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**IS DISCONTINUANCE: TRACKING DOWN USERS'
MOTIVATIONAL JOURNEY FROM AMOTIVATED TO
MOTIVATED AND BACK IN CROWDSOURCED
SOFTWARE TESTING**



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ABSTRACT

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The power of crowds has been used for centuries to solve organizational problems. Crowdsourcing is the means to solve organizational problems by handing them out to an external crowd in an open call manner using Internet technology as predominant means. It consists of the problem to be solved, a party who has a problem to be solved, the crowd that is willing to solve the problem and an intermediating platform to orchestrate the crowdsourcing initiative. Because of technological development, crowdsourcing has become a tempting alternative to conduct different business activities previously carried out by the companies themselves. Software industry is not an exception, which is why crowdsourcing has been implemented in various software engineering activities in the recent years. One of the activities is software testing. However, to make crowdsourcing truly working, the problem solving party must be motivated accordingly. Motivation is the driving force that makes people take actions. People are motivated by different things and the motivations an individual has towards certain activity, may vary over time. Motivation concerning initial and continued use are one of the key ingredients of information systems use.

This thesis strives to track down users' motivational journey by unravelling the underlying motivational factors that affect individual user's IS use behavior through a specific information system's usage life cycle in a software engineering context. The emphasis of the thesis is in the last stage of the usage life cycle – what makes individuals discontinue the use of a certain crowdsourced software engineering service, although the research tracks down the entire usage life cycle from adoption to termination.

The research was conducted as an exploratory study using qualitative approach and theme interviews matched with a theoretical framework that combines Self-Determination Theory and Organismic Integration Theory. The research results show that there are both extrinsic and intrinsic motivational factors that affect individual user's decision to continue. Additionally, the results point out that the motivational factors vary over the usage life cycle and in fact, some extrinsically originated motivational factors are dwarfed by intrinsically originated motivational factors in terms of their importance regarding use continuance. Individual user's motivational journey through the IS usage life cycle appeared to progress from pre-usage amotivation through extrinsically and intrinsically motivated state to post-use amotivation.

Keywords: crowdsourcing, motivation, amotivation, continued use, discontinued use, IS discontinuance, software testing

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Väkijoukkojen voimaa on käytetty vuosisatoja osana organisatoristen ongelmien ratkaisemista. Joukkoistaminen on keino ratkaista organisatorisia ongelmia ohjaamalla ongelmat ulkoiselle joukolle avoimen kutsun muodossa hyödyntäen Internet-teknologiaa. Joukkoistaminen koostuu ratkaistavasta ongelmasta, ongelman omaavasta osapuolesta, kyseisen ongelman ratkaisevasta väkijoukosta sekä eri osapuolet yhdistävästä, joukkoistamisen mahdollistavasta alustasta. Teknologisen kehityksen ansiosta joukkoistamisesta on tullut houkutteleva vaihtoehto aktualisoida yritysten aiemmin itse toteuttamia liiketoimintoja. Ohjelmistoteollisuus ei ole poikkeus ja tämän vuoksi joukkoistamista onkin käytetty viime vuosina myös useissa ohjelmistokehityksen eri toiminnoissa. Yksi näistä on ohjelmistotestaus. Jotta joukkoistaminen todella toimisi, ongelman ratkaiseva väkijoukko on pystyttävä motivoimaan. Motivaatio on liikkeelle paneva voima. Ihmiset motivoituvat eri asioista ja yksilön motivaatiotekijät tiettyä toimintaa kohtaan voivat vaihdella ajan mittaan. Järjestelmäadoptioon ja jatkuvaan käyttöön liittyvä motivaatio on yksi tietojärjestelmien käytön avaintekijöistä.

Tämä pro gradu-tutkielma pyrkii kartoittamaan yksittäisen käyttäjän motivaationaalisen matkan selvittämällä tietyn ohjelmistotestausjärjestelmän käytön taustalla vaikuttavat motivaatiotekijät. Tutkimuksen pääpaino on järjestelmän käytön elinkaaren viimeisessä vaiheessa - mikä saa käyttäjän lopettamaan tietyn joukkoistamispalvelun käytön - vaikkakin tutkielma kartoittaa yksilön koko käytön elinkaaren liittyvät motivaatiotekijät.

Tutkimus toteutettiin laadullisena, eksploratiivisena tutkimuksena käyttäen teemahaastatteluja empiirisen osion tiedonkeruumenetelmänä. Tutkielman teoreettisena viitekehystenä käytettiin itseohjautuvuusteoriaa sekä orgaanista integraatioteoriaa. Tutkimustulokset osoittavat, että yksittäisen käyttäjän käytön jatkamispäätökseen vaikuttavat sekä ulkoiset että sisäiset motivaatiotekijät ja nämä motivaatiotekijät vaihtelevat järjestelmän käytön elinkaaren aikana. Lisäksi havaittiin, että osa ulkoisista motivaatiotekijöistä menettävät merkitystään sisäisten motivaatiotekijöiden rinnalla jatkuvan käytön tapauksessa. Yksittäisen käyttäjän motivaationaalinen matka läpi järjestelmän käytön elinkaaren näytti etenevän käyttöä edeltävästä amotivaatiosta ulkoisesti ja sisäisesti motivoituneen vaiheen kautta käytön jälkeiseen amotivaatioon.

Asiasanat: joukkoistaminen, motivaatio, amotivaatio, jatkuva käyttö, käytön lopettaminen, järjestelmän käytön lopettaminen, ohjelmistotestaus

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1 INTRODUCTION

Back in the end of 18th century, a society called the French Academy of Sciences ran into a problem that needed to be solved. They needed to produce one of the key ingredients of paper and glass from cheaper materials it had been previously produced. This key ingredient was sodium carbonate, also known as soda ash. To tackle this challenge, the Academy decided to harness the power of people and handed out this challenge for the masses to be solved. Likewise, the British government turned to the masses to solve the wretched problem of navigation in the open seas. Like the French Academy of Sciences, the British government handed out this challenge for open crowds to develop an accurate and reliable method to determine the longitude in the open seas. A marine chronometer was developed. (Smith, Ramos & Desouza, 2015.) In the late 19th century, a certain man known as professor James Murray lead an ambitious literary project. The purpose of the project was to collect a definition of particular English words and the tool used for the project's knowledge gathering process composed of unpaid contributors who were strangers to the professor himself. Hundreds of thousands of definition-containing paper slips and a good 70 years of work later, the Oxford English Dictionary was published. (Lanxon, 2011.) In 1936 Toyota held a logo design contest, which resulted in 27 000 design proposals. Later on, in 1955 Joseph Cahill organized a contest to generate a design for a building that would later be built on Sydney's harbor. (Lynch, 2010.)

What is common for all the cases is that one party had a problem which needed to be solved and to gain this solution, the problem was handed out for other external parties and individuals to be solved. The French Academy of Sciences, the British Government as well as professor James Murray were exploiting the power of crowds, which is known today as crowdsourcing. The examples clearly show that crowdsourcing is not a novel idea. The type of crowdsourcing used today is harnessed with advanced Internet technologies, which have enabled the more practical and lucrative use as well as the popularization of crowdsourcing in business contexts (Afuah & Tucci, 2012; Saxton, Oh & Kishore, 2013; Zogaj, Bretschneider & Leimeister, 2014). Connectivity between organizations wrestling with challenges and voluminous crowds of potential solvers is no longer restricted by spatiotemporal distances. Since competition in contemporary

markets has not abated, but quite conversely become more intense, firms are constantly looking new ways to improve their businesses. Crowdsourcing has been noted by the business world and it has been adapted to such corporate activities as innovation purposes (Schlagwein, D. & Bjørn-Andersen, 2014), product design, ideation and content creation (Geiger et al., 2011) to name a few. Additionally, crowdsourcing has been applied successfully in public sectors and by governments (Smith et al., 2015) for the greater good of communities and it is not a novel thing in Finland either. For example, Hackrfi has been utilizing crowdsourcing as a key component in their bug bounty service for information security testing (Hackrfi, 2018).

Crowdsourcing, as it is today, can be decomposed into three essential components: 1) the client layer, which is the one proposing a problem or a challenge to be solved, 2) the crowd layer, which is the people solving the offered problem, and 3) the platform layer, which connects the two previously presented layers and provides the infrastructure and rules for the crowdsourcing activity (Soliman, 2013). As it is the case in majority of other businesses as well, human resource is a vital part crowdsourcing. This is the people, the crowds, completing tasks given by the party managing the crowdsourcing initiative. To retain and nurture this precious asset the crowdsourcing platform must have qualities that support crowd's motivation to participate and use the platform.

Information systems usage life cycle and related motivational factors have been studied quite extensively in the past (see e.g. Davis, 1989; Venkatesh, 2000; Bhattacharjee, 2001; Bhattacharjee & Premkumar, 2004; Lee, Cheung & Chen, 2005; Furneaux & Wade, 2011; Lin & Lu, 2011; Turel & Zhang, 2011; Venkatesh, Thong & Xu, 2012). However, these studies have focused mainly in the adoption and continued use stages of the IS usage life cycle, leaving the last stage of the life cycle in shadows, although individual users constitute the vital asset of a crowdsourcing service and hence discontinuance can be perceived as a strategic issue (Xu et al., 2014). Why do users discontinue the use of an information system, especially in the case of an online crowdsourced software engineering platform, which is highly volitional from the users' perspective, and of which use can be perceived both as a hobby and a job? What are the motivational factors behind individual person's use behavior? According to Ryan and Deci (2000a) amotivated person is, a person who is not motivated at all. Amotivation is the preceding state of extrinsic and intrinsic motivation in a so-called continuum of internalization (Ryan & Deci, 2000a). What is the role of amotivation regarding discontinued use of an information system in non-organizational context where individuals usually have free choice?

This thesis consists of three main elements, which are bound together to answer the set research questions. *Crowdsourcing* forms the context of this research and dictates the research scope in terms of the type of information system to be studied (i.e. crowdsourcing systems). *IT/IS service usage life cycle* which refers to the use of a certain information system service from the first contact with that system service, its continued use and ultimately to its final use stage - the death - from an individual user's point of view. *Motivation* is the underlying driving force of people. Motivation towards certain activity affects the ITS/IS service

use during the service's usage life cycle. The research questions to be answered are the following:

1. Why do users discontinue the use (i.e. quit using or switch to an alternative) of a certain crowdsourced software engineering service?
2. What are the demotivational factors driving user's decision to discontinue the use of a certain crowdsourced software engineering service?
3. How do motivational factors change during service usage life cycle from adoption to discontinued use?

In order to open the curtain and reveal the mystery ahead of users' discontinued IS use motivation, an empirical inquiry was performed. A natural choice was to head to the upper reaches of the phenomenon and interview the actual users to unveil what are the demotivational factors that affect user's decision to discontinue the use.

The rest of the thesis is organized as follows: the next chapter (chapter 2) will introduce crowdsourcing and its main building blocks, give a brief overview of how crowdsourcing has been utilized before and what is crowdsourced software engineering. Chapter 3 presents the theoretical background of the research. On chapter 4, the research approach and methods used in this thesis as well as the research context, research questions and research and analysis process are being introduced. Chapter 5 will then present the research findings and chapter 6 is dedicated for the analysis of the results, discussion, evaluation, proposals for future research topics and a final conclusion.

2 CROWDSOURCING

This chapter uncovers the phenomenon called crowdsourcing. First, a definition of crowdsourcing is underlined based on prior literature on the subject. After the phenomenon is defined, the main building blocks as well as different actor roles and types of crowdsourcing are introduced. The chapter then continues by examining the differences between crowdsourcing and other sourcing models and presents some of the identified advantages and disadvantages of crowdsourcing. Finally, the chapter ends with a sub-chapter provides a brief introduction to the main building blocks of software engineering, describes what is crowdsourced software engineering and how crowdsourcing has been utilized in software development.

2.1 The essentials of crowdsourcing

What is crowdsourcing actually? Crowdsourcing has a wide variety of different definitions. The plethora of different definitions can yield vague interpretations about the phenomenon, but they also reveal the abundance of different viewpoints crowdsourcing has. As the name highly suggests, crowdsourcing involves people and it is related to conducting business in one way or another. As Estellés-Arolas and González-Ladrón-De-Guevara (2012) word it, crowdsourcing involves people participating in initiatives and a number of procurement activities to engage with suppliers. They define crowdsourcing as an online activity that is participative in nature and in which an entity (i.e. an individual, an institution, a company or a non-profit organization) hands out a proposal to a group of individuals of varying numbers, knowledge and heterogeneity in an open call manner to carry out a specific task. Earlier, Rouse (2010) argued that crowdsourcing can be perceived as a new business innovation method as well as an alternative way of conducting organization's outsourcing practices.

One of the perhaps most cited and well-known definition is by Jeff Howe. Howe popularized the term crowdsourcing in Wired Magazine (2006) and defined crowdsourcing as:

... the action of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call. This can take the form of peer-production (when the job is performed collaboratively), but is also often undertaken by sole individual. The crucial prerequisite is the use of an open call format, and the wide network of potential laborers. (Howe (2006) in Estellés-Arolas and González-Ladrón-De-Guevara (2012).)

Brabham (2008, 79) emphasizes crowdsourcing's value to a company's business by linking it directly organization's strategical assets by defining crowdsourcing as a "... strategic model to attract an interested, motivated crowd of individuals

capable of providing solutions superior in quality and quantity to those that even traditional forms of business can.” whereas Doan, Ramakrishnan and Halevy define crowdsourcing more simply as “... a general-purpose problem-solving method.” (Doan et al., 2011, 87). According to Vukovic (2009, 686), crowdsourcing is “... the new on-line distributed problem solving and production model in which networked people collaborate to complete a task.”. Yet another definition with a bit differing viewpoint is brought up by Burger-Helmchen and Pénin (2010, 2) as the definition highlights the cognitive side stating crowdsourcing as “... one way for a firm to access external knowledge.”. Another definition by Saxton et al. (2013, 5) gives a general viewpoint to the phenomenon with emphasis on advanced Internet technology as the main enabler defining it as “... a sourcing model in which organizations use predominantly advanced Internet technologies to harness the efforts of a virtual crowd to perform specific organizational tasks.”. Blohm, Leimeister and Krcmar (2013) conclude that crowdsourcing comprises of five main elements: the crowdsourcer, an undefined group of people wishing to contribute voluntarily, task and the type of a call used (i.e. an open call). The fifth element is the both parties (the crowdsourcer and the participating group of people) binding infrastructure, an IT-based crowdsourcing platform.

