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**WORKER MOTIVATION IN CROWDSOURCING NEW PRODUCT
DEVELOPMENT**

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ABSTRACT

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In the study the recently appeared technology of crowdsourcing and its implications to new product development activities. The goal of the research is to figure out the motivating factors used in crowdsourcing projects related to new product development. The study is based on the theoretical backgrounds of crowdsourcing; new product development, and motivation, which resulted in the framework for the crowdsourcing cases assessment and the list of possible motivating factors used for the analysis.

The research is based on 16 crowdsourcing projects divided in 4 sets according to the stage of new product development at which they are directed. The motivating factors present in the projects were distinguished and explained. Further analysis allowed making conclusions showing which of the motivating factors are suitable for the crowdsourcing projects related to the particular stage of new product development. The results can be used for creation or assessment of crowdsourcing projects for the companies because the main factor of success for crowdsourcing is motivation, and the work is answering how to motivate the workers.

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INTRODUCTION

Crowdsourcing is now one of the hot topics in a business research community. It has brought a lot of attention from the academics as well as from the business sphere. Crowdsourcing became a trend changing the perception of Internet usage for business firms, governments and non-profit organizations. The concept started to appear in early 00's; however, an article in Wired Magazine by Jeff Howe (2006) brought the greater attention to the crowdsourcing.

More and more companies are starting to realize that crowdsourcing might help them to develop products better and faster. NPD implies collaboration of different functional parts of the company, and crowdsourcing in many companies becomes very good supplement for these parts. There are many web-sites appeared which might help to solve technical problems, come up with a marketing plan, or even get an idea of a new product – all with the help of crowdsourcing. Crowds easily solve problems and issues that hardly could be solved by a person or a team of people, or this solution would require much more resources. We know great examples of Wikipedia and YouTube which content is being created by the crowds what proves that the collective actions able to rapidly generate content. There are many other examples of businesses using crowds' content such as iStockphoto which sells the photos made by its users.

Crowdsourcing is used not only by businesses, but also being used in the non-profit and government sectors as a problem-solving tool (Brabham, 2008). Samasource, txtEagle, Ushahidi, peer water exchange, and mCollect (Sharma 2010) are very notable examples where crowdsourcing was used for poverty alleviation, livelihood support and improving crisis response in Africa, Latin America and parts of South Asia (Greenough et al., 2009).

Appearance of many new crowdsourcing initiatives makes it possible to investigate the phenomena better and more thoroughly. This research will discuss the existing literature about crowdsourcing and analyze some of the created crowdsourcing initiatives. Due to the fact that crowdsourcing is a term closely related and sometimes overlapping with the Human Computation and Social Computation, the examples of them are also going to be analyzed.

The focus of the research is directed towards implications of the crowdsourcing in new product development, which is being one of the crucial areas of actions for many organizations; many researchers agree that it is necessary to come up with the new products to survive (Knight 1967; Qin & Wang 2006; Bartos 2007). However, the process is not very clear and easy; therefore, the discussion about the NPD process and the literature about it will also be discussed in the thesis.

The main aim of this research is to understand the motives of people to participate in crowdsourcing activities for companies' new product development. The participation of the crowd in any crowdsourcing initiative is a crucial and the most important factor of success of the initiative (Sharma 2010). Due to the fact that the research area is very new, the literature still lacks comprehensive discussion of the main motives of the crowds to participate. Also, the topic has clear managerial application as the companies willing to use crowdsourcing in their NPD process have to be sure that they attract required number of participants. It is necessary to understand what motives move people towards participation in crowdsourcing activities in order to use crowdsourcing in business.

To understand the possible motivating factors that can be used for ensuring the participation in the crowdsourcing NPD activities, the theoretical backgrounds of the new product development, crowdsourcing, and motivation are provided in the first chapter. More precisely, the chapter defines the NPD process; discusses what activities are to be done in order to develop a new product; and provides the information about customer empowerment and open innovation NPD practices. Further, the crowdsourcing and its related concepts are introduced and defined. The section also discusses the characteristics and factors of success for any crowdsourcing project. The next section of the theoretical review contains the information about the motivation and motivational factors. The section allows distinguishing the main motivating factors which can be used in crowdsourcing projects; the factors are based on classical motivation and open source software motivation theories.

The following chapter provides the reader with the information about the design and methodology of the research. The chapter also contains the data used for the research, which includes the description of the 16 crowdsourcing projects and the motivating factors used in them.

The third chapter is indeed to answer the research questions and state the managerial implications derived from the answers. Also, the information on the conducted analysis, allowing answering the questions, is provided in the chapter. The following conclusion summarizes the work done and presents the results.

1. THEORETICAL BACKGROUNDS OF NPD, CROWDSOURCING & MOTIVATION

1.1. Research objectives

The following research is addressing the motivating factors in new product development crowdsourcing projects. The literature review shows that there is a diversity of motivating factors exists. Therefore, the first task of the research is to define which of the whole set of the factors can be used to motivate workers to participate in crowdsourcing projects. However, there is currently a diversity of the existing crowdsourcing projects and the activities the workers have to do in these projects. Consequently, different motivating factors should be used in different projects. Due to the scope of the work, the analyzed crowdsourcing projects were limited to the projects related to the NPD activities.

The main **goal** of the research is to understand **how to motivate the crowd to participate in NPD**. To address the goal, the NPD crowdsourcing projects can be classified according to stages of the NPD towards which the projects are directed. Consequently, the NPD crowdsourcing projects can be divided in 4 categories – one for each NPD stage.

Therefore, the following research questions (RQ) seem logical to be set for the research:

RQ1: What are the motivating factors for the workers in crowdsourcing project directed to the 1st Stage NPD activities?

RQ2: What are the motivating factors for the workers in crowdsourcing project directed to the 2nd Stage NPD activities?

RQ3: What are the motivating factors for the workers in crowdsourcing project directed to the 3rd Stage NPD activities?

RQ4: What are the motivating factors for the workers in crowdsourcing project directed to the 4th Stage NPD activities?

The research has clear managerial implications as the crowdsourcing becomes a very popular technology that being used in the variety of business areas including the new product development. Due to the fact that literature overview showed that motivation of the workers is the main success factor of the crowdsourcing projects, it is necessary to know how to motivate people and what motivating factors should be used in order to ensure the participation in the crowdsourcing projects, and therefore the success of the activities being done in such projects.

1.2. New Product Development (NPD)

Currently, companies operate in highly competitive environment with rapid technological change and uncertain future. In order to survive in the environment and be successful, it is important to have the competitive advantage (Axarlogou 2003). However, the constantly changing environment quickly outdates existing competitive advantages; therefore, a company has to always pursuit new ways of creating and sustaining competitive advantage (Hung, Chung & Lien 2007).

One of the ways to create and maintain the advantage is to come up with innovations which can be completely new products or modifications to existing products (Adis & Razli 2009). In other words, the company should develop and launch the new products in order to have the sustainable competitive advantage.

New product development (NPD) process is very complex process which consists of many diverse activities and requires contribution of people with knowledge and expertise in different areas. Generally, NPD is defined as “the set of activities beginning with the perception of a market opportunity and ending in the production, sale and delivery of a product” (Ulrich & Eppinger 2007).

In other words, NPD is the process of creating innovations in a company: from the idea generation to the launch of the product to the market. By a product here not only a tangible product is meant: services, digital and intangible goods are also treated as products and generally developed with the same principles as a tangible good. There are several others definitions of NPD in the literature; however, they are focusing in some specific areas or depend on the areas of

business. In this work, NPD is treated in its broad sense which is the creation of a new products or services.

NPD is accommodated with range of different risks. Successful development and launch of a product might drive the company to the leading positions on the market; however in the same time, company might waste a lot of resources on the development without getting any positive results (Coad & Rao 2008). To ensure that NPD will bring positive outcomes to the company, the process should be clearly defined and correctly managed (Booz-Allen & Hamilton 1982).

1.2.1. NPD Stages

Usually the NPD process is broken into a series of stages according to the state of the product at each step. Schroeder (2003) breaks the NPD process in three phases: Concept development, Product design, and Pilot production/testing. This model leaves the actual production and sales out of the NPD process. Ulrich and Eppinger (2007) go further and divide the process in 5 steps: concept development, system-level design, detail design, testing and refinement, and production ramp-up. Boer (1999) also proposes the five-steps NPD process; however, includes the commercialization inside the NPD process: “Raw ideas”, “Conceptual project stage”, “Feasibility stage”, “Development stage”, and “Early commercialization stage”.

The differences in the models are connected with the perspective of the research and depend on the aim that researchers were pursuing. However, despite the differences, all models have the common core: first, it is necessary to create an idea of the product, second - design how the product will look like and describe its features, then develop the product, and finally prepare the product for the commercialization. This is very similar to the NPD process proposed by Sun and Wing (2005), according to which NPD process consists of four broad stages: ideas generation, conceptual design and specification, development and prototype, and commercialization. Such NPD process was chosen due to the fact that it can be broadly applied, meaning that the stages can be applied to the development of any product (Sun & Wing 2005).

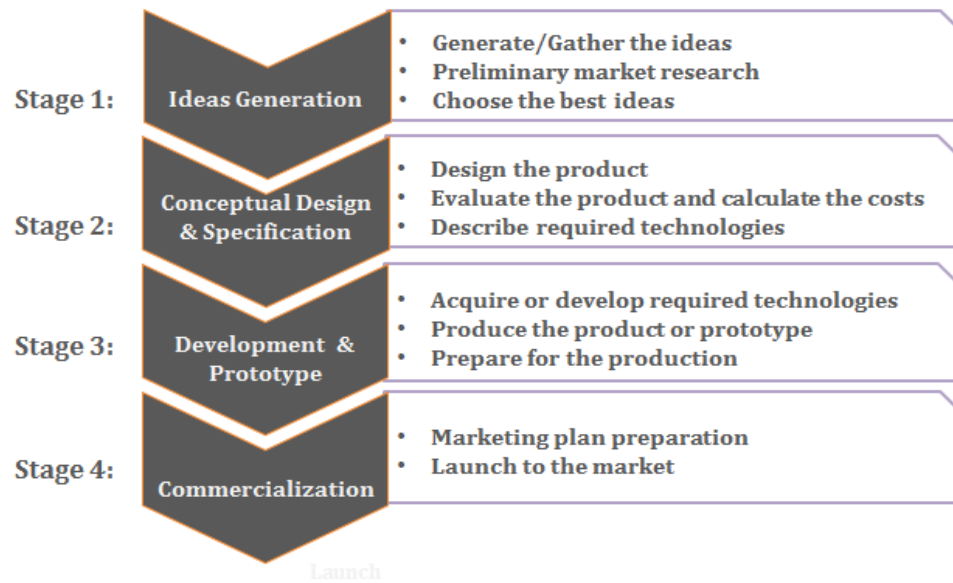


Figure 1 **Stages and activities of the NPD Process** (adapted from: Sun & Wing, 2005)

The **ideas generation** stage is the very first step of the NPD process. At this stage, the company should find or develop the ideas for the new products to be developed. Besides, the stage might include the preliminary market research to understand what needs of consumers the new product will address. It is done by answering the following questions: who are the potential customers, what customer's needs will be met, how the product corresponds with the company's mission, vision, and strategy (Boer 1999). Here the several ideas of the products might appear which should be compared with each other (Ulrich and Eppinger 2007).

The **conceptual design and specification** stage is the second stage of the NPD process. The stage is devoted to the further analysis of the product ideas. The main task here is creation of a business case with detailed description of the future products. It means that all the necessary aspects such as product design, materials to be used, components to be used, and required technologies should be assessed at the stage. Also, the stage should include the market research and financial analysis: different options of products are evaluated in order to find the best option in terms of costs, development time, technologies used, or any other

terms important for the firm (Boer 1999). During this stage the product potential should be confirmed in order to move to the following step.

The **development and prototype** stage is the third stage of the NPD process. This stage is generally the most costly one, as the product is getting ready for the production (Boer 1999). It means that all the required for the product technologies should be acquired or developed and the production process should be specified. The outcome of the stage should be the ready working product or its prototype; besides, everything should be ready for the production of the required number of the products.

The last NPD stage is **commercialization**. The stage includes the preparation of the marketing strategy and plan for the product. This is a necessary and important stage, especially for the really new products, as their success is often highly dependent on the marketing of those. Besides, the stage includes the actual launch of the product on the market.

The Figure 1 visualizes the stages of the NPD process and the activities that have to be done at each of the stage by a company in order to launch the product.

To conclude the said above, the NPD process is a complex process requiring complex approach. Today, NPD process is generally presented in form of phases or stages. Each of the stages has specific activities that are necessary to be done in order to move a product idea to the market. In this research the 4-stage NPD model proposed by Sun & Wing (2005) will be used as it allows using the model for the development of any kind of products.

1.2.2. NPD success factors

As it was stated earlier, a launch of a new product might lead a company to the success or fail. It is necessary to understand the factors which influence the success of the NPD. Many researchers were focusing on the studies concerning the performance of the NPD (Cooper 1979; Zahra 1993; Eisenhardt & Tabrizi 1995). They were looking for the management practices that were impacting the

performance of the NPD process as well as for the ways to determine that performance.

The early studies proposed to treat the NPD process as a project which consists of three components: product performance, schedule, and cost (Cooper 1979). Sometimes, the three components were called product performance, speed to the market, and development costs (Ulrich & Eppinger 2000).

The **product performance** is the level of performance of the product according to the specifications. Accordingly, it includes the gathering and understanding of the consumer needs, creation of the product specifications, and creation of the product itself (Ulrich & Eppinger 2000).

The **speed of the product development** is another vital part of the new product development, the faster a product will get to the market the more chances it has to succeed there because of the several reasons. First, the company will have the first mover advantage and gather the higher margins than the competitor. Second, the company will have more time to change the product after the launch to protect the product from the followers. Also, by decreasing the time of development, the company may develop more products with the same resources which means more chances to succeed. (Zahra 1993)

The **cost of development project** affects the number of the products that could be developed by a company with limited resources. If a company makes the similar product with less resources, it can develop additional products or modifications to the existing ones. Besides, lower development cost allow to choose the market price from a bigger range, what is additional benefit (Griffin 1997).

Close collaboration and involvement of different functional elements of a company is necessary for the successful product development. The creation of a new product involves the work and contribution of R&D, marketing, finance, supply, manufacturing and other departments of a company. Study of the computer industry conducted by Eisenhardt and Tabrizi (1995) proved that firms using multiple design iterations, extensive testing, and a multifunctional team are accelerating the development. An international study of Hauptman and Hirji

(1996) also showed that cross-functional cooperation had a positive impact on project success. Creation of the multifunctional teams is sometimes the only way to develop complex problems as they allow to see the problem from a range of perspectives and look for a solution in different areas. Therefore, multifunctional teams increase the product performance. Besides, multifunctional teams can conduct the work in parallel when each team member has his tasks, what decreases the time to the market.

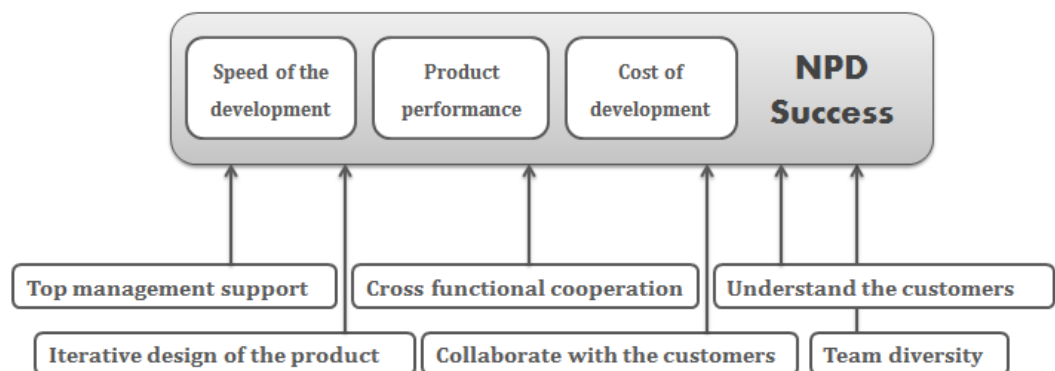


Figure 2 **NPD success factors** (Adapted from:Ulrich & Eppinger, 2000; Hauptman & Hirji, 1996)

However, the organization should also learn how to listen, please, and satisfy customers. Close and intensive **work and collaboration with customers** is highly important for NPD process. The companies, which make the needs of their customers the central part in innovation process, have higher success rates in launching new products than those which do not. Understanding the needs of the customers is considered to be one of the most influencing on the innovation success factors (Griffin 1997). Calantone, Vickery, and Droge (1995) found out that customization, new product introduction, design and product innovation had positive impact on firm ROI, market share, and return on sales.

Another factors that were found to have an influence on the success of the new product development are top management support (Connell et al. 2001), Senior management support is also vital for the success of NPD. Such support allows to make the decisions faster and get the required resources, what means

that the factor positively influences the speed of development. The topmanagement, by creating the vision of the project and giving the freedom for employees to create it increases the chances that the product will be created according to the specifications and in time. Of course, there are more factors that influence the success, but these are the most general factors which affect every of the three elements of NPD.

In order to understand whether the NPD is successful or not the review of the success factors is presented in the text. The Figure 2 summarizes the literature findings, according to which NPD success is expressed through the speed and cost of development, and product performance. These factors depend on the practices used during the NPD process, such as cross-functional cooperation and collaboration with the customers.

1.2.1. Customer Empowerment & Open Innovation in NPD

Today more and more companies shifted to a new fundamental ways in which they create new ideas and launch them to the market. They join both internal and external resources what accelerates the speed of the launch and often decreases the cost of the NPD (Chelsbrough 2003). Involvement of the customers as co-creators or co-developers of products is relatively new. However, customers do help to develop the successful product because they know their own needs and problems more than anyone else. Involvement of the customer is often viewed as part of Open Innovation approach to NPD.

More recent approaches to the NPD process which are sometimes called Open Innovation (Chelsbrough 2003; Blackwell & Fazzina 2008) are directed towards higher level of involvement of customers and users in the NPD process. The stage models and previous approaches were implying that NPD process uses only internal resources, while the Open Innovation approach implies that company seeks additional resources, ideas, and experts outside of the company.

Chelsbrough (2003) states that companies should create the Innovation networks with universities, partners, suppliers, customers, and even competitors in order to be more efficient in NPD. Such actions would increase the chances that innovation will be created and decreases the costs and time required for the

creation. Companies use the both inside and outside ideas and technologies. The main idea of Open Innovation is that companies open up their R&D departments, what creates two knowledge flows: inbound and outbound (Chesbrough 2003). In other words the company using Open Innovation approach is gathering the ideas, technologies and knowledge in general from outside of the firm. Besides, the company makes its knowledge and technologies available to the other firms. Also the companies seek both external and internal paths to the market: either direct selling of the product or licensing the company's technologies and products to other companies. The approach is visualized in the Figure 3.

