tasks. Crowdvoting or evaluation can be used at the final stage of implementation to find out the usefulness of a new product or service. Which crowdsourcing forms are utilised is based on need and the type of project being carried out. Even entire projects can be crowdsourced.

Crowdsourcing can be utilised as a tool for obtaining value in the capture phase. An organisation receives value commonly in the form of profit along with other benefits such as new knowledge. An organisation can try to find new development ideas for new innovation in the capture phase. An organisation can also evaluate an innovation's impact on the business environment in the capture phase. Crowd can be used for evaluating the impact of a new product or service. Crowd creation can be utilised for gathering new ideas for innovations. This way an organisation may implement improvements for new products or services.

## 3    Methodology

The research is based on case studies. The case organisations have RDI activities and crowdsourcing was utilised in the organisations. Multiple persons were invited to research sessions. The amount of responders per organisation was from one to nine persons. The case organisations are micro, small, medium, and large.

Based on the EU definition an organisation is micro when it has less than ten employees, small when it has less than 50 employees and medium when it has less than

250 employees (Centre for Strategy and Evaluation Services, 2012). An organisation can be considered as a large organisation if the organisation has more than 250 employees.

The empirical data in this study was collected using interviews and a web survey. The study included 18 case organisations from a wide range of industry sectors. The total number of responses for the interviews and survey was 44. Thirty-one respondents participated in interview sessions where they were mainly group interviewed in their organisations. Twenty-nine of the 31 respondents who took part in the interviews also responded to the survey and two of the respondents only participated in the interviews. The survey had 42 responses in total. Table 1 presents the case organisations' profiles.

**Table 1**    Case organisations profiles

| Industry | Size | Industry | Size |
|---|---|---|---|
| Communications | Micro | Communications and financing | Small |
| Measurement device manufacturing | Micro | Consulting | Medium |
| Communications and relationships | Medium | Management consulting and business premises | Small |
| Consulting | Small | ICT | Large |
| Communications and networks | Large | Energy and environment | Medium |
| Logistics | Large | Consulting | Medium |
| Aviation | Large | Publishing | Medium |
| Software and systems | Small | Media and news | Small |
| Education | Large | Confectionary | Large |

The case organisations are in the product and service industries. The study responders were acting in multiple levels in an organisation but were mainly managers. Figure 3 is presenting the role of the responders in the case organisations.

**Figure 3**    Role of responders in case organisations (see online version for colours)
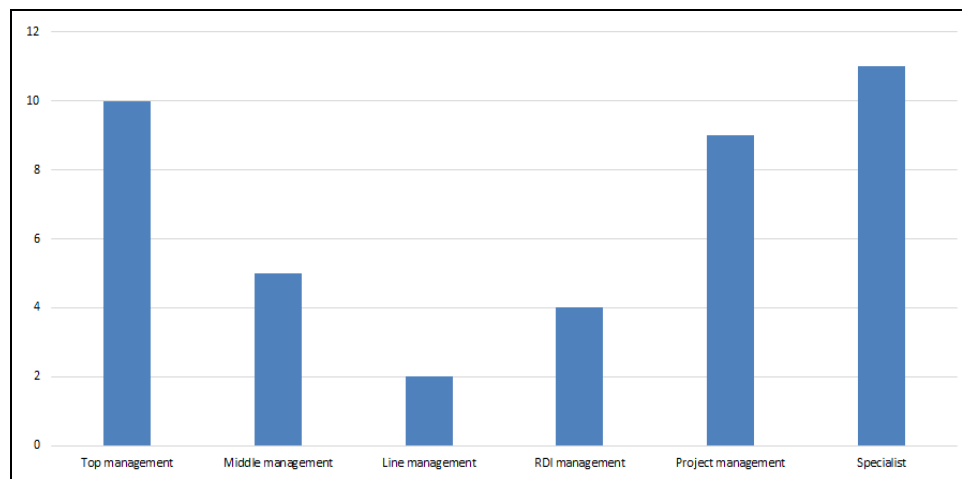
The study includes qualitative and quantitative methods. The researcher introduced the research area to the responders. The survey had 109 questions which included qualitative and quantitative questions. The survey included questions and answers which are not relevant to this study. These questions and answers were excluded from this study. The terms utilised in this study were introduced to the responders. A common understanding of the study was required in the case organisations before answering the web survey and taking part in the interview.

Analysing the answers was implemented using quantitative and qualitative methods. The results were summarised and illustrated using charts, texts, and statistical methods. Descriptive statistics and Pearson two-tailed correlation was applied to this study. The text includes an analysis of crowdsourcing utilisation in the innovation management phases. The result of this study is the innovation management-based crowdsourcing taxonomy.

## 4    Results of the study

Innovation management is managing the process of innovation from the idea searching phase to the value capture phase. This research is applying Tidd's and Bessant's (2013) innovation management model which has four phases. The focus of this study was to research which crowdsourcing types are part of an organisation's innovation management activities in the search, select, implement, and capture phases and to find out if there is a correlation between crowdsourcing types in innovation management phases.

The case organisations were able to find the search, select, implement, and capture phases from their innovation management processes. This leads to the conclusion that these innovation management phases are common and can be utilised in a wide range of industry sectors. On the other hand, every industry is acting in a variety of ways and because of this these processes have differences.

Data is illustrated with bar charts and descriptive statistics. Analysis of the results is extended with interviews. The survey included 42 responses but some answers to the questions were missing. The lowest value in the Likert scale is 1 (not at all) and highest is 6 (a very lot).

Correlations of crowdsourcing types in innovation management phases was analysed with Pearson two-tailed correlation. The results indicate that there are strong correlations in crowdsourcing types in innovation management phases. Correlation tables can be found in Appendix 1.

### 4.1    Search phase

The first stage of innovation management is search. The search phase includes the scanning of an environment for getting ideas for new products and services. Utilised crowdsourcing types in this phase are crowd wisdom, crowd creation, microtasking, macrotasking, and crowdfunding. Figure 4 is illustrating crowdsourcing utilisation in the innovation management search phase in the case organisations.

**Figure 4** Crowdsourcing in innovation management search phase (see online version for colours)
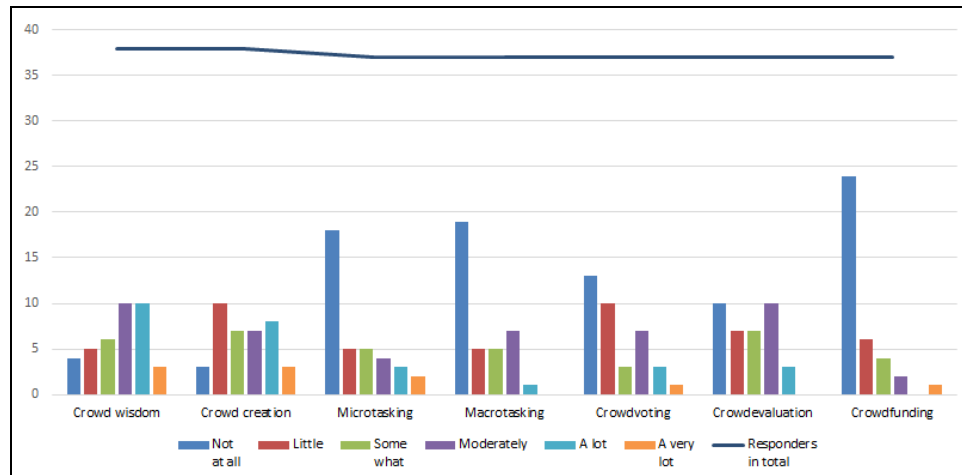


Figure 4 illustrates crowdsourcing utilisation in innovation management search phase with bar charts. Based on interviews selected crowdsourcing types are valid in an organisation innovation management search phase. Table 2 is presenting descriptive statistics of innovation management search phase.