In essence, the phenomenon of crowdsourcing seems to consist of two main factors as the name suggests with a mediating platform linking these main factors: 1) the crowd of people willing to solve the crowdsourcing problem, 2) another participating individual or party with a need to outsource problem solving of some kind and 3) a platform that connects the two main factors and acts as a mediator between them. Soliman (2013) divides crowdsourcing into three layers based on its actors’ different roles, namely the client layer, the crowd layer and the platform layer. *The client layer* is the one responsible of the crowdsourcing initiative. According to Soliman (2013), client layers are often companies that have a certain task to be accomplished, which is channeled to a crowd external of the company. *The crowd layer* is the executing part in the equation. This layer is comprised of individual persons (in most cases) who have the means and the motivation to perform a particular task handed out by the company (i.e. an instance of the client layer). Zogaj et al. (2014) elaborate the concept of the crowd layer by including communities, institutions, firms and non-profit organizations as entities of the crowd besides individual persons. The third layer is *the platform layer*. Platform layer is the marketplace and infrastructure used as a mediation tool to announce and hand out tasks to the crowd over the Internet. (Soliman, 2013.) According to Zogaj et al. (2014), the platform can be run by the crowdsourcer itself or by a third actor, an intermediary. When crowdsourcer itself (i.e. the client layer, initiating party) runs the platform, the activity is performed using an *internal crowdsourcing platform*. On the contrary, a *crowdsourcing intermediary platform* is used when the platform is run by a third-party. (Zogaj et al., 2014.) The roles and different types of platform operation is depicted in figure 1.

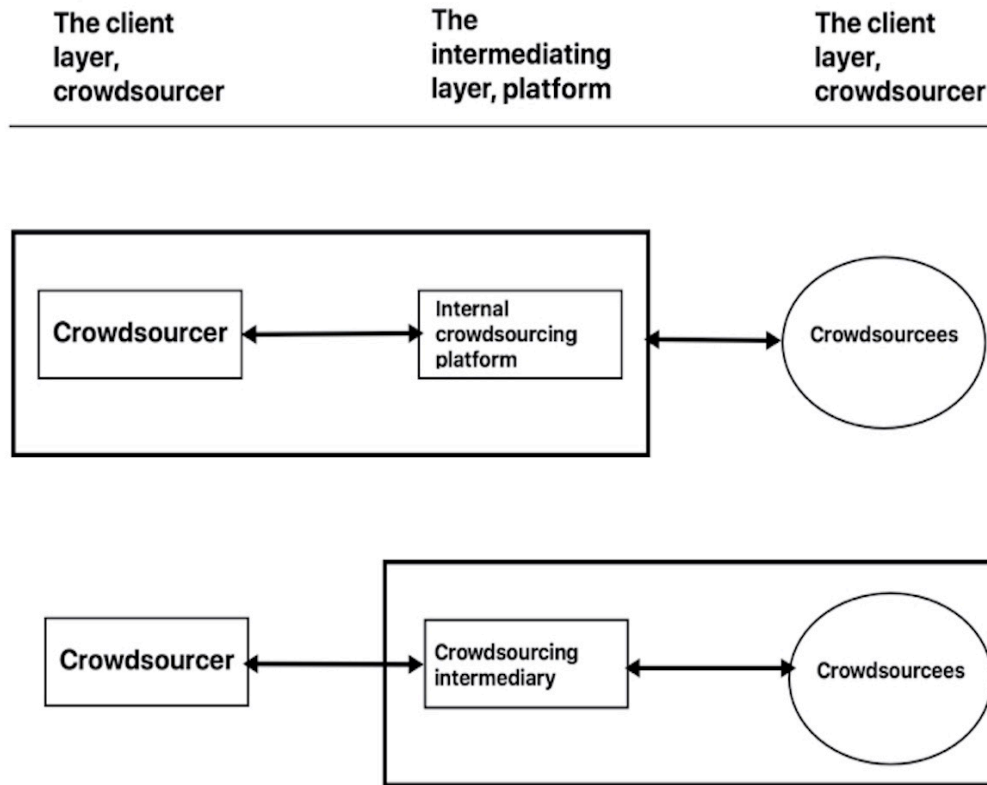


FIGURE 1 Roles and platform mediation in crowdsourcing. Adapted from Zogaj et al. (2014, 379)

The definition used in this thesis to define crowdsourcing is the one provided by Saxton et al. (2013), since it provides wide enough definition by not narrowing crowdsourcing only as an outsourcing of organization's innovation activities. Additionally, the definition emphasizes the immanent technical aspects of modern day's crowdsourcing initiatives.

In order to classify an initiative as crowdsourcing, the initiative has to meet the requirements of the definition of crowdsourcing. Estellés-Arolas and González-Ladrón-De-Guevara (2012) list eight characteristics which can be used to define if the selected case is crowdsourcing. The characteristics are derived from the three elements identified as crowdsourcing's main elements. An initiative can be defined as crowdsourcing, if:

- The initiative has a clearly defined crowd
- The initiative has a clear goal
- The initiative clearly defines the recompense received by the crowd
- The initiative has a clearly identified crowdsourcer
- The crowdsourcer's compensation to be received is clearly defined
- The initiative is a process that is both participative and online assigned
- The initiative is handed out as an open call of variable extent

- The initiative uses internet.

The first three characteristics are concerned with the *crowd* element in crowdsourcing (who form the crowd, what does the crowd have to do and what will the crowd get in return for its contributions). The next two characteristics defined the *initiator* element (who is the initiator and what the initiator(s) get in return from the crowd) and the last three characteristics are concerned with the *process* element of crowdsourcing (what type of a process is it and what type of call and medium is used). (Estellés-Arolas and González-Ladrón-De-Guevara (2012).)

The power of the crowd can be used to serve multiple different purposes in various areas. *Crowd wisdom* is concerned with innovation and problem solving tasks. An example of such a model is a crowdsourcing platform called InnoCentive, which offers innovation tasks to crowds as well as its own employees and other close stakeholders to be solved. In *crowd creation*, the crowd is used for value creation. Crowd creation can be sponsored as in the case of Threadless (a company who have crowdsourced the designing of t-shirts to crowds) or autonomous (for example Youtube, a service where users create the content themselves). In *crowd reviews* the crowd reviews and/or updates certain contribution in a collaborative manner to provide better reviewing outcomes than would be achieved if participants reviewed the contribution individually. *Crowdfunding* is a way to raise funds in the Internet by pooling money among the participants of a network (Burtch, Ghose & Wattal, 2013 in Smith et al., 2015). *Crowd democracy* "... designates crowdsourcing initiatives designed to (i) promote the participation of citizen in government-sponsored activities, and (ii) empower citizens to influence political and government decisions, therefore promoting open government." (Smith et al., 2015, 603). In *citizen science* crowds consisting of non-scientists contribute by taking role in science within scientific communities. *Citizen journalism* involves crowds to act as amateur journalists and produce journalism concerning various areas of interest and finally, *crowdsourcing for crisis response* "... refers to the involvement of individuals in response to disasters and crises by performing tasks delivered through web platforms." (Smith et al., 2015, 604.)

2.2 Crowdsourcing typologies and classifications

As with the concept of crowdsourcing, crowdsourcing systems have different names such as community systems, user-powered systems, collaborative systems, user-generated content, collective intelligence and social systems. Examples of such systems include Amazon Mechanical Turk, Wikipedia, Mob4hire and Innocentive to name a few. (Doan et al., 2011.) In simple terms, crowdsourcing systems are systems built to connect the crowdsourcing side (the ones with the target problem) and the problem-solving side and orchestrate the entire crowdsourcing initiative. However, these systems and initiatives vary in the way they are orchestrated and thus, a further classification is needed to make a distinction be-

tween crowdsourcing initiatives. Blohm et al. (2013) divided crowdsourcing initiatives into tournament and collaboration based initiatives. The former type of initiative is characterized by independent solutions provided by the participating individuals (contributors) in a contest form, whereas the latter case involves collective contributions by the participants. However, the distinction between the two types is not always clear, since they can be used in a combination as well. (Blohm et al., 2013.)

By conducting a thematic analysis on the studies of crowdsourcing, outsourcing and innovation literature, Rouse (2010) classified different types of crowdsourcing into three dimensions: 1) the nature of the task crowdsourced and the supplier capabilities this implies, 2) distribution of benefits and 3) nature of the motivation to participate. *Nature of the task crowdsourced and the supplier capabilities this implies* has three embodiments, which are simple tasks, sophisticated tasks and moderate tasks. According to Rouse (2010, 5), a crowdsourcing task can be classified as a simple, sophisticated or moderate based on the capabilities a supplier needs to possess, which depend on the degree of complexity and skills involved in the particular task and how much of it is tacit, the extent of technical as well as business knowledge required to carry out the task sufficiently enough and "... the extent to which the output's quality can be easily evaluated...". *Simple tasks*, such as book reading or copy editing, are of low complexity, can be easily performed with moderate education and training and are relatively easy to evaluate. On the contrary are tasks that are complex, require high level of education and training and are difficult to evaluate are known as *sophisticated tasks*. These tasks can be usually performed only by suppliers with extensive knowledge and experience in business and within the domain of the task. For example, different design tasks or the development of software modules and business plans can be classified as sophisticated tasks. *Moderate tasks* are the ones, which cannot be classified as simple nor sophisticated. As the name indicates, these tasks involve only moderate amounts of education and training to be performed, they are of moderate complexity and difficulty and the evaluation of the task is at moderate level. Such tasks are for example the design of a logo or a color scheme. (Rouse, 2010.)

Distribution of benefits grounds on Chris Gramm's (2010) notion of how benefits distribute differently within crowdsourcing and open source communities. Rouse (2010) adapted the view of Gramm's notion and classified crowdsourcing into two separate activities based on the distribution of benefits: 1) the activities that distinctly provide personal or firm benefits, labelled as "individualistic" and 2) the activities that benefit a community (of some kind), labelled as "community". In *individualistic* crowdsourcing activity, the benefits accrued are directed to individual persons winning the offered crowdsourcing prize or getting paid for completing a task or to a firm using crowdsourcing to meet its business goals. Here, the ones benefiting from crowdsourcing (i.e. an individual completing a task, a firm initiating a crowdsourcing activity) usually consist of a handful of people, as opposed to a *community*, where the nature of the relation between crowdsourcing and benefits accrued is "many-to-many". Community activities are for example open source activities and community research projects. Simply put, in individualistic crowdsourcing activities the benefits are allocated only to

a small number of entities whereas in community activities the benefits are allocated to many. (Rouse, 2010.) However, there also exists crowdsourcing activities which are a mix of the both worlds. When a firm is about to improve its current products and decides to engage its customers' knowledge and skills via crowdsourcing to come up with improvement suggestions, a mixed crowdsourcing activity is being performed. Here, the main benefits of the ideation are allocated to the firm initiating the crowdsourcing activity. However, a portion of the benefits is realized by the customers as well, since the customers can be benefits from the improved products. (Rouse, 2010.)

Nature of the motivation to participate is built on the classification of motivations by Leimeister et al. (2009), which is composed of the following motivations: learning, direct compensation, self-marketing and social. Rouse (2010) supplemented this classification by adding instrumental motivations and altruism. The former is the motivation to solve personal or a firm's problem or to address a particular personal and/or firm need and the latter is to help without a personal benefit. Additionally, Rouse (2010) divided compensations to token compensations (e.g. relatively small monetary prizes or pieces of equipment) and market compensations (i.e. monetary compensations similar to the size earned by specialists in the related field). Rouse's final addition to Leimeister et al. original classification was personal achievement. Personal achievement is a source of motivation associated with self-actualization and mastery (Rouse, 2010). *Self-marketing* is a form of self-advertising, an opportunity to demonstrate his or her capabilities and skills (especially amongst individuals looking for a new job) as transcribed from Leimeister et al. (2009) by Rouse (2010). Rouse changed the label of the original 'Social' motivation to '*Social status*' as it deals with the reactions of an individual's "... significant others, friends or the audiences." (Leimeister et al., 2009, 205 in Rouse, 2010, 6), which refers more to social status rather than to a need for social company. *Instrumental motivation* "... involves motivation to obtain some practical benefit, either personally, or for the firm worked for." (Rouse, 2010, 6). *Altruism* is described according to Simon et al. (1998) as "... values and behavior that emphasize primarily the interests of others, without personal reward." (Rouse, 2010, 6). *Token compensation* is a motivation to acquire some kind of a physical object or a cash prize that is relatively small in value. This description has been derived from (Kazdin & Bootzin, 1972). *Market compensation* is similar to token compensation. However, market compensation is distinguished from the latter by its nature, i.e. market compensations are usually bigger in value than token compensations and they most often provide a source of making a living to the person obtaining market compensation. Market compensations are payments for services. (Rouse, 2010.) *Personal achievement and learning* is "... motivation associated with feelings of personal mastery, competence, fulfilment..." (Rouse, 2010, 6) and it includes the motivation to acquire additional knowledge and skills, which was identified by Leimeister et al. (2009). The motivations were additionally divided into intrinsic and extrinsic motivations depicting the origin of the motivation (Rouse, 2010) - whether it is originating from the individual's inborn interest or curiosity towards the activity or does it originate from an instrumental value attached to the activity (Ryan & Deci, 2000a).

Based on a combination of these three dimensions, a hierarchical tree diagram (figure 2) was created. The motivations to participate have been divided into intrinsic and extrinsic motivations. Intrinsic motivations are marked with a star symbol on the top right corner of the motivation. Rouse (2010) adduces that the diagram can be used to classify crowdsourcing types. For example, Youtube can be classified as “community sophisticated” and a simple service letting users connect photos with relevant tags could be classified as “individualistic simple”.