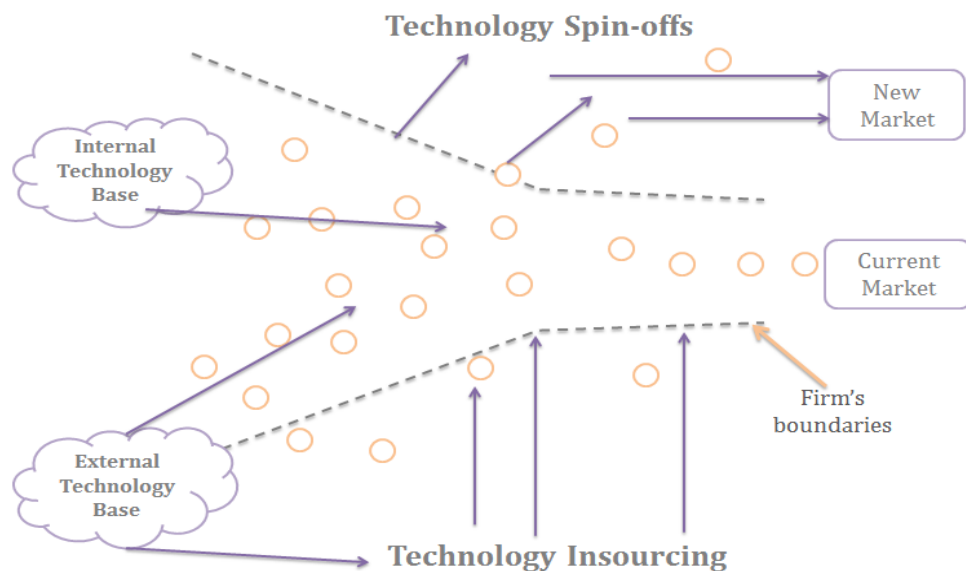


Figure 3 **Open Innovation Framework** (Adapted from: Chesbrough 2003)

Currently, many companies move their innovation process from R&D driven approach, when the process mainly takes place in a lab, to so-called customer-driven approach, when the collective wisdom and knowledge are used for developing new products or improving the existing ones (Mohr et al 2010). As stated by Libert & Spector, innovation development process, and therefore, the NPD process as well, moves from R&D to R&We (2007). Different companies came up with many different approaches of using customers in a company's NPD process. But opening of a company's R&D generally leads to the more efficient NPD process. Mansfield in 1986 proved that NPD projects based to a large extent

on external developments have shorter development times and require less investment than similar projects based solely on internal R&D.

A good example of a company using Open Innovation might be the example of Proctale&Gamble. Not only have all of the P&G's employees sharing their new ideas with each other, but also the company effectively looks for new ideas outside. "Inventors are evenly distributed in the population, and we're as likely to find invention in a garage as in our labs" as the past CEO of the company Alan George Lafley explained (Sellers 2004). The company changed its tradition R&D model to the "connect and develop" model built on the open innovation principles, when more new ideas and innovations are taken from external sources: from customers, other organizations, individuals, or even university labs (Witchalls 2007).

Participation of the customers in the NPD process is proved to be one of the practices increasing the chances for success of NPD (Griffin 1997). Generally there distinguished three modes of customer participation in NPD distinguished: design for customers, design with customers, and design by customers (Dahan & Hauser 2002).

The **design for customers** mode is the most commonly used in practice. According to this mode the products are created on the basis of the information about the customers and their needs gathered from different sources. The examples of the sources of the information could be the analysis of the previous sales data, usage of customers' focus groups, feedback gathering, and quality function deployment (QFD). (Hauser & Clausing 1988)

The second mode of customer involvement is **design with customers**. It implies that the products are shown or given to the customers which somehow react to them. The reaction and feedback of the customers is gathered and then analyzed. Very often, customers propose their own ideas of products improvements. The approaches used in this mode are: beta-testing or concept-testing, and empathic design.

The stated approaches are similar. According to the concept-testing, customers receive a prototype or the early version of the product and asked to test it and give the feedback: what they liked, what they would improve, and so on. Beta-testing is the concept-testing used for the software and computer systems testing: the users receive the access to a beta-version of a product, which has the main functionality (Dolan & Matthews 1993).

Very often it is hard to understand all of the consumer's needs; a lot of the needs could be missed because even the customer himself is not aware of all of them. The technique that allows the company to understand even the unarticulated and latent customer needs is called Empathic design. Empathic design pays a lot of attention to the feelings of the customers. To do this, a multifunctional team could observe the customers behavior and analyze it; it can be done by video recording, for instance (Burns et al 1999). Observation is the foundation of the empathic design; by watching the consumers use the company's or competitors' products or services. However, in contrast with the focus groups, the observation happens in natural environment of the consumer. (Leonard & Rayport 1997)

The **design by customers** is the most involving a customer mode. In this mode, a customer is actively integrated in the NPD process of an organization. There are several different ways to do that, which could be used separately or together: empower customers to co-create products, transfer the customers' ideas about new products into the company. Empowering customers to co-create and using customers' ideas in NPD is very beneficial for the company: it allows creating more innovations within shorter period of time with less resources (von Hippel 2005).

The idea to use customers and users in innovation process is not a new one. One of the first researchers that articulated the importance of using customers in innovation process was Eric von Hippel who introduced the Lead User Method of innovation in 1980's. According to him, the lead users are users that are way ahead of the usual market needs and trends, or in other words, such users have the lead-edge needs that most of the users do not have (Von Hippel 1986). Due to the fact that the solution is unavailable somewhere else, Lead Users very often create a solution by themselves. Even if they do not have their own solution, they are

aware about their needs and problems, which is highly important for the company willing to address these or similar needs. For the company, it means that by collaborating with such users in developing a solution for them, the company gets many insights, useful information, ideas, and resources for innovations; very often work with the lead users leads to creation of breakthrough innovations (Von Hippel et al 1999). Many companies try to find new lead users to create new products for the market or commercialize the solutions that such users have already created (The Economist 2005). However, not only the leading-edge users are used in a company's innovation process. Close communication with the company's customers always brings its benefits and allows increasing the value that innovation brings to market.

The Figure 4 concludes the literature findings about the possible ways of using customers in the development of the new products. The described above approaches and technics are implying the use of the customers' involvement in the New Product Development process. However, many companies have successfully understood that not only customers, but any outsiders could be used in the creation of new products and services. So called crowdsourcing is becoming more and more popular not only in NPD area, but in much other business related areas. For better understanding, a separate discussion of the crowdsourcing is included in the master thesis.

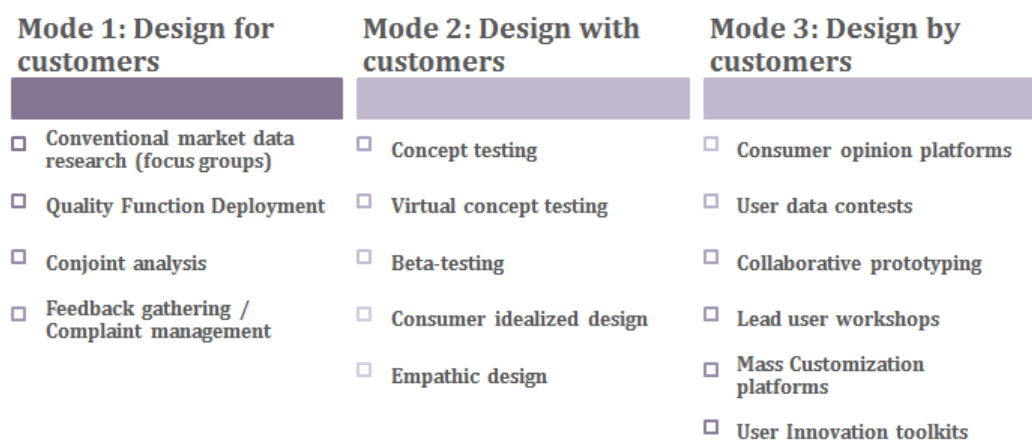


Figure 4 **Modes of customer empowerment in NPD** (Adapted from: Piller 2004; Fredberg & Piller 2009; Dahan & Hauser 2002)

Customer empowerment being a part of Open Innovation NPD approach becomes more popular among the organizations because it helps to reduce the development cost, decrease time to market, and increase the quality of the product. Above most of the common methods of using the customers are given and briefly discussed.

One of the ways to empower customers to create product and innovate for the company is to use crowdsourcing. The following part of the literature review will introduce the term and discuss the possible ways of using crowdsourcing in NPD.

1.3. Crowdsourcing

“No matter who you are, most of the smartest people work for someone else.”

– Bill Joy, Cofounder Sun Microsystems

During the last decade, the Internet technologies were rapidly developing. Appearance of Web2.0 technologies opened great opportunities for everyone; of course, it opened new perspectives for NPD. Many companies opened their NPD process to the open internet environment. The companies are making an open call to the crowds on the internet. This attracts attention of huge number of people, which allows decreasing the costs and the time required for a product development. A company is receiving a lot of solutions and suggestions for its NPD projects after broadcasting the problem or task.

As Poetz & Schreier (2009) have mentioned, users can actually **outperform** professionals in the generation of new product ideas and solving NPD problems. It means that the products developed by or with the customers have the high chance to perform well on the market. Also, innovation projects based on external developments have **shorter development times** and **require less investment** than similar projects based solely on internal R&D (Mansfield 1986).

Therefore, it can be concluded that use of external human resources such as customers or even non-related people in NPD can shorten the new product's development time, decrease the costs, and increase the chances of high performance of the product – these three factors are the factors determining the success of the NPD as it was stated in the NPD section of the literature review. Consequently, it can be stated that use of outsiders in NPD increases the success of the development. Due to the fact that crowdsourcing implies usage of many people, which are outsiders for the organization, it can be said that the use of crowdsourcing increases the chances of the NPD success.

Also, it is proved by many real life examples. Crowdsourcing becomes a brilliant solution for the small and medium sized firms that have very limited resources. Even for the huge companies are starting to use crowdsourcing in their NPD process more and more. For example, Fiat Brazil created the first ever “crowdsourced car” - Fiat Mio CC (Pinheiro 2012). The company has asked the customers through the web site to give the designs and suggestions for their new model of Fiat Mio CC. In a year, the company had 2.3 million unique visitors, more than 10,000 submitted design ideas, and more than 16,000 specific comments (Pinheiro 2012).

InnoCentive, a web-site created in 2001, connects R&D centers inside of companies with each other and with the brainpower outside of the companies. InnoCentive has a community of millions of individual problem Solvers. Companies like Eli Lilly, Life Technologies, NASA, nature.com, Popular Science, Procter & Gamble, Roche, Rockefeller Foundation, and Du Pont using the service to solve their scientific problems and innovate faster: they just post a problem and anyone from the InnoCentive community can try to solve it (InnoCentive 2011).

The strength of InnoCentive and similar networks is the diversity of intellectual background. Sometimes the solutions of the problems come from people who had no or little expertise in the problem field. Simply by looking to the problem from different angles, the problem could be solved much easier.

The following discussion is intended to define the crowdsourcing and crowdsourcing project. The crowdsourcing projects' characteristics and the most important success factors are presented and discussed below.

1.3.1. Crowdsourcing & related concepts

Crowdsourcing is now one of the hot topics in a business research community. It has brought a lot of attention from the academics as well as from the business sphere. Crowdsourcing became a trend changing the perception of Internet usage for business firms, governments and non-profit organizations.

Despite the fact that the term crowdsourcing was created only in 2006, the concept was used by many organizations and institutions before. For example, Threadless and as iStockphoto, companies basing entire business models on crowdsourcing were both created in 2000 (Brabham 2008). The term crowdsourcing was firstly introduced by Jeff Howe (2006) in the article about outsourcing to crowds where the author has described the new way of doing business and several applications of crowdsourcing. In his blog, Howe (2011) uses the following definition of 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.

Another very similar definition of crowdsourcing is created by crowd and available in Wikipedia, an online encyclopedia which is also being created by crowdsourcing. Crowdsourcing is defined as “the act of taking tasks traditionally performed by an employee or contractor, and outsourcing them to a group (crowd) of people or community in the form of an open call” (Wikipedia 2011). Since the Howe’s (2006) article publication, the buzz about crowdsourcing has started and many researchers are now trying to investigate this concept (Dai, Mausam & Weld 2010; Socialbrite 2011; Quinn & Bederson 2011). Generally the term is defined similarly to the Howe: Dai, Mausam & Weld (2010), for example, state that crowdsourcing is a relevantly new framework in which employers, called “**requesters**”, outsource some human intelligence tasks to a crowd of unknown people, called “**workers**”, as an open call, usually through Internet. The names **workers** and **requesters** became well used terms in the literature regarding the crowdsourcing and related activities. According to another definition (Socialbrite 2011), crowdsourcing is act of “harnessing the skills and enthusiasm of those outside an organization who are prepared to volunteer their time contributing content or skills and solving problems”.

According to Malone, Laubacher & Dellarocas (2009) crowdsourcing is one of the of Collective intelligence techniques. The Collective intelligence appears when “groups of individuals doing things collectively that seem intelligent”. Due to the fact that Human Computation and Social Computation are

very similar to Crowdsourcing techniques of Collective Intelligence, they have many things in common, and sometimes it is hard or even impossible to distinguish one from other because the implications are sometimes overlapped (Quinn & Bederson 2011). Therefore, it is necessary to define all of them and distinguish the differences. The relation of the Crowdsourcing, Human Computation, and Social Computation are shown on the Figure 5.

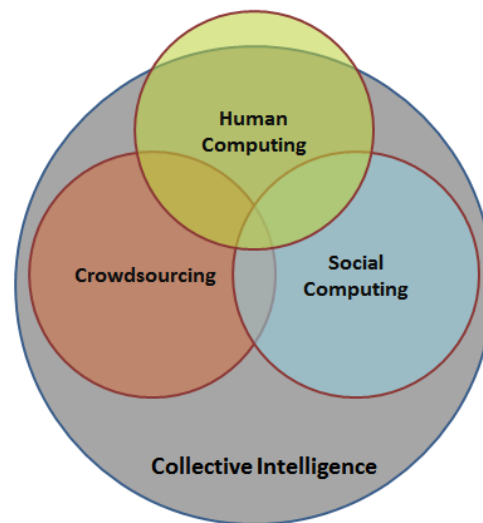


Figure 5 **Relationship of Crowdsourcing, Human Computation, and Social Computation** (Source: Quinn & Bederson 2011)

Human Computation is defined (von Ahn 2008) as “a paradigm for utilizing human processing power to solve problems that computer cannot yet solve”. Despite their growing power, computers still cannot perform simple actions and things that any person could easily do – that is where crowd of people can help again. Quinn & Bederson (2009) defined Human Computation as “...systems of computers and large numbers of humans that work together in order to solve problems that could not be solved by either computers or humans alone”.

Based on the provided definitions we can say that Human Computation is an approach to solve complex computational problems. It is necessary to stress the difference between Crowdsourcing and Human Computation: while

Crowdsourcing is replacing humans work with crowdsourcing work, the Human Computation is replacing computers with humans or crowds of humans (Quinn & Bederson 2011). It is necessary to understand that Human Computation is not always requiring a crowd or even a group of people. For example, translation from one language to another could be done both by a computer and by human, depending on the quality that is necessary. Therefore, on the Figure 5, Human Computation is partially out of the Collective Intelligence.

Social Computing is also a way of using Collective Intelligence. The most important aspect in Social Computing is the social role of humans (Quinn & Bederson 2011). The term is defined by Parameswaran & Whinston (2007) as

“applications and services that facilitate collective action and social interaction online with rich exchange of multimedia information and evolution of aggregate knowledge.”

Blogs, emails, instant messages, wikis, P2P networks, photo and video sharing communities are all examples of Social. These platforms and applications are activating knowledge creation and sharing among participants. They also empower users to show up their creativity, contribute their expertise, share some content, or collectively build new tools. (Parameswaran & Whinston 2007)

It is necessary to understand the difference between Crowdsourcing and Social Computing. Of course, Social Computing enables knowledge creation and some action through socializing in some way; however, these outcomes are not the main purpose of Social Computing. Crowdsourcing in contrast has clear purpose of solving particular company's problem, and human efforts are directed towards this problem and solving.

Crowdsourcing has also some relations with Open Innovation and OpenSourceSoftware. The main idea of Open Innovation, as it was stated earlier, is that companies open up their R&D departments, what creates two knowledge flows: inbound and outbound (Chesbrough 2003).In other words the company using Open Innovation approach is gathering the ideas, technologies and knowledge in general from outside of the firm. Besides, the company makes its knowledge and technologies available to the other firms.

Crowdsourcing and Open Innovation have many things in common: companies are gathering new knowledge from the outside and create new innovations by opening up their R&D. However, Open Innovation implies that a company is connecting with the other companies, while Crowdsourcing implies that a company is using the crowd. Crowdsourcing could be viewed as a way to gather outside ideas and knowledge or as a part of Open Innovation (Schenk Guittard 2011).

Crowdsourcing and Open Source Software based on the same idea that the knowledge and competencies are distributed among the people (Raymond, 1999). However, Open Source Software is of course directed only towards the computer software products while Crowdsourcing implications are not that limited.

After the crowdsourcing was defined and the differences of crowdsourcing from the similar terms were determined, we can state some characteristics of the crowdsourcing. First, the crowdsourcing is initiated and managed by a company, or any institution such as non-profit organization for instance, that has a task to be done or a problem to be solved. Also, people, or better say, crowd accepts the work on an open call, meaning that each person decides whether he or she wants to participate in the work. Necessary to highlight that crowd's do "...a job traditionally performed by a designated agent (usually an employee)..." (Howe 2011). It is possible to say more broadly: crowdsourcing replaces traditional human workers with crowds.

To conclude, crowdsourcing is a collective intelligence technique usually initiated through the internet. The main purpose of the crowdsourcing is to perform a task for a business which usually is performed by a firm's employee. Crowdsourcing is now actively used for different purposes. It enables to coordinate human efforts, helps social interactions, and empowers creativity. Also, crowdsourcing could be used for idea generation, problem solving and design creation. Many of the applications could be used for the New Product Development.

1.3.1. Crowdsourcing Success Factor Model

Ankit Sharma (2010) in his research focuses on the description of the factors that influence the success of a crowdsourcing initiative. The author emphasizes the similarities between crowdsourcing and outsourcing, and therefore, uses the existing frameworks on outsourcing. Also, the unified theory of acceptance and use of technology (Viswanath et. al, 2003) is used to explain how and why the crowd accepts crowdsourcing.