**Table 2** Descriptive statistics of crowdsourcing in innovation management search phase

|  | N | Minimum | Maximum | Mean | Std. deviation |
|---|---|---|---|---|---|
| Crowd wisdom | 38 | 1 | 6 | 3.68 | 1.472 |
| Crowd creation | 38 | 1 | 6 | 3.42 | 1.482 |
| Microtasking | 37 | 1 | 6 | 2.32 | 1.617 |
| Macrotasking | 37 | 1 | 4 | 1.97 | 1.213 |
| Crowdvoting | 37 | 1 | 6 | 2.46 | 1.483 |
| Crowdevaluation | 37 | 1 | 5 | 2.70 | 1.351 |
| Crowdfunding | 37 | 1 | 6 | 1.68 | 1.156 |
| Valid N (listwise) | 37 |  |  |  |  |

Crowd wisdom and crowd creation are utilised mostly in innovation management search phase as we can see from Table 2. Crowdfunding is one of the least utilised crowdsourcing types in the innovation management search phase. Thus, crowdfunding could be utilised for searching for innovations and finding products or services which might have pull in the markets; based on the micro amount of funding received. Crowdsourcing types which are utilising the knowledge of the crowd are used mostly. These are crowd wisdom, crowd creation, microtasking, macrotasking, crowdvoting, and crowdevaluation. Crowdsourcing is utilised to gathering new ideas about an organisation's products or services. Crowd wisdom is utilised for opening new discussions to detect which innovations could have pull on the market. This is implemented, for example, with social networks and blogs.

Knowledge-based crowdsourcing types are commonly utilised for tracking ideas which could lead to innovation. Open platforms are utilised for idea generation and

management. Ideas are gathered from an organisation's internal and external crowd. Crowdevaluation and crowdvoting are utilised to obtain knowledge about useful products and services. This makes it easier to analyse which are the most popular products or services on the market. Crowd wisdom and creation are utilised in idea formulation. Crowd can give opinions about an idea. An organisation may use this knowledge in product or service development. This could be either a small or large task or it may require special skills. On the other hand, this can be seen as a micro- or macrotask.

## 4.2   Select phase

The next phase in innovation management is select. Decisions about selecting the innovation can be based on existing products or services or the organisation's strategy. An organisation's strategy has an impact on selecting the innovations which will be implemented. Crowdsourcing can be utilised in various ways when an organisation is selecting the idea for innovation. Figure 5 is illustrating crowdsourcing types which were identified in case organisations in the innovation management select phase.

**Figure 5**   Crowdsourcing in innovation management select phase (see online version for colours)
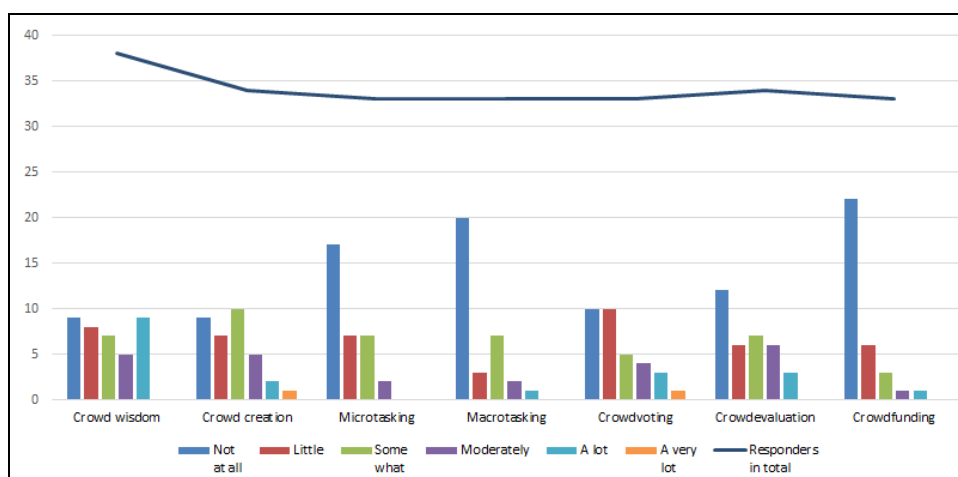


**Table 3**       Descriptive statistics of crowdsourcing in innovation management select phase

|                    | N  | Minimum | Maximum | Mean | Std. deviation |
|--------------------|----|---------|---------|------|----------------|
| Crowd wisdom       | 38 | 1       | 5       | 2.92 | 1.514          |
| Crowd creation     | 34 | 1       | 6       | 2.62 | 1.349          |
| Microtasking       | 33 | 1       | 4       | 1.82 | .983           |
| Macrotasking       | 33 | 1       | 5       | 1.82 | 1.158          |
| Crowdvoting        | 33 | 1       | 6       | 2.48 | 1.439          |
| Crowdevaluation    | 34 | 1       | 5       | 2.47 | 1.376          |
| Crowdfunding       | 33 | 1       | 5       | 1.58 | 1.001          |
| Valid N (listwise) | 33 |         |         |      |                |

Figure 5 illustrates crowdsourcing utilisation in innovation management select phase with bar charts. Crowdfunding is one of the less utilised crowdsourcing types in the innovation management select phase. Table 3 is presenting descriptive statistics of innovation management select phase.

Crowdsourcing is utilised for commenting on innovative ideas. Large or small crowds can give feedback about new ideas. This way an organisation gets knowledge about which products or services have pull in the market. This can be crowd wisdom, crowd creation, microtasking, macrotasking, crowdvoting, or even crowdevaluation. On the other hand, it is not possible to know if a product or service has pull on the market before the new product or service is launched. Thus, this only gives the prediction; does the new product or service have customers at all. Crowdvoting is utilised for voting for the best solutions from several possibilities. This separates the good ideas from the bad ones.

Crowdsourcing is utilised in the testing of new products or services. A product's or a service's upcoming customers are involved in the development process at an early stage so as to make the correct decisions about the product or service's development. An organisation's internal crowd wisdom and crowd creation are utilised in team discussions and process evaluations. Social media is utilised to obtain the knowledge from an external crowd when selecting the idea. Social media tools like Facebook, Twitter, LinkedIn, and GooglePlus are utilised in this phase. External crowdsourcing platforms like InnoCentive and Amazon Mechanical Turk were not utilised in the case organisations. Organisations have their own crowdsourcing platforms which were widely utilised in the case organisations activities. Final selection decisions are made by management, employees, financiers, and owners but the crowd can support these decisions.