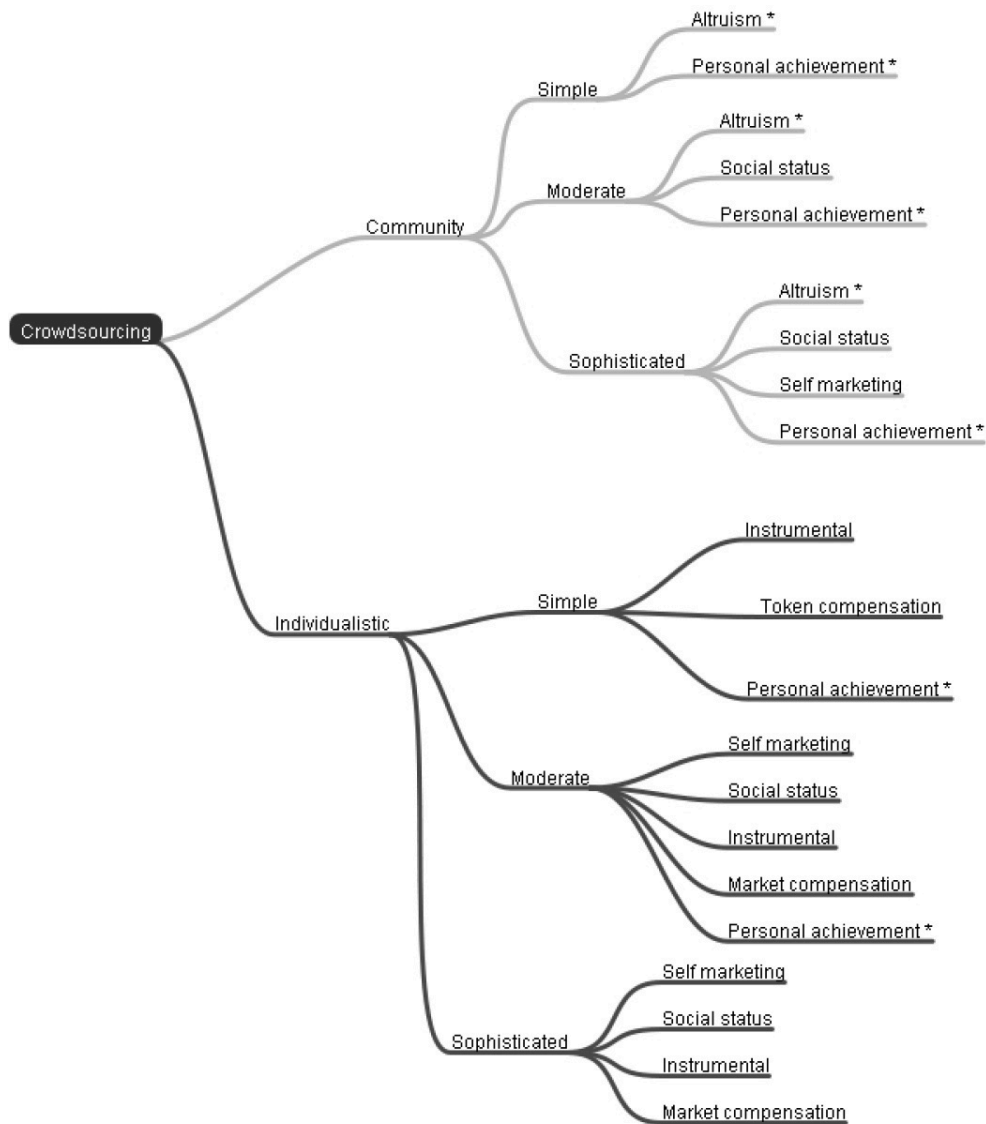


FIGURE 2 Crowdsourcing taxonomy (Rouse, 2010, 7)

Yet another classification by Doan et al. (2011) provide a rather comprehensive definition for what a crowdsourcing system is. According to them, crowdsourcing systems is a system that “... enlists a crowd of humans to help solve a problem defined by the system owners...”. In addition, the system must address four specific challenges to be classified as a crowdsourcing system. The challenges are as follows: How are the users recruited and how are they retained? What are the

contributions the recruited users can make? How are these contributions combined to solve the target problem at hand? How can users and their contributions be evaluated? (Doan et al., 2011.) For a closer examination and classification purposes on different crowdsourcing systems, Doan et al. (2011) suggest a nine-dimension classification model, which consists of the following dimensions:

- Nature of collaboration
- Type of target problem
- How to recruit and retain users?
- What can users do?
- How to combine users' inputs?
- How to evaluate users' inputs?
- The degree of manual effort
- The role of human users
- Architecture

As mentioned earlier, Doan et al. (2011) argue that a crowdsourcing system can be both explicit and implicit by their *nature of collaboration*. As an explicit crowdsourcing system, the system is a so-called standalone system which engage users for collaboration to explicitly solve a particular problem set by the crowdsourcing system's owner(s). These systems are usually intended for purposes such as evaluation, sharing, task execution, artefact building or networking. On the contrary, implicit crowdsourcing systems, which can be standalone systems where the users collaborate as a side-effect (implicitly) to solve the target problem or "piggyback" systems, in which the users collaborate implicitly through their user traces on other systems (which are in turn exploited by the crowdsourcing system, hence the name piggyback systems). (Doan et al., 2011.)

The *target problem* of a crowdsourcing system can be virtually any problem defined by the system owner(s). The problems can vary from building of a temporary or permanent artifacts to task executions, to evaluation or sharing tasks. (Doan et al., 2011.)

The next dimension should yield an answer to the question of how to create the user side of the crowdsourcing system (i.e. *recruit*) and what are the means to *retain* them. According to Doan et al., (2011) users can be recruited by offering a payment, asking for volunteers, by making users pay for a service (in order to use some service, the user is asked to solve a small crowdsourcing problem first), by piggybacking on the users' traces or by requiring users to make contributions (pre-condition is that the system owner has the authority to do, e.g. a manager-employee relationship). Blohm et al. (2013) elicit another option for in-house crowdsourcing initiatives. In their solution, a special group of company workers with motivation to participate in a crowdsourcing initiative are actively recruited. Respectively, users can be retained by providing instant gratification for the contribution; by providing an enjoyable experience or a necessary service; by providing different ways to establish, measure and show fame, trust and/ or reputation; by setting up competitions or by providing ownership situations (Doan et al., 2011).

Depending on the system's complexity, users can make contributions in a varying. These can be fairly simple user ratings, ratings or evaluations or more challenging, cognitively demanding tasks such as resolving controversial issues or supplying inference rules. Doan et al. (2011) suggest four important points regarding *user contribution* dimension that should be considered: How cognitively demanding are the contributions? What should be the impact of a contribution? What is machine's contribution? Does the system's user interface make it easy to contribute? The contributions made by the users should be ultimately *combined* to create value "greater than the sum of its parts". Users' contributions can be combined using either manual solutions (e.g. users can manually merge edits or solve semantic conflicts in a knowledge base like in Wikipedia) or automatic solutions undertaken by the computer. *Users and their contributions need to be evaluated* as well. Since people are the main contributors regarding crowdsourcing systems, malicious intentions need to be considered. These can be addressed by using different techniques to block, detect and/ or deter malicious users. (Doan et al., 2011.)

The dimension of *manual effort* is concerned with how and what kind of manual work is divided in the system between users and the system owners. An example of such work is the combination of ratings and code (executed by the system's users) in contrast to the evaluation of the system's users (done by the system owners). The work division result is also dependent on the system's automation degree. Most likely it will be also affected by the *roles* each user is attached with. Doan et al. (2011) identify four main roles within crowdsourcing systems, namely slaves (users solve various problems to save owners' time and effort), perspective providers (users give perspective on subjects, e.g. book reviews), content providers (users' contributions comprise of content they have produced themselves) and component providers (the users are components of an artefact, e.g. a social network). They point out that users can have multiple roles in a single crowdsourcing system.

The last dimension is concerned with an architectural question: should the system be built on an existing system (and thus facilitate user traces to solve the crowdsourcing problems) or should the system be created as standalone. (Doan et al., 2011.)

Soliman and Tuunainen (2015) distinguished different crowdsourcing systems by their task nature and recurrence of the tasks. Tasks can be distinguished by their nature as integrative or selective. *Integrative tasks* are tasks that have little value on their own, as a single task, but valuable when multiple tasks are combined. The true value of integrative tasks comes about when large amounts of contributions from the crowd are combined to form a greater whole. (Soliman & Tuunainen, 2015.) An example of an integrative crowdsourcing task is crowdfunding, where one single contribution from the crowd is relatively small. However, when large amounts of contributions are collected and combined, the total of the inputs becomes significant. *Selective tasks* are tasks that respond to a particular problem. Most often selective tasks are related to competitions, where the crowd propose multiple solutions to a given problem and the task initiator selects

the winner solution that has the best fit. (Soliman & Tuunainen, 2015.) For example, a building design competition handed out to the crowds is a crowdsourcing initiative using selective task approach.

Recurrence of tasks has a dichotomous nature as well; the task offered to crowds can be non-recurring or recurring. *Non-recurring tasks* are crowdsourcing tasks that are planned to be undertaken as a one-off. (Soliman & Tuunainen, 2015.) A company might want to improve its online store's customer experience and use crowds' wisdom and skills to find bugs and malfunctions from it. The task could be arranged as a one-off, non-recurring task. *Recurring tasks* on the other hand, are tasks which are handed out more than once. Such approach is often used by media content providing companies. (Soliman & Tuunainen, 2015.) For example, a news company might use crowds to contribute with pictures related to selected news phenomena.

2.3 Crowdsourcing compared to other sourcing models

As mentioned earlier, crowdsourcing has been defined as an alternative form of outsourcing. Rouse (2010) argues that outsourcing has three major classes, which are *simple outsourcing* (no IT involved, e.g. cleaning), outsourcing of a company's IT/IS (also known as *ITO*) and *business process outsourcing* (BPO). BPO involves the outsourcing of a company's relatively complex business services, which are most often supported by IT. (Rouse, 2010.) Crowdsourcing is perceived to be a particular form of a BPO according to Rouse (2010). However, in a corporate setting crowdsourcing has two fundamentally different elements distinguishing it from other sourcing models: the to-be-sourced corporate task is proposed in an open call manner and the entity willing to carry out the execution of the sourced task is an undefined crowd that constitutes of individual entities unknown to the sourcing party. In contrast, the more traditional outsourcing involves the corporate task to be handed out to a designated third party – a provider - who is somewhat known by the sourcing party. (Zogaj et al., 2014.) This provider is bound by contracts and is responsible for managing the activities and resources related to the outsourced task (Rouse, 2010).

Open source software movement and the applications of its philosophy to other areas has been often affiliated with crowdsourcing. Yet, there is no consensus whether open source is a particular form of crowdsourcing or not. According to Rouse (2010), the open source community prefers to distinguish themselves of crowdsourcing. The argument is that open source activity consists of many contributors and many beneficiaries and the intent is to contribute for the greater good of the community by sharing code within that community. The code is open for everyone to be worked on and the benefits accrued from open source are distributed to everyone as well in form of better working software. Crowdsourcing, however, consists of many contributors but the vast share of benefits usually drift to a small number of beneficiaries within the crowdsourcing community. (Rouse, 2010.)

Brabham (2008) distinguish crowdsourcing from open source by their cost structures and compensation nature. Whereas open source software development induces relatively small overhead costs (e.g. costs accrued from raw materials, production waste handling, distribution, etc.), a t-shirt company using crowdsourcing for logo ideation might introduce voluminous overhead costs due to production operation. The company is also the one bearing all the risks. (Brabham, 2008.) However, it should be noted that the idea generation process performed by the crowds and the production of the shirts (i.e. producing the shirts and printing the logos on them) are two distinct processes, whereas open source development is usually a one big ensemble. Additionally, people working on open source development are usually mostly driven by intrinsic motivation towards the activity. In simple terms, they are highly interested in contributing, find it interesting and are compensated by the satisfaction they get when solving problems. They are the people who would be performing the activity of software development anyway. People taking part in crowdsourcing activities are most often compensated with prizes, free giveaways or monetary compensations, which implies that there are extrinsic motivations involved as well. The crowds may attend because of inborn interest, but by performing the activity the participants are most often compensated with a separable outcome as well. (Brabham, 2008.)

2.4 Advantages and disadvantages of crowdsourcing

Crowdsourcing is argued to introduce multiple benefits when managed correctly and many of the benefits seem to be very much the same as with outsourcing, e.g. cost savings and access to capabilities not held in-house. Unlike outsourcing, crowdsourcing enables a company to tap into the knowledge- and skill pool of volunteers whose contributions might not be realized otherwise. (Rouse, 2010.) On the other hand, when managed incorrectly, crowdsourcing can induce great financial losses, cause significant delays and ultimately wreck company's reputation (Rouse, 2010).

One of the great disadvantages of crowdsourcing is related to its main ingredient, the crowds. According to Brabham (2008), crowdsourcing can potentially affect the labor pool negatively, echoing the traits of exploitation. He argues that the compensations of the intellectual labor performed by a crowd are most often much smaller than what the solutions are worth for. Comparing a crowdsourcing participant designing a problem for a company and a professional designer performing the same task, the participant's compensation is usually much smaller compared to the compensation of the professional designer. As the author puts it:

Proportionately, the amount of money paid to the crowd for high quality labor relative to the amount that labor is worth in the market resembles a slave economy." (Brabham, 2008, 83.)

Brabham (2008) also argues, that as the compensation rates for intellectual labor are lowered by crowdsourcing, many of the professionals in those areas of service (e.g. professional stock photographers, designers, software developers) are forced to significantly cut down their asking prices or simply close their businesses.

On the other hand, when examined in the macro-level, crowdsourcing can potentially shake the industries' giants by empowering consumers and integrating them as part of the production processes. Additionally, participating in a crowdsourcing activity can be learning experience for the participants, where an individual can enhance his or her knowledge and skills and even boost the opportunity to acquire a new job. (Brabham, 2008.)

Schenk and Guittard (2011) list the main benefits of crowdsourcing relating to cost, quality, network externalities, agency issues and motivations and incentives. Costs accrued from the solution design processes are most often lower when comparing crowdsourcing to traditional outsourcing. This is due to the nature of the payments (i.e. small, micro-payments instead of professional grade payments).

2.5 Crowdsourced software engineering

Software engineering comprises various activities related to the initial design, implementation and maintenance of a software product. According to Ian Sommerville (2016, 21):

Software engineering is an engineering discipline that is concerned with all aspects of software production from the early stages of system specification through to maintaining the system after it has gone into use.

In other words, software engineering is not mere code lines or design of a system. Software engineering comprises all the activities related to 1) *creation* of a software and 2) ensuring the software works after it has been introduced in production. The discipline and practice of software engineering is comprised of the following processes:

- Software specification,
- Software development,
- Software validation and
- Software evolution

These processes altogether form a so-called *software process*, which is ultimately a systematic approach used to produce and deliver a high-quality software product (Sommerville, 2016). *Software specification process* (also known as requirements engineering) intends to bring about the true purpose of the system being created by identifying relevant stakeholders and their needs for the system (Nuseibeh & Easterbrook, 2000). It also identifies the constraints these needs might introduce

to the development and operation of the system. The process consists of three main activities, namely requirements elicitation and analysis, requirements specification and requirements validation. Software specification process produces a *specification document*, which depicts the stakeholder needs, identified constraints and how these are addressed by the system in case. (Sommerville, 2016.) According to Sommerville (2016), *software development* (i.e. design and implementation) is a process that comprises software designing and programming processes, which ultimately result in an executable system. Design process consists of multiple different design activities (e.g. architectural design, database design, interface design, component design, etc.), whereas programming is an individual activity that does not have such a general process to be followed. Depending on the development approach used (i.e. waterfall, spiral, agile, etc.), the design of the system may or may not be documented. The approach also determines the level of documentation done, if it is done. (Sommerville, 2016.) Validation and verification, a process which is intended to validate that the created system is coherent with its specifications (i.e. the system functions as it was specified) and that it meets the customer needs, is called *software validation*. Software validation is mainly done via software testing. Testing is a sub-process of software validation, although development includes testing as well. Software testing related to software validation is usually comprised of component testing, system testing and customer testing. Other than testing activities, software validation can include various process checks and reviews. (Sommerville, 2016.) *Software evolution* relates to software maintenance and its modification system's life cycle as stakeholder and/or market needs change. Software evolution can be divided into development and operation activities of which the latter is concerned with ensuring the system functions in daily operations (i.e. maintenance). (Sommerville, 2016.)

The two functions, development and operations, are nowadays increasingly integrated as one working unit and not being kept as separate functions. In fact, an agile development approach called DevOps strives to seamlessly integrate development, delivery and operations with the help of automation to lower costs and decrease the time to market (Ebert, Gallardo, Hernantes & Serrano, 2016).

Most of the processes constituting software engineering have been addressed by crowdsourcing. In a nutshell, crowdsourced software engineering involves the management (i.e. decomposition and direction), implementation and achievement of various software engineering tasks performed by a crowd unknown to the organization initially handing out the tasks. Stol and Fitzgerald (2014, 189) have defined crowdsourced software development as follows:

The accomplishment of specified software development tasks on behalf of an organization by a large and typically undefined group of external people with the requisite specialist knowledge through an open call.