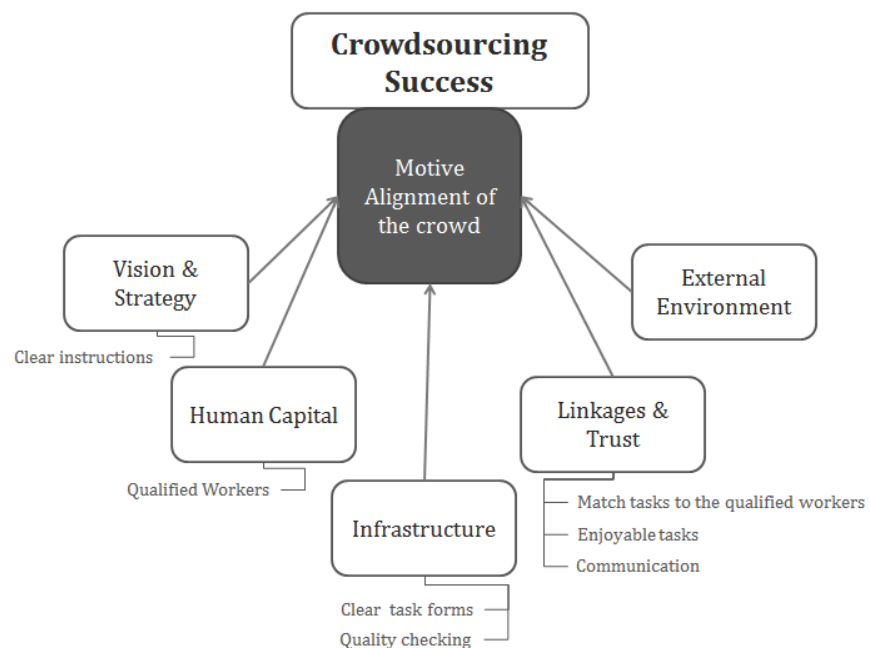


Figure 6 **Crowdsourcing critical success factor model** (Adapted from: Sharma 2010)

After investigating several crowdsourcing initiatives Sharma (2010) came up with the crowdsourcing success factor. According to the author, the crowdsourcing initiatives are termed successful when there is a sufficient number of the crowd participating in it. The number of the participants depends on how well the crowd was motivated to stay in the project and contribute to it. This in turn is built on Vision and Strategy of the project, Human Capital or workers, the project's Infrastructure, Linkages and Trust of the community and External environment factors.

The further analysis of the literature showed that crowdsourcing project success depends on smart and motivated workers, clearly stated instructions, convenient and enjoyable task forms, the tasks matching the qualified workers (CloudFactory 2011)

Jeff Howe (2006) in his book also outlines that the motivation of the workers is crucial for a crowdsourcing project. The organizations should make workers wanting to participate or in other words motivate them.

The Figure 6 shows the summarized findings of the factors determining the success of a crowdsourcing factors. Below the more detailed explanation is given.

The model has the motive alignment of the crowd is the central factor affecting the success of an initiative, while other factors are secondary and affect the success of the crowdsourcing only by affecting the motive alignment. The success of a crowdsourcing initiative is also affecting the motive alignment, as the success of the initiative is supposed to bring in more participants. Further presented description of each factor determining the success of a crowdsourcing initiative:

Vision and Strategy. The initiative should have clear vision and strategy to make the crowd perceive the initiative as valuable and increase motives to participate in it. The tasks should have clear instructions and workers have to understand what do they have to do and why.

Human Capital. Human capital is described by Carmel (2003) as the collective characteristics, skills and abilities. The crowd should poses skills and abilities that the crowd poses should be aligned with the skills required. For the scientific problems solving the people familiar with science should participate in order to have some result.

Infrastructure. The crowdsourcing initiatives are usually based on internet or mobile services; therefore, the infrastructure of the service should be clear. Workers should be easily navigated through the web-site, be able to easily

do the required work and view or rate the other works if it is required by the project.

Linkages and Trust. Linkages are some kind of connections that emerge among the crowd participants. The linkages enable easier transfer of knowledge from the crowd. The trust is also an important factor for the knowledge creation and transfer. Therefore, organizations should try to create a community which would gather, retain and motivate the workers.

External Environment. The external environment in its broader sense can affect the participation in a crowdsourcing initiative. Cultural norms; business, political and economic environments; proper government support are all the examples of the parts of external environment that determines whether a particular person will participate in an initiative. All of this should also be analyzed before the launch of the project.

Motive Alignment. It is the most important and centric factor of the model. The crowd must have some kind of motivation and incentive in order to participate in the crowdsourcing initiative what determines the overall success of this initiative. The most important task in the crowdsourcing project is motivation of the participants, without them even the best designed project with perfect infrastructure will not bring anything. The model is very well describes the factors determining the success of crowdsourcing.

1.3.2. Crowdsourcing projects' characteristics

Brabham (2009) described the steps of a typical crowdsourcing project. According to the author, the company should realize a problem it wants crowds to solve. Then, instead of using its own employees, the company broadcasts the problem and makes an open call to the “crowd”. The participants of the “crowd” work on the problem and submit possible solutions for the problem. The submitted solutions could be assessed by the same “crowd”, when people vote for the best solutions, or by the company itself, when the employee decide which solution it will take. After the best solution is identified, the submitter of the solution receives some kind of reward, which can be monetary or non-monetary, such as recognition.

Doan, Ramakrishnan, and Halevy (2011) discuss crowdsourcing systems on the Web from a variety of perspectives. According to their definition, a crowdsourcing system “enlists a crowd of humans to help solve a problem defined by the system owners.” Similarly Geiger et al. (2011) have proposed a prototypical crowdsourcing approach, which can be found on the Figure 7. According to it, an organization realizes its goals through a crowdsourcing process. The process itself consists of sourcing and aggregating contributions from the workers of the crowd.

For the firm that is going to use crowdsourcing is necessary to consider the characteristics of the crowdsourcing process in order to reach the particular goal (Geiger et al. 2011). Therefore it is necessary to understand what characteristics might a crowdsourcing project have and how one project distinguishes from the other. There are several academic researches on the topic of crowdsourcing projects typology which will be further discussed.

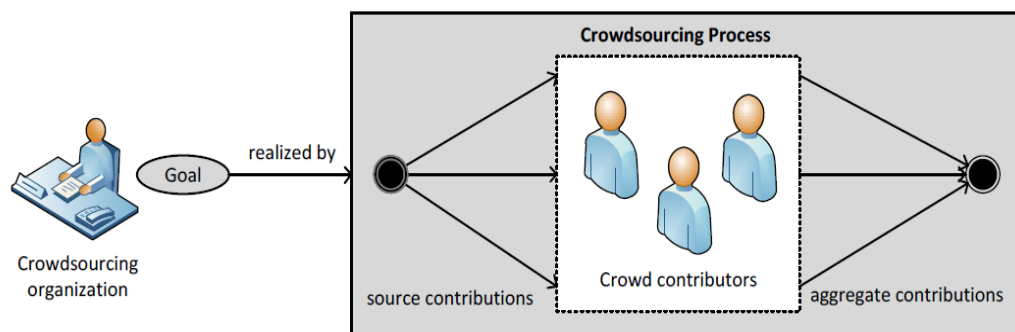


Figure 7 A prototypical crowdsourcing approach (Source: Geiger et al. 2011)

Doan et al. (2011) identify the basic roles that users can take in a crowdsourcing system. The “worker” is a member of a crowd performing some action needed by the beneficiary. A “beneficiary” is the organization or a person that gets direct benefit from the crowd work. The “employer” is the firm that have organized the crowdsourcing project. Sometimes the role of beneficiary and employer is the same, but in many cases they differ (ex. Innoventive 2012).

Corney, Torres-Sanchez, Jagadeesan, and Regli (2009) find three dimensions for crowdsourcing project: task nature, worker capabilities required, and nature of the reward. The nature of the tasks could be: creation, evaluation, and organization. These tasks can be “any individual”, “most people”, “expert” depending on the worker’s requirements to do the task. Workers do the task voluntarily or rewarded with some kind of prize. Similarly, Rouse (2010) distinguishes between simple, like proposing product ideas, moderate tasks such as designing t-shirts, and sophisticated tasks like developing software. Therefore, one of the characteristics is type of the worker which was mentioned. Another characteristic that can be derived from the researchers is type of the task done by workers. The reward is a way to motivate the crowd, and will be discussed later.

Schenk and Guittard (2011) used two dimensions: process and tasks. A process of crowdsourcing project can be integrative, when the outcome is some kind of the combination of the work done by participants, or selective, when the work is done separately by each worker and the result is one best work. A different taxonomy of a crowdsourcing projects was created by Geiger et al. (2011). The taxonomy has 4 dimensions: Preselection of contributors, Accessibility of peer contributions, Aggregation of contributions, and Remuneration for contributors. Aggregation of contribution is another characteristic of a crowdsourcing project which states the way of creation a crowd product: selective, when one best solution is chosen; integrative, when the crowd product is a combination of work pieces done by workers. Crowd product, which is another important characteristic, is the final outcome of the crowd

Based on the described classifications, the characteristics of crowdsourcing projects were determined – Figure 8. The characteristics were divided in 3 categories: who, what, and how. Each of these categories has one or two characteristics inside which will be now discussed.

What? Crowdsourcing can be used as for solving very simple tasks such as tagging a photo, as for the very complex tasks such as solving a company’s technological problem. Also, there are many examples when crowdsourcing is being used for the creation of something new – design, logo, advertisement. Therefore, the division of the crowdsourcing tasks on simple, complex, and

creative proposed by Schenk and Guittard (2011) seems very logical. Also, due to the fact that we are analyzing the use of crowdsourcing in NPD, it is necessary to understand what precise activity of NPD is being crowd sourced: idea generation, idea selection, or may be technological problem assessment. The final product that the crowd makes, whether it is an idea or scientific solution, determines the NPD stage at which the project is directed.

Who? It is estimated that the world wide crowd consists of more than 1,000,000,000 people, for the start of a crowdsourcing project it is necessary to have at least 5,000 people (Howe 2006). But 5,000 people should be qualified for the work. That is why it is important to determine the qualification needed for the task completion (Geiger et al. 2011). Zwass (2010) distinguishes between “anyone”, “skilled contributors”, and “community members” types of crowds. “Anyone” means that there is no qualification needed and anyone can freely participate in the project. “Skilled contributors” option assumes that the crowd members should poses special skills. For instance, the solvers of technological problems should have some technological or scientific background, while the designers of t-shirts should be able to draw. The third option, “community members” means that the workers should be a part of the community first. Also, it is necessary to understand who and how benefits from the work done by crowd. Sometimes only those who organized the projects benefit, sometimes the crowd is also benefited.

How? The crowd may work on the job in different ways. First of all, there are two general ways to create the final desired outcome in a crowdsourcing project: integrative and selective (Schenk and Guittard 2011). Selective approach happens when the several outcomes are created and one the best is selected, while integrative approach assumes that the work is divided on the very small pieces, the workers do the different pieces, and the final outcome is created as the combination of these small pieces. Also, the way the work is done depends on the fact whether the workers are allowed to access or see the other workers’ results (Geiger et al. 2011). There are 4 possible options of the access to the peer contributions: “modify”, “assess”, “view”, and “none”. “None” means that the workers cannot even see each other contributions. “View” limits the access to the read-only mode, meaning that the workers can see, but cannot change the others

contributions. “Assess” implies that the workers can somehow express their opinion about the other contribution: vote, rate or comment. The highest level of accessibility is “modify” when the workers can edit or even delete the other works.

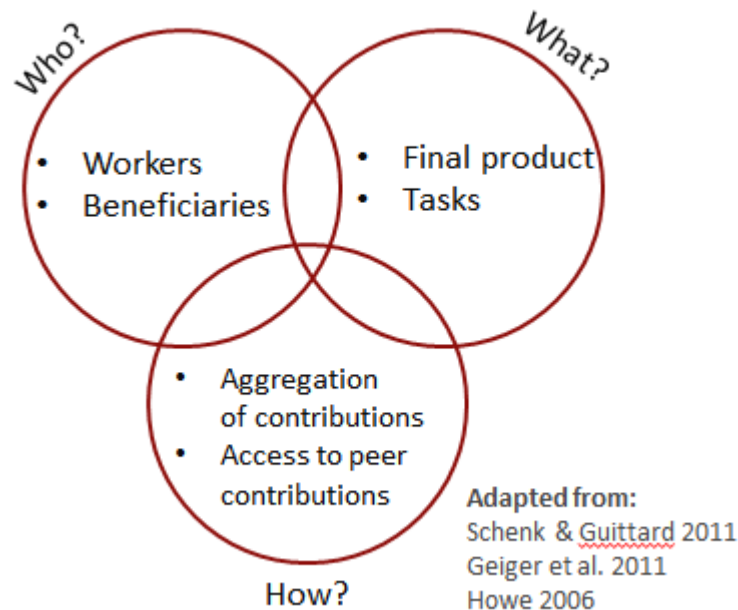


Figure 8 A crowdsourcing project characteristics

Another important question to ask is why the crowd participates, as it is the main success factor of the project (Howe 2006; Geiger et al. 2011; Sharma 2010). Howe (2006) in his book has pointed out that the money is not the most significant motivation for the crowds; however, people need to feel that their work is appreciated and if they are doing some job for the company they suppose that their work should be awarded. The monetary award can be “fixed”, when the worker knows the sum that he will get for the work or “success based”, when the award depends on some factors. Despite the fact that monetary motivation is important, there are many examples of the projects without any monetary recognition. The discussion above has described the main characteristics of the crowdsourcing project. The motivation of workers is crucially important for the

crowdsourcing projects success, and therefore it is necessary to have a separate discussion about the possible ways to motivate the crowd.

1.4. Motivation of crowds

The popularity of crowdsourcing grows at both ends: more companies are willing to use it as well as more people are willing to participate in crowdsourcing projects. As it was stated earlier, the success of any crowdsourcing initiative depends on the motivation of the people or “crowd” to participate in the project. To understand what can motivate the people to participate in such projects it is necessary to analyze the motivational theories existing in the literature.

1.4.1. Motivation theories

According to the Deci & Ryan’s Self-Determination Theory (1985), motivations can be divided in two types: intrinsic and extrinsic. Generally, the difference between intrinsic and extrinsic motivation is that intrinsic motivation is internal for the person while extrinsic motivation is based on the external factors. For example, people playing video-games are intrinsically motivated to play by the joy generated during the game; the people doing a job to get money or other reward are extrinsically motivated, in this case the job is just the tool for achieving a certain outcome.

There is also another one popular motivational model in classical working conditions which is widely accepted. The Job Characteristics Model by Hackman and Oldham (1980) defines three psychological states important for the internal motivation of a worker: Experienced meaningfulness of the work, experienced responsibility for outcomes of the work, and knowledge of the actual results of the work. The authors also have come up with stimulating job characteristics which are: Skill variety, Task identity, Task significance, Autonomy, and Feedback from the job (Hackman & Oldham 1980).

Crowdsourcing is very similar to the Open Source Software (OSS) approach, which often involves geographically and culturally different workers collaborating over the internet. Therefore, it is possible to adapt an appropriate motivational model from OSS to Crowdsourcing (Kleemann, Voß, and Rieder 2008).

According to Leimeister et al. (2009) there are only four overall motives: “Direct Compensation”, “Learning”, “Self-Marketing” and “Social motives”. The

four motivations do not include intrinsic ones and include only those motivators that could be managed by a company.

Another approach was used by Lakhani and Wolf (2005). The author divided the motivators into intrinsic and extrinsic groups, which is similar to the classical motivation theory; further, each group was subdivided in categories. “Enjoyment Based Motivation”, “Community/Obligation Based Motivation” are the intrinsic categories, while “Immediate Payoffs”, “Delayed Payoffs”, and “Social Motivation” are the extrinsic ones.

1.4.2. Motivation Framework

The analyzed motivation theories give the possibility to create a framework that can be used for the assessment of the crowdsourcing projects. Similarly to Deci & Ryan (1985) and Lakhani & Wolf (2005), it was decided to use two general groups of motivational factors in the framework: Intrinsic and Extrinsic. The groups are subdivided in categories which in their turn contain the specific motivating factors.

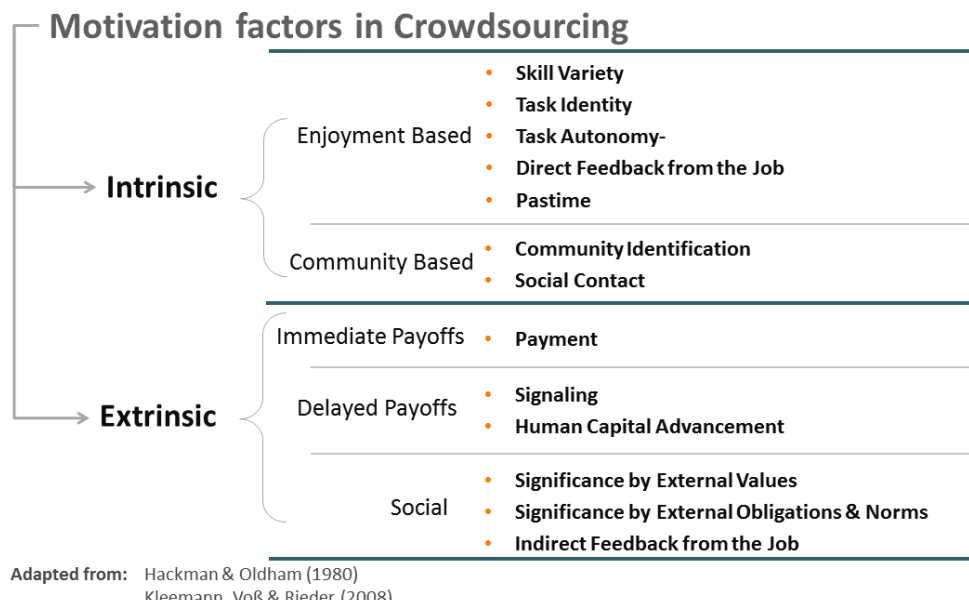


Figure 9 Crowdsourcing motivation framework

The Figure 9 presents the framework created for the assessment of the crowdsourcing projects and shows the categories and motivating factors found in the literature. Below, the description of the framework elements is presented. Each of the motivating factors is explained for the full understanding of them.

Intrinsic motivation is the motivation driven by internal drivers that exists within the individual rather than relying on any external pressure such as reward. Therefore, it is logical that intrinsic motivation is subdivided in two categories: Enjoyment Based motivation and Community Based motivation (Hackman & Oldham 1980; Brabham 2008).

Enjoyment Based motivation contains factors that lead to the feeling of enjoyment or fun during the job completion. The literature review (Hackman & Oldham 1980; Brabham 2008) allowed distinguishing five motivating factors in the category: Skill variety, Task identity, Task autonomy, Direct feedback from the job, and Pastime which are described in Table 2.

Table 1 **Enjoyment based motivation** (Adapted from: Hackman & Oldham 1980; Brabham 2008)

Motivating factor	Description
Skill variety	The different skills required to perform a task are increasing the chances that each worker might have fitting skills. The worker motivation will be greater as more his skills fit the required for the task skills.
Task identity	The more evident and tangible the result of a worker's work is, the more will be the motivation to perform the task.
Task autonomy	The more freedom and space for the creativity a worker has during the task completion, the greater the motivation of the worker.
Direct feedback from the job	The factor relies on the sense of achievement that can be felt after the task completion. The more feedback could be gathered from the task, the more person is motivated to do that task. It is necessary to mention that direct feedback should be received by worker from the task, but not from the other persons.
Pastime	The factor appears when a worker wants to avoid boredom and does a task to "kill time" or he has nothing better to do at the moment.

Community Based motivation happens when people perceive themselves as a part of some community and willing to do a job required for the community or in order to meet new people (Hackman & Oldham 1980; Lindenberg 2001; Lakhani & Wolf 2005). The category contains two motivating factors: Community identification and Social Contact.