**Figure 6** Crowdsourcing in innovation management implement phase (see online version for colours)
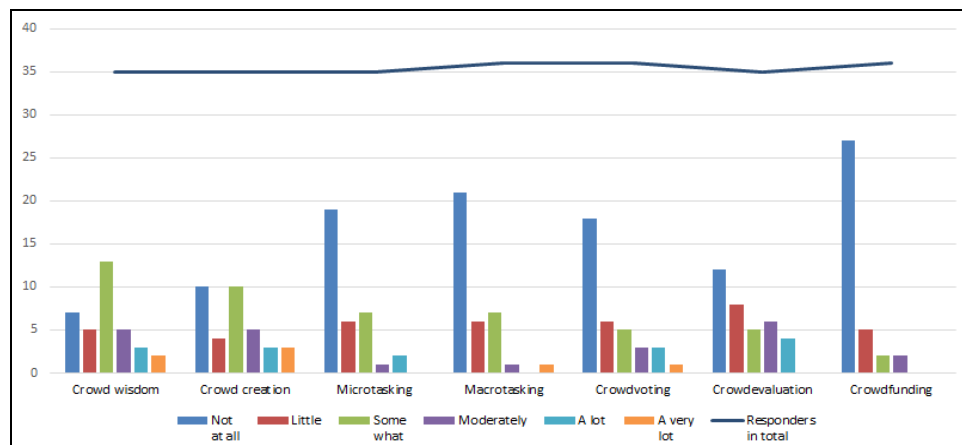


## 4.3 Implement phase

The next phase in innovation management is implement. This phase includes the development of new products or services. Development of a product or service is implemented commonly using projects. Organisations are utilising crowd creation for

planning in part the new product or service. Organisation's internal crowd creation was utilised in project planning to generate a more realistic project plan. Figure 6 is illustrating crowdsourcing usage in the innovation management implement phase.

Figure 6 shows that knowledge-based crowdsourcing types are the most utilised crowdsourcing types in the innovation management implement phase. Crowdfunding is again the less utilised crowdsourcing type in this phase. Table 4 is presenting descriptive statistics of the innovation management implement phase.

**Table 4**    Descriptive statistics of crowdsourcing in the innovation management implement phase (see online version for colours)

|  | N | Minimum | Maximum | Mean | Std. deviation |
|---|---|---|---|---|---|
| Crowd wisdom | 35 | 1 | 6 | 2.94 | 1.413 |
| Crowd creation | 35 | 1 | 6 | 2.89 | 1.605 |
| Microtasking | 35 | 1 | 5 | 1.89 | 1.183 |
| Macrotasking | 36 | 1 | 6 | 1.78 | 1.149 |
| Crowdvoting | 36 | 1 | 6 | 2.17 | 1.483 |
| Crowdevaluation | 35 | 1 | 5 | 2.49 | 1.422 |
| Crowdfunding | 36 | 1 | 4 | 1.42 | .841 |
| Valid N (listwise) | 35 | | | | |

Crowdsourcing types can be utilised widely during the innovation management implement phase. Social networks are commonly utilised in an organisation's crowdsourcing activities. Organisations have development groups in social networks which are seen to be useful during the innovation implement process.

Crowdsourcing activities can be either internal or external during this phase. Recruitment to product testing is implemented using crowdsourcing. However, an organisation is selecting the persons who are participating in the product or service testing. Crowdvoting and evaluation are common crowdsourcing types for judging a new product or service in the innovation management implement phase. This can be seen as crowd wisdom, crowd creation, microtasking, or macrotasking depending upon the scope of the activity.

Product or service testers can give grades to indicate the best product or service. This can be seen as crowdvoting or evaluation based on the scope of analyses which the crowd implements. A product or service is improved through crowdsourcing. The case organisations have tools for this process. The crowd will crucially affect the development process. Some organisations have carried out beta testing using crowd wisdom and crowd creation. This is common in industries where IT is strongly involved. A public link is sent to social networks where testing can be done by a limited amount of users and feedback given about the new product or service. Organisations can be in touch with client's customers during this phase using crowdsourcing. This makes a new product or service more tempting for customers because the development process is affected by the upcoming customer. This could lead to better products or services which may have more pull on the market.

## 4.4 Capture phase

The last stage of innovation management is capture. An organisation is capturing value from the innovation in this phase. The value can be for example: financial reward, an effect on the business environment, a social effect, or ideas for new innovations. Crowdsourcing is utilised during the innovation management capture phase. Figure 7 is illustrating crowdsourcing utilisation in the innovation management capture phase.

**Figure 7** Crowdsourcing in the innovation management capture phase (see online version for colours)
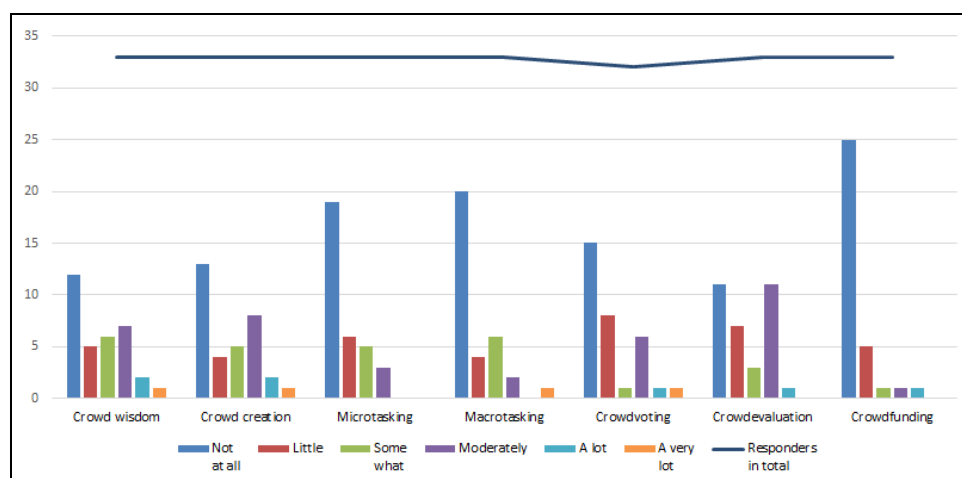


Based on Figure 7 crowdsourcing is utilised less in the innovation management capture phase. Crowdfunding is the less utilised crowdsourcing type in the innovation management capture phase. On the other hand, Crowdevaluation is the most utilised crowdsourcing type in this phase. Table 5 is presenting descriptive statistics of the innovation management capture phase.

**Table 5** Descriptive statistics of crowdsourcing in the innovation management capture phase

|  | N | Minimum | Maximum | Mean | Std. deviation |
|---|---|---|---|---|---|
| Crowd wisdom | 33 | 1 | 6 | 2.55 | 1.481 |
| Crowd creation | 33 | 1 | 6 | 2.55 | 1.523 |
| Microtasking | 33 | 1 | 4 | 1.76 | 1.032 |
| Macrotasking | 33 | 1 | 6 | 1.82 | 1.236 |
| Crowdvoting | 32 | 1 | 6 | 2.16 | 1.439 |
| Crowdevaluation | 33 | 1 | 5 | 2.52 | 1.349 |
| Crowdfunding | 33 | 1 | 5 | 1.42 | .936 |
| Valid N (listwise) | 32 |  |  |  |  |

Organisations are using crowdsourcing to evaluate innovation implementation. This can be seen as crowdvoting or evaluation. Crowdsourcing is utilised mainly for knowledge creation using crowd wisdom or crowd creation. Knowledge is created through a network of actors from the different sectors of industry. The results are analysed using

crowdsourcing. Knowledge of the corporate actors is used in the form of crowd wisdom in this situation.