As a result, multiple crowdsourcing platforms have been built to support crowdsourced software engineering. Adepetu, Ahmed, Al Abd, Al Zaabi and Svetinovic (2012) present *CrowdREquire*, a blueprint for a platform operated over the internet intended for requirements engineering using crowdsourcing. Although *CrowdREquire* is not an established platform existing in the internet it

provides the structure and requirements needed to create a functioning online crowdsourcing platform for requirements engineering. According to the authors, CrowdREquire differs from crowdsourcing platforms such as Amazon Mechanical Turk in that the tasks of CrowdREquire are generally more complex and require specific talent. The platform uses a contest model, where a client organization gives specification task(s) to the platform, the task(s) is handed out for the crowd of platform members and the best solution is selected by the platform client among the members' submissions. It can be noticed that in order to participate, an individual has to register to the platform and be a part of its crowd of members. The winning proposals selected by the client are then to be compensated with monetary rewards. (Adepetu et al., 2012.)

Topcoder, founded in 2001, is an established online crowdsourcing platform for software development with its own community of registered members. As in the case of CrowdREquire, it is orchestrated as a contest between the developers. Client organization's tasks are broken down into smaller work units and the units are then handed out to the crowd as small software development tasks. The best solution offered and its runner-up wins. The selection is carried out using a peer-review of the submissions, which is carried out by the platform members. Only users registered to the platform and for the specific contest can solve tasks in Topcoder. (Stol & Fitzgerald, 2014.)

uTest is an established online crowdsourcing platform and community for software testing. Unlike CrowdREquire and Topcoder, uTest does not use contest based approach. The platform has a global community of registered testers who are invited to customer projects based on project demand as well as the testers' skill set and availability. Before a tester can participate in paid project, the tester has to go through an audition arranged by the platform to show his or her skills. The testers are like consultants working in different client projects, except they are unknown to the client organization and to some extent to the platform as well (in most cases the members and the platform's administrative personnel have not met anywhere else than online). The members are compensated with monetary payments and the size of the payment depends on the tester's performance. Thus, the better the tester the higher the payment. Better work performance also yields more project invitations. (uTest, 2017.)

test IO, formerly known as testCloud, is an established online crowdsourcing platform and community for software testing. Originally founded in Berlin in 2011 test IO is now headquartered in San Francisco, USA. Like uTest, test IO has a global community of registered testers who are invited to customer projects based on project demand and the tester's own skill set and availability. The testers are first evaluated by the platform before testers can participate in a paid project. The members of the platform - or the testers - are compensated with monetary payments. (LinkedIn, 2017.)

The next chapter will present the theoretical background that is used in this research as a set of theoretical lenses to examine the phenomena of crowdsourced software engineering - particularly testing - and related continuance motivation.

3 THEORETICAL BACKGROUND

When thinking about a crowdsourcing service and how it is constructed, we can quickly infer that it is dependent on the crowd of contributing users. In order to get people to participate and start contributing, the service has to motivate the people to participate in the crowdsourcing initiative. To have a successful lucrative crowdsourcing service, the crowdsourcing platform must motivate people to participate (Hossain, 2012).

Now, why do people engage in crowdsourcing initiatives? Or what are the reasons behind continued use, why do they keep participating? According to Kaufmann, Schulze and Veit (2011), the demographics of the participants are diverse and many of the contributors are in fact highly skilled fulltime workers. At the same time the monetary rewards paid for completing a task are usually very modest, which would indicate that monetary compensation is only part of the story why people participate (Kaufmann et al., 2011). What makes these persons “tick”? According to Ryan and Deci (2000, 1), “To be motivated means to be moved to do something.”. Motivation is concerned with all the aspects of activation and intention (Ryan & Deci, 2000b). A person who is motivated is “energized or activated towards an end”, whereas an unmotivated person is one “who feels no impetus or inspiration to act” (Ryan & Deci, 2000a, 1). Motivation can spring from a number of sources: an activity is valued by the person or an external pressure is used to make the person act as wanted or the person is bribed to act in a certain way or the person acts from a sense of personal commitment, etc. (Ryan & Deci, 2000b).

Traditionally, there has been a dichotomy between utilitarian and hedonic information systems. Hedonic information systems are systems that individual’s use mostly on their pastime and which primarily provide pleasure and such value as enjoyment, excitement and relaxation to the user. Utilitarian information systems, on the other hand, deliver instrumental value and are designed as productivity improving systems. (Van der Heijden, 2004.) Based on earlier studies on crowdsourcing and related motivation (see e.g. Kaufman et al., 2011; Hossain, 2012; Soliman & Tuunainen, 2015), crowdsourcing systems can be classified as both utilitarian and hedonic of nature.

3.1 Information systems adoption and continued use

The use of a certain crowdsourcing service from the first contact to the last stage of the service use from an individual user’s point of view is depicted by a usage life cycle adapted from Porter’s (2012) work on user experience design as well as Maier, Laumer, Weinert and Weitzel’s (2015, 278) user transformation model and Furneaux and Wade’s (2011) work on information systems life cycle. Porter’s (2012) life cycle consists of five distinct life cycle stages (figure 3). The life cycle describes the stages an individual crowdsourcing service user goes through when the person engages with a particular crowdsourcing system. The stages are

first encounter, first time use, continued use, passionate use and the death of use. However, it should be noted that the final stage of the life cycle, “the death of the usage” stage, may be reached already after the first encounter or even after the first use of the service.

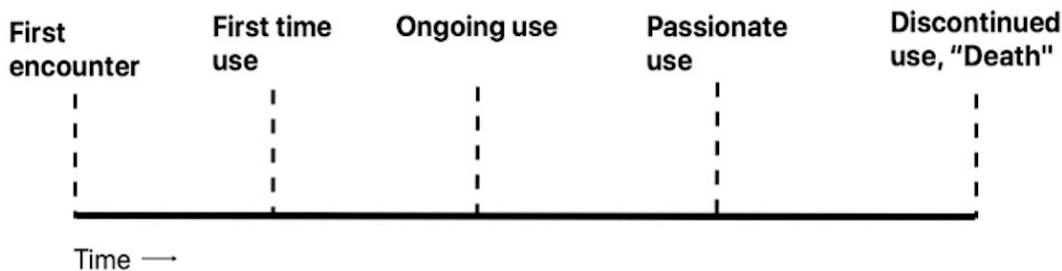


FIGURE 3 Design usage life cycle (Porter, 2012)

First encounter occurs when an individual becomes aware of the service. Interest towards the service is either evoked or the individual ignores the service. *First time use* occurs when an individual tries the service for the first time. If the service is perceived by the individual to produce more benefits than what it consumes, the individual is likely to continue its use and the stage of an *ongoing use* reached. *Passionate use* may be achieved after ongoing use, if the user perceives the service enough satisfying. According to the author, this type of use usually is hard to achieve, but when reached it promotes organic growth as users often share their passion to others. Ultimately, the individual decides the use of the service does not give him or her enough benefits or a better solution is discovered, the person quits using the service and the usage life cycle faces its last stage, the *death*. (Porter, 2012.) This idea combined with Maier et al. (2015) user transformation model and the work of Furneaux and Wade (2011) on IS life cycle was adapted for the study to distinguish different IS use stages based on temporal dimension and to assign related motivational factors into those stages. For simplicity and to make the framework better match earlier studies the first encounter and passionate use were left out in this study. Additionally, first time use was re-named as adoption as in Maier et al. (2015) user transformation model, ongoing use as continued use and the last stage of usage life cycle - the termination or “death of the usage” stage - as discontinued use as in the work of Furneaux and Wade (2011).

Adoption of an information system service can occur when the individual first encounters the service and decides to try it. Hence, the process of adopting an information system is comprised of the events and actions involving the user to first find out about the service and soon after that to try the service (Karahanna, Straub & Chervany, 1999). *Continued use* of an information system service can be achieved after initial adoption, if the individual perceives the use of the service is enough beneficial to him or her (Karahanna, Straub & Chervany, 1999). In other words, if the use of the service is perceived to consume less resources than what it pays back, then the individual may voluntarily continue using the service. In

this study, the term *discontinued use* of IS is used to describe certain use behavior of an individual. More specifically, discontinued use of IS occurs when an individual decides to quit using a specific information system service and acts accordingly. Consequently, the individual has volitionally stopped using the information system service with no intention of continuing its use again (Turel, 2015). The adapted IS usage life cycle used in this study is depicted below in figure 4.

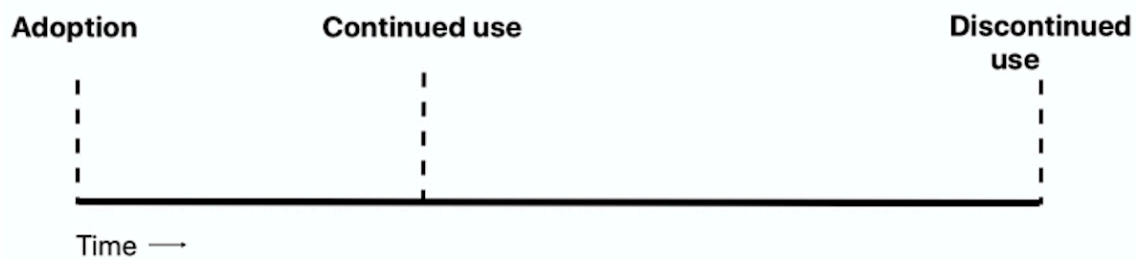


FIGURE 4 IS usage life cycle (adapted from Furneaux and Wade, 2011; Porter, 2012; Maier et al. 2015)

3.1.1 Technology Acceptance Model (TAM)

Prior research on information systems adoption and continued use is rather extensive. As a result, different models have been constructed to explain the adoption and subsequent continued use of information systems. Davis (1985) proposed a theoretical model called Technology Acceptance Model (TAM) to explain and give more insight on user acceptance processes. The model was additionally aimed to provide a theoretical base for user acceptance testing by providing a methodology for practical testing scenarios. De facto, this kind of testing would include a set of systems which would be presented to a target audience (mainly consisting of the actual users of the system) in a laboratory environment. The target audience would experiment these systems and measurements would be made about the users' motivations towards using the systems. (Davis, 1985.) According to the model, individual's intention to use certain system is determined by the system's perceived ease of use and perceived usefulness. Here, the individual's intention to use the system functions as a mediator of actual use (Davis, 1985). The model was later extended by Venkatesh and Davis (2000), who included *social influence processes* (i.e. subjective norm, voluntariness and image) and *cognitive instrumental processes* (i.e. job relevance, output quality, result demonstrability and perceived ease of use) in the model to increase the model's explanatory power. According to Maier et al. (2015), TAM is one the most significant models to explain individual person's technology adoption intentions and it is one of the most established IS theories. However, TAM has been also criti-

cized of “putting blinders on IS researchers” in a sense that it has turned researchers’ attention away from studying the design- and implementation-based antecedents of IT adoption and acceptance. Additionally, behavior- and performance-based consequences of IT adoption and acceptance have been left for little attention as a result of researchers focusing mainly on TAM itself. (Benbasat & Barki, 2007, 212.)

3.1.2 Expectation-Confirmation Theory (ETC)

Anol Bhattacharjee (2001) studied users’ intentions to continued information systems use using Expectation-Confirmation Theory (ECT) as the underlying theory. According to Bhattacharjee’s (2001), Expectation-Confirmation Model of IS Continuance posits that users’ continuance intentions are mainly affected by user satisfaction, which is determined by perceived usefulness of the information system and the confirmation of expectations. As Technology Acceptance Model (TAM) is tightly linked to IS usage life cycle’s first stage, the adoption, this information systems continuance model is perceived to explain the next stage of the life cycle, the continued use (Maier et al., 2015).

3.1.3 Unified Theory of Acceptance and Use of Technology (UTAUT)

According to Unified Theory of Acceptance and Use of Technology (UTAUT), users’ intentions to use information systems and related usage behavior are determined by performance expectancy, effort expectancy, social influence and facilitating conditions. These constructs’ impact on use intention and usage behavior are moderated by individual’s age, gender, experience and voluntariness. (Venkatesh, Morris, Davis & Davis, 2003.) The model was aimed at organizational contexts and thus, similar to TAM, UTAUT was also extended later on to better fit into consumer context. UTAUT2 by Venkatesh, Thong and Xu (2012) included additional three constructs compared to the original model, namely hedonic motivation, price value and habit. These constructs’ impact on use intention and usage behavior are moderated by individual’s age, gender and experience (voluntariness was dropped out of the model in UTAUT2). (Venkatesh et al., 2012.)

Although these models are quite comprehensive and widely used, none of the models and related theories clearly explains individual user’s motivation behind initial and continued system use. What is the driving force steering individual’s behavior? Furthermore, these models – except UTAUT2 – were mainly designed with organizational context in mind. In non-organizational context, the individual usually has a free will and can choose whether he or she will adopt and continue the use of a certain information system or not. However, in organizational context, the individual is more or less obligated to comply with the hiring organization’s customs and regulations and this applies most often to information systems as well. (Turel, 2014.) With this in mind, we need to take a closer look on motivation theories to uncover the underlying motivational factors affecting system use in a non-organizational context through the system’s usage

life cycle. The next chapter 3.2 introduces Self-Determination Theory and its sub-theory Organismic Integration Theory. Self-Determination Theory will be used as the main underlying theory and combined with Organismic Integration Theory, these theories will also provide the main theoretical lens used in this research.

3.2 A theoretical framework to explore IS use motivations – Self-Determination Theory (SDT) and Organismic Integration Theory (OIT)

Self-determination theory (SDT) by Deci and Ryan (1985) is a motivation theory that is widely used in the field of information systems. It is also widely used in the context of crowdsourcing (see e.g. Igbaria, Iivari & Maragahh, 1995; Shang, Chen & Shen, 2005; Hossain, 2012; Zogaj et al., 2014; Soliman & Tuunainen, 2015; Lowry, Gaskin & Moody, 2015). According to the theory, motivation varies not only in the level of motivation (i.e. how motivated a person is, how much motivation does one have), but also in the orientation of motivation (i.e. what type of a motivation is concerned) (Ryan & Deci, 2000a).

The theory distinguishes two types of motivations based on the origin of motivation, a locus of causality, into intrinsically orientated motivation and extrinsic motivation. *Intrinsic motivation* is "... the doing of an activity for its inherent satisfactions rather than for some separable consequence." (Ryan & Deci, 2000a, 56). It is the kind of motivation that is present when a person does something out of his or her pure, inherent interest, enjoy or challenge (Ryan & Deci, 2000a). The person acquires only satisfaction as a result of doing the activity (Ryan & Deci, 2000b). Thus, the person is not motivated to perform certain activity in the hope of obtaining some separable outcome. According to Ryan and Deci (2000a), intrinsic motivation is the key motivation of creativity and learning. Highly related to intrinsic motivation is a sub-theory called Cognitive Evaluation Theory (CET) (Deci and Ryan, 1985). CET argues that certain "social-context events", for example rewards, communication and feedback which promote individual's feeling of *competence*, are the factors that can reinforce or increase individual's motivation towards certain activity. Here, the intrinsic motivation is perceived to satisfy individual's inborn psychological needs of competence and autonomy (Deci & Ryan, 2000a). Furthermore, the experience of efficacy or competence alone does not enhance intrinsic motivation. Individuals must feel a sense of *autonomy* over the activity being performed. The behavior must be experienced as self-determined by the individual. As Ryan and Deci (2000a, 58) put it, "... for a high level of intrinsic motivation people must experience satisfaction of the needs both for competence and autonomy.". Thus, environmental events that de-promote individual's experience of efficacy, competence and autonomy (e.g. threats, directives and deadlines) can undermine individual's intrinsic motivations towards an activity (Ryan & Deci, 2000b).