Table 2 **Community based motivation** (Adapted from: Lakhani & Wolf 2005; Lindenberg 2001)

Motivating factor	Description
Community identification	The personal identification of a worker with the community causes the worker to accept the norms, believes, and values. If a person associates himself with the community he is more likely to do tasks for or in the community.
Social contact	The factor appears when a person participates in the community that allows him to create new social contacts.

Extrinsic motivation is the motivation driven by the external factors, generally by some kind of the reward that a person gets for doing a task. The researchers (Deci & Ryan 1985; Weiss 1995; Lakhani & Wolf 2005) propose to divide extrinsic motivation in three categories: Immediate payoffs, Delayed payoffs, and Social motivation.

Immediate payoff is the reward that a worker gets for the task completion. Possible direct payoffs in the case of crowdsourcing projects are monetary payments for the task (Lakhani & Wolf 2005).

Table 3 **Immediate payoffs motivation** (Adapted from: Weiss 1995; Lakhani & Wolf 2005)

Motivating factor	Description
Payment	Completion of task can be motivated by the payment that the worker receives for it. The greater reward the person gets the more willing that person to participate.

Delayed payoffs are all kinds of things that can be strategically used for future advantages of the worker (Weiss 1995). Lakhani & Wolf (2005) mentioned that signaling and human capital advancement are two motivating factors included in the delayed payoffs category.

Table 4 **Delayed payoffs motivation** (Adapted from: Deci & Ryan 1985; Hackman & Oldham 1980)

Motivating factor	Description
Signaling	The tasks might be perceived by the worker as a way to signal a message to the surroundings. As an example, a person might perform tasks in order to be noticed by possible employer.
Human capital advancement	The tasks might be the way to learn and improve specific skills that can be further used by the worker for generation of material advantages.

The last category of the extrinsic motivation found in the literature is **Social motivation** (Deci & Ryan 1985; Hackman & Oldham 1980). It is in some way similar to the intrinsic motivation by community identification. However, in this case the motivation comes from the values, norms and believes of the community outside of the crowdsourcing project community. Also, indirect feedback from the job and the need for social contact are the motivating factors included in the category (Hackman & Oldham 1980).

Table 5 **Social motivation** (Adapted from: Deci & Ryan 1985; Hackman & Oldham 1980)

Motivating factor	Description
Action significance by external values	A worker might be motivated to do the tasks because they correspond with values and believes of the community with which the worker identifies himself.
Action significance by external obligations and norms	A worker might be obliged to do and perform some tasks by some third party (e.g. university or work). Generally, in that case workers do the tasks in order to avoid some sanctions.
Indirect feedback from the job	The motivation might be a result of the feedback received by the worker from the other persons.

The discussion above shows the diversity of motivating factors that can be used to motivate workers to participate in crowdsourcing projects. The factors are divided in two general categories: intrinsic and extrinsic, which are further subdivided in categories consisting of the actual factors.

Summary of the chapter

The main **goal** of the research is to understand **how to motivate the crowd to participate in NPD**. To address the goal, the following research questions (RQ) were set:

RQ1: What are the motivating factors for the workers in crowdsourcing project directed to the 1st Stage NPD activities?

RQ2: What are the motivating factors for the workers in crowdsourcing project directed to the 2nd Stage NPD activities?

RQ3: What are the motivating factors for the workers in crowdsourcing project directed to the 3rd Stage NPD activities?

RQ4: What are the motivating factors for the workers in crowdsourcing project directed to the 4th Stage NPD activities?

In this research the 4-stage NPD model proposed by Sun & Wing (2005) is used. According to the model, the NPD consists of 4 stages: Idea generation, Product design, Product development, and Launch. Each of the stages consists of activities that the company does in order to create a new product.

The literature analysis shows that the three success factors of NPD are the speed and cost of development, and product performance (Ulrich & Eppinger 2000; Griffin 1997; Zahra 1993). As Poetz & Schreier (2009) have stated, users can actually outperform professionals in the generation of new product ideas and solving NPD problems. While Mansfield (1986) proved that innovation projects based on external developments have **shorter development times** and **require less investment** than similar projects based solely on internal R&D. More recent works of Howe (2006) and Piller (2004) also prove the same.

Therefore, it was concluded that use of external human resources such as customers or even non-related people in NPD can shorten the new product's development time, decrease the costs, and increase the chances of high

performance of the product – these three factors are the factors determining the success of the NPD as it was stated in the NPD section of the literature review. Consequently, it can be stated that use of outsiders in NPD increases the success of the development. Due to the fact that crowdsourcing implies usage of many people, which are outsiders for the organization, it can be said that the use of crowdsourcing increases the chances of the NPD success.

The further analysis of crowdsourcing related literature showed that success of the crowdsourcing actions is mostly related with the motivation of crowd (Sharma 2010; Howe 2006). Further, the characteristics of a crowdsourcing project necessary for the further analysis were found in the literature (Corney, Torres-Sanchez, Jagadeesan, & Regli 2009; Schenk & Guittard 2011; Geiger et al. 2011; Zwass 2010). The 6 characteristics distinguishing crowdsourcing projects are: beneficiaries, workers, final product, type of the tasks, type of the contributions' aggregation, and access to peers' contributions. The stated characteristics are used for the projects description and analysis in the further chapters.

The final part of the literature analysis distinguishes the motivating factors that can be used in crowdsourcing activities. According to Deci & Ryan's Self-Determination Theory (1985) two broad types of the motivation are intrinsic and extrinsic. The Lakhani and Wolf (2005) further divided the two types of the motivation in motivating factors categories: "Enjoyment Based Motivation", "Community/Obligation Based Motivation" are the intrinsic categories, while "Immediate Payoffs", "Delayed Payoffs", and "Social Motivation" are the extrinsic ones. Each category contains specific motivating factors. In total there are 13 motivating factors are distinguished.

2. RESEARCH OF THE CROWDSOURCING PROJECTS' MOTIVATIONAL FACTORS

2.1. Methodology & data collection of the research

To achieve the desired results of the research and answer the set research questions it is necessary to align them and the research goal with the research method used (Punch 2005). Therefore, in this section of the paper, the chosen research approach will be explained and discussed. Besides, the section discusses the data collection methods, which is necessary for the validation of the results and conclusions.

The purpose of the research is to find out what motivating factors are the most suitable for the crowdsourcing NPD projects directed to the different NPD stages, and further, to explain the managerial implications of the found results. The literature currently lacks comprehensive researches on that area, and therefore, appropriate research methods should be used.

The qualitative research helps to answer the “how” and “why” questions and more precisely, it helps to answer “how things work in particular contexts” (Eisenhardt & Graebner 2007). Due to the fact that the goal of the research is to find out how to motivate people in the context of crowdsourcing NPD projects, the qualitative research was chosen as the most appropriate research method for this research.

Besides, in the case of this particular work, qualitative research is more appropriate than quantitative research as it allows addressing the complexity of the environment as the objects in qualitative research are studied in their usual environment (Mason 2002). The qualitative research could be done with the usage of several sources of the data such as documents, experiences of people, observations, and others (Denzin & Lincoln 2005). That is suitable for this research as it allows studying the objects from various points of view, what increases the understanding of the topic and the depth of the analysis. In other words, the qualitative type of research gives the opportunity to precisely study the phenomenon of crowdsourcing NPD projects and the motivating factors used in them with all the complexity of the topic and its environment.

The fact that the research topic was not thoroughly studied in the literature also corresponds with the motives to use the qualitative research. According to the Creswell (2009) the qualitative research is more appropriate for the poorly discussed topics.

Multiple case study analysis will be used as a research method in this work. According to Yin (1994) case study is one of the most relevant research methods when the researcher has little control of the events, and due to the fact that the author of the current work has no control on the crowdsourcing projects, the method suits here well.

Also, case studies are commonly used in business and allow investigating phenomenon within its real-life context (Eisenhardt 1989). Therefore, usage of case studies as research method enables to use the holistic approach to the situation in that sense that the particular real-life events' characteristics are preserved. Besides, the topic of motivation in crowdsourcing is limitedly researched. In its turn, case studies are the most appropriate research method for such settings (Eisenhardt 1989).

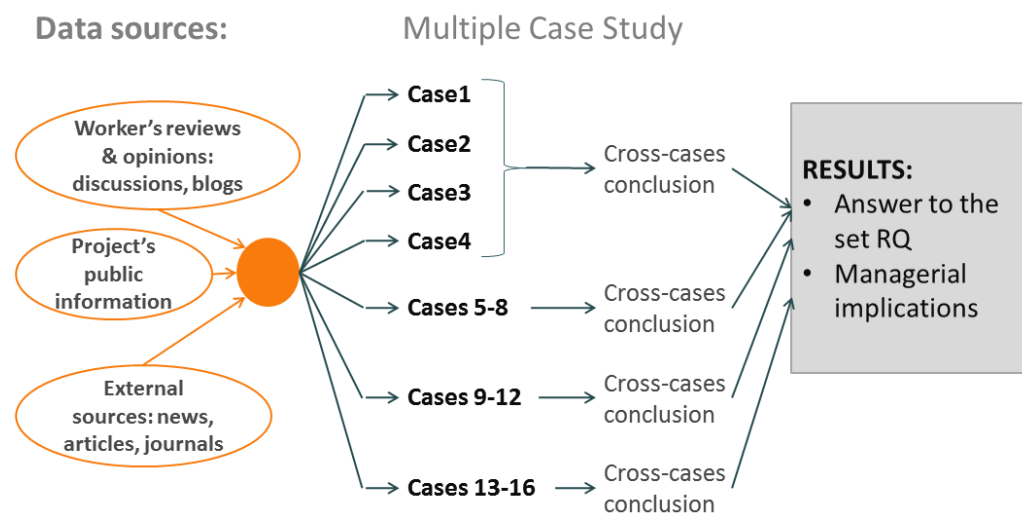


Figure 10 **Research framework**

There are some limitations on usage of case studies: very often the results cannot be fully generalized (Yin 2009). However, how Yin (2009) has stated, case

study might give the clues to the further researchers by providing the examples which might be used for developing their own researches. Besides, to overcome some of the generalization problems, the multiple case study was chosen for this work. To use multiple case study method, the researched objects should pose similar or opposite characteristics (Yin 2009). The crowdsourcing projects directed to one stage of NPD pose similar characteristics; therefore, multiple case studies can be used and it will help to generalize made cross-cases conclusions to another crowdsourcing projects directed at the same stage of NPD.

In order to conduct the multiple case study analysis, the set of cases have to be developed and the data for the each case found. The qualitative research and the case study method as well, could be done with the usage of several sources of the data such as documents, experiences of people, observations, and others (Denzin & Lincoln 2005). The Figure 10 represents and visualizes the research design structure for the ease of its understanding.

The cases will be categorized in four groups: one for the each stage of the NPD. Each of the NPD stages will be presented by 4 distinct cases; therefore, the 16 cases in total will be analyzed. The cross-case conclusions will be made for the each category. The Table 6 presents the projects that were analyzed in the work.

Each of the case will be analyzed from the multiple angles. First of all, the characteristics of the crowdsourcing project, based on the framework presented in the theoretical section of this work, will be determined and the general description of the project will be stated. Then, the motivating factors used in the project will be found and analyzed. It will give the possibility to come up with the conclusions about the motivating factors that should be used at each of the stages of NPD.

The case study will be developed based on multiple sources of evidence such as the project web-sites and information existing there, news and other open media sources containing the information about the chosen projects, and the external data such as scientific, journalistic, and investment analyst publications about the case projects. More precisely, the sources of the information can be divided in three categories: publicly available project's publications, which are generally found at the project's websites; external data on the projects such as scientific, and journalistic publications mentioning, and discussing the projects;

and the workers review's and opinions on the projects found in the web discussions, forums, and blogs.

Also, the case studies should be based on existing theories' analysis (Eisenhardt and Graebner, 2007). In this paper, the case is developed based on the literature on crowdsourcing and motivation. The theoretical background presented earlier in the text helps to distinguish the patterns based on which the cases will be built. The general pattern for the case composition is consisting of the following parts: overview, characteristics, and motivating factors.

Table 6 Chosen NPD crowdsourcing projects

1st Stage NPD	2nd Stage NPD	3rd Stage NPD	4th Stage NPD
Ideas Storm	Threadless	InnoCentive	Zooppa
Innovate with Kraft	Peugeot Design Contest	NineSigma	PopTent
Ideas Project	Electrolux Design Cup	Ideaken	eYeka
Fiat Mio	Zazzle	Innovation Exchange	Tongal

The overview part of a case contains the brief description of the project including its history, main features, and additional information relevant for the topic such as success stories of the workers, examples of the work done, companies that benefit from the crowd's work, and so on. This information helps to determine the characteristics of the case project.

The characteristics part presents the crowdsourcing characteristics of the case projects. The framework, derived from the theoretical part, see Figure 8, is used for the characteristics classification; each case will be analyzed from 3 points of view: who, what, and how. "Who" part contains the information about the workers and beneficiaries in the project. "What" part – about the type of the task performed by workers and the final product created by the crowd. "How" part has

information about how the worker contributions are made and what happens further with them in order to achieve the desired outcome of the project.

The motivation part focuses at the motivating factors found to be used in the case project. The information from the characteristics and motivation parts of all 16 cases is further used for cross-case conclusions for each of the 4 sets of cases directed towards different stages of NPD. The conclusions in their turn distinguish the link between specific motivating factors used at the projects and the stages of NPD. The following sections of the chapter present the descriptions of the cases and summarize the information about found motivating factors.

2.2. Crowdsourcing projects related to 1st stage of NPD

The analyzed cases are devoted to the gathering ideas of the products and services, which is the first stage of new product development. Further parts of the section are devoted to the description of the case projects, their characteristics, and motivating factors used in there. The Table 7 summarizes the findings.

Table 7 Motivating factors present in the projects related to the Idea stage of NPD

Motivating factor \ Case	IdeasProject	Innovate with Kraft	IdeasStorm	FiatMio
Skill variety	no	no	no	no
Task identity	yes	yes	yes	yes
Task autonomy	yes	yes	yes	yes
Direct feedback	yes	no	yes	no
Pastime	no	no	no	yes
Community	yes	no	yes	yes
Social contact	yes	no	yes	yes
Payment	no	no	no	no
Signaling	yes	yes	yes	yes
HC advancement	yes	no	yes	yes
External values	no	no	no	no
External obligations	no	no	no	no
Indirect feedback	yes	no	yes	yes

2.2.1. Case of IdeasProject

IdeasProject is an online community for global brainstorm. Nokia users and other users from around the world share their ideas with the Nokia developers. As it is stated on its portal:

“IdeasProject is founded on philosophy of democratized innovation and idea crowdsourcing. We believe that users are able to innovate products and services for themselves and that user-centered innovation offers great advantages over the manufacturer-centric innovation development systems [...] Users that innovate can develop exactly what they want, rather than relying on manufacturers to act as their, often very imperfect, agents. Moreover, individual users do not have to develop everything they need on their own: they can benefit from innovations developed and freely shared by others, which leads us to open innovation, another principle of IdeasProject” (IdeasProject 2012).

IdeasProject is based on the ideas of democratized innovation and idea crowdsourcing. Nokia uses the simple idea that users themselves know what they want and can create products and services for themselves, or at least give the ideas about the new products and services for the developers. At any case, both sides benefit: the user get their ideas implemented in real life, while developers get fresh ideas for the products and services.

For this purpose was created the IdeasProject’s web-portal, where people can share their own ideas, develop other’s ideas, and give/receive feedback. The web sites announces when someone idea was further developed into the product.

For example, Nokia found 12 ideas for improving the functionality and usability of its N9 mobile-phone through decreasing the number of actions required to do something on the phone (IdeasProject 2011). The ideas were implemented in real-life and the authors of the ideas were rewarded; however, the size of the reward is not stated. Except the described, many other ideas from the web sites are being implemented in real life. Also, the web-site opens great opportunities for the users to communicate with the experts from around the world and to learn from each other (Ideas Project 2012).

The community of IdeasProject consists of about 20,000 people which have contributed several thousands of ideas some of which were used in real life. For the good idea a user might receive a monetary prize.

The following values of the crowdsourcing projects' characteristics were distinguished:

- **Beneficiary:** Nokia
- **Final products:** Ideas of the products taken to further development by Nokia
- **Workers:** Anyone
- **Types of the tasks:** Simple
 - Post the description of the idea
 - Vote for ideas
 - Comment on ideas
- **Aggregation of contribution:** Selection based on the opinion of:
 - Nokia
 - Users
- **Access to peer contributions:** Assess

To conclude the said above, the case project is based around the Nokia brand, products and services which are mostly IT related. The workers send their ideas to see them implemented in real life. Besides posting the ideas users also can assess other ideas by viewing, voting and commenting on them. The experts of Nokia participate in the communications and provide the feedback on the ideas what enables the human advancement of the participants. The ideas are chosen based on Nokia perceptions and users' votes. In this project, the idea of the product or service is the final product created.

To motivate the participation of the workers the following motivating factors are used:

- **Task identity:** workers have a chance to see their ideas implemented in real life.
- **Task autonomy:** limited by the scope of Nokia's operations.

- **Direct feedback from the job:** the idea's author receives feedback in form of acceptance of the idea by the company.
- **Community identification:** the community generally consists of Nokia's employees and loyal customers.
- **Social contact:** users can discuss the ideas and anything else with each other and with the Nokia's personnel
- **Signaling:** ideas submitters might be noticed by the possible employees (Nokia and its partners)
- **Human capital advancement:** possible through the communication with the experts
- **Indirect feedback from the job:** the idea's author receives feedback in form of other users' comments.

The motivation of the workers here is non-monetary and both intrinsic and extrinsic. Workers can be motivated to participate because of the possibility to see the idea in real-life. They communicate with each other while discussing the ideas, the experts also communicating with the workers, what enables the human advancement. The feedback on the idea is both direct and indirect.

2.2.2. Case of "Innovate with Kraft"

While some companies go to the special platforms to get connected with the crowd, other try to bring the crowd closer without any intermediate. One of such companies is Kraft Foods, the second largest in the world producer of packaged food. On their site (Kraft Foods 2012), Kraft accepts new ideas of products, processes, technology and packaging, as well as recipes and flavor ideas.

Sometimes Kraft outlines the specific needs which anyone can address and try to solve. If the idea is good enough, Kraft will let the user know about it, and further the company will develop relationships with the user. Kraft purchases new ideas or creates partnerships and alliances with the person or company which owns the technology. Probably such success lead to the creation of "Collaboration Factory" – another Kraft site gathering ideas for the Cadbury which is one of the Kraft's brands (Cadbury 2012). Unfortunately, there is no data about the number

of ideas submitted or accepted. However, Perfecto Perales, senior director of Kraft Foods, states that such approach brought to the company many new technologies, especially in packaging area (Pierce 2011).

The following values of the crowdsourcing projects' characteristics were distinguished:

- **Beneficiary:** Kraft
- **Final products:** Ideas of the products taken to further development by Kraft
- **Workers:** Anyone
- **Types of the tasks:** Simple
 - Post the description of the idea
- **Aggregation of contribution:** Selection based on the opinion of:
 - Kraft
- **Access to peer contributions:** No

The case project is based around the Kraft brand, products and services which related to one the following areas: Packaging, Products Ingredients, and Processes. The workers send their ideas to see them implemented in real life. The Kraft's project slightly differs from the other cases in this category. The ideas sent without showing it to the public, what means that workers cannot discuss them and the assessment of the project exclusively belongs to Kraft.