New ideas which may lead to innovation are gathered from the crowd during this phase with crowdsourcing. Feedback from the crowd can lead to new business solutions and innovation can be applied to other business environments as well. This leads an organisation to new markets and creates opportunities. Organisations are collecting new feature ideas for their products or services during the capture phase. Innovations change organisations reputation in a positive way. Crowdsourcing can be utilised for managing a companies' reputation.

Crowdsourcing is utilised for innovation management process evaluation. Crowdsourcing is used for marketing purposes and for the company to get feedback on a new product or service. The crowd is acting as marketers in this case. The innovation management capture phase is the last stage of innovation management. However, this can lead to new innovations and development activities. This creates a loop for innovation management.

## 4.5   Discussions

Crowdsourcing is utilised in organisations innovation activities. Still, crowdsourcing usage is quite low. All case organisations agreed that crowdsourcing utilisation in innovation management activities implements value for innovation. Organisations should analyse when it is most profitable to utilise crowdsourcing. Sometimes it is not profitable at all to use crowdsourcing because it could damage or expose the innovation. Service industries gain most benefit from crowdsourcing because they can expose innovation at an early stage.

Crowdfunding was the least utilised crowdsourcing type in case organisations. Crowdfunding can be seen as an enabler at least for micro, small, and medium size enterprises. An organisation could create innovations which could not be possible in normal situations because of crowdfunding. Crowdfunding acts also as a marketing channel through the funders. If somebody is funding your innovation or innovation idea she or he will act as a marketer for your product.

There was strong correlation with crowdsourcing types in every innovation management phase. Crowdsourcing strengthens the ideology that crowdsourcing is one entity and it includes different types. Crowdfunding is one type of crowdsourcing. Still, it differs from other crowdsourcing types.

## 5   Conclusions

This research was focusing on how crowdsourcing is utilised in organisations' innovation management within a wide range of industry sectors. The study was applying the four phase innovation management model. Crowdsourcing is utilised in the case organisations in innovation management. Utilised crowdsourcing types are common and can be used in a wide range of industry sectors. Crowdsourcing utilisation accelerates an organisation's production of innovations.

Innovation capability is increased with crowdsourcing as well asthe possibility to create innovations with more market pull. Crowdsourcing brings customers, possible customers, and other citizens more closely and intensively to an organisation's innovation

activities. On the other hand, crowdsourcing includes risks which organisations should consider before implementing crowdsourcing activities. Risks associated with crowdsourcing needs more research.

Crowdsourcing was seen as vital in the case organisations. More and more external and internal knowledge is needed in an organisation's innovation management when the nature of that organisation's business area is to be creative. However, every innovative idea cannot be implemented in an organisation. An organisation always needs to consider resources and internal knowledge before innovation implementation. On the other hand, in some case organisations crowdsourcing was not the standard way to act. However, in some case organisations crowdsourcing was a part of the organisation's culture and it cannot be separated from innovation activities.

Crowdfunding was the least utilised crowdsourcing type in all case organisations. More research is needed about crowdfunding into why it is used less during the innovation management process. Crowdfunding makes it possible for anyone to be involved in the funding and development of a new product or service. Crowdfunding may work also as a channel for marketing upcoming products or services. Crowdfunding creates hype around new products or services which makes it easier to market them. Innovations are generally developed with projects. Crowdsourcing can be utilised during the project lifecycle. More research is needed into crowdsourcing types used in the project lifecycle.

Crowdsourcing was utilised in the case organisation's innovation management but not as widely as it could be used. On the other hand, crowdsourcing is a new way to act for many organisations and it needs development so that it could be utilised more closely in innovation activities. Organisations can use internal and external crowd in innovation activities in many ways. However, it should be considered carefully which types and phases in the innovation management process that could utilise crowdsourcing and create value for new products and services.

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# Appendix

*Pearson correlation (two-tailed) of crowdsourcing in innovation management phases*

| | | Crowdsourcing in innovation management search phase | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Crowd wisdom | Crowd creation | Microtasking | Macrotasking | Crowdvoting | Crowdevaluation | Crowdfunding |
| Crowd wisdom | Pearson correlation | 1 | .942** | .817** | .725** | .877** | .940** | .692** |
| | Sig. (two-tailed) | | .000 | .000 | .000 | .000 | .000 | .000 |
| | N | 38 | 38 | 37 | 37 | 37 | 37 | 37 |
| Crowd creation | Pearson correlation | .942** | 1 | .905** | .802** | .938** | .942** | .772** |
| | Sig. (two-tailed) | .000 | | .000 | .000 | .000 | .000 | .000 |
| | N | 38 | 38 | 37 | 37 | 37 | 37 | 37 |
| Microtasking | Pearson correlation | .817** | .905** | 1 | .826** | .956** | .897** | .905** |
| | Sig. (two-tailed) | .000 | .000 | | .000 | .000 | .000 | .000 |
| | N | 37 | 37 | 37 | 37 | 37 | 37 | 37 |
| Macrotasking | Pearson correlation | .725** | .802** | .826** | 1 | .795** | .808** | .608** |
| | Sig. (two-tailed) | .000 | .000 | .000 | | .000 | .000 | .000 |
| | N | 37 | 37 | 37 | 37 | 37 | 37 | 37 |
| Crowdvoting | Pearson correlation | .877** | .938** | .956** | .795** | 1 | .929** | .883** |
| | Sig. (two-tailed) | .000 | .000 | .000 | .000 | | .000 | .000 |
| | N | 37 | 37 | 37 | 37 | 37 | 37 | 37 |
| Crowdevaluation | Pearson correlation | .940** | .942** | .897** | .808** | .929** | 1 | .772** |
| | Sig. (two-tailed) | .000 | .000 | .000 | .000 | .000 | | .000 |
| | N | 37 | 37 | 37 | 37 | 37 | 37 | 37 |
| Crowdfunding | Pearson correlation | .692** | .772** | .905** | .608** | .883** | .772** | 1 |
| | Sig. (two-tailed) | .000 | .000 | .000 | .000 | .000 | .000 | |
| | N | 37 | 37 | 37 | 37 | 37 | 37 | 37 |

Note: **Correlation is significant at the 0.01 level (two-tailed)

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*Pearson correlation (two-tailed) of crowdsourcing in innovation management phases (continued)*

| | | Crowd wisdom | Crowd creation | Microtasking | Macrotasking | Crowdvoting | Crowdevaluation | Crowdfunding |
|---|---|---|---|---|---|---|---|---|
| | | | | | Crowdsourcing in innovation management select phase | | | |
| Crowd wisdom | Pearson correlation | 1 | .954** | .945** | .881** | .957** | .957** | .810** |
| | Sig. (two-tailed) | | .000 | .000 | .000 | .000 | .000 | .000 |
| | N | 38 | 34 | 33 | 33 | 33 | 34 | 33 |
| Crowd creation | Pearson correlation | .954** | 1 | .909** | .837** | .933** | .949** | .794** |
| | Sig. (two-tailed) | .000 | | .000 | .000 | .000 | .000 | .000 |
| | N | 34 | 34 | 33 | 33 | 33 | 34 | 33 |
| Microtasking | Pearson correlation | .945** | .909** | 1 | .931** | .926** | .947** | .872** |
| | Sig. (two-tailed) | .000 | .000 | | .000 | .000 | .000 | .000 |
| | N | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
| Macrotasking | Pearson correlation | .881** | .837** | .931** | 1 | .936** | .886** | .929** |
| | Sig. (two-tailed) | .000 | .000 | .000 | | .000 | .000 | .000 |
| | N | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
| Crowdvoting | Pearson correlation | .957** | .933** | .926** | .936** | 1 | .948** | .885** |
| | Sig. (two-tailed) | .000 | .000 | .000 | .000 | | .000 | .000 |
| | N | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
| Crowdevaluation | Pearson correlation | .957** | .949** | .947** | .886** | .948** | 1 | .815** |
| | Sig. (two-tailed) | .000 | .000 | .000 | .000 | .000 | | .000 |
| | N | 34 | 34 | 33 | 33 | 33 | 34 | 33 |
| Crowdfunding | Pearson correlation | .810** | .794** | .872** | .929** | .885** | .815** | 1 |
| | Sig. (two-tailed) | .000 | .000 | .000 | .000 | .000 | .000 | |
| | N | 33 | 33 | 33 | 33 | 33 | 33 | 33 |