By contrast, *extrinsic motivation* involves some separable outcome (e.g. money, food, prizes) to be accommodated with an activity. More precisely, an activity is performed because it can yield some instrumental value to the person

performing the activity. (Ryan & Deci, 2000b.) Ryan and Deci (2000a) argue, that extrinsic motivation gains more ground on individuals' lives as they grow up, since social demands and roles force people to engage with activities that are not intrinsically motivating. According to SDT, extrinsic motivation varies in the level of autonomy. For example, individual might perform an activity because he or she wants to avoid a sanction (i.e. the instrumental value of the activity) which occurs, if the individual did not perform that particular activity. Or individual wants to perform certain activity because it can help her work career, school some other aspect in the individual's life. In the latter example, the instrumental value of the activity is the positive outcome obtained from performing the activity (e.g. individual's work career is being uplifted). Both are examples of individuals acting by extrinsic motivation and to gain instrumental value (instead of performing out of pure interest towards the activity), but the level of autonomy varies from compliance with some external control/ authority and the latter involves individual's personal choice. (Ryan & Deci, 2000a.) Similar to intrinsic motivation, extrinsic motivation is closely related with a sub-theory of SDT, known as Organismic Integration Theory (OIT). OIT presents the different stages of extrinsic motivation of an individual as a continuum, from being utterly demotivated to being highly extrinsically motivated and how extrinsic motivation can be divided into multiple forms based on individual's autonomy over the activity. Additionally, the theory details the contextual factors that aid or hamper individual's "... internalization and integration of values and behavioral regulations." (Deci & Ryan, 1985 in Ryan & Deci, 2000a, 60). *Internalization* is a process where an individual receives and "takes in" a value or a regulation of some certain behavioral request (i.e. the individual is desired to behave in a certain way, for example perform a work task). *Integration* is a process where an individual has internalized the behavioral regulation and transformed the received regulation into his or her own. Thus, the individual has a greater sense of autonomy over the behavior and as a result, the received regulation will emanate from within the individual itself. (Ryan & Deci, 2000b.) This continuum of self-determination is depicted below in figure 5.

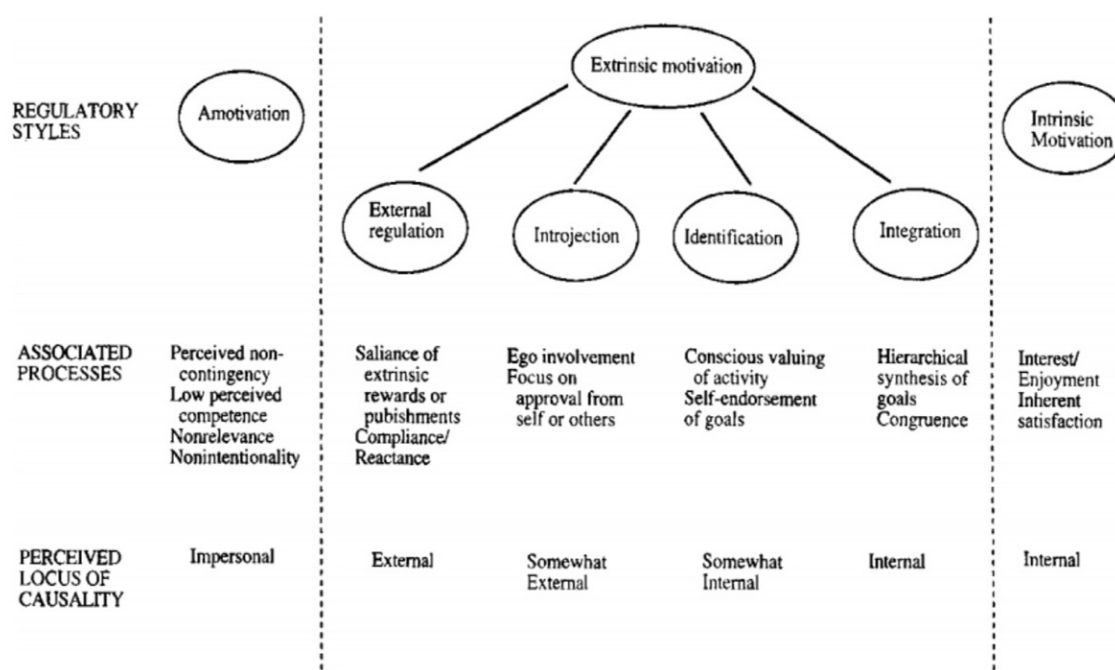


FIGURE 5 A taxonomy of human motivation (Ryan & Deci, 2000a, 61)

The forms of extrinsic motivation are the following (starting from the least autonomous and advancing towards greater level of autonomy):

- external regulation,
- introjected regulation,
- identified regulation and
- integrated regulation.

Additionally, if an individual is not motivated at all (he or she does not have extrinsic or intrinsic motivation), the person is said to be *amotivated* and as a result of this, does not act at all or acts without an intent. Amotivated person is unwilling to commit certain behavior. Thus, in this respect, an individual who is forced to do something that he or she is not willing to do, would be amotivated and would act without an intent. Respectively, an individual motivated purely out of interest towards the activity is said to be *intrinsically* motivated. (Ryan & Deci, 2000b.)

Externally regulated motivations are the least autonomous forms of extrinsic motivation. For example, avoidance of sanctions by performing an activity or performing an activity only to obtain some externally imposed reward would be categorized as externally regulated motivations. A person behaving out of externally regulated motivation strives to "... satisfy an external demand or obtain an externally imposed reward contingency.". Externally regulated behavior is often perceived as controlled or estranged. (Ryan & Deci, 2000a, 61.)

Introjected regulation occurs when an activity is performed because of contingent self-esteem and related feelings. Such activities are performed to obtain pride, to boost one's ego or to avoid a sense of guilt or anxiety. Additionally, a

feeling of pressure is often present when introjected regulation occurs. This type of motivation is more autonomous than the previous one, external regulation. (Ryan & Deci, 2000a.)

Regulation through identification involves individual to identify the behavior in case with a personal importance. For example, a girl memorizing mathematical rules of various calculations perceives the activity as valuable, since remembering the rules improves her performance in mathematical tests, which she values as a goal worth to pursue. Regulation through identification is more self-determined behavior than the previous one, introjected regulation. (Ryan & Deci, 2000a.)

When an individual has completely assimilated identified regulations to self, the most self-determined behavior, *integrated regulation*, is said to occur. The more reasons for certain actions are internalized and assimilated to the self, the more autonomous and self-determined the individual's extrinsic motivations become. Thus, the individual's behavior is volitional and he or she values the activity to some extent. However, integrated regulation should not be confused with intrinsic motivation, since integrated regulation is still driven by perceived instrumental value separate from the behavior. (Ryan & Deci, 2000a.)

3.3 Motivation related to adoption and continued use of a crowdsourcing system

Hossain's study from 2012 recognized, aggregated and classified various motivational factors that have been identified by prior research on user's motivation to participate in online crowdsourcing platforms. Motivational factors were classified into two main groups, which consist of the same groups we saw in the Ryan and Deci's (1985) Self-Determination Theory: extrinsic and intrinsic motivations. Further classification separated extrinsic motivation factors into financial, social and organizational groups, while intrinsic motivation remained undivided. The reason for not classifying intrinsic motivation further was because "... the intrinsic motivation originates from a particular task itself." (Hossain, 2012, 312). Within extrinsic motivation, *financial motivators* were benefits, cash, dissatisfaction, job opportunities, personal need, problem pressure and revenue. *Obligation*, collaboration, ego, experience, frustration, knowledge gathering, networking, peer recognition, power, privilege attainment, publicity, reputation, skill development, social bonds, social interaction and status were identified as *social motivators*. *Organizational motivators* were career development, marketing oneself, professional prestige, recruitment and responsibilities. Intrinsic motivations were, among others, listed as charity, competence, desire to solve, enjoyment, fun, pleasure, self-satisfaction, altruism, autonomy, belongingness, community drives, identification, self-determination, getting ideas, learning, pastime, pride and self-fulfillment. (Hossain, 2012.) It should be noted that like Ryan and Deci (2000a;2000b), Hossain infers that tasks demanding creativity should be designed to be intrinsically motivating, whereas simpler tasks should be complemented with extrinsically motivating incentives. Another interesting point was

also made regarding the two distinct origins of motivation: according to the author, intrinsic motivation can transform into extrinsic in some cases. For example, when a task that is originally intrinsically motivating is complemented with a reward, the motivation can turn from intrinsic to extrinsic. Similarly, originally extrinsically motivating task (a task complemented with a reward) can turn into intrinsically motivating, if the person performing the task finds the task interesting enough. (Hossain, 2012.)

A survey undertaken by Kaufmann et al. (2011) studied the motivations of the participants of Amazon Mechanical Turk (MTurk), an online crowdsourcing platform which intermediates crowdsourcing organizations' small tasks to crowds to be processed and solved. The tasks are usually relatively small like image labeling, transcription and web research. (Kaufmann et al, 2011.) The authors used a model that combined classic motivation theory, open source software development (OSS) and work motivation and education theory as one whole. Based on the constructed model, crowdsourcing participants' motivation can be divided into extrinsic and intrinsic motivation. Furthermore, intrinsic motivation was classified as enjoyment based motivation and community based motivation. *Enjoyment based motivation* is related to participant's having fun participating in a crowdsourcing initiative and it consists of factors like skill variety, task identity, task autonomy, direct feedback from the job and pastime. *Community based motivation* is related to participants' actions that are guided by the platform community and involves community identification and social contact. In addition to intrinsic motivation, crowdsourcing participants are driven by extrinsic motivation. *Immediate payoffs* is related to immediately received compensations acquired for performing a task, regardless of the kind of payment. Immediate payoffs involve only one factor, payment. *Delayed payoffs* are payoffs that can be used to produce material benefits in the future and can be also of any kind. Delayed payoffs consist of signaling, human capital and advancement. *Social motivation* cover the extrinsic motivation related to values, norms and obligations that are outside the crowdsourcing platform community. Social motivation consists of action significance by external values, action significance by external obligations and norms and indirect feedback from the job. (Kaufmann et al., 2012.) The model in its entirety is depicted figure 6 below.

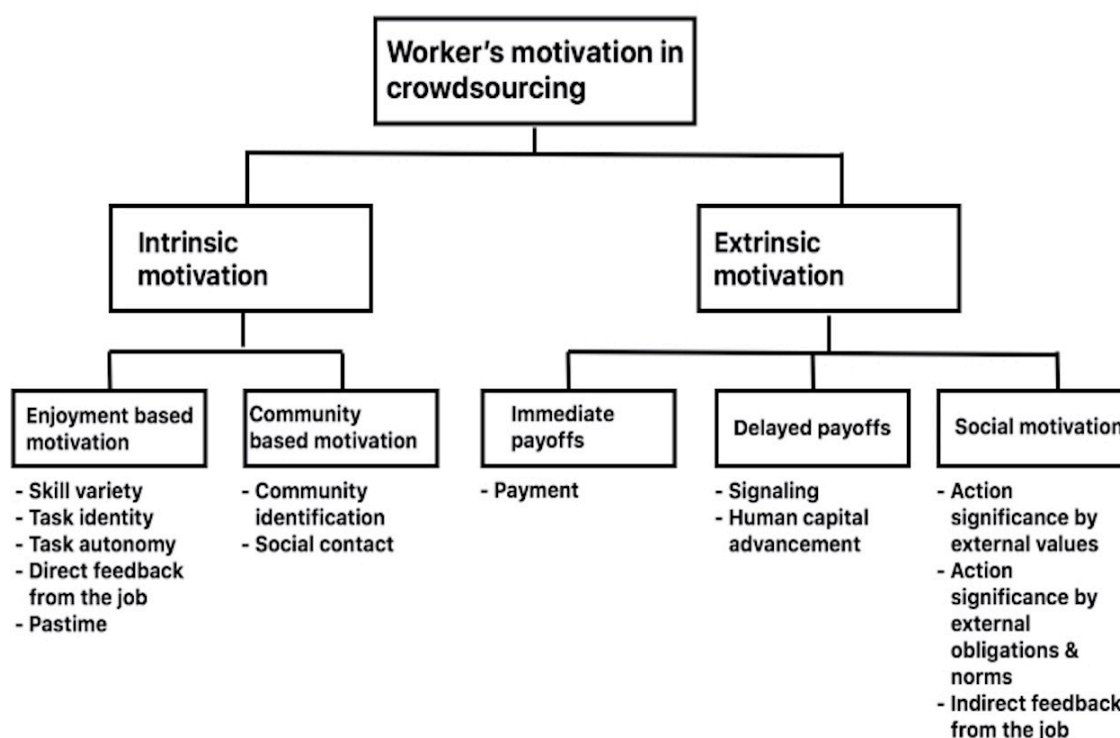


FIGURE 6 A model for worker's motivation in crowdsourcing (Kaufman et al., 2011, 4)

A case study on media content providing crowdsourcing platform by Soliman and Tuunainen (2015), produced an extended framework (figure 7) of motivational factors affecting initial and continued use of the platform. The framework combined the origin dimension of motivations (i.e. the intrinsic and extrinsic motivations) with 1) an aim dimension classifying motivations into selfish and social motivations, and 2) a temporal dimension to distinguish motivational factors, which influence initial and continued usage. By adding the aim dimension, the authors were able to distinguish if a motivation influencing certain behavior is selfish (i.e. the activity is aimed at one's self, benefitting only the individual itself) in nature or social (i.e. the activity is aimed at others, benefitting others). The temporal dimension explains the dynamic nature of motivations regarding initial and continued use: the mix and strength of motivations vary over time from initial use to continued use. In other words, the motivational factors that are present in the initial use might be different than the ones influencing continued use. Additionally, in a situation where both same motivational factors are present in both phases of usage, the strength of the factors may vary from phase to another. (Soliman & Tuunainen, 2015.)

		ORIGIN	
		INTRINSIC	EXTRINSIC
AIM	SELFISH	<u>Initial Use</u> Curiosity	Monetary rewards
	SOCIAL	<u>Continued Use</u> Enjoyment	Non-monetary rewards
		Altruism	Publicity

FIGURE 7 Motivational factors and the temporal dimension (Soliman & Tuunainen, 2015, 10)

The study was conducted as a case study on a digital platform called Scoopshot, which provided the means for publishing and media agencies to connect with crowds (consumers) generating media content (i.e. news photos). The results of the study revealed that **initial use** of a crowdsourcing system was dominated by selfish motivational factors, such as curiosity and financial rewards and **continued use** were influenced by both, selfish and social motivational factors. It should be noted that regarding initial and continued use, both, intrinsic and extrinsic motivational factors were present. However, continued use was influenced by such selfish factors as enjoyment (intrinsic) and non-monetary rewards (extrinsic) and by social factors of altruism (intrinsic) and publicity (extrinsic). (Soliman & Tuunainen, 2015.)