Further the information about the found motivating factors is presented:

- **Task identity:** workers have a chance to see their ideas implemented
- **Task autonomy:** Limited, the ideas can be posted in Packaging, Products Ingredients, and Processes sections
- **Signaling:** ideas submitters might be noticed by the possible employees (Nokia and its partners)

The motivation of the workers is non-monetary and mostly intrinsic. Workers can be motivated to participate because of the possibility to see the idea in real-life products. They do not communicate with each other, there is a

possibility to communicate with the experts if Kraft likes one's idea. Therefore, only direct feedback is present in the project.

2.2.3. Case of Dell's IdeaStorm

Another company that used the crowd's power was Dell. In 2007 the company has launched IdeaStorm – a website which purpose was to reveal the most important and most relevant ideas of the further development of Dell. In other words, Dell wanted to know what products to develop next and how to develop the existing ones. (Ideastorm 2012a). For 5 years, the web site has gathered more than 17,000 ideas and about 100,000 comments, 500 of the ideas were implemented.

The site has its community consisting of some of the Dell's employees and users that have registered on the site. The submitted ideas are discussed and voted, the hottest ideas and discussions are posted on the main screen what adds new discussion in there. Such approach is ensuring the number of participants and increase the chances of the idea further development.

Dell openly states in IdeaStorm's Terms OF Services that “a posted idea will grant Dell royalty free license to use and implement it without compensation to the originator. Participants should be aware of this before posting any ideas” (Ideastorm 2012b). Therefore, Dell receiving a 100 innovations a year for free from the crowds. Besides the company is gathering thousands of ideas that can be implemented later.

The following values of the crowdsourcing projects' characteristics were distinguished:

- **Beneficiary:** Dell
- **Final products:** Ideas of the products taken to further development by Dell
- **Workers:** Anyone
- **Types of the tasks:** Simple
 - Post the description of the idea
 - Vote for ideas

- Comment on ideas
- **Aggregation of contribution:** Selection based on the opinion of:
 - Dell
 - Users
- **Access to peer contributions:** Assess

The case project is based around the Dell's brand, products and services which are mostly IT related. The workers send their ideas to see them implemented in real life. Besides posting the ideas users also can assess other ideas by viewing, voting and commenting on them. The experts of Dell also participate in the communications and provide the feedback on the ideas what enables the human advancement of the participants. The ideas are chosen based on Dell's specialists perceptions and users' votes. In this project, the idea of the product or service is the final product created.

Further the information about the found motivating factors is presented:

- **Task identity:** workers are motivated by the possibility to see their ideas implemented in real life.
- **Task autonomy:** the project limits the ideas to IT.
- **Direct feedback from the job:** the idea's author receives feedback in form of acceptance of the idea by Dell.
- **Community identification:** global community of ideators and experts
- **Social contact:** users can discuss the ideas and anything else with each other and with the Dell's personnel
- **Signaling:** ideas submitters might be noticed by the possible employees (Dell and its partners)
- **Human capital advancement:** possible through the communication with the experts
- **Indirect feedback from the job:** the idea's author receives feedback in form of other users' comments.

The motivation of the workers is non-monetary and both intrinsic and extrinsic. Workers can be motivated to participate because of the possibility to

see their idea implemented in real-life. They communicate with each other and experts and discuss the ideas or any other topics. Even if a person does not have an idea he can surf other ideas and comment them. The feedback on the idea is both direct and indirect.

2.2.4. Case of Fiat Mio

Fiat had launched a web-site in 2009 which was inviting people to participate in the creation of the car of the future or design the world's first crowdsourced car. The car was successfully introduced in Sao Paulo Auto in 2010. The futuristically designed car concept was based on the ideas of the people all around the world (FiatMio 2011).

The resulting product was "a compact and agile car, comfortable and safe with innovative traffic solutions for big cities, a pollutant-free engine and the capacity to receive personalized updates, and changes in configuration, and having interface between car and user." (Pinheiro 2011). The crowd was able to create the specifications for the car in just one year.

During the project, the company has gathered more than 17,000 participants, which in total have submitted about 11,000 ideas. The ideas were concerning every part of the car: technical aspects, design, electronics, comfort and safety insurance etc. (FiatMio 2011)

It is notable, participants do not receive any monetary reward; besides, the car final specifications were submitted under Creative Commons licenses, meaning that it is free to use for everyone including the competitors' companies (FiatMio 2011).

The following values of the crowdsourcing projects' characteristics were distinguished:

- **Beneficiary:** Fiat
- **Final products:** Specifications for the car based on the people's ideas
- **Workers:** Anyone

- **Types of the tasks:** Simple
 - Post the description of the idea
 - Develop and modify other's ideas
 - Vote for ideas
 - Comment on ideas
- **Aggregation of contribution:** Integration
 - the final product consists of many contributions
- **Access to peer contributions:** Modify

The case project differs from the others as the final product is the integration of smaller contributions, while the other cases in this section used the selective approach to the ideas. It is made possible because of the function to modify the existing description of the idea. However, all the contributors to the final result were proudly named after the specifications for the car were created.

Further the information about the found motivating factors is presented:

- **Task identity:** workers are motivated by the possibility to see their ideas implemented in real car and by possibility to create their ideal car
- **Task autonomy:** the project limits the ideas to the car related.
- **Pastime:** workers might enjoy spending free time on looking and commenting other's ideas and communicating with other users
- **Community identification:** Brazilian community of the first ever crowdsourced car creators
- **Social contact:** users can discuss the ideas and anything else with each other and with the Fiat's personnel
- **Signaling:** ideas submitters might be noticed by the possible employees (Fiat)
- **Human capital advancement:** possible through the communication with the experts of the company and within the crowd.
- **Indirect feedback:** present in form of other users and experts comments

The motivation of the workers is non-monetary and both intrinsic and extrinsic. Workers can be motivated to participate because of the possibility to see the real car which is created with their contribution and based on their own ideas. The workers communicate with each other and the company experts while discussing and working on the ideas, what enables the human advancement. The feedback on the idea is both direct and indirect. The community identification is very high in this case, as workers were constantly monitoring the project during its development.

2.3. Crowdsourcing projects related to 2nd stage of NPD

The analyzed cases are devoted to the design stage of new products development where the product concepts are created. Further parts of the section are devoted to the description of the case projects, their characteristics, and motivating factors used in there. The Table 8 summarizes the findings.

Table 8 Motivating factors present in the projects related to the Design stage of NPD

Case	Threadless	Electrolux Design Cup	Zazzle	Peugeot Design Contest
Skill variety	no	no	no	no
Task identity	yes	yes	yes	yes
Task autonomy	yes	limited	yes	Limited
Direct feedback	yes	yes	yes	yes
Pastime	yes	yes	yes	yes
Community	yes	yes	yes	yes
Social contact	yes	yes	yes	yes
Payment	2,500\$ + presents	up to 5000\$ + a job offer	15% from the sales	10,000 euros & presents
Signaling	no	yes	no	yes
HC advancement	no	yes	no	yes
External values	no	no	no	no
External obligations	no	no	no	no
Indirect feedback	yes	yes	yes	yes

2.3.1. Case of Threadless

Threadless is the community-based T-shirt company which makes an open-call for shirts design submissions. The idea behind the company is very simple: every week Threadless launches a design competition where anyone can publish his or her T-shirt designs, and then the community is voting for the best designs. Every week, the six best designs are printed on a limited number of T-shirts which sold to the community members or regular customers. The author of the winning design receives a cash prize of \$2,500 and other prizes.

The company states (Threadless 2011) that:

“Everything we do gives you, and all the creative minds in the world, more opportunities to make great art. [...] We love helping art unknowns become art totally-knowns, which is why every single one of our products carries an artist’s name. We support our artist community in every way possible, whether it be through our annual creative awards, our commission-based award system, or simply by tweeting their name to the world. Lots of our artists have even gone on to start their own companies, and we believe that’s a success.”

The company targets at young male and female students and designers who want to express their creativity and make some money out of it. The company was founded way back in 2000 and initially sold several thousand T-shirts a year. By the present time, company sells more than a million of T-shirts a year globally. Now, besides the T-shirts they also sell posters and other various merchandise (Threadless 2012). The company also helps to establish a name for the young designers.

Due to the fact that Threadless asks its community how many T-shirts they should produce, the company is able to minimize the inventory costs. They simply print as many T-shirts as it was said by the community members. Sometimes, Threadless makes the sales where it sells all the left T-shirts.

Today, more than the 500 thousand people community of Threadless gives about 150 designs and several hundred thousand votes per day (Piller 2007). The

community is very important aspect of Threadless and similar sites. It allowed the company to receive more than \$30 million of revenue in 2009 as stated in Forbes magazine (Burkit 2010). The company would not be able to receive such revenues with the use of full-time working designers. There are several reasons for that: the first one, is the cost of having several designers which will make the same amount of the designs as the crowd. The second, it is impossible to ensure the quality of full-time designers – that is why Threadless asks its users to vote for the designs they like, it helps to determine the best designs (Threadless 2012).

The following values of the crowdsourcing projects' characteristics were distinguished:

- **Beneficiary:** Threadless
- **Final products:** The designs for T-shirts
- **Workers:** Designers (graphic design)
- **Types of the tasks:** Creative & Simple
 - Design a T-shirt
 - Vote for designs
 - Comment on designs Simple
 - Post the description of the idea
- **Aggregation of contribution:** Selection based on opinion of:
 - users
- **Access to peer contributions:** Asses

The case project shows that there are many designers among the crowds who are willing to do the designs for the company. In Threadless, the workers need to have the graphic design skills in order to create the final product which is the design for –shirts which are produced by the company. However, to assess the designs the company is also using the crowd – the people vote for the designs that they like, showing the future demand on each of the presented designs. Only the best designs are printed at the shirts. Therefore, it can be stated that the aggregation of the contributions is selective, and the selection is made by the crowd. To vote for the designs, the people should see them; therefore, anyone has the access to see and comment the designs.

Further in the information about the found motivating factors is presented:

- **Task identity:** workers have a chance to show up their design skills and see their designs on the limited collection of T-shirts.
- **Task autonomy:** the project allows any designs to be posted.
- **Direct feedback from the job:** the design's authors receive feedback in form of acceptance of the design for the production and received award.
- **Pastime:** workers might enjoy spending free time on looking and commenting other's designs and communicating with other users.
- **Community identification:** Big community of designers and company's fans consisting of 500,000 people.
- **Social contact:** workers can discuss the designs and anything else with each other and with the company.
- **Payment:** 2,500\$ for accepted design.
- **Indirect feedback from the job:** indirect feedback in form of user's comments and votes.

The workers are mostly motivated by the intrinsic factors; however, the extrinsic motivation is also used. First of all, the Threadless allows workers to show up the skills of design. The submitter of the design receives direct feedback from Threadless, and indirect feedback from other users. Besides, Threadless have managed to create the community which have the size of 500,000 people and the number is still growing. The community allows users to socialize with each other, what creates additional bonding to the project. Another important motivating factor is payment, the best designers receive 2500\$ and other valuable prizes for a submitted design that got to printing. Workers also get opportunities to get a job in Threadless or become a well-known designer, at least within the community.

2.3.2. Case of Electrolux Design Lab

The series of the annual design contests called Electrolux Design Lab celebrates the 10th anniversary in 2012. The contests are held by Electrolux, a household appliance company. The contest is designed to support young talents in

design in their future career and of course to provide Electrolux with new designs which can be implemented in real products. (Electrolux Design Lab 2012)

The winners of the contest receive up to 5,000 euros and invited to the award ceremony which is held in different country every year. The ceremony is attended by company representatives, industry experts, product designers, and journalists (Electrolux Design Lab 2012). This is the great opportunity for the young designers to get a job in one of the leading home-appliance companies.

Electrolux have managed to create the community and the users of the previous contests participate in the following and bring more friends with them. The contest of 2011 had about 13,000 participants (Electrolux Design Lab 2011)

The following values of the crowdsourcing projects' characteristics were distinguished:

- **Beneficiary:** Electrolux
- **Final products:** Designs of the home appliance products
- **Workers:** Designers (3D design)
- **Types of the tasks:** Creative
 - Design a product
- **Aggregation of contribution:** Selection based on opinion of:
 - Electrolux
- **Access to peer contributions:** View

Electrolux targets the young designers, mostly students to obtain the new designs for future products. The participants have to create a design of products within some category which is announced for every contest. The designs are chosen by Electrolux employees and users do not participate in the evaluation of them. However, the company does not close the designs from public eyes, anyone can see the submissions, but still users cannot vote or comment on other works.

Further, the information about the found motivating factors is presented:

- **Task identity:** workers have a chance to show up their design skills and see the products designed by them.
- **Task autonomy:** Limited by the topic of contest.
- **Direct feedback from the job:** the design's authors receive feedback in form of acceptance of the design and received award.
- **Pastime:** workers might enjoy spending free time on looking and commenting other's designs and communicating with other users.
- **Community identification:** Community of workers, mostly students, participating in the contest
- **Social contact:** workers can discuss the designs and anything else with each other and with the company.
- **Payment:** Several winners receive up to 5000\$ and 6-month job offer.
- **Signaling:** the winners receive the job offer; besides, other designers might be noticed by the Electrolux.
- **Human capital advancement:** the designers communicate with the experts from the company and might receive new skills and knowledge.
- **Indirect feedback from the job:** indirect feedback in form of user's and experts comments.

Electrolux uses both intrinsic and extrinsic motivating factors in its Design Cup. The participation is motivated by the participants' desire to see their designs in real life and get a job in Electrolux. The winners receive a sufficient monetary reward and a job or paid internship offer in Electrolux; therefore, payment and signaling motivation factors are present in the case. The task identity is also present, as the workers might see the real outcomes of their jobs, if the designs will be implemented by Electrolux. Even if the designs do not win the contest, the authors receive the feedback from the experts of Electrolux. This means that the direct feedback and human capital advancement motivating factors are present in the case.

2.3.3. Case of Zazzle

Zazzle is an online community, which uses crowdsourcing to design different kinds of products: clothes, shoes, hats, office supplies, gifts, photo frames, skin covers for electronic devices and many others. The site was opened in 1999 as a family business. However, in 2005 Google has invested \$16 million dollars in Zazzle, what gave the site new opportunities for growth (Olsen 2005).

Zazzle's mission is simple: "To Enable Every Custom, On-Demand Product in the World on Our Platform" (Zazzle 2012a). To do it, Zazzle have been creating the tools for users that help them easily design and customize products. Also, Zazzle provides a marketplace for these goods, which is its unique feature.

In other words within Zazzle's platform a user can customize existing or design new products, and then purchase the products for himself or sell them to others. Zazzle will manufacture and deliver the products. The users selling their designed products receive 15% commission from Zazzle. Therefore, Zazzle not only crowdsources the design of the products, but also its sales function.

Besides, Zazzle has established a global community of its users and actively participates in the discussions with users: the company listens for the desires of the users, answers their questions, and creates new discussion topics where people can discuss anything they want and socialize (Zazzle 2012b). There is no information about the size of the community, but there are English, Spanish, and even Japanese speaking sections of communities; the English-speaking community, for example, has about 40,000 open discussions with more than 100,000 posts in some of them (Zazzle 2012c). This helps to assume that the community is very large and consisting of several hundreds of thousands people worldwide.

The following values of the crowdsourcing projects' characteristics were distinguished:

- **Beneficiary:** Zazzle
- **Final products:** Designed products
- **Workers:** Designers (graphic design)

- **Types of the tasks:** Creative & Simple
 - Design a product
 - Customize a product
 - Vote for designs
 - Comment designs
- **Aggregation of contribution:** Selection based on opinion of:
 - Users
- **Access to peer contributions:** Assess

The case project shows that not only the design of a product might be crowdsourced, but also its sales as well. There are many people with the design skills willing to use their abilities and design new products. As in the Threadless case, the workers need to have the graphic design skills in order to create the product's designs. Besides, the ability to promote and sell the products is also can be used – users can sell the products with their designs and make money. The workers design and customize many different types of simple goods: clothes, souvenirs, and covers for electronic devices and so on. Also, users by themselves decide what is a good design and they are able to purchase any product with the design they like. Therefore, assessment of the contributions is also a crowd's function. Users can easily view and comment any product designs. Therefore, it can be stated that the aggregation of the contributions is selective and made by the crowd.

Further the information about the found motivating factors is presented:

- **Task identity:** workers have a chance to show up their design skills and see their designs on the produced products.
- **Task autonomy:** the project allows any designs to be posted.
- **Direct feedback from the job:** the design's authors receive feedback in form of acceptance of the design for the production.
- **Pastime:** workers might enjoy spending free time on looking and commenting other's designs and communicating with other users.

- **Community identification:** community of customers, designers, and fans.
- **Social contact:** Users can discuss the designs and anything else with each other and with the staff of Zazzle
- **Payment:** Yes. 15% from the sales
- **Indirect feedback from the job:** indirect feedback in form of user's comments and votes.

The motivating factors used in the case are mostly intrinsic, meaning that the workers are motivated to participate and create the designs because of the chance to show up their skills and see the results of their work in the form of ready products with the user's design. Also, the task autonomy intrinsic motivating factor is present: users are free to choose what product they will design; there are no strict rules of how the design should be done, if it is not plagiarism and the other users like it – it is a good design. It means, that the contributors of the designs receive the direct feedback form the project, as well as indirect feedback from other users who can comment on any design. The community and socialization of the users is also very important as it helps to create a stronger link between a user and Zazzle.

2.3.4. Case of Peugeot's design contest

Peugeot is one of the first car manufacturers that have decided to use crowd's power. To do it, the company's management decided to launch a design contest where people were asked to present their ideas about the future design of the Peugeot cars.

The first design contest by Peugeot was launched in 2000. The participants were invited to show how Peugeot will look in 2020. The company has received more than 2,000 designs from people all around the world. After the designs were uploaded, the participants were voting for the best designs (Car Design News 2001).

The results of the first contest in 2000 were very promising and the company has decided to hold such contests regularly. The company has launched such contests in 2002, 2005, 2007 and 2008 (Peugeot 2008).

Every year the number of participants was increasing: the last competition has gathered about 5,000 designs which received about one hundred of thousands of comments and votes. The number and value of the prizes were also growing: the winner of the last contest has received 10,000 euros and a brand new Microsoft's X-Box 360, a gaming console (Peugeot 2008). It is notable, that the average participants' age has decreased from 28 in 2000 to 22 in 2008, meaning that the contests attracts young designers (Car Body Design 2008).

Besides, the company is able to find young and creative designers through the contests: as it is stated on the Peugeot's web-site, some of the contests participants are currently working in the company (Peugeot 2008).

The contest held by Peugeot attract attention of media, meaning that the company benefits not only from the new designs, but from the publicity; it is even hard to say what benefit of the contests is more valuable (BrandPotion 2011). Such contests help to promote the Peugeot's brand among young and innovative people that either have participated in one of the contests or just have been reading the news about them. Nevertheless, the concepts of the cars designed by users are created and shown at different auto shows. For example, the cars with the designs created during the contests, are regularly shown at the Frankfurt Motor Show (Car Body Design 2008).