Note: **Correlation is significant at the 0.01 level (two-tailed)

*Pearson correlation (two-tailed) of crowdsourcing in innovation management phases (continued)*

| | | Crowdsourcing in innovation management implement phase | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Crowd wisdom | Crowd creation | Microtasking | Macrotasking | Crowdvoting | Crowdevaluation | Crowdfunding |
| Crowd wisdom | Pearson correlation | 1 | .957** | .876** | .835** | .881** | .936** | .766** |
| | Sig. (two-tailed) | | .000 | .000 | .000 | .000 | .000 | .000 |
| | N | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| Crowd creation | Pearson correlation | .957** | 1 | .892** | .863** | .927** | .953** | .768** |
| | Sig. (two-tailed) | .000 | | .000 | .000 | .000 | .000 | .000 |
| | N | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| Microtasking | Pearson correlation | .876** | .892** | 1 | .924** | .963** | .926** | .870** |
| | Sig. (two-tailed) | .000 | .000 | | .000 | .000 | .000 | .000 |
| | N | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| Macrotasking | Pearson correlation | .835** | .863** | .924** | 1 | .928** | .910** | .897** |
| | Sig. (two-tailed) | .000 | .000 | .000 | | .000 | .000 | .000 |
| | N | 35 | 35 | 35 | 36 | 36 | 35 | 36 |
| Crowdvoting | Pearson correlation | .881** | .927** | .963** | .928** | 1 | .936** | .882** |
| | Sig. (two-tailed) | .000 | .000 | .000 | .000 | | .000 | .000 |
| | N | 35 | 35 | 35 | 36 | 36 | 35 | 36 |
| Crowdevaluation | Pearson correlation | .936** | .953** | .926** | .910** | .936** | 1 | .746** |
| | Sig. (two-tailed) | .000 | .000 | .000 | .000 | .000 | | .000 |
| | N | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| Crowdfunding | Pearson correlation | .766** | .768** | .870** | .897** | .882** | .746** | 1 |
| | Sig. (two-tailed) | .000 | .000 | .000 | .000 | .000 | .000 | |
| | N | 35 | 35 | 35 | 36 | 36 | 35 | 36 |

Note: **Correlation is significant at the 0.01 level (two-tailed)

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*Pearson correlation (two-tailed) of crowdsourcing in innovation management phases (continued)*

| | | Crowdsourcing in innovation management capture phase | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | Crowd wisdom | Crowd creation | Microtasking | Macrotasking | Crowdvoting | Crowdevaluation | Crowdfunding |
| Crowd wisdom | Pearson correlation | 1 | .987** | .907** | .892** | .932** | .950** | .752** |
| | Sig. (two-tailed) | | .000 | .000 | .000 | .000 | .000 | .000 |
| | N | 33 | 33 | 33 | 33 | 32 | 33 | 33 |
| Crowd creation | Pearson correlation | .987** | 1 | .902** | .884** | .917** | .954** | .731** |
| | Sig. (two-tailed) | .000 | | .000 | .000 | .000 | .000 | .000 |
| | N | 33 | 33 | 33 | 33 | 32 | 33 | 33 |
| Microtasking | Pearson correlation | .907** | .902** | 1 | .944** | .942** | .856** | .854** |
| | Sig. (two-tailed) | .000 | .000 | | .000 | .000 | .000 | .000 |
| | N | 33 | 33 | 33 | 33 | 32 | 33 | 33 |
| Macrotasking | Pearson correlation | .892** | .884** | .944** | 1 | .956** | .826** | .906** |
| | Sig. (two-tailed) | .000 | .000 | .000 | | .000 | .000 | .000 |
| | N | 33 | 33 | 33 | 33 | 32 | 33 | 33 |
| Crowdvoting | Pearson correlation | .932** | .917** | .942** | .956** | 1 | .846** | .855** |
| | Sig. (two-tailed) | .000 | .000 | .000 | .000 | | .000 | .000 |
| | N | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| Crowdevaluation | Pearson correlation | .950** | .954** | .856** | .826** | .846** | 1 | .613** |
| | Sig. (two-tailed) | .000 | .000 | .000 | .000 | .000 | | .000 |
| | N | 33 | 33 | 33 | 33 | 32 | 33 | 33 |
| Crowdfunding | Pearson correlation | .752** | .731** | .854** | .906** | .855** | .613** | 1 |
| | Sig. (two-tailed) | .000 | .000 | .000 | .000 | .000 | .000 | |
| | N | 33 | 33 | 33 | 33 | 32 | 33 | 33 |

Note: **Correlation is significant at the 0.01 level (two-tailed)

# Crowdsourcing in a Project Lifecycle

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**Abstract.** Project management is an essential part of an organization's research, development, and innovation activities. A new products or services are carried out with projects. New products and services are innovative because of elements of newness. Project management is managing the lifecycle of a project and it has four main phases: initiation, planning, execution, and closure. Crowd can be seen as a project resource. This research is focusing on how crowdsourcing is utilized in a project's lifecycle and it is a case study. The case organizations are operating in a wide range of industry sectors. The outcome of the study shows that crowdsourcing can be utilized in a project's lifecycle in several ways. Crowdsourcing can be effective in the projects. However, the risks and possible failure of crowdsourcing activities should be taken into account. Crowdsourcing activities can be private or public and can be implemented inside or outside of the organization.

**Keywords:** Crowdsourcing · Innovation · Project lifecycle · Project management

## 1 Introduction

Innovations drive modern economies. It has been widely accepted that innovations lead to an organization's economic growth. Innovations should therefore be in demand in the markets where the organization is operating. Innovations are commonly implemented with the projects. Project management is an essential part of an organization's research, development, and innovation (RDI) activities. Project management is managing a project lifecycle [17]. Each project management phase is unique and organizations are implementing projects in a variety of ways. Still, the main project processes are the same.

Crowdsourcing is the utilization of an undefined crowd. Crowdsourcing is an outsourcing task where the task achiever is not defined [7]. Generally crowdsourcing activities may take place inside or outside an organization. Internal crowdsourcing is commonly utilized in medium and large organizations. The crowd implements a task which employees of the organization normally carryout. Crowdsourcing types vary and they can be applied to projects in several ways.