3.4 IS discontinuance and motivation

Although users' participation motivation in crowdsourcing initiatives and information systems adoption and continued use has been studied extensively during the last decades, the last stage of the usage life cycle has been widely ignored and left mostly untouched until recent years. This last stage of the IS usage life cycle where an individual stops using that specific information system for a certain period of time or for good has been previously called as IS discontinuance

(Bhattacharjee, 2001; Furneaux & Wade, 2011; Turel, 2014) discontinued use (Soliman & Tuunainen, 2015) and termination (Maier et al., 2015) to name a few.

Bhattacharjee (2001) argue that person's intention to discontinue the use of an information system is ultimately a result of a cognitive appraisal done between the expectations towards that information system and its perceived performance. According to Expectation-Confirmation Theory, "... Lower expectation and/or higher performance lead to greater confirmation, which in turn positively influence customer satisfaction and continuance intention." (Bhattacharjee, 2001, 354). According to Furneaux and Wade (2011) information systems discontinuance can be perceived as a deviation from a status quo situation that is achieved as a result of continued use. The authors examined discontinuance in an organizational context. In this context, when a person stops using the system, he or she rejects the status quo state by committing a conscious action that requires the use of certain mandatory organizational resources and an effort to make the change happen. In organizational context, these resources and effort put into discontinuance decision can constitute a noteworthy expenditure in the form of switching costs and overheads related to it. In a non-organizational context, similar underlying mechanism seems to apply, although in a lot smaller and simplistic scale. (Furneaux & Wade, 2011.) In non-organizational context, when a person stops using some specific information system, he or she makes a conscious decision to stop using it. The resources in this context might constitute of the abandoned system and possibly related hardware, possible switching costs and time consumed for the decision making. The effort is the exertion put in the whole process of making the change happen, including the possible search for an alternative system and related costs (tangible and intangible). It should be noted, however, that in non-organizational context individuals usually have a free choice, which is often limited in organizational settings from the individual user's perspective because of enforcement to use specific IS (Turel, 2014). Turel (2014) argues that discontinuance is "... a post-continuance behavioral intention..." occurring after a period of use and that an intention to discontinue the use of a certain IS can co-exist simultaneously with an intention to continue the use (Turel, 2014, 2). Thus, the behavioral attitude to discontinue the use does not immediately replace the old attitude - at least not entirely. (Turel, 2014.)

Why does it occur? What makes people discontinue the use of an information system? Viewed from the individual user's perspective, Turel's (2014) study on habituated use of a hedonic information system, such as Facebook, showed that discontinuance decision can rise up from a feel of guilt that is complemented with perceived high levels of efficacy to terminate the use of such IS. Maier et al. (2015) studied IS discontinuance and techno stress (i.e. a stress an individual person may experience when using information technology). They found that individual's experienced exhaustion resulting from the use of IT can develop intentions to discontinue the use of that technology and ultimately lead to discontinued use. On the other hand, viewed from the organizational perspective, Furneaux and Wade's (2011) study on organizational IS discontinuance and its survey revealed that system capability shortcomings, support availability and technical integration constitute the most prominent factors affecting information systems discontinuance in organizational context.

This thesis attempts to investigate what makes people discontinue the use of an information system by investigating the motivational factors affecting user's actual discontinuance of the service use. Furneaux and Wade (2011) studied organizational (i.e. highly utilitarian) information system use whereas Turel's (2014) and Maier et al. (2015) research focused on an information system that has more hedonic traits. However, when thinking about an information system such as Facebook, it clearly has utilitarian features as well (e.g. marketing features, job seeking features, features related to corporate communication and connectivity, etc.). Thus, Facebook could be considered as a mixed system in terms of utilitarian and hedonic traits. The service studied in this thesis has also both utilitarian and hedonic features, but unlike Facebook, the context is not clearly non-organizational from the individual's perspective. Rather, it is something between organizational and non-organizational setting - a semi-organizational setting - and is thus thought to provide new insights on individual user's IS continuance behavior.

3.5 Summary

This chapter presented various theories that have been used in studies related to IS adoption and continued use. As we saw earlier, the work of Furneaux and Wade (2011) as well as Porter (2012) and Laumer et al. (2015) provides us a foundation for studying the temporal aspect of IS usage. An adapted version of IS usage life cycle was created based on the previous work on usage life cycle. Next, the chapter presented various well-known theories that have been previously used in IS usage research, namely research focusing on adoption and continued use. TAM is an established IS theory that strives to explain users' acceptance and adoption of technologies in organizational contexts. ECT focuses on the next state of usage, continued use, and strives to explain individuals' post-adoption or post-purchase satisfaction. In IS context, the theory has been used to explain individual users' IS continuance intentions based on the user's satisfaction outcome. UTAUT2 seeks to explain IS users' use intentions and subsequent use behavior in a non-organizational context and is a modified version of the original UTAUT.

However, despite of multiple options to choose from, the existing theories might still not provide the optimal view point for a study such as the one at hand. As mentioned earlier, TAM has been criticized of "putting blinders on IS researchers" and is designed for organizational contexts. ECT and UTAUT2 on the other hand, do not shed enough light to the motivational aspects of usage and only examine usage from the perspective of continued use or adoption and subsequent continued use. As a result, there seems to be room for a theory or a model that views IS usage beyond the first two stages of IS usage life cycle and tracks down users' motivations. With this in mind, motivation theories - namely SDT and OIT - were taken in to provide a theoretical lens for tracking down users' motivational aspects throughout the entire IS usage life cycle.

The next chapter will describe how the research was conducted, what are the research question, what constitutes the research context and how the data was collected and analyzed.

4 RESEARCH APPROACH AND METHODOLOGY

This chapter describes how the research was conducted. First, research approach and chosen research methods are presented as well as the motivations why these specific methods were chosen to be used. Additionally, the research questions are revealed and an explanation is given on why these remained as the ultimate research questions. Furthermore, the research design and process in its entirety is presented along with research context. Finally, analysis techniques are described and explained.

4.1 Research approach and methods used

This research strives to untangle the mystery of user motivation related to information systems use. Particularly, this study has its focus in the last stages of information system's usage life cycle. Thus, in order to achieve the goal of discovering the motivational factors driving individual user's behavior, the study was conducted using *qualitative research approach*. Qualitative research strives to increase understanding of a certain phenomenon (Stake, 2010). The interesting question within qualitative research is rather "What kind of?" instead of "How much/ fast/ long/ etc.", which is the case most often with quantitative approach (Hirsjärvi, Remes & Sajavaara, 1997). When talking about qualitative approach, we are most interested in finding out the qualities related to a phenomenon under investigation, as opposed to numeric attributes of the unit of analysis. With qualitative research methods, the researcher can get closer to the subject under study and be a part of the study. This is particularly important when finding out the building blocks of a certain phenomenon: what actually constitutes the problem at hand. Respectively, qualitative approach favors data gathering methods that permit and support the examinees voice to be heard (Hirsjärvi, Remes & Sajavaara, 1997). According to Eskola and Suoranta (1998), qualitative data is most simplistically text. The text can be gathered using various methods, for example interviews, personal diaries, autobiographies, internet forums and chats just to name a few. When the purpose is to find out the motivational factors behind individual user's use behavior, it seems then a natural choice to choose an approach that is designed to support that. Interview, with its multiple variations, is one of the most used data gathering methods in qualitative research (Myers & Newman, 2007), not least because it is a flexible data gathering tool that can be used in multiple different situations and it is powerful enough to tap into the deep information, motivations, beliefs and opinions of an individual (Hirsjärvi & Hurme, 2000). Among other things, interview is perceived as a good alternative for data gathering when the phenomenon under investigation has not yet been studied extensively (making it an unknown field for the researcher), the phenomenon under study is likely to produce varying and complex answers and the answers are likely to be clarified and deepen with extra questions. Additionally, interview is seen especially effective when human is being perceived as a subject,

an active party that creates meanings. As such, individuals need freedom to express themselves as freely as possible, which is something interviews can deliver. (Hirsjärvi, Remes & Sajavaara, 1997.) Among different interview techniques, *theme interview* was chosen to be used. Theme interviews are semi-structured interviews, which places them roughly in the half-way of structured interviews and unstructured interviews and the distinctive characteristic is that theme interviews do not have a strict and ordered question list. Instead, the interviewer has a few predefined themes that function as the framework for the interview. The questions might be presented in varying order and some questions might be added and some left out from interview session to another. (Hirsjärvi, Remes, Sajavaara, 1997; Hirsjärvi & Hurme, 2000.) The approach gives freedom for the interviewer to change the order of the questions as well as to ask extra questions and deepen the answers, which is needed to discover individual's motivations. Additionally, the freedom can make the interview session feel more natural for the both parties, possibly enabling the interviewee to give more encompassing and accurate answers as a result of a more relaxed feeling during the session. Theme interviews focus on working with and within predefined themes, leaving the number of interview sessions conducted or how deep the interviews were, out of the examination. This shifts the focus of the interview more towards taking into account the interviewees' voice and their interpretations and meanings given to the matters being processed. (Hirsjärvi & Hurme, 2000.)

During the research, starting from the very first days, literature review was an on-going process. The purpose was to gather all the required knowledge to complete the research. The aim of the literature review was to cover as much of the prior research within the research area as possible in terms of time span and authors. Prior literature was searched from various sources. Main sources were databases such as Google Scholar, IEEE Xplore Digital Library, EBSCOhost Business that granted an access to scientific articles. Related literature was searched within the databases by conducting different search queries containing keywords such as "information system", "crowdsourcing", "motivation", "use", "discontinuance", "discontinued", "quit". Often these keywords were combined to form specific queries and some defining words were attached. For example, "motivation and discontinuance" + "information system" or "crowdsourcing and motivation" or "information system and discontinued use" + "quit" + "crowdsourcing" were found to be relatively good in searching relevant articles. Literature was also searched by examining the reference lists of chosen articles, searching literature from the university's library and reading related online news and websites and searching literature from their reference lists. Potential literature was first chosen based on the publicity of the article or book. Practically, in this case it means how frequently the article or book was referred by peers in other publications. As the literature review progressed, certain authors and publications seemed to surface again and again among the relevant literature. Hence, a few corner stone authors and publications were identified. Based on this, it was easier to evaluate the validity of the other publications (it could be sought out whether the author(s) knew the relevant and important publications or were they referring to some publications which were less known and cited). The literature found

(mostly articles and books) was then evaluated by its subjectivity (i.e. is it relevant or not), the amount other researchers have referred it, the date it was published, how famous the authors are in their field and what was the overall quality appearance of the chosen source.

4.2 Research questions

This subchapter introduces the research questions guiding the study. Additionally, all the questions are being unraveled to give them a justification and to examine their validity in contrast to the phenomenon under investigation. The research questions used in this study were shaped to following:

1. Why do users discontinue the use (i.e. quit using or switch to an alternative) of a certain crowdsourced software engineering platform?
2. What are the demotivational factors driving user's decision to discontinue the use of a certain crowdsourced software engineering platform?
3. How do motivational factors change during service usage life cycle from adoption to discontinued use?

Research question number one is the main question and acts as the parent question for questions two and three, using a parent-child entity relationship metaphor familiar from IS literature and relational databases (see e.g. Teorey, Yang & Fry, 1986; Chen, 1988). The purpose of this study is to discover what are the motivational factors that affect individual's behavior to discontinue the use of an online crowdsourced software engineering service. Platform comprises the crowdsourcing intermediary's core business service (i.e. the service it operates utilizing crowdsourcing) and the aggregate of an interface, infrastructure and rules that together constitute the marketplace where specific tasks are mediated between crowdsourcees and crowdsourcers. The users consist of the platform's crowdsourcees who are given the tasks and how contribute to the platform by providing solutions to the given tasks. Additionally, the context is semi-organizational in a way that the unit of analysis in question is an individual person using the crowdsourcing service and its platform as the contributor. In that sense, the individual person has a freedom of choice whether he or she continues the use or discontinues the use. Question number two digs deeper and strives to answer what are the motivational factors that affect users' decision to discontinue the use of a certain crowdsourced software engineering service. Question number three examines how motivational factors change during IS usage life cycle from the adoption to discontinued use. A prior study by Soliman and Tuunainen (2015) demonstrates that there is a difference in what motivates users to participate in an online crowdsourcing initiative in the adoption stage in contrast to continued use. Thus, question number three strives to fill in the blanks regarding the discontinued use stage.

4.3 Research context and process

4.3.1 Context: uTest, an online crowdsourced software testing platform

The subject of the study is comprised of the crowdsources of a software testing community and crowdsourcing platform called uTest. uTest was chosen as the studied service for two main reasons. First, the service provides an interesting view point into crowdsourcing, since although it is voluntary for the participants, the platform aims to provide its testers a certain baseline in terms of testing skills and knowledge by obligating the users to undergo and complete the required basic audition. Additionally, the service itself as an information system lies somewhere between hedonic and utilitarian IS and the context is semi-organizational from the user's point of view. Second, the researcher works in a software development business domain, which made it a natural choice to seek a crowdsourcing service that is operating in the same business domain.

uTest is an established, global online community of software testers with a platform for managing crowdsourced software testing (uTest, 2018). The community and platform operate under a parent company called Applause, a privately held software company founded in 2007 and headquartered in Framingham, Massachusetts (LinkedIn, 2018). According to their website, Applause offers various software testing solutions for client companies, ranging from manual testing to automated testing, usability testing, accessibility testing and payments testing (Applause, 2018). uTest constitutes the community of the testers who commit the testing projects and the crowdsourcing platform for task distribution. The platform provides the interface, infrastructure and rules to manage the operation of crowdsourced software testing. (uTest, 2018.) uTest can be classified as being a mix of hedonic and utilitarian information systems (Furneaux & Wade, 2011; Turel, 2014; Maier et al., 2015). Based on the conducted interviews, the users of uTest truly enjoy completing the testing tasks and find the service fun and exciting. On the other hand, the users are financially compensated when completing tasks, the users gain experience and participation can be a leverage in job interviews. However, when comparing working on uTest to a more traditional position, it is clear that the context is more of non-organizational from the user's point of view.

uTest platform has a global community of registered testers (more than 300 000 members according to Applause website) who are invited to customer projects based on project demand as well as the testers' skill set, past project performance and availability. The testers are unknown to the client organization and to some extent to the platform as well (in most cases the members and the platform's administrative personnel have not met anywhere else than online). Before a tester can participate in paid projects, he or she must be qualified by completing an audition arranged by the platform. This is called Sandbox 101 Program. Sandbox 101 Program allows uTest to evaluate new starting testers (or testers who are not yet rated) and let starting testers become familiar with the service. In short, new testers are invited to upcoming Sandbox test cycles. Once he or she gets invited, the tester is assigned with a so-called Sandbox team lead who supervises

and provides all the necessary resources and guidance for the tester. Then the tester follows given Sandbox test cycle (an unpaid test cycle mimicking real, paid test cycles) instructions, submit one test case and one-to-two software bugs from a pre-defined website. New testers' performance in the Sandbox Program is linked to their profiles and thus, to some extent, dictates the tester's ability to receive paid projects. (uTest, 2018.) This makes uTest to stand out from traditional crowdsourcing services. Normally anyone can participate in a crowdsourcing initiative, but uTest wants assure its crowd of testers have some standardized basic level testing training. After completing the Sandbox 101 Program, the tester can be invited to paid projects. The amount and quality of software bugs found affects the paid projects invitation frequency. Thus, the more testing cycles a tester participates in and how well he or she performs in each testing cycles improves the tester's chances to receive more invitations and gain more testing opportunities. According to uTest website, users can also improve their chances by keeping their tester profiles up-to-date, applying to all the projects that fit into the user's profile and by participating in a weekly offered training and coaching program called uTest Academy (uTest, 2018.)