The following values of the crowdsourcing projects' characteristics were distinguished:

- **Beneficiary:** Peugeot
- **Final products:** Designs of the cars
- **Workers:** Designers (3D design)
- **Types of the tasks:** Creative
 - Design a car
- **Aggregation of contribution:** Selection based on opinion of:
 - Peugeot

- **Access to peer contributions:** View

Peugeot targets the young designers that are able and willing to design their own car. The participants have to create a design of the future Peugeot car according to the topic of the contest, which differs every time. The designs then being chosen by Peugeot experts; the users are not participating in the evaluation of the designs. However, the users can view and comment each other's designs. Further, Peugeot creates the prototypes of the designed cars and presents them on different motor shows around the globe. The authors of the best designs receive the monetary award and have a chance to be noticed by Peugeot or other car manufacturing/designing company.

Further the motivating factors found in the cases are presented:

- **Task identity:** workers have a chance to present their designs for public at the contest and see the real cars built by their design.
- **Task autonomy:** limited to the topic of the contest.
- **Direct feedback from the job:** the design's authors receive feedback in form of acceptance of the design for the production.
- **Pastime:** workers might enjoy spending free time on looking and commenting other's car designs.
- **Community:** the community of the contest participants and fans.
- **Social contact:** participants can discuss the designs and anything else with each other.
- **Payment:** winners receive big awards (10,000 euros) and valuable prizes from partners (eg. Microsoft's XBox).
- **Signaling:** workers might be noticed by possible employees.
- **Human capital advancement:** through the feedback of experts.
- **Indirect feedback from the job:** indirect feedback in form of user's comments.

It was found that many motivating factors are being used in the case. Among the possible intrinsic factors, the skill variety and task identity factors are being used: the users have the chance to present their 3D design skills and the ability to design a car, which might be manufactured by Peugeot. There are not so many options for the young designers to construct their own car, and the Peugeot's contest might fulfill the designer's dream. Even if the design was not chosen by the experts, the designers receive the feedback from the company's experts and other users, what might help the designers to improve their skills and knowledge. Therefore, the both direct and indirect feedback motivating factors are present here, as well as the human capital advancement factor. Talking about the extrinsic factors, each worker has a chance to win the contest and receive sufficient monetary reward and other prizes; moreover, the young designers receive a unique opportunity to be noticed by Peugeot or any other car manufacturer and get the job offer.

2.4. Crowdsourcing projects related to 3rd stage of NPD

The analyzed cases are devoted to the 3rd stage of new products development which is the actual development stage which requires the technical development of the product. Further parts of the section are devoted to the description of the case projects, their characteristics, and motivating factors used in there. The Table 9 summarizes the findings.

Table 9 Motivating factors present in the projects related to the Development stage of NPD

Case	InnoCentive	NineSigma	Innovation Exchange	Ideaken
Skill variety	yes	yes	yes	yes
Task identity	yes	yes	yes	yes
Task autonomy	yes	yes	yes	yes
Direct feedback	yes	yes	yes	yes
Pastime	yes	yes	yes	yes
Community	yes	yes	yes	yes
Social contact	yes	yes	yes	yes
Payment	large	large	large	large
Signaling	yes	yes	yes	yes
HC advancement	yes	yes	yes	yes
External values	no	no	no	no
External obligations	no	no	no	no
Indirect feedback	no	no	yes	yes

2.4.1. Case of InnoCentive

InnoCentive is a web-site created in 2001 that connects R&D centers inside of companies with each other and with the brainpower outside of the companies. InnoCentive has a community of millions of individual problem Solvers. Companies like Eli Lilly, Life Technologies, NASA, nature.com, Popular Science, Procter & Gamble, Roche, Rockefeller Foundation, and Du Pont using the service to solve their scientific problems and innovate faster: they just post a problem and anyone from the InnoCentive community can try to solve it. Each successful solution is paid: the “price” of a solution varies, but usually it starts from \$10,000. This sum of money is nothing for huge companies, and they would spend more by trying to solve the problem by their own (InnoCentive 2012a).

The strength of InnoCentive is the diversity of intellectual background. Sometimes the solutions of the problems come from people who had no or little expertise in the problem field. For example, a chemical problem might be easily solved by an engineer. Simply by looking to the problem from different angles, the problem could be solved much easier (InnoCentive 2011). InnoCentive is probably the most well-known example of a network allowing R&D crowdsourcing; YourEncore and NineSigma are two more examples of such networks.

One of the first users of InnoCentive was Procter&Gamble. In 2000, the company’s stock prices were falling because of the falling sales and increasing R&D costs. Larry Huston, Procter&Gamble’s vice president of innovation and knowledge, made a wise decision to use networks like InnoCentive and NineSigma: it allowed the company to decrease the size of R&D department to 9,000 people, while the performance increased. (Howe 2006)

InnoCentive had published the statistics showing the results over its 10 years of existence (InnoCentive 2012b). The number of existing solvers is exceeding 250,000. However, through their strategic partners such as EDF, nature.com, Popular Science, and The Economist the total solver reach of InnoCentive is more than 10 million. About 1,500 public challenges were posted more than 50% of which were successfully solved. The total amount of given awards is more than \$35 million. The amount of the award varies from \$500 to

\$1,000,000 depending on the complexity of the task. The numbers prove that the crowds can and do solve hard and complex problems (InnoCentive. 2012b).

InnoCentive offers expertise knowledge and creativity from talented workers to companies requiring solutions for their Research and Development problems in Engineering, Math, Physical Science, Computer Science, Business, Chemistry and Life Sciences.

To post an R&D challenge, companies contact with InnoCentive as Seekers. Seekers provide the definition of the problem and the monetary award to the InnoCentive. Those who want to solve the challenges register as Solvers. Solvers review challenges and submit their solutions to the InnoCentive web-site; the Seeker company reviews the submissions and selects the best suited solution. The Solver that had the best solution receives the monetary award.

The fields of problems greatly vary: a Solver can try oneself in chemistry, or biology, or product design, or programming, or even aerospace technology areas.

The following values of the crowdsourcing projects' characteristics were distinguished:

- **Beneficiaries:** Solution seeking companies
- **Final products:** Developed solutions of the problems
- **Workers:** Solvers (Scientists, specialists, experts)
- **Types of the tasks:** Sophisticated
 - Develop a solution of the stated problem
- **Aggregation of contribution:** Selection based on opinion of:
 - The solution seeking company
- **Access to peer contributions:** no

InnoCentive plays an intermediate role between the crowd of experts and the companies that need to find solutions to their R&D problems. Therefore, beneficiaries are the companies seeking a solution – seekers. While the workers, called solvers, are professionals and experts in some specific field of science. A

worker can see the description of the problem and all the necessary information and submit the solution if he knows how to solve the problem. While the problems are available for the public, the solutions can be seen only by the seeker, meaning that anyone else cannot even see other's solutions. The seeker assesses the solutions and pays the reward to the solver posted the best solution, InnoCentive receives at least 10% commission and ensures that the security of transactions.

Further the information about the found motivating factors is presented:

- **Skill variety:** a worker has a chance to show up the skills and expertise.
- **Task identity:** the outcome of the work could be seen by a participant as the solution to the problem that could not be solved by others.
- **Task autonomy:** the workers free to choose the problem and propose any solution.
- **Direct feedback from the job:** workers receive direct feedback on the solution in form of acceptance of the solution.
- **Community identification:** the community consisting of top experts, scientists and companies.
- **Social contact:** the community members can communicate with each other
- **Payment:** Solvers receive large awards (\$10,000- \$1 mln).
- **Signaling:** solvers might be noticed by possible employers.
- **Human capital advancement:** by solving the problems and communicating with the experts new knowledge and skills can be obtained.

The motivation to participate is supported by many factors. First of all, the solvers have the chance to show and use their knowledge in some specific field to solve the previously unsolved problems. The solvers are free to choose how they are going to assess the problem: very often problems are solved by experts from different areas. The solutions are provided with the qualified feedback from the

seeker company's experts – the direct feedback motivating factor is present in the case, as well as the human capital advancement factor. InnoCentive has a huge community consisting of about 250 thousands of solvers; however, the company is also broadcasting the problems via its partners and the total audience exceeds 10 million potential solvers specializing in diverse set of areas: biology, chemistry, astronomy, physics, medicine, and many others; the community is still growing. The discussions in the community are very distinct; people discuss everything from the new scientific breakthroughs to the best places for the summer holidays. The monetary rewards depend on the seeker's desire, but start from \$10,000 and not limited; there were several cases when solvers have received more than a million dollars for the solution. The last, but not the least is the signaling motivating factor, which is present here as the solvers get the chance to be employed in a seeker company, which are usually huge multinational organizations.

2.4.2. Case of NineSigma

NineSigma also offers marketplace for seekers and solvers. NineSigma opens the opportunities to make workable connections between seeker's companies and solvers around the world through business and technology challenges. The idea is the same as in InnoCentive: a seeker posts a problem that has to be solved in a form of challenge with a monetary prize, NineSigma informs its community about the new challenge, anyone willing to participate publishes the solution, and finally the Seeker chooses the best solution and the solver receives the prize (NineSigma 2012).

The company was founded in 2000 – before Open Innovation became a common managerial approach. As it stated in the company description, NineSigma “Engages companies across all industry sectors with the global innovation community and Enables their organizations to leverage our open innovation network of external resources to solve immediate challenges, fill product pipelines and integrate new knowledge and capabilities into their organizations” (NineSigma 2012).

Very often the solution to a seeker's problem already exists in different companies or even industries. Each posted problem is further spread within the

community, and the solution is found. If no existing solution is found, the scientists and other solvers are trying to solve it (Scanlon 2007).

NineSigma is one of the largest communities of the problem solvers, and their pool of expertise continues to grow. The network consists of 1.5 million experts, which are free to spread the NineSigma's tasks to more experts in their social networks. The solution providers are located in more than 135 countries and represent the diverse science and technology areas. The areas of the problems solved through NineSigma include biotechnology, biomedical, chemical, electrical, engineering, food technology, green technology, materials, mechanical and industrial engineering. It is possible due to the wide innovation network including: large companies, small/medium-sized enterprises (SMEs), universities, government and private labs, trade organizations, research institutes, and individual innovators (NineSigma 2012).

The following values of the crowdsourcing projects' characteristics were distinguished:

- **Beneficiaries:** Solution seeking companies
- **Final products:** Developed solutions of the problems
- **Workers:** Solvers (Scientists, specialists, experts)
- **Types of the tasks:** Sophisticated
 - Develop a solution of the stated problem
- **Aggregation of contribution:** Selection based on opinion of:
 - The solution seeking company
- **Access to peer contributions:** no

The characteristics of NineSigma are very similar to the InnoCentive's. The company is also playing an intermediate role between the crowd of experts and the seeker companies having R&D problems. The logic of the work is as follows: a seeker posts the description of its problem, the problem is then spread through the community of solvers. The solvers, which can be individuals or organizations, solve the posted problems. The submitted solutions can be seen only by the seeker, meaning that anyone else cannot even view other's solutions.

The seeker pays the reward to the solver posted the best solution, a small part of which is taken by NineSigma as commission.

Further the information about the found motivating factors is presented:

- **Skill variety:** a worker has a chance to show up the skills and expertise.
- **Task identity:** the outcome of the work could be seen by a participant as the solution to the problem that could not be solved by others.
- **Task autonomy:** the workers free to choose the problem and propose any solution.
- **Direct feedback from the job:** workers receive direct feedback on the solution in form of acceptance of the solution.
- **Community identification:** the community consisting of top experts, scientists and companies.
- **Social contact:** the community members can communicate with each other
- **Payment:** Solvers receive large awards (\$10,000- \$500,000).
- **Signaling:** solvers might be noticed by possible employers.
- **Human capital advancement:** by solving the problems and communicating with the experts new knowledge and skills can be obtained.

The motivation to participate is supported by both intrinsic and extrinsic factors. First, the solvers have the chance to show and use their knowledge and expertise in some specific field of to solve the seekers' problems. The task autonomy is one of the motivating factors present in the case: the solvers are free to choose how they are going to assess the problem. The solutions are provided with the qualified feedback from the seeker company's experts; therefore, the direct feedback motivating factor is present in the case, as well as the human capital advancement factor. The NineSigma's community consisting of about 1,5 million solvers that specialize in diverse set of areas. The solvers receive

monetary rewards that depend on the seeker's desire, but they usually exceed \$10,000. However, the solvers also receive a chance to get a job or make a business contract with one of the seekers.

2.4.3. Case of Innovation Exchange

Innovation exchange is another web-service that connects the organizations requesting solution, Seekers, and people able to solve the problem, Solvers. The client companies place their problems or desires and any volunteer who knows how to solve the problem proposes the solution. The winning solution brings a reward to the solver. The rewards are pretty high – \$30-80 thousands (Innovation Exchange 2012).

The challenges areas also vary: there are scientific and business problems in contrast with similar organizations like InnoCentive and NineSigma that focus mainly on the scientific and technology problems. The scientific problems in Innovation Exchange are usually R&D related and require specific knowledge and expertise from the solvers. The business problems are generally related to the marketing and might ask solvers to evaluate the size of the market or propose the advertising idea. However, most of the posted problems are related to the developmental stage of the product creation (Innovation Exchange 2012).

As it has been said earlier, the problems require knowledge from different areas: chemistry, biology, mechanics, management and others. In some cases the knowledge from several areas might be required. That is one of the reasons why the work on the problems is made in a collaborative manner – that is another difference from NineSigma and InnoCentive.

The work is organized in the following manner: a seeker posts a problem, the solvers write the summaries of the ideas for solving the problem, the solvers collectively develop the proposed ideas, and finally the seeker chooses the solution and rewards the contributors. Innovation Exchange has the special tools for the collaborative work on the problems, which with the help of seeker measures the contribution of the solvers, participated in the solution. Each of the solvers participating in the problem receives a part of the stated reward according to his contribution (Innovation Exchange 2012).

Therefore, each problem is being solved simultaneously by several teams consisting of different solvers; the solvers can choose to propose their own idea or develop someone else's idea. It ensures that the problem is viewed from the different points of view and increases the chances for the success.

The following values of the crowdsourcing projects' characteristics were distinguished:

- **Beneficiaries:** Solution seeking companies
- **Final products:** Developed solutions of the problems
- **Workers:** Solvers (Scientists, specialists, experts)
- **Types of the tasks:** Sophisticated
 - Develop a solution of the stated problem
- **Aggregation of contribution:** mixed:
 - The several final products are created through the integration of smaller contributions
 - Out of the created solutions, the solution seeking company selects one
- **Access to peer contributions:** yes

Innovation Exchange is also an intermediary between the crowd of experts and the companies that need to solve some problem. Despite the final product is a solved problem as in other cases in this section, the characteristics of Innovation Exchange are slightly different. The main differences are that solvers collaboratively working on the problems and that they can view the others' submissions of the solutions. Therefore, the aggregation of the contributions happens in the mixed way: one problem might have several solutions consisting from the contributions of several solvers, which is integrative form of aggregation; however, the seeker chooses one solution which presents the selective form of aggregation. Such structure of the work brings more solvers for each problem and therefore increases the chances that the problem will be solved.

Further the information about the found motivating factors is presented:

- **Skill variety:** a worker has a chance to show up the skills and expertise.
- **Task identity:** the outcome of the work could be seen by a participant as the solution to the problem that could not be solved by others.
- **Task autonomy:** the workers free to choose the problem and propose any solution.
- **Direct feedback from the job:** workers receive direct feedback on the solution in form of acceptance of the solution.
- **Community identification:** the community consisting of top experts, scientists and companies.
- **Social contact:** the community members can communicate with each other even during the problem solving process
- **Payment:** Solvers receive large awards (\$10,000- \$500,000).
- **Signaling:** solvers might be noticed by possible employers.
- **Human capital advancement:** by solving the problems and communicating with the experts new knowledge and skills can be obtained.
- **Indirect feedback from the job:** the feedback in form of other users' comments.

The motivation to participate is supported by both intrinsic and extrinsic factors. First, the solvers have the chance to show and use their knowledge and expertise in some specific field to solve the seekers' problems. Another motivating factor present in the case is the task autonomy: the solvers are free to choose what problem to solve and how they are going to assess the problem. The solutions are provided with the qualified feedback from the seeker company's experts and from other solvers; therefore, the both direct and indirect feedback motivating factors are present in the case. The human capital advancement factor is also present as the solvers learn from each other during the work on the problem and in the discussions with the seeker's company experts. The Innovation Exchange has the established community of solvers and seekers, which enables the communication with each other and increases the bonding of solvers and

seekers to the site. The solvers receive monetary rewards that depend on the seeker and vary from \$100 to \$1,000,000. However, the solvers also receive a chance to get a job or make a business contract with one of the seekers which is also important motivating factor.

2.4.4. Case of Ideaken

Ideaken is the marketplace where anyone can try to solve complex Research and Development problems for a reward and recognition. According to the statement on the Web-site, Ideaken believes that “Exceptional and unconventional talent is present everywhere; Creative people are also collaborative; Innovation through collaboration requires a platform” (Ideaken 2012).

The three listed Ideaken believes describe their business very well. First of all, Ideaken enables enterprises to collaborate and innovate with employees, customers, research vendors or with the global pool of talents. Of course, Ideaken itself does not solve any R&D problems, instead it play an intermediary role by connecting those who need a solution with those who might have it. According to the statement on the site, the Solvers receive reward, recognition and most importantly intellectual satisfaction – these are the main motivations used (Ideaken 2012)

The work in the project can be described in three steps: a company submits a challenge, solvers with the support of the company solve the problem, and finally the problem-solvers get paid for his or her work. The collaboration between the crowd and the company is one of the unique features of Ideaken (Markovitz 2011); the company wanting to solve a problem is also actively working on the solution together with the outside solvers found on Ideaken.

The following values of the crowdsourcing projects’ characteristics were distinguished:

- **Beneficiaries:** Solution seeking companies
- **Final products:** Developed solutions of the problems
- **Workers:** Solvers (Scientists, specialists, experts)

- **Types of the tasks:** Sophisticated
 - Develop a solution of the stated problem
- **Aggregation of contribution:** integrative:
 - The final product is created through the integration of smaller contributions of workers
- **Access to peer contributions:** yes

Ideaken is another intermediary between the crowd of experts and the companies that need to solve some problem. However, its concept differs from the similar cases. The final product is also a solved problem as in other similar cases; however, the final product is the result of collaborative work of solvers and companies, not the individual. Therefore, the aggregation of the contributions happens in the integrative way when the final product results from several smaller contributions. Ideaken has developed special tools that allow collaborative work of solvers and the client companies. Therefore, a solver can look through the list of problems, see what is being done there and propose a solution or help to develop someone else's solution. The company asking for help is usually also actively participates in the process of solving its problem. Further the information about the found motivating factors is presented:

Further the information about the found motivating factors is presented:

- **Skill variety:** a worker has a chance to show up the skills and expertise.
- **Task identity:** the outcome of the work could be seen by a participant as the solution to the problem that could not be solved by others.
- **Task autonomy:** the workers free to choose the problem and propose any solution.
- **Direct feedback from the job:** workers receive direct feedback on the solution in form of acceptance of the solution.
- **Community identification:** the community consisting of top experts, scientists and companies.