Based on this study crowdsourcing can be utilized in several ways in a project lifecycle. Crowdsourcing can be a tool for project management. Crowdsourcing can be utilized for example: for implementing more realistic project plans, to create a new product or for service evaluation. The result of this study is taxonomy of crowdsourcing types which can be utilized in organizations' project management activities.

## 2   Projects and Crowdsourcing

Project management has a crucial role in an organization's RDI activities. Crowdsourcing tasks may, for example, create innovative ideas for an organization. This section brings out all the relevant literature for this study and it includes the themes of project management, project lifecycle, crowdsourcing, and modern crowdsourcing implementations.

### 2.1   Project Management

Innovation can be defined as the management of a process which leads to new technology, service, or even a new process [23]. Innovations are carried out generally with projects. Researchers have defined a project in several ways. Definitions have, however, a clear consensus and the same elements exist. Projects types are different. Thus, building a house is a different kind of project than implementing a mobile application. Still, both are projects and they share the same elements, but the outcomes are different. Lake [13] defines a project as follows:

> "A project is a temporary endeavor involving a connected sequence of activities and range of resources, which is designed to achieve a specific and unique outcome and which operates within time, cost and quality constraints and which is often used to introduce change."

A project implements a task that has been specified beforehand and is temporary. Every project is unique and is established to achieve specific outcomes. A project may have its own organization and might include specialists from several industry fields. Projects can be organized as a matrix organization but it can be challenging [14]. On the other hand, matrix organization is one of the most common forms used for project organization.

A project can be a research, development, or innovation project. Research projects are, for example, studying new phenomena. Development projects carry out, for example, a new product or service. Innovation projects target development of new products, service, or processes [15]. Research projects produce development projects in the final stage. Development projects are clearer to manage than research projects. The results are normally known beforehand in development projects. Research and development projects share the same common elements. Still, every project is unique and different and projects have the same basic terms for time, costs, and quality.

### 2.2   Project Lifecycle

Project management is about managing the lifecycle of a project. The lifecycle involves four main phases, which are: initiation, planning, execution, and closure. Project management is also about motivating, planning, monitoring, and controlling the resources to achieve the predefined goals. The project manager is the person who is responsible for the project.

Projects are implementing something that has not been created before and project results are normally unique [17]. The nature of a project is innovative because of the

element of newness. Projects are taken in different organizational levels and projects may involve one or more employees. Figure 1 is illustrating The Project Management Institute's [17] approach to project management.

Figure 1 illustrates a common approach for project management. Every project, in general, goes through four phases. The process may vary based on the project, organization, and involved industry.

The project initiation phase is the first stage in the project lifecycle. A project gets its aim, scope, and purpose among other requirements in the initiation phase. Project resources can be considered in this phase. Most projects have several stakeholder interests [12]. Interests guide the project's scope in the project initiation phase. The customers', potential customers', or end user point of view should be considered here. Rogers [18] argues that project initiation offers the chance to know whether the vision is viable, the plan is practical and agreeable, and if there is sufficient support, enthusiasm and resources.

A project is planned more closely in the project planning phase. Resources are allocated for the project implementation. Written project plans can be either long or short, based on the project's scope. The project's scope and results should be clear in this phase. Lake [13] emphasizes the importance of project planning and the use of project management tools during this phase. Modern project management tools are IT based and can be utilized in several ways.

A project is implemented in the project execution phase using resources which can be either internal or external to an organization. The project execution and planning phases are closely related to each other. There might be a need to get back to the planning phase during the execution phase. A project may require changes in expected activity durations. Changes may also occur in resource productivity, availability or unanticipated risks may arise [17]. Still, a project may have iteration in all phases. Management and monitoring is required in the execution phase to keep the project in the right scope.

The last state of a project lifecycle is the project *closure*. Evaluation is implemented in this phase. The project subscriber and other stakeholders are normally evaluating the project. The success or failure of a project is decided in this phase. Sarfraz [19] argues that the failure or success of the projects is influenced by many external and internal factors. These can be, for example, administrative, contractual, team behavioral and budget factors. The closure phase may include the final product



**Fig. 1.** Project management phases [17]

delivery for the customer. This phase can include a new product or service being launched onto the markets.

## 2.3    Crowdsourcing

Crowdsourcing is a way to involve an organizations' external and internal crowd in the innovation activities. It is important to be in touch with internal and external crowd during a product or service development. A new product or service is impacted by customer, potential customer, known, or unknown persons in the innovation development process.

A crowdsourcing task can be taken outside or inside an organization. Crowdsourcing can be implemented between different departments if an organization is large enough. Crowdsourcing is constructed from two words: "crowd" and "sourcing". Sourcing refers to outsourcing. Jeff Howe published an article about crowdsourcing in *Wired*-magazine in 2006 and he defines crowdsourcing as follows [7]:

> *"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."*

Crowdsourcing is not an open innovation [2]. An open innovation can be seen as a model for a new product or service development. An open innovation is open to everyone and ideas can be utilized in other organizations as well. This may lead to difficulties if an organization is making a profit with innovations. An example of open innovation is the open source product called Linux which is free to everyone. On the other hand, crowdsourcing includes open innovation elements. Open innovation collects and releases projects outside an organization. Whereas, crowdsourcing is an activity that takes place inside or outside an organization and the results are collected by the organization.

A common example of crowdsourcing is Wikipedia where anyone can write an article about almost anything. An example of a crowd development platform is InnoCentive where crowd is solving development problems of organizations [11]. Motivation for problem solving is a reward which varies based on the problem's difficulty.

## 2.4    Crowdsourcing Implementations

Crowdsourcing can be utilized in a wide range of industries. Crowdsourcing has an element of open call. Generally this means that anyone can participate inside or outside of an organization. Still, there can be some limitations. Some tasks are industry based and require special skills to implement crowdsourced task.

Crowd wisdom is one of the most commonly utilized crowdsourcing types [21]. Crowd wisdom can be utilized to extend a new product or service features during project implementation. A project employee's knowledge can be extended with the use of crowdsourcing which can be either internal or external to an organization. Generally projects include new product or service testing. Crowd wisdom creates

knowledge for an organization for improvements to a new product or service. Crowd can collectively give opinions which make the product or service more useful.

Crowd creation is a second type of crowdsourcing. Customers, potential customers, or other stakeholders are participating in an organization's development activities like employees [4]. A crowd creation task can have a loose definition and the nature of the task is creative [5]. Crowd can partly implement projects. This can be, for example, programming a system for an organization. This is quite common in open source communities. An organization should monitor the crowd creation activities of the crowd and estimate its quality during implementation.

Microtasking enables hundreds of people to perform microwork for the organization [3]. Individuals perform microtasks. Work can be paid or unpaid. Microtasking systems like Amazon Mechanical Turk enable the use of crowd in project activities. Projects may utilize microtasking, for example, designing a new product or service. The quality of microtasking results can be excellent but the quality of the results needs to be verified. This is implemented generally by comparing several responses to a same task [6].

Macrotasking is a second crowdsourcing tasking type. Generally macrotasking requires special skills from the crowd's individuals. Crowdsourcing needs to be more focused in macrotasking [8]. Generally the crowd's individuals are utilizing a web platform to implement a task or a project. An organization can donate a financial reward to the task achiever. InnoCentive is an example of a macrotasking platform. The problem solver or project achiever needs to have proof of concept for the solution [20]. Macrotask can be an independent task, a small part of a project, or even an entire project. An organization can utilize macrotasking when the organization does not have the resources or knowledge for implementing a project or part of a project.