All the active testers on uTest are rated against each other and the rating is test type dependent. A tester can be rated as Rated, Proven, Bronze, Silver or Gold based on tester's activity and quality of work on test cycles. Since the rating is type dependent, a tester can have multiple ratings, for example Silver rating in one type and Proven in the other. *Activity level* is determined by lifetime participation level (which is determined by quality of participation factors, e.g. number of reported bugs, number of approved bugs), recent participation level during the previous three, six or twelve months and reliability (i.e. the tester reports test cases and bugs for projects that have a Test Cycle Agreement checked). Additionally, accepting a test cycle and not submitting any reports has higher negative impact, than if the tester would have declined the test cycle in the first place. *Quality of participation* approval percentage for all report types (e.g. usability reports, test cases, surveys), accuracy of the initial bug report/ severity classification determined by the tester (re-classifications done after report submission will have negative impact) and how inclusively the tester has provided information in his or her submitted report that was requested in the test cycle's scope and instructions. Additionally, rejected initial reports have less negative impact on the rating than rejected disputes. (uTest, 2018.)

The members are compensated with monetary payments and the size of the payment depends mainly on the tester's performance. Thus, the better the tester the higher the payment. Testers receive payments for approved bugs (here, the size of the payment is determined by a Base Bug Report Payout Rate that varies from test cycle to test cycle and in some cases how the customer has valued the tester's report. The report can be Exceptionally Valuable, Very Valuable or Somewhat Valuable.), approved test cases, bonuses in some test cycles, completed usability surveys and other reports, such as test cases (manuals), security reports, automated test scripts, etc. Furthermore, payment rates of Gold, Silver or Bronze rated testers are higher than other members' payment rates in the community. For example, if a tester has Bronze rating in one type and that rating exalts to Silver, the tester will receive higher payouts for test of that type. (uTest, 2018.)

uTest was chosen as the studied service because for two main reasons. First, the service provides an interesting view point into crowdsourcing, since although it is voluntary for the participants, the platform aims to provide its testers a certain baseline in terms of testing skills and knowledge by obligating the users to undergo and complete the required basic audition. Additionally, the service itself as an information system lies somewhere between hedonic and utilitarian IS and the context is more of a non-organizational from the user's point of view. Second, the researcher works in software development business domain, which made it a natural choice to seek a crowdsourcing service that is operating in the same business domain.

It should be noted that from here on, the terms "platform" and "service" are used interchangeably to describe the information system that users of uTest are interacting with.

4.3.2 Research process

The research started with a rough sketch, which could be called as an early plan. At this point the only thing clear was that the study would focus on crowdsourcing. However, the common thread or the angle of the research was still missing. After a good amount of juggling with different research themes in the area of crowdsourcing, the idea of the focus point began to brighten up. This iterative process of reading, thinking, planning, writing and returning back to the drawing board evolved a research theme of IS use life cycle with an emphasis on discontinuance as the final stage of the life cycle. The phenomenon is examined from individual user's perspective and crowdsourcing provides the context. The main sections of this study consist of a literature review was described earlier and an empirical study.

The empirical study was conducted using theme interviews as mentioned earlier. Since the purpose of the research was to examine individual users' use motivations, the natural choice was to gather the data from the users themselves via interviews. The interviews were conducted using Internet-based computer-mediated communication strategy (CMC). Internet-based CMC covers for example such communication medias as email, telephone and instant messaging, which are operated using computers or mobile devices with Internet connection. These online-based interview means can introduce so-called contextual naturalness to the interview situation, which can help the interviewee to perceive the situation more natural. Contextual naturalness can be achieved in a sense that the interview situation resembles a lot like the situation where the interviewee would normally carry on the activity for which he or she is interviewed. (Kazmer & Xie, 2008.) In other words, CMC was perceived to provide an interview setting that would resemble the interviewees normal setting using uTest as compared to face-to-face or normal telephone interviews. Above all, this strategy was chosen because the interviewees were globally distributed and lived in different countries than the interviewer himself. According to Eskola and Suoranta (1998), interviewees should be granted with the opportunity to choose a place for the interview session that best suits them and feels most natural. Against this backdrop,

CMC strategy enabled interviewees to choose the most convenient time and place for them. Additionally, CMC strategy enabled the interviewer (and the interviewee) to choose the most suitable communication channel. In all of the interview cases Skype was chosen as the channel and the interviews were carried out using either instant messaging (i.e. typing), Skype voice call without video or Skype video call. The chosen communication technique (i.e. typing, voice call or video call) was determined by the interviewees preferences and abilities to use that particular technique. The interviews lasted from 35 minutes to 75 minutes with an average interview length at 45 minutes.

The interviews were constructed using a motivational factors framework by Soliman and Tuunainen (2015) as the underlying theoretical framework. The interview protocol was built on the following three main themes based on the distinct stages of IS usage life cycle: 1) adoption of the crowdsourcing service (and its platform), 2) continued use of the crowdsourcing service (and its platform) and 3) discontinued use of the crowdsourcing service (and its platform). Each of the main themes were then divided into two subthemes based on the origin of the motivation, extrinsic and intrinsic motivation. These themes provided a framework for the interview and ensured that every stage of the life cycle is taken into consideration related to use motivation in different stages of IS usage life cycle and that most of the motivational factors identified in earlier studies are covered. The themes remained the same for every interviewee, but the order of the questions or wordings changes from interview to another depending on the flow of the interview.

4.4 Data collection

All the interviewees were contacted using CMC strategy. More precisely, the interviewees were first contacted via LinkedIn or by email. The potential interviewees to be contacted were selected based on the following main criteria:

- the person had worked for uTest according to his or her LinkedIn profile,
- the person was not working for uTest anymore at the moment according to his or her LinkedIn profile and
- the end date of the uTest work period was not more than three years ago. This requirement was set to ensure the person still remembered the time he or she was using the crowdsourcing platform and hereby was able to answer the interview questions.

Due to the nature and purpose of the study, the criteria used was quite broad. Because of this, the interviewees' demographics and socioeconomics varied between each other. However, despite having a broad criteria for interviewee selection and spending altogether more than 10 months finding potential interviewees using multiple sources and persuading people to participate in this

study, the amount of interviews obtained remained low. Every possible means to find potential interviewees was tried and the search was carried on until the very last stages of the thesis writing. Eventually, the quest was put to an end since no new interviewees were found. A more thorough report of the potential interviewee search can be found in Appendix 2.

4.5 Analysis

The analysis of the research results was done as follows the motivational factors framework by Soliman and Tuunainen (2015) was used as the underlying framework and OIT was then used as the theoretical lens for analyzing the user's motivational journey. The attempt was to track users' journey from being motivated to being amotivated during the service use life cycle from adoption to discontinued use. The rationale for using this specific framework is that the motivational factors framework by Soliman and Tuunainen (2015) presents the main factors identified in the initial service use (adoption) and in continued service use. This research intends to augment this framework with third - and in this context, the final - usage life cycle stage, which is discontinued use. Thus, the framework would cover the main motivational factors related to different usage life cycle stages from adoption of the service to its "death" from the individual user's point of view. Now the current motivational factors framework is lacking the final stage of the usage life cycle. The users' motivational journey from pre-adoption to discontinued use was then analyzed using Organismic Integration Theory.

The analysis process was conducted in practice as follows:

1. The interviews were transcribed right after each interview session was held. Every interview recording was played multiple times from start to end and paused every two or three seconds to type down what was heard and how the interviewee seemed to react to the related question. Eventually, every interview was then transformed into written format for a proper analysis.
2. The interviews were then partitioned and color coded by the respective interview protocol's theme (examples provided in the indented bullets below)
 - Non-colored text indicated that the text belongs to interview protocol's theme 0, "Interview session introduction and background information".
 - Yellow text indicated that the text belongs to interview protocol's theme 1, "Adoption of the crowdsourcing service (and its platform)".
 - Green text indicated that the text belongs to interview protocol's theme 2, "Continued use of the crowdsourcing service (and its platform)".

- Turquoise texts indicated that the text belongs to interview protocol's theme 3, "Discontinued use of the crowdsourcing service (and its platform).
3. The interviews' data was then arranged into logical groups based on the interview themes. Each usage life cycle stage's text was then examined closely to find the motivational factors of the respective stage. Quotes containing indicators of motives were coded corresponding to the motivational factors' origin (intrinsic or extrinsic). Examples of the quotes are presented in the next chapter.
 4. Because interviewees used different words and wordings to describe same common phenomena (for example words like self-improvement, learning, mastering a new skill), higher level codes were created for the found motivational factor to standardize them and make them easier to classify.
 5. The motivational factors found in each stage were then divided into intrinsic and extrinsic motivation based on their **origin** of motivation.
 6. Within the extrinsic motivation group, the motivational factors were further classified into external regulation/introjected regulation/ identified regulation/ integrated regulation based on the factor's regulatory style as defined by OIT.
 7. The users' motivational journey from pre-adoption to discontinued use was examined through Organismic Integration Theory.

The process yielded a matrix which consisted of the identified motivational factors related to each usage life cycle stage. Additionally, the matrix used a classification scheme which divided each life cycle stage's motivational factors based on their origin of motivation. Furthermore, externally originated motivations were classified based on their regulatory styles. Finally, the users' motivational journey was identified and this has been depicted in figure 11 in chapter 6.

The next chapter presents the obtained research findings. Prior to the results, the chapter gives a brief overview of the interviewees' backgrounds.

5 RESEARCH FINDINGS

This chapter presents the research findings derived from the interviews. The chapter is constructed as follows: first, chapter 5.1 presents the interviewees' background information. This is followed by chapter 5.2 which presents the motivational factors that were identified affecting individual's motivation to adopt the service. Then chapters 5.3 and 5.4 proceed with the same logic and present the motivational factors identified in continued use and discontinued use, respective to the IS usage life cycle. Hence, the motivational factors are divided and presented in the following order: adoption, continued use and discontinued use of the service.

5.1 Overview of the interviewees

Interviewee number one - from here on known as "Pekka" - was a thirty years old male software quality assurance engineer from Southern Europe working in a global company offering other companies insurance services. Pekka has a testing experience of almost ten years of which three years as a freelancer in crowdsourced software testing.

Interviewee number two - "Matti" - was a thirty years old male also working as a quality assurance engineer. Differing from Pekka, Matti was from South America, working in a global company providing professional IT services for other companies.

Interviewee number three - from here on known as "Eeva" - was a female participant from Central Europe close to her thirties. Eeva was working in a global company as well, which offers professional cloud based IT services for other companies. Eeva's educational background is not originally oriented towards testing.

Interviewee number four, "Kimmo", was a slightly over forty years old male from Central/ Northern Europe working as software testing engineer in a global company providing various, in many case IT related, professional services for other companies. Kimmo has a quite extensive background in testing domain with more than ten years of experience.

Interviewee number five, "Tiina", was a female participant, slightly over her thirties. She was located in Scandinavia, but was originally from India. Tiina had her educational background in electrical engineering, but has work experience in software testing. Tiina was looking for a new job at the moment of the interview.

The frequency and volume of use varied between the interviewees quite significantly. For example Tiina used uTest in a periodical manner, i.e. the interviewee used uTest for a couple of months, stopped using the service for some time and then continued its use. During the use period Tiina used the service approximately five or six times in a month. On the contrary, Pekka stated that the usage period consisted of one continuous period and active use of the service was

daily, approximately 2-3 hours per day. Matti stated that the usage was roughly a couple of days per week during the period of the service use and the normal work day was around couple of hours. Eeva used the service also for one certain period of time and during that time the usage was fairly low in the beginning but gradually evolved into around 20 hours per week. Kimmo only stated that the usage was fairly active during the first five-to-seven months, consisting of weekly usage.

Kimmo, Matti and Pekka were not employed by any other company or entity during the time of uTest service use, whereas Tiina and Eeva were employed by another company at the time of the service use period.

Matti, Tiina, Kimmo and Eeva did not participate in any similar crowdsourcing service at the same time or after the use of uTest (at the time of the interview), whereas Pekka had tested some other similar services as well for comparison. A summary of the background information is presented in table 1.

TABLE 1 Background information of the interviewees

	<i>Interviewee number 1, "Pekka"</i>	<i>Interviewee number 2, "Matti"</i>	<i>Interviewee number 3, "Eeva"</i>	<i>Interviewee number 4, "Kimmo"</i>	<i>Interviewee number 5, "Tiina"</i>
<i>Gender</i>	Male	Male	Female	Male	Female
<i>Age</i>	30-40 years old	30-40 years old	20-30 years old	40-50 years old	30-40 years old
<i>Location</i>	Southern Europe	South America	Central Europe	Central/Northern Europe	Scandinavia
<i>Education related to software engineering</i>	No	Yes	No	Yes	Yes
<i>Employment at the time of interview</i>	Employed (software QA engineer)	Employed (software QA engineer)	Employed (IT consultant)	Employed (IT consultant/SW tester)	No
<i>Employment during the service use</i>	No	No	Yes	No	Yes
<i>Frequency of use (approximate)</i>	5-7 days per week	1-3 days per week	4-7 days per week	1-5 days per week	0-3 days per week
<i>Volume of use (approximate)</i>	2-3 hours per session	1-3 hours per session	2-3 hours per session	1-3 hours per session	1-3 hours per session
<i>Prior experience in similar service</i>	Yes	No	No	No	No

5.2 Adoption

The interviewees found out about uTest from various sources, such as software testing publications, through googling, from colleagues and testing related blog sites. The reasons to try the service varied also quite a bit. Some were interested to just see how it works, some wanted to learn new and gain experience and some were looking for a temporary job. Below are the motivational factors that were found to affect individuals' decision to initially adopt the service.

5.2.1 Intrinsically originated motivation

Curiosity to try the service, to see how it actually works and to experience the offers uTest was providing at the time was one of the main intrinsically originated motivations affecting initial service adoption amongst the interviewees. "... I was curious to see would it work." (Kimmo) and "... I wanted to try it." (Pekka) were the types of answers that were categorized as curiosity when asked why did the interviewee decide to try the service. Curiosity was in par with the motivational factors of concluding enjoyment. Interviewees expressed enjoyment as a driving factor of adopting the service by stating explicitly that they enjoyed their work and role in the platform or by describing their preferences and how the platform managed to fulfill those (e.g. Eeva stated earlier to prefer varying tasks and that one of the main reasons to try the service was that uTest was able to provide lots of different offers). Self-actualization was also identified as one of the driving motivational factors as one of the interviewees stated "... I also had a feeling of mastery while doing it.". Self-actualization refers to person being able to express himself or herself, control the outcome and feel a sense of mastery over the action. Thus, self-actualization is traced back to satisfying individual's need for competence, which is one of the Cognitive Evaluation Theory's three basic psychological needs that form the basis for intrinsic motivation (Ryan and Deci, 1985).