- **Social contact:** the community members can communicate with each other even during the problem solving process
- **Payment:** Solvers receive large awards (\$5,000- \$300,000).
- **Signaling:** solvers might be noticed by possible employers.
- **Human capital advancement:** by solving the problems and communicating with the experts new knowledge and skills can be obtained.
- **Indirect feedback from the job:** the feedback in form of other users' comments.

There found many motivating factors in the case. The solvers have the chance to show up and use their knowledge and expertise in some specific field to solve the problems. Another motivating factor is the task autonomy as the solvers are free to choose the problem to assess. The solvers instantly receive the feedback from the companies as they collaboratively work on the problems. Besides, solvers receive feedback from the other users; therefore, the both direct and indirect feedback motivating factors are present in the case. The solvers can advance their knowledge as they communicate with the other experts and employees of a seeker organization. The Ideaken has its own community of solvers and seekers, which enables the communication with each other and increases the bonding of solvers and seekers to the site. For the contribution to a solution, solvers receive monetary rewards depending on the contribution they have made. However, the solvers also receive a chance to get a job or make a business contract with one of the seekers which is also important motivating factor.

2.5. Crowdsourcing projects related to 4th stage of NPD

The analyzed cases are devoted to the preparation to the commercialization of the products, which is 4th stage of new products development; the stage is mostly consisting of marketing related activities. Further parts of the section are devoted to the description of the case projects, their characteristics, and motivating factors used in there. The Table 10 summarizes the findings.

Table 10 **Motivating factors present in the projects related to the 4th stage of NPD**

Case	GiantHydra	Zooppa	Tongal	eYeka
Skill variety	yes	yes	yes	yes
Task identity	yes	yes	yes	yes
Task autonomy	limited	yes	yes	yes
Direct feedback	no	yes	yes	yes
Pastime	no	yes	yes	yes
Community	yes	yes	yes	yes
Social contact	yes	yes	yes	yes
Payment	yes	yes	yes	yes
Signaling	yes	yes	yes	yes
HC advancement	yes	no	no	no
External values	no	no	no	no
External obligations	no	no	no	no
Indirect feedback	yes	yes	yes	yes

2.5.1. Case of Giant Hydra

Giant Hydra was created in 2008 and it occupies a unique niche in the world of advertising and marketing. The company allows companies to use a global pool of creative professionals specializing in different areas of expertise. The company operates as an advertising agency; however, it is being able to create more and better solutions for marketers with the help of crowdsourcing (Giant Hydra 2012a).

The working process is very simple. A client company provides Giant Hydra with a brief describing what and how should be done. The brief is sent out to hundreds of creative teams, called HydraHead. Those teams interested in the work, apply to the project. The applied teams are given more details on the project and start the work on the assignment. Out of the HydraHeads, a project manager is assigned, whose task is to manage the collaborative work of different teams; usually, the prequalification is required to become the project manager (Giant Hydra 2012b).

The work on the project lasts about two weeks. The cost of a project in the Giant Hydra is around \$10,000-\$15,000. After the work is done, the results are presented to the client company and the company pays to the Giant Hydra, which further passes the money to the contributors leaving a small amount for itself as commission (Giant Hydra 2012c).

Most of the participants are copywriters, art directors, planners, strategists, directors, producers, photographers, and other people that might be required to create the marketing plan or advertisement.

The characteristics of the crowdsourcing project are presented below:

- **Beneficiaries:** Client companies of Giant Hydra
- **Final products:** Developed marketing plan or advertisement
- **Workers:** Professionals in marketing (copywriters, art directors, planners etc)
- **Types of the tasks:** Sophisticated
 - Develop a marketing plan

- **Aggregation of contribution:** integrative
 - The final products are created through the integration of smaller contributions
- **Access to peer contributions:** modify

The organization uses the crowd as the internal employees; however, the client companies are the ones benefiting from the crowd work. The final product, received by a client company, is the developed marketing plan or ready advertisement. To create the final product, marketing professionals are used as workers. The diversity of the expertise of the people working on one project allows viewing the problem from different angles and develop a better solution. The work of the crowd is hidden from the public eyes; however, the integrative aggregation of contributions requires the access to change the peers' contributions.

Further, the motivating factors found to be present in the case:

- **Skill variety:** workers can use any suitable for the particular project skills and knowledge.
- **Task identity:** workers can see the final result of the work.
- **Task autonomy:** workers are free to choose the project; however, the role in work on the project limits the possible actions.
- **Community:** the community us consisting of the marketing professionals.
- **Social contact:** workers can easily obtain new contacts and friends.
- **Payment:** workers are paid according to their contribution.
- **Signaling:** workers might be noticed by a possible employer.
- **Human capital advancement:** new knowledge and skills are obtained through the work on the project and during the communications with other experts.
- **Indirect feedback:** workers receive feedback from the clients and peers.

The motivating factors used in the project are both intrinsic and extrinsic. The broad goals of the project require contribution of people with the different

skills; therefore, the project allows workers to show up their skills. The workers might choose the project to work on; however, further work tasks depend on the assigned role. The workers can communicate with each other during the work on a project or in their free time within the community consisting of experts. During these actions workers can advance their skills and knowledge, and receive the feedback from the clients and peers.

2.5.2. Case of Zooppa

Zooppa is the place where people can create their own video advertisements for famous companies and brands. Zooppa was founded in 2007 in Italy; after successful results of the first year, Zooppa was launched in the US in 2008. Zooppa continues to grow and linking the major brands with the crowd of video advertisers from around the world (Zooppa 2012a). T

To start the work, a client companies provide a creative brief for the workers and announce the award and prizes for the best ads. The workers, who got interested in the assignment, start the work on the project according to the stated in the brief requirements (Zooppa 2012b). The winners of the contest are chosen in several categories: the users' choice, Zooppa's staff choice, and the client company's choice. The winners of each category awarded according to the initially stated award. Therefore, the assessment of the videos is triangular what ensures that the best results will be rewarded. Currently, more than 2 million dollars in total were paid out to the winners (Zoopa 2012c).

Within the Zooppa's community consisting of 140,000 members, workers can make money by winning the contests, meet other creative people, grow the portfolio of made videos, and have the work seen by millions of people (Zoopa 2012c). Each member of the community can easily access the works of others, both for the current and last projects. The users can comment and vote for the best videos.

The following characteristics values of the case were distinguished:

- **Beneficiaries:** Client companies of Zooppa
- **Final products:** Video advertisements

- **Workers:** Video makers, actors, directors, animators
- **Types of the tasks:** Creative
 - Develop an advertising video
- **Aggregation of contribution:** selection based on the opinions of:
 - a client company
 - Zooppa's staff
 - users
- **Access to peer contributions:** assess

Zooppa uses the creative power of the crowd to help its clients to achieve the desired results. The client companies what they want, the workers do it, and the best videos are chosen and awarded. The work on the project is individual, meaning that the workers create the videos independently; however, they can view and vote for other users' videos. The choice of winners is triangular: Zooppa staff, client company, and the workers themselves assess the videos and choose the best.

Further presented the found motivating factors for the case:

- **Skill variety:** there is a chance to show up the creative skills associated with the video production.
- **Task identity:** workers see the real outcome of the work in form of the shown video advertisements created by them.
- **Task autonomy:** workers are free to choose the project and the idea of the video.
- **Direct feedback:** the direct feedback to workers in form of award for the best video.
- **Pastime:** workers can enjoy watching others' videos or communicating with each other in the free time.
- **Community:** the community consists of 140,000 video creators and animators.
- **Social contact:** workers can communicate with each other and with the client companies.
- **Payment:** the winners of the contests receive monetary compensation.
- **Signaling:** workers might be noticed by the possible employers.

- **Indirect feedback:** workers receive the feedback in form of other users and clients comments.

Zooppa service uses many motivating factors to ensure the participation of the workers on the projects. The beneficiaries are the client companies, which request and receive the video advertisements for their products and services. Clients pay sufficient awards for the chosen videos. Besides the reward, the workers might be noticed by the companies and get the job or business contract. The community of Zooppa is large and consisting of 140,000 video creators which can communicate and share the ideas with each other. Besides, Zooppa might be used for recreation activities: people can entertain themselves by watching the created videos.

2.5.3. Case of Tongal

Tongal is a service offering the creative people to work with famous brands and companies needing new and original video content. From the other point, Tongal offers the companies to use the creative abilities of the crowd to create better video advertisements (Tongal. 2012a).

The Tongal projects are divided into several phases: Ideation, Production and Distribution. That means that different people with different skills and expertise are required for one project: writers, directors, actors, and animators can all focus the best thing they are able to do. Besides, anyone can also get money for the promotion of the winning videos and prediction of the awarded videos (Tongal 2012b).

The Ideation phase of the work requires copy-writers and idea people who can come up with an outstanding idea for the advertisement. After the phase is over, the company with the users chooses the best ideas, and the following Production phase begins. The Production phase requires directors, actors, animators and shooters to create the unique videos based on the proposed in the previous phase ideas. After this, the best videos are chosen, and optionally, the Distribution phase begins. The client might want to distribute the video to the customers by itself or ask the crowd to do it. If second, the workers will distribute the video through their channels: own YouTube channel, Facebook account, or

even through Twitter. During each phase the contributors and the winners are receiving the part of the total award stated by the client company (Tongal 2012b).

Besides, the Tongal has an established community of its workers and clients, consisting of several dozens of thousands members (Tongal 2012c). The community promotes sharing the ideas and communication among its members.

The following characteristics values of the case were distinguished:

- **Beneficiaries:** Client companies of Tongal
- **Final products:** Video advertisements
- **Workers:** Video makers, actors, directors, animators, creative people
- **Types of the tasks:** mostly creative
 - Develop an idea for advertising video
 - Develop advertising video
 - Distribute the video
- **Aggregation of contribution:** selection of ideas and videos based on opinions of:
 - a client company
 - users
- **Access to peer contributions:** assess

Tongal also uses the creative power of the crowd to help its clients to achieve the desired results. The client companies what they want, the workers do it, and the best videos are chosen and awarded. The work on the project is individual, meaning that the workers create the videos independently; however, they can be based on the collaboratively created ideas. The workers can see and assess other users' videos and ideas; based on this, the evaluation of the contribution is calculated. The choice of winners depends on both: the client company and the users themselves.

Further presented the found motivating factors for the case:

- **Skill variety:** there is a chance to show up the creative skills associated with the video production and idea creation.

- **Task identity:** workers see the real outcome of the work in form of the shown video advertisements created by them.
- **Task autonomy:** workers are free to choose the project and the idea of the video.
- **Direct feedback:** the direct feedback to workers in form of award for the best video.
- **Pastime:** workers can enjoy watching others' videos or communicating with each other in the free time.
- **Community:** the community consists of video creators, animators, etc.
- **Social contact:** workers can communicate with each other and with the client companies.
- **Payment:** the winners of the contests receive monetary compensation.
- **Signaling:** workers might be noticed by the possible employers.
- **Indirect feedback:** workers receive the feedback in form of other users' and clients comments'.

Tongal uses many motivating factors to promote the participation of the workers in the projects. The beneficiaries are the client companies, which request and receive the video advertisements for their products and services. Clients pay sufficient awards for the chosen videos. Besides the reward, the workers might be noticed by the companies and get the job or business contract. Tongal also has an established community of its users and clients where the members can communicate, and share their ideas. The Tongal's site might be used for recreation activities: people can entertain themselves by watching the created videos and reading the idea proposals.

2.5.4. Case of eYeka

eYeka is the global market leader in online consumer co-creation created in 2006 by 2 French entrepreneurs. The main purpose of eYeka is to give its clients the access to the pool of knowledge of the crowd to innovate marketing and communication with new and creative ideas. The company helps its client companies to acquire creative insights, find innovation opportunities, and increase

the consumer engagement in the product development. eYeka works with the top companies; for example, 40 out of the top 100 leading global brands according to Interbrand's ranking are eYeka's clients. The following companies are some of the eYeka's clients: such as Procter & Gamble, L'Oreal, Coca-Cola, Unilever, Danone, Hyundai, Diageo and Microsoft (eYeka 2012a).

eYeka has an online community consisting of more than 200,000 members. Despite the fact that the company was created in France, currently it operates all around the world and has workers from more than 94 countries (eYeka 2012b).

According to "The Forrester Wave™: Co-Creation Contest Vendors, September 2011" report, eYeka "sits atop the leaderboard" and is considered "well positioned for future growth." The company was ranked the first in each of the assessment groups: offering, strategy, market presence, customization, client services, product & corporate strategy, and strength of management team. (Williams 2011)

Further, the characteristics' values of the case are described:

The following characteristics values of the case were distinguished:

- **Beneficiaries:** Client companies of eYeka
- **Final products:** Advertisements (video, posters, on-line)
- **Workers:** Video makers, graphic designers, animators, etc.
- **Types of the tasks:** mostly creative
 - Develop an advertisement (video, picture, song, etc)
- **Aggregation of contribution:** selection of ideas and videos based on opinions of:
 - a client company
- **Access to peer contributions:** assess

The company is an intermediary between the creative crowd and the companies needing the advertisements for the products. The client companies request and receive the advertisements created by creative people outside of their organization. The people choose the projects according to their skills; for

example, the poster-advertisements require those workers who have the graphic design skills. The proposed advertisements are assessed by the clients and other eYeka members; the company chooses the best idea and rewards the winner. Other workers can always access the others' works and rate or comment them.

Further presented the found motivating factors for the case:

- **Skill variety:** there is a chance to show up the creative skills associated with the required type of advertisement.
- **Task identity:** workers see the real outcome of the work in form of the advertisements created by them.
- **Task autonomy:** workers are free to choose the project and the way of work.
- **Direct feedback:** the direct feedback to workers in form of award for the best advertisement.
- **Pastime:** workers can enjoy watching other worker's advertisements and communicating with each other in the free time.
- **Community:** the community consists of more than 200,000 creators.
- **Social contact:** workers can communicate with each other and with the client companies.
- **Payment:** the winners of the contests receive monetary compensation for the work.
- **Signaling:** workers might be noticed by the possible employers.
- **Indirect feedback:** workers receive the feedback in form of other users' and clients' comments.

eYeka also uses many motivating factors to promote the participation of the workers in the advertisement creation. The beneficiaries of the crowd's work are the client companies, which request and receive advertisements for their products and services. Clients pay sufficient awards received by the authors of the best advertisements. Besides the reward, the workers might be noticed by the companies and get the job or business contract. eYeka has a 200,000 members

community consisting of workers and clients. The community allows easy communication and sharing the ideas.

Summary of the chapter

For addressing the research questions the qualitative research is found to be more appropriate than quantitative research as it allows addressing the complexity of the environment as the objects in qualitative research are studied in their usual environment (Mason 2002). The qualitative research could be done with the usage of several sources of the data such as documents, experiences of people, observations, and others (Denzin & Lincoln 2005). That is suitable for this research as it allows studying the objects from various points of view, what increases the understanding of the topic and the depth of the analysis. In other words, the qualitative type of research gives the opportunity to precisely study the phenomenon of crowdsourcing NPD projects and the motivating factors used in them with all the complexity of the topic and its environment.

The fact that the research topic was not thoroughly studied in the literature also corresponds with the motives to use the qualitative research. According to the Creswell (2009) the qualitative research is more appropriate for the poorly discussed topics.

Multiple case study analysis will be used as a research method in this work. According to Yin (1994) case study is one of the most relevant research methods when the researcher has little control of the events, and due to the fact that the author of the current work has no control on the crowdsourcing projects, the method suits here well.

The sources of the information for cases' composition can be divided in three categories: publicly available project's publications, which are generally found at the project's websites; external data on the projects such as scientific, and journalistic publications mentioning, and discussing the projects; and the workers review's and opinions on the projects found in the web discussions, forums, and blogs.

The research is based on 16 different crowdsourcing cases which are grouped in categories according to the stage of NPD. The Table 6 has the list of the described projects and companies. A case description includes the overview of the project, the crowdsourcing project's characteristics, and the motivating factors found to be present in the project. The Tables 7, 8, 9, and 10 summarize the found motivating factors for the cases. Further, the information obtained through the cases is analyzed in order to answer the set research questions.

3. THE STUDY ON CROWDSOURCING NPD PROJECTS' MOTIVATIONAL FACTORS

The following sections are discussing the analysis of the described in the previous chapter crowdsourcing projects. The purpose of the analysis is to answer the set research question in order to understand how to motivate crowds to participate in crowdsourcing NPD projects. The first four sections of the chapter are intended to analyze each of the four sets of projects directed towards different NPD stages. The following section presents the outcomes of the analysis as well as states the answers for the research questions and the managerial implications of it. The summary describing the results of the analysis and its outcomes is also presented in the end of the chapter.

3.1. Motivating factors for crowdsourcing projects directed to Idea Generation stage of NPD

The analysis of the four cases was directed to the Idea Generation stage of NPD, which is the first stage. The following cases were analyzed: Ideas Project, Innovate with Kraft, IdeaStorm, and FiatMio crowdsourced car. The listed cases have the clear purpose to gather crowd's ideas for the new products and services, also they all have many similar characteristics.

All the projects are based around particular company and gather the ideas to be implemented by the same company. IdeasProject is created by Nokia and directed at the Information and Communication Technologies (ICT) related ideas. Innovate with Kraft gathers the ideas for packaged goods produced by the company. IdeaStorm is launched by Dell and gathers mostly the IT related ideas. Brazilian project of Fiat gathered the ideas of people for the first ever crowdsourced car – the car which concept is created by the crowd.

Generation of the ideas is an easy task for the crowd, and the number of ideas depends on the number of people in the crowd. To share an idea, a worker should only has the basic computer skills and know how to write. The analyzed cases were successful in gathering the ideas, and therefore, they can be used for distinguishing the critical motivating factors.

The Table 7 shows the motivating factors found in each of the projects related to the Idea generation. Further presented the list of the motivating factors that present in four or at least three projects:

Intrinsic motivating factors:

- Enjoyment based
 - **Task identity**
 - **Task autonomy**
- Community based
 - **Community identification**
 - **Social contact**

Extrinsic motivating factors:

- Delayed payoff
 - **Signaling**
 - **Human capital advancement**
- Social motivation
 - **Indirect feedback**

First of all, the factors do not include the monetary reward, what means that workers are ready to share their ideas for free. None of the projects is paying for the ideas; however, gathers thousands of them. The explanation could be found in the simplicity of the tasks that the workers should perform: describe the idea and vote for the other ideas they like.

The voting mechanism is helping the companies to assess the ideas. The number of ideas generated by the crowd is generally very large, and the task of choosing the ideas is also crowdsourced. By voting for the best ideas, the workers show that the idea is good enough.

The participation in the Idea Generation crowdsourcing projects is strongly motivated by the workers desire to see the results of their work, which is the task identity motivating factor. There is a chance that the idea generated by a worker will be implemented by the company in the real product or part of the product.

The indirect feedback that is received by worker from the project is also an important intrinsic motivating factor (Hackman & Oldham 1980; Brabham 2008).

The indirect feedback is expressed as the comments and votes from other users and the company experts. To use the motivating factor, the project should allow peer access to the contributions, meaning that the workers should be able to view and comment others' ideas. Otherwise, as in the case of Kraft, when the ideas are visible only by the company, the motivating factor is not present.