Crowdvoting is a crowd analytics type, which can be utilized to organize large amounts of data and it is one of the earliest crowdsourcing types. Crowdvoting can be utilized for the evaluation of new products or services which are developed in projects [9]. Thus, crowdvoting can be utilized in a new product or service's testing in the final phase of project implementation. Crowdvoting is a simple task for the crowd's individuals because it only takes a small amount of time to give your opinion about a developed product or service.

Crowdevaluation is a more extensive crowd analytics type. Crowdevaluation can be utilized as a useful part of project activities for evaluating results in the product or service development process. Crowdevaluation should be repeated through a product or service development process but the ranking of the quality of the results should be considered [1]. Quality of evaluation can alternate between the crowd's individuals and the professionals. On the other hand, more inclusive analysis of a developed product or service is better than a narrow one.

Crowdfunding is a way to collect micro or macro amounts of capital for an organization's projects [16]. Anyone can participate and give capital for a crowd-funded project or even an organization. Generally the funder gets the new product developed if the organization receives enough funding for the project's implementation. Example of crowdfunding platform is Indiegogo where projects can be financed by the crowd with crowdfunding campaigns [10]. Crowdfunding campaigns needs to have a goal. If the crowd is funding a project an organization should

implement it and bring out the results which the organization has promised the crowd which is funding the project.

## 3    Methodology

The research is based on case studies. The case organizations have RDI activities and crowdsourcing was utilized in the organizations. Several persons were invited to research sessions. The amount of responders per organization was from one to nine persons. The case organizations are small, medium, and large. The responders were in: top management, line management, RDI management, project management, or were specialists.

The empirical data of this study was collected using interviews and a web survey. The study included 16 case organizations from a wide range of industry sectors. The total number of responders for the interviews and survey was 39 persons. 27 persons participated in interview sessions where they were group interviewed in their organizations. 25 of the 27 persons who took part in the interviews also responded to the survey and two of the persons only participated in the interviews. The survey had 37 responders in total. The industries involved included for example: consulting, publishing, education, networking, automation, energy, and public relations. The study includes qualitative and quantitative methods and it can be considered a mixed research as both methods were utilized in data gathering and analysis.

The researcher introduced the research area to the responders. The survey had 109 questions which were qualitative and quantitative questions. The survey included questions and answers which are not relevant to this paper. These questions and answers were excluded from this paper. The terms utilized in this study were introduced to the responders. A common understanding of the study was required in the case organizations before answering the web survey and taking part in the interview.

This study can be identified as a positivistic research. The study is built on empirical data which was collected from organizations which are acting in a wide range of industry sectors. The inductive reasoning method is utilized in this study. Inductive reasoning ("bottom up") is building a theory from observations [22]. The inductive reasoning approach is utilized for finding the patterns of crowdsourcing utilization in innovation management. The theory is constructed by applying existing crowdsourcing theories and validating them.

Analyzing the answers was implemented using quantitative and qualitative methods. The results were summarized and illustrated with charts and texts. The text includes an analysis of crowdsourcing utilization in a project's lifecycle.

## 4    Results of the Study

The project lifecycle was studied in several case organizations. These organizations recognized the four phases of project management. On the other hand, the project types varied based on the industry. The focus of this study was to research crowdsourcing types which can be utilized in projects which are implemented in different industries.

Crowdsourcing is a way to keep customers, potential customers, and other stakeholders involved in project initiation, planning, execution, and closure.

Project initiation includes the construction of a project idea. The idea may come from previous projects or it might be an order from a customer. Previous projects may produce new project ideas. Project ideas can be evaluated with crowdvoting and evaluation. Evaluation gives an overall view of the market situation for a possible new product or service. However an organization still need to consider does the crowd know what they really need. The results of crowdvoting or evaluation should be analyzed carefully.

A clients' customer is also involved in a project with crowdsourcing in some industries. This is common in industries where the client is ordering something that is not to be used by the client itself. This is useful because the client will receive a product or service which is more tempting to the clients' customer. The most common crowdsourcing type in the initiation phase is crowd wisdom. Crowdfunding is a less utilized crowdsourcing type in the case organizations in this study. Figure 2 illustrates crowdsourcing utilization in the project initiation phase.

Several crowdsourcing types can be applied with a focused crowd or undefined crowd. Some tasks require special knowledge about an organization's products and services. Thus, this leads to crowdsourcing implementation which needs to be more targeted. Sometimes focused crowd is better than undefined crowd because the quality of the results may be more relevant in focused crowdsourcing activities. Crowdsourcing activities can be private or public in the initiation phase. Private crowdsourcing may be utilized when an organization is large enough.

Crowdsourcing activities inside of an organization may create more intensive results. On the other hand, external crowd can produce innovative results which may lead an organization to new business areas. An organization should always analyze the knowledge which crowd produces because it does not necessarily fit into the organization's projects. Crowdsourcing was utilized for scanning weak signals. A weak signal is a sign that something new might be a megatrend in the future. Weak signals may lead to new products or services.
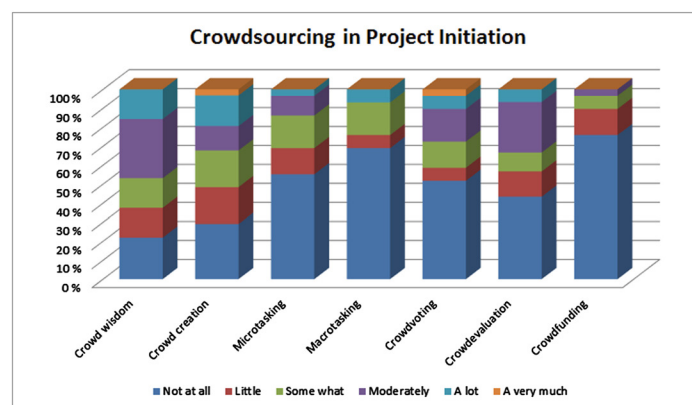


**Fig. 2.** Crowdsourcing in project initiation

Crowdsourcing platforms which are utilized by organizations can be either private or public. Generally organizations want to own the data which crowd produces. Thus, data which is gained from crowdsourcing activities is important. Crowdsourcing platforms include elements from crowd wisdom and crowd creation. Organizations utilized crowd creation with both internal and external crowds for idea construction. Crowdfunding was a less utilized crowdsourcing type in project initiation. Still, it was seen as a potential way to fund projects in the case organizations. Crowdfunding produces hype around a new product or service which generates customers for an upcoming product or service. Thus, this creates innovations which have a pull on the markets.

The project planning phase includes, for example, clearing out the resources, budget, and schedules for a project. Crowdsourcing types are utilized in various ways to support project planning. This includes project planning with a crowd's individuals as a micro or macrotask. A crowd's individuals may be internal or external to an organization. Figure 3 illustrates crowdsourcing types in project planning.

Crowd wisdom and crowd creation can be utilized in project planning to implement a more realistic project plan. Normally project planning is an organizations' internal task but it can be extended to include crowd wisdom and crowd creation. Thus, generally this is a private crowdsourcing task where the crowd is limited to specific stakeholders. Social networks are utilized for spreading information about a new project during the planning phase. Crowdvoting and evaluation can be utilized for the selection of the most realistic project plan. An organization could have several project plans or parts of plans which can be analyzed using the crowd.