The other very important motivating factor is the identification of workers with the community. If a worker identifies himself as a member of the community, he unconsciously or consciously accepts the norms and the beliefs of the community, and also becomes linked to this community (Lakhani & Wolf 2005). It is a very important factor as it ensures the bonding of a worker to the project and guarantees the constant participation. However, to sustain the community, the company should play an active role and promote the socialization and communication with and among the workers (Howe 2006).

The community linking also allows using other motivating factors such as enjoyable pastime, and human capital advancement. Some workers might enjoy talking with each other, looking and discussing different ideas, what also motivates them to complete the required tasks – share own ideas and assess others' ideas. The human capital advancement might motivate the participation as well. The possibility to talk with the company experts and obtain new knowledge or skills is present in most of the cases.

Another motivating factor used in the project is the signaling, which exists when there is a possibility to signal a message through the tasks. The workers in the projects can show the companies their skills and desire to work to get noticed and be employed by the company.

To conclude, the participation in the projects is motivated by many factors: mostly by the intrinsic task identity, community identification, and social motivating factors. Also, the extrinsic motivating factors are used: indirect feedback, signaling, and human capital advancement.

In other words, the workers should see the clear chances that their ideas can be implemented in the real life as the real products or services, for this a clear statement of the purpose of users' work should be present. The community

building is essential as it creates the linkages of the workers with the project and the company; therefore, the company should actively communicate with the users and give the workers possibility to communicate with each other. Besides, the communities allow using extrinsic factors such as signaling and human capital advancement, if the workers have the possibility to communicate with the experts and company's employees within the community.

3.2. Motivating factors for crowdsourcing projects directed to Design Creation stage of NPD

The analysis of the four cases was directed to the Design Creation stage of NPD, which is the second stage. The following projects and companies were analyzed: Threadless, Zazzle, Electrolux Design Lab, and Peugeot car design contests. These cases are directed at using the crowd for the product design.

The projects differ in terms of the skills required and the way of organization: Threadless and Zazzle require the graphic design skills and constantly open for the participation, while the Electrolux's and Peugeot's projects require 3D design skills and organized as contests. Besides, the projects are directed towards the creation of different products: Threadless is the T-shirt producer, Zazzle produces clothes and gifts such as photo frames and souvenirs, Electrolux – home appliances, while the Peugeot is the car producer. Consequently, the companies use the crowd to design the specific products.

As any other crowdsourcing project, the described ones depend on the number of participants. The more designs are submitted the more chances for the company to find the really good one. The projects were successful in gathering the designs, and therefore, they can be used for distinguishing the motivating factors important for the second stage of NPD.

The following factors were found to motivate the participation in the projects:

Intrinsic motivating factors:

- Enjoyment based
 - **Task identity**
 - **Task autonomy**
 - **Direct feedback**
 - **Past time**
- Community based
 - **Community identification**
 - **Social contact**

Extrinsic motivating factors:

- Immediate payoff
 - **Monetary reward**
- Social motivation
 - **Indirect feedback**

The tasks required for the second stage of NPD are mostly creative, meaning that the users in the projects have to use their creativity and express it some visual form. Generally, the graphic design skills for the 2-dimensional design of simple objects and sketches are required, while the 3D design skill is required to create the design of complex products such as cars and home appliances.

The projects clearly state the designs will be used for the future products what can be motivation for the designers. The task identity motivating factor in the projects is one of the most crucial, especially for creation of complex products: the designers have not so many chances to design the real car and see it is produced. Besides, the designers from the crowd might not be the professional designers. It means they do not really have any chance to present their skills elsewhere; that is why skills variety motivating factor plays an important role in the motivation of the participation.

The other important motivating factor is the community identification as it helps to bond the designers to the particular project. The created community of designers gives the workers possibilities to communicate with each other and company's employees, share the ideas or get rest from the real work.

In contrast with the ideas generation projects, the workers of the Design crowdsourcing projects get paid. The monetary reward is given in the form of the award for the best design; in the described projects, the authors of the best designs receive up to 10,000 euros depending on the project. The more complex is a product that the crowd designs, the higher the award should be.

The projects vary in terms of who chooses the best designs. In some cases (Threadless and Zazzle) the workers and other users of the company vote for the designs. In the contest-like organized projects (Electrolux and Peugeot), the jury consisting of the company's experts decide what design is the best. Each of the

ways has its own advantages and disadvantages. The users' decision can be used to predict the future demand on the product, allowing the company to sell as many products as they produce. The decision of the company might be used if the company has strict requirements to the needed design.

Design skills are one of the requirements for the people participating in the project; such users are the core of the project and they create the required final product. The contributor whose design was used usually receives some kind of reward. In some projects the crowd also plays a role of jury which determines which design is the best. Such approach opens the possibility to attract the users without design skills which will vote for the designs they like. It helps the company organized the project to determine the demand on the goods which are not even produced. It can be clearly seen in the Threadless case – the company produces only those designs which have the most votes and they generally sell everything they have produced (Threadless 2012). The community is another important part of the discussed cases. The discussion shows that some kind of community is present in every case. It can be implemented in the form of on-line discussions, contests, or chats; however, the users should not only communicate with each other, the company should also be actively present in the discussions. The more time a user spends on the site the better; therefore the enjoyable pastime should be ensured. Communities give an option to talk with someone in worker's free time. Workers can also look other designs.

3.3. Motivating factors for crowdsourcing projects directed to Development stage of NPD

The analyzed cases were related to the 3rd stage of NPD which is Development of the product. The stage is usually associated with the solving of technological and scientific R&D problems, and therefore, experts with the knowledge and expertise in the problem related field are required. The following projects and companies were used for the analysis: InnoCentive, NineSigma, Ideaken, and InnovationExchange. All of the projects are devoted to help their client companies their Research&Development problems required for the new product development.

The workers in the projects are the experts specializing in specific fields: biology, physics, chemistry, engineering, and so on. As the projects show, there are many experts willing to share their skills and knowledge. The number of experts here is very important for solving a hard problem: the more experts, the wider the expertise of the resulting crowd; the chances that someone can solve the problem are very high - the cases clearly prove it.

The described projects play the intermediary role between the client companies and expert crowd. By collecting many companies' problems from different areas, the platforms gather the community of experts with different knowledge willing to use their skills and get the award with all the benefits.

The following factors are motivating people to participate in such projects:

Intrinsic motivating factors:

- Enjoyment based
 - **Skill Variety**
 - **Task identity**
 - **Task autonomy**
 - **Past time**
 - **Direct feedback**
- Community based
 - **Community identification**
 - **Social contact**

Extrinsic motivating factors:

- Immediate payoff
 - **Monetary reward**
- Delayed payoff
 - **Signaling**
 - **Human capital advancement**

The monetary award for solving a problem is usually very high (\$10,000-\$500,000). Such prize allows attracting the best experts in the world and alone can motivate many people to participate in such projects. The monetary motivation here is crucially important; however, besides the monetary motivation, the experts are motivated by the other factors.

The task identity, which is also found in projects directed to other stages of NPD, present here as well. The results of the proposed solution are implemented by the company and the solvers have the chances that their solution will be used for real problem. The skills variety here is also important, the solution of different problems require different skills and knowledge. Therefore, workers have possibility to show up their distinct skills and expertise in different areas. It also results in the task autonomy – the workers are free to choose the problems and the way they are going to solve the problems.

Some of the projects (InnoCentive and NineSigma) imply the individual work in the problems, and do not allow workers seeing others' solutions, what encourages the competitiveness among the workers. InnovationExchange and Ideaken use the collaborative approach, and encourage the team work under the problems. In that case the others' solutions are mostly accessible for others. Both of these approaches might lead to successful solutions of the problems.

Besides, the task identity, task autonomy, skills variety, and monetary reward. Other motivating factors are being used. One of them is the community establishment. Each of the projects has the established communities where the workers and client companies might communicate with each other. Through the communications, workers can develop their skills and acquire the new knowledge, get noticed by the employers, and spend the time socializing. These factors

important because they help to establish long-time relationships among the workers, as well as between the workers and the project

To conclude, the payment, task identity, task autonomy, and skill variety motivating factors are encourage the active participation, while community identification, direct feedback, pastime and human capital advancement motivating factors used for retaining the workers inside the project.

3.4. Motivating factors for crowdsourcing projects directed to Launch stage of NPD

The analyzed cases were related to the 4th stage of NPD which is Launch of the product. The stage requires mostly marketing activities such as marketing plan creation and advertising materials development. The following projects and companies were used for the analysis: GiantHydra, Zooppa, Tongal, and eYeka. The projects help companies to use crowd to come up with the fresh and innovative marketing ideas and advertisements. Zooppa specializes in the video advertisements creation; Tongal's and eYeka's workers can create not only video but any other kinds of advertisements: posters, banners, and even songs. GiantHydra is the advertising agency using crowds to create the marketing plans.

Therefore, mostly creative workers with some experience in marketing are used in the projects as the tasks require marketing and advertisement skills and expertise. However, the projects differ in their characteristics and the way of the crowd work organization. Zooppa uses the contest-like approach; Tongal and eYeka are more collaborative; while GiantHydra uses the crowd as internal employees. However, the projects use the similar motivating factors:

Intrinsic motivating factors:

- Enjoyment based
 - **Skill Variety**
 - **Task identity**
 - **Task autonomy**
 - **Past time**
- Community based
 - **Community identification**
 - **Social contact**

Extrinsic motivating factors:

- Immediate payoff
 - **Monetary reward**
- Delayed payoff
 - **Signaling**
- Social motivation

- **Indirect feedback**

As in other analyzed crowdsourcing projects, the task identity and task autonomy play an important role. Each of the cases proposes a chance to show up the creative skill of a worker to the whole world in form of the created advertisements. At the same time the number of the available projects is allowing to choose only those which the worker likes and do it in any way. Besides, the tasks in the projects might require different skills from the workers depending on the required outcome: graphic design, video editing, copy writing, etc. Sometimes the a task might be performed by workers with different skills what motivates more people to participate.

The decision on the quality of the work is taken by workers, client organizations, or by both simultaneously. For example, Zooppa has triangular assessment of the submitted videos: the decision is taken by users, Zooppa's staff, and the client company. Nevertheless, the best works are awarded with the monetary prizes which are stated and paid out by the client companies. The size of the reward differs but generally is larger than \$5,000, which is enough to motivate the work of crowd as it shown by the cases.

The community is also being present in each of these projects. In the communities, the workers and client companies' representatives can communicate and discuss work and non-work related issues. Also, the workers within the community can find new business contacts and get employed in one of the client companies. Besides the work and business related issues, users might discuss anything else in their free time, or watch the fresh videos of other workers; in other words, the time on the project site might be spent with pleasure, what surely can motivate some people to participate

3.5. The results of the analysis

The analysis of the cases has revealed the motivating factors used in the crowdsourcing NPD projects. The analysis has shown that the projects directed at the different stages of NPD are using mostly the same motivating factors; however, there are still several motivating factors that are used in the projects directed to particular stage. Further, the motivating factors stimulating the participation in the crowdsourcing projects are presented:

Table 11. Motivating factors for the crowdsourcing NPD projects

	Idea Generation (1 st stage)	Product Design (2 nd stage)	Development (3 rd stage)	Launch (4 th stage)
Skill variety	-	-	yes	yes
Task identity	yes	yes	yes	yes
Task autonomy	yes	yes	yes	yes
Direct feedback	-	yes	yes	-
Pastime	-	yes	yes	yes
Community	yes	yes	yes	yes
Social contact	yes	yes	yes	yes
Payment	-	yes	yes	yes
Signaling	yes	-	yes	yes
HC advancement	yes	-	yes	
External values	-	-	-	-
External obligations	-	-	-	-
Indirect feedback	yes	yes	-	yes

As it can be seen in Table 11, the following factors found to be present in all the projects:

- Intrinsic motivating factors:
 - Enjoyment based
 - **Task identity**
 - **Task autonomy**
 - Community based
 - **Community identification**
 - **Social contact**

These factors are found in every new product development related crowdsourcing project, and therefore, might be considered the base of motivation for this type of projects. To tap the crowdsourcing power, the companies give people an opportunity to participate in the development of real products and services – it means that the people are able to see the actual results of their work in form of the products that they help to design, develop, or promote. Such chances are enough for some people to contribute their time and skills to product development as task identity is a strong motivating factor (Brabham 2008). Additional joy to workers might give the fact that they might work on tasks autonomously – workers are generally free to choose the tasks and the way to complete the tasks. Therefore, enjoyment based intrinsic motivating factors Task identity and Task autonomy are two of the main motivating factors for the NPD crowdsourcing projects.

Also, the projects gather the people with similar interests: Threadless gathers young creative designers, while InnoCentive gathers top experts, for example. In any case, crowdsourcing projects give possibilities to workers to communicate with each other by establishing the communities. A community is a very good tool for linking the users to the company (Brabham 2008). In case of the crowdsourcing projects, the community is the place where people discuss anything related or even not-related to the tasks of the project; people share the knowledge, experienced users teach inexperienced ones, company representatives answer the users' questions and so on. Established community also brings additional rewards for the project: the workers receive the option to communicate

with each other and with the companies' representatives. It gives the workers the possibilities to advance their human capital through the communication with the experts, make new social and business contacts, and get noticed by the possible employees.

The other motivating factors depend on the type of crowdsourcing project and the tasks that the workers have to do there. Further the motivating factors for crowdsourcing projects directed to the particular stages of NPD are discussed.

The Idea generation crowdsourcing projects are the projects with the easiest tasks, and workers there can be motivated to work without monetary reward. Besides the 4 common motivating factors, the Idea generation projects have extrinsic motivating factors: Signaling, Human capital advancement, and Indirect feedback. It means that the workers are motivated by the possibilities to advance their skills and gather new knowledge from the peers or companies' experts. Also, due to the fact that the projects are company centered, some people might consider the projects as an opportunity to be noticed and employed.

The Design crowdsourcing projects gather the creative people able to design new product. To do that, the projects use the 4 common motivating factors and the following: Direct feedback, Past time, Monetary reward, and Indirect feedback. The projects pay for the designs, what motivates people to contribute their design skills. Of course, not every worker is paid; only the real contributions to the product development are paid. It means that the company is not paying for the thousands of the product designs, but pays only for the very best one - it allows the companies to save lots of internal resources and often money. The direct feedback from the job is usually received by workers in the form of the contribution acceptance. It means that the worker can easily figure out if his or her work got accepted by the company, and generally receive the feedback of the company experts or other users. Besides, such projects are generally designed in such way that the people enjoy spending time there either communicating with other persons or simply surfing through the uploaded designs.

The Development related crowdsourcing projects help companies to solve hard R&D problems and require diverse skills; therefore, they use more

motivating factors than any other type of NPD related crowdsourcing projects. Besides the 4 common factors, the following are used: Skill Variety, Past time, Direct feedback, Monetary reward, Signaling, and Human capital advancement. The projects usually are associated with the hard problems that cannot be solved by companies alone. To assess the problem, the workers should possess distinct skills and expertise in different areas; therefore, there is the possibility for workers to show up their skills and expertise. The workers' submitted solutions are assessed by the companies' experts and the working solutions are awarded by large amounts of money sufficient to attract the top experts. The communities of the projects consist of the experts in very broad range of areas; by communicating with each other, they exchange knowledge and skills. Besides, the companies asking for the solutions might as well look for new employees or business partners in the projects' communities; the workers understand it as well, and use the opportunity to get noticed and employed.

The Launch stage of NPD is associated with the marketing activities, and therefore, the marketing related crowdsourcing projects were analyzed. As the design crowdsourcing projects, they tap the creative power of crowd. However, more diverse set of skills is needed there: graphic design, video production, copy writing, etc. Therefore, sufficient efforts are required to motivate the participation in such projects. Besides the 4 common motivating factors, the following are used in analyzed projects: Skill Variety, Past time, Monetary reward, Signaling, and Indirect feedback. First of all, the workers get paid for the contributions, the best works and ideas are rewarded by the company needing them. Besides, the community of marketers both professional and nonprofessional; it enables the human capital advancement of the workers, and gives them chances to get employed or find a business partner.

Summary of the chapter

The previous sections answer the set research questions and complete the goal of the research. The description above presents the motivating factors used in the crowdsourcing projects related to different stages of new product development. The four factors were found to be common for the projects despite the stage of NPD:

- Task identity
- Task autonomy
- Community identification
- Social contact

The crowdsourcing projects directed to the Idea generation require use additional motivating factors:

- Signaling
- Human capital advancement
- Indirect feedback

The crowdsourcing projects direct to the Design require the following motivating factors , besides the 4 common factors:

- Direct feedback
- Past time
- Monetary reward
- Indirect feedback

The participation in Development related crowdsourcing projects is motivated by the broadest set of factors:

- Skill Variety
- Past time
- Direct feedback
- Monetary reward
- Signaling
- Human capital advancement

The marketing related crowdsourcing projects, which were used as the projects related to the Launch stage of NPD use the following motivating factors:

- Skill Variety
- Past time
- Monetary reward
- Signaling
- Indirect feedback

CONCLUSION

Crowdsourcing is now one of the hot topics in a business research community. It has brought a lot of attention from the academics as well as from the business sphere. Crowdsourcing became a trend changing the perception of Internet usage for business firms, governments and non-profit organizations. The concept started to appear in early 00's; however, an article in Wired Magazine by Jeff Howe (2006) brought the greater attention to the crowdsourcing.

This particular research is focusing on the crowdsourcing new product development projects; more precisely, on the motivating factors used in such projects. The research **goal** was to understand **how to motivate the crowd to participate in NPD**. To address the goal, the NPD crowdsourcing projects were found and classified according to stages of the NPD towards which the projects are directed. Consequently, the NPD crowdsourcing projects can be divided in 4 categories – one for each NPD stage.

Therefore, the following research questions (RQ) seem logical to be set for the research:

RQ1: What are the motivating factors for the workers in crowdsourcing project directed to the 1st Stage NPD activities?

RQ2: What are the motivating factors for the workers in crowdsourcing project directed to the 2nd Stage NPD activities?

RQ3: What are the motivating factors for the workers in crowdsourcing project directed to the 3rd Stage NPD activities?

RQ4: What are the motivating factors for the workers in crowdsourcing project directed to the 4th Stage NPD activities?

The research goal of the research was completed, and the third chapter presents the results and the answers to the research questions. To answer the questions, the literature related to the new product development, crowdsourcing and motivation was gathered and analyzed in the first chapter of the text. Further,

the data on the 16 crowdsourcing projects was collected and presented as cases in the second chapter of the research.

The results show that 4 intrinsic motivating factors are present in every case despite the stage of NPD at which the projects are directed. These factors are task identity, task autonomy, community identification, and social contact. Also, the projects directed to a particular stage of NPD possess the different sets of additional motivating factors. They can be seen in the third chapter.

The study also opens the possibilities for the further research; the crowdsourcing is not well studied yet in the academic literature. Therefore, further research might be focused at the crowdsourcing and its implications to the business. The NPD crowdsourcing projects can also be studied more deeply. The present research's outcomes might be used for determination of the particular actions that motivate people to participate in the projects. Also, the crowdsourcing impact to the NPD or any other business activity might be studied.

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