Knowledge about an organization and its resources are required for implementing crowdsourced tasks in the planning phase. Project planning can be carried out with workshops, seminars, or informal meetings where anyone can participate from inside or outside of an organization. An organization can use crowdsourcing for recruitment of project employees from inside an organization. Crowdfunding is a potential type to partly fund a project. Crowdfunding is not a common way to act in most
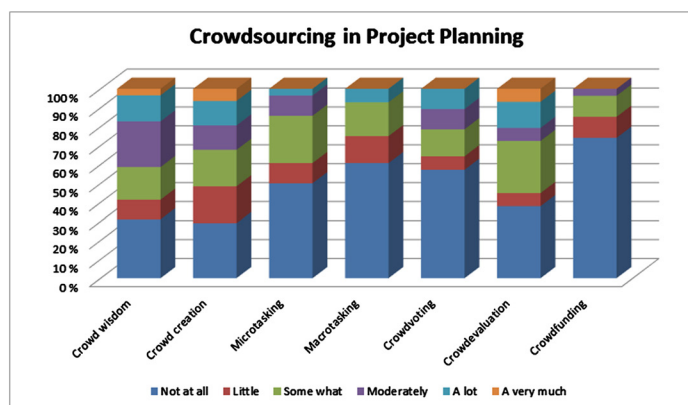


**Fig. 3.** Crowdsourcing in project planning

organizations. Organization's projects are, for example, normally funded by owners, clients, and customers.

Project execution is the implementation of tasks which have been allocated for the project. Crowd can be utilized in product or service testing in product or service development. A product or service can be under development during testing. Thus, the project or service development can be monitored with crowdsourcing. The crowd's individuals' give feedback analyzes about the developed product or service. Figure 4 is illustrating crowdsourcing implementations in the project execution phase.

The execution phase includes crowdsourcing types, such as: crowd wisdom, crowd creation, micro and macrotasking, and crowdvoting. Crowd may give development ideas for the developed product or service. Ideas may lead also to a new product or new service features. Crowd can also implement changes for a product or service as a focused crowd. This can lead to more intensive results and more emphasis on products and services. Generally the crowd is formed from individuals who are interested in an organization's products and services. An organization can activate a crowd which is in a totally different business area to get innovative ideas which can lead also to radical innovations.

Organizations may offer crowdsourcing services. Still, this is not possible for every organization because an organization should have a platform which includes crowdsourcing elements and a large amount of users in their platforms. Crowd can develop products or services for a client's customer with a crowdsourcing platform. Thus, a crowdsourcing service provider should consider the possible failure of crowdsourcing activities and make this clear to the client which is investing in the crowdsourcing service.

The project closure phase finalizes the project. Crowdsourcing can be utilized as a marketing tool for the developed product or service. The crowd is acting as an informer in this situation. Crowdsourcing utilization in the closure phase creates a positive reputation for an organization. Still, crowdsourcing activities should be monitored and reacted to in the closure phase. If the crowd gives negative feedback to
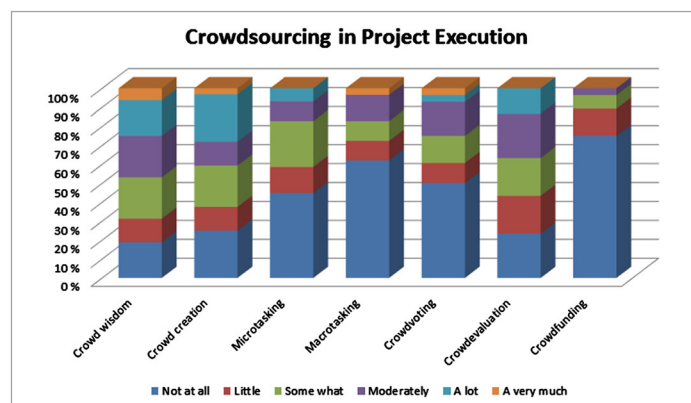


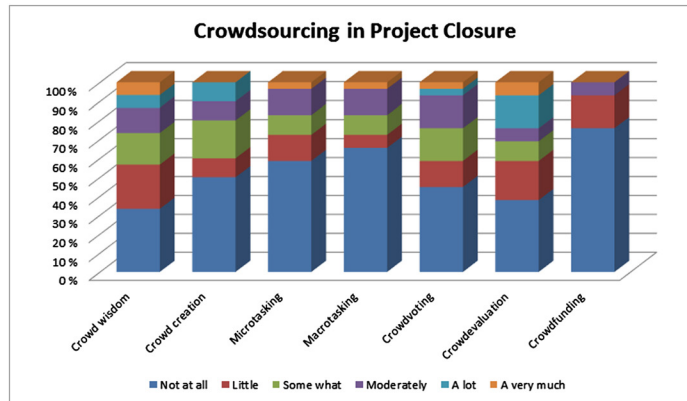**Fig. 4.** Crowdsourcing in project execution

**Fig. 5.** Crowdsourcing in project closure

an organization they should always react to the feedback and find out why the feedback is negative. Figure 5 is illustrating the project closure phase from a crowdsourcing point of view.

Project closure includes the evaluation of the project. The evaluation should be an iterative process. The evaluation can be extended beyond the project closure phase with crowdsourcing. An organization gets feedback from the crowd on a new product or service. The closure phase may include final product delivery to a customer and it may be described as the hand over phase. New activities are put into practice inside the organization. An organization is delivering developed products to the crowd-funders if crowdfunding was applied in the project initiation or planning phase. Thus, crowdfunders will get the new product before it is on the market.

Evaluation of a new product or service can be implemented with crowdvoting or evaluation. An organization will receive new development ideas for new products or services with crowd wisdom and crowd creation. Crowd wisdom may be utilized for creating new project ideas which may lead to new innovations. Thus, it is important that the final version of a product or service is evaluated, because it generates new knowledge for an organization.

## 5    Conclusions

This study was focusing on how crowdsourcing is utilized in the project lifecycle in wide range of industries. Organizations can keep customer, possible customer, or other stakeholder's a part of the project lifecycle with crowdsourcing. This adds new value to a product or service which is under development. The crowd can commit opinions about a new product or service. The crowd can test a new product or service. However, organizations should also view critically crowd results.

Quality control and monitoring is required in crowdsourcing activities. An organization should be aware that the crowd's individuals are not normally professionals. Usually the crowd's individuals are product or service end users. Based on this study

the service industries gain the most benefit from crowdsourcing. Developed services can be changed more quickly based on crowdsourcing results in the service industry. Still, every industry should benefit from crowdsourcing activities.

This research is limited to crowdsourcing utilization in the project lifecycle. The case organizations are acting in wide range of industries. More industry based research is required about crowdsourcing utilization. Interviews and surveys were utilized for collecting the empirical data. This was a reasonable option because crowdsourcing is still a new model in product or service development. Still, organizations are utilizing crowdsourcing but not as systematically as it could be. This is industry based and requires research into how crowdsourcing processes differs in other cases.

This study included crowdsourcing types which can be utilized for organization's project activities. More research is required into crowdfunding as an enabler in projects. Crowdfunding enables projects which the crowd sees as having potential. New products and services can be funded with crowdfunding. Nevertheless, all crowdsourcing types are needed to implement innovative products and services which have more pull in the markets.

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