All three identified intrinsically originated motivational factors of adoption - curiosity, enjoyment and self-actualization - were actually aimed at the interviewees themselves (i.e. intrinsically originated motivational factors with selfish aim). Hence, no intrinsic motivational factors with social aim were identified in the adoption stage of the service usage life cycle.

5.2.2 Extrinsically originated motivation

Financial rewards was the major driving extrinsic motivation of the service adoption. All of the interviewees stated that financial rewards played an important role when it comes to initial trial of the service and later on adopting it. "... Probably wouldn't have ever started if the service did not offer any money." (Pekka),

“... I was looking for something to get more money.” (Eeva) and “... The paid projects of uTest caught my eye.” (Tiina) were some of the answers when asked what made the interviewees try the service in the first place.

As with intrinsically originated motivational factors, all the identified externally originated motivations had also selfish aim. The identified motivational factors affecting adoption of a crowdsourced software testing platform are summarized in below figure 8.

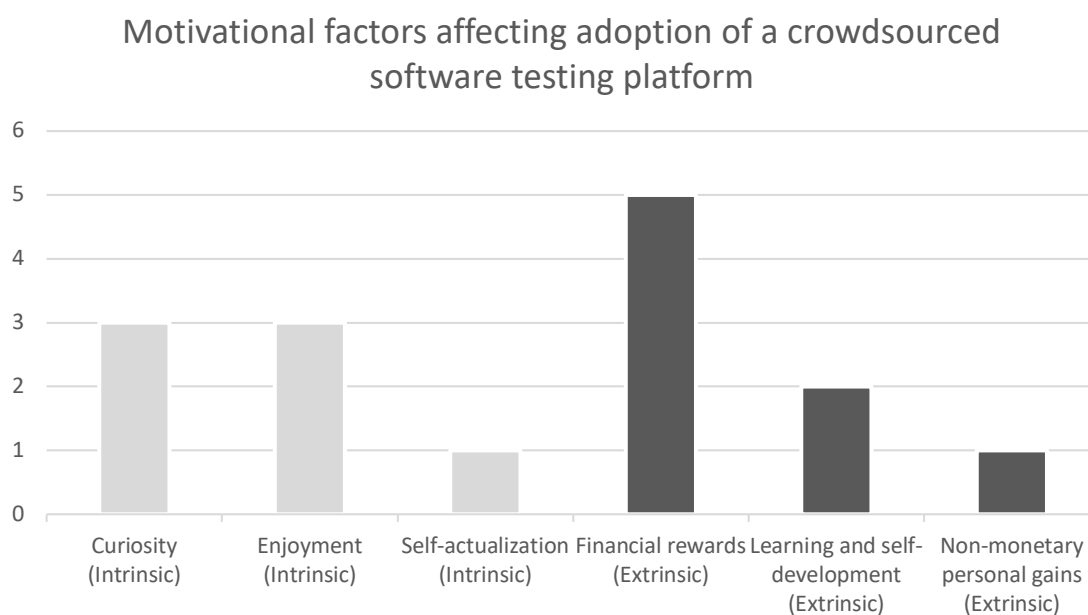


FIGURE 8 Motivational factors affecting adoption of a crowdsourced software testing platform

5.3 Continued use

Motives to continue the use of uTest varied between interviewees. For example, Matti stated that the projects provided by the service were interesting and that kept number two using it. Eeva commented that it was rewarding to see one’s progression testing work. According to Kimmo, the use of uTest gave good experience of testing work and provided a good topic to discuss about in job interviews. Below can be found the motivational factors that were identified to affect individual’s decision to continue using uTest.

5.3.1 Intrinsically originated motivation

Enjoyment and self-actualization were the most frequent intrinsically originated motivational factors that affected interviewees continued use of the service. The interviewees perceived the use of the service to be fun, interesting, exciting and something that gave “a little buzz” when done. For example, Pekka stated “... I did it mostly for fun.” when asked the reasons to continue the service use and

Eeva replied “... I really liked finding challenging bugs.” when asked the same question.

Self-actualization included the following expressions: sense of freedom and autonomy regarding how the actual work was done, sense of freedom to perform the work whenever and wherever and sense of mastery upon the work. “The freedom to do it anywhere and when you wanted...” (Eeva), “... I felt a sense of master and freedom.” (Pekka) and “... sense of autonomy regarding project selection.” (Matti) were some of the expressions used by the interviewees when asked what motivated them to continue the use of the service.

Other motivational factors were curiosity and altruism. Curiosity was related to different projects that uTest was offering at the time. Variety in the nature, type and scale of the projects aroused some of the interviewees’ interest and made them curious to see what the service could offer, which made them continue the use. Altruism was also discovered to affect continued use. For example, Pekka stated being rather active in the service community helping new members and educating old ones. Eeva had written instructional article for the service community to help other members in the testing work. One of the interviewees brought up a sense of societal expectations as one of the motivational factors of continued use by stating “... then it’s not that I’m not doing anything. At least I’m doing testing at home.”. Here, societal expectations is used to represent the individual’s sense of necessity to contribute to society he or she belongs to by working. At the time, Tiina did not have a permanent job, so uTest was something that the interviewee could do while applying for a permanent job.

5.3.2 Extrinsically originated motivation

Financial rewards were found to be the strongest influence of extrinsically originated motivational factors related to continued use of the service. Four out of five interviewees stated that the number one motivating factor of continued service use was getting financially compensated. For example, Eeva answered simply “Fast money.” when asked what made the interviewee continue the service use. Additionally, Eeva said that without monetary compensation the interviewee would not have continued using the service. Also, Kimmo stated that the most motivating thing about continuing the service use was getting financially compensated.

Learning and self-development was the next frequently identified influencer regarding continued service use. Possibility to increase knowledge (Matti), learning more about testing (Eeva) and gaining experience on testing (Tiina) were driving interviewees to continue using the service.

Other identified motivational factors were non-monetary personal gains, publicity and societal expectations. Non-monetary personal gains were for example the possibility to add the experience gained during the service use to interviewees’ CV and to bring up the experience gained in service use in job interviews. Publicity was also identified as one factor since Pekka stated that one of the motivating thing was that the interviewee was able to enhance skills in testing and gain a reputation as one of the best testing engineers in Utest. Additionally,

one of the interviewees brought up a sense of societal expectations as one of the motivational factors of continued use by stating “... then it’s not that I’m not doing anything. At least I’m doing testing at home.”. Here, societal expectations is used to represent the individual’s sense of necessity to contribute to society he or she belongs to by working. At the time, Tiina did not have a permanent job, so uTest was something that the interviewee could do while applying for a permanent job. The identified motivational factors affecting continued use of a crowdsourced software testing platform are summarized in below figure 9.

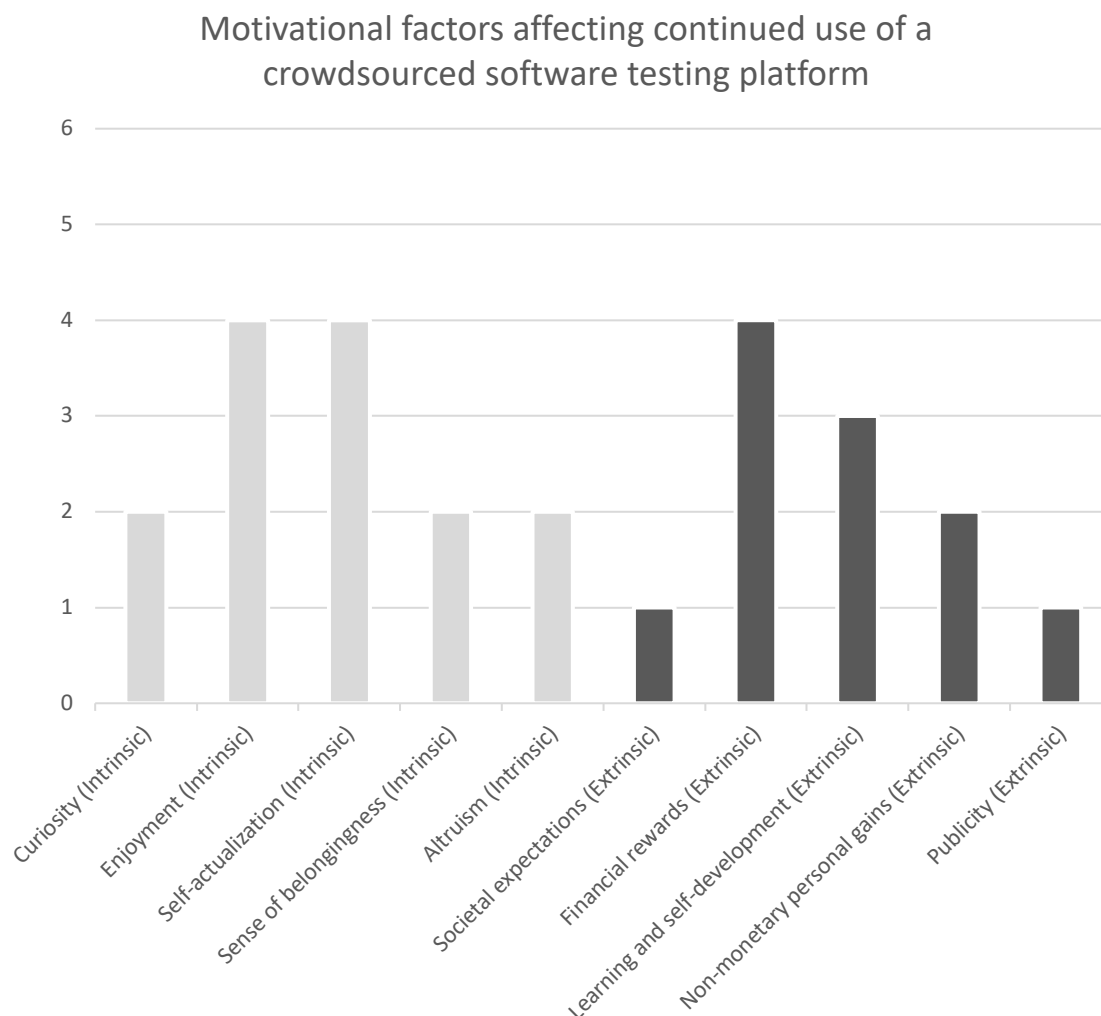


FIGURE 9 Motivational factors affecting continued use of a crowdsourced software testing platform

5.4 Discontinued use

In contrast with motivational factors related to adoption or continued use of an information system service, the identified motivational factors related to discontinued information systems use have a negative effect on the individual’s use

behavior. In other words, if individual's decision to quit using a specific information system service is affected for example by too small monetary remuneration, then financial rewards is identified as one extrinsically originated motivational factor affecting the individual's use behavior. Or if the individual feels that the service is not as enjoyable anymore, then decreased enjoyment is identified as one intrinsically originated motivation factor affecting user behavior. Therefore, the motivational factors of discontinued use can also be called as demotivating or amotivating (Deci & Ryan, 2000a) factors according to their negative effect on individual's motivation. From here on, the two terms are used interchangeably to refer to motivation being decreased. Below can be found the motivational factors that were identified to affect individual's decision to discontinue using uTest.

5.4.1 Intrinsically originated motivation

uTest is a service that relies on voluntariness. According to the interviewees, decrease of enjoyment was one of the major amotivating factors that amplified or sparked individuals' decision to discontinue the use of the service. "The projects did not feel interesting anymore..." (Matti) and "... it didn't feel like fun anymore." (Pekka) are examples of how the service use was perceived in the end of the usage life cycle for some of the interviewees. Per interviewees' answers, the service use had lost its excitement along the way since the projects or tasks did not offer any novelties and in some cases the enjoyment was hampered by the service's practicalities. The interviewees got eventually enough of the service use.

Besides enjoyment, frustration against practicalities and instructions and frustration against operative management of the service were identified as demotivating factors. Frustration against practicalities and instructions was constructed to operationalize interviewees' negative feelings against instructions that were perceived as confusing and/or which were vaguely expressed. For example, Matti stated that "... confusing terms regarding payments..." was one of the reasons the interviewee had decided to quit using uTest. Frustration against operative management was used to operationalize interviewee's negative feelings against the support offered by the service. According to Matti, "... project's technical leader was never present.", which affected interviewee's perception of the service's support and consequently affected interviewee's decision about whether to continue using the service or not. Most likely, a lack of support from the superiors and service support can make the user feel insecure about his or her work and alienate the user from the service and its community. In context like uTest, where the user does not work face-to-face with the community, superiors and peers, it would be even more important to strive for making everyone feel as part of the community and provide all the support needed.

Two of the interviewees' stated that they had felt themselves being mistreated during the service use. Although sense of being mistreated was identified on two interviewees', the subject seemed to be rather sensitive and emotionally loaded. Additionally, when confronted by a sense of being mistreated the decision to discontinue service use was made fairly quick. As stated by Pekka:

I was professionally frustrated with uTest because I was working hard there, had earned great ratings, received awards and was active in the community but I was always skipped regarding role promotions and high values contracts.

In Pekka's situation the self-actualization was practically suppressed by not providing an opportunity to develop his skills further, fulfill his talent and expertise and feel competent over the activity. In other words, the need for competence was not satisfied and was actually undermined. Additionally, the answer implies that Pekka did not feel himself as being valued by the service superiors. This can be traced back to CET's basic need of relatedness, which concerns belongingness and connectedness to the surrounding people and groups (in this case, belongingness to a work community) (Ryan & Deci, 2000a). These events affected Pekka negatively, which again had an effect on his view about the service and eventually led Pekka to terminate the use.

5.4.2 Extrinsically originated motivation

Personal life constraints was identified as the number one extrinsically originated demotivational factor affecting individual's decision to quit using the service in par with limited learning and self-development possibilities. *Personal life constraints* was constructed to describe the situations interviewee's were facing that affected their decision to discontinue the service use. Such situations were lack of time because of a full-day job that the individual had acquired or that the individual had decided to move from the testing work offered by uTest to other type of testing activities. *Limited learning and self-development possibilities* was identified from similar statements like the following: "... I felt like I achieved my top regarding learning from projects..." (Matti), "The possibility to learn new decreased..." (Pekka). Since learning and self-development was perceived as one major driver along with monetary compensations, the limitation of learning and self-development possibilities within the service affected individuals' use behavior in a negative manner.

Although perceived as important factor, financial rewards was not the most frequently stated demotivational factor that affected individual's decision to discontinue the service use. Per interviewees, the monetary compensations offered by uTest were perceived too inadequate compared to the amount of time and work the interviewees had put on the service use. Answers like "As I put more effort I started expecting more (money) but that never really happened..." (Pekka) and "... if the pay was vastly different, then I might have reconsidered..." (Kimmo) were interpreted as motivational factors related to financial rewards and their effect on the individual's use behaviour was deduced to be of negative type. In other words, smaller monetary compensations decreased motivation towards service use especially when the other non-financial factors did not compensate for the small pay and thus, promoted individual's decision to quit using the service. The identified demotivational factors affecting discontinued use of a crowdsourced software testing platform are summarized in below figure 10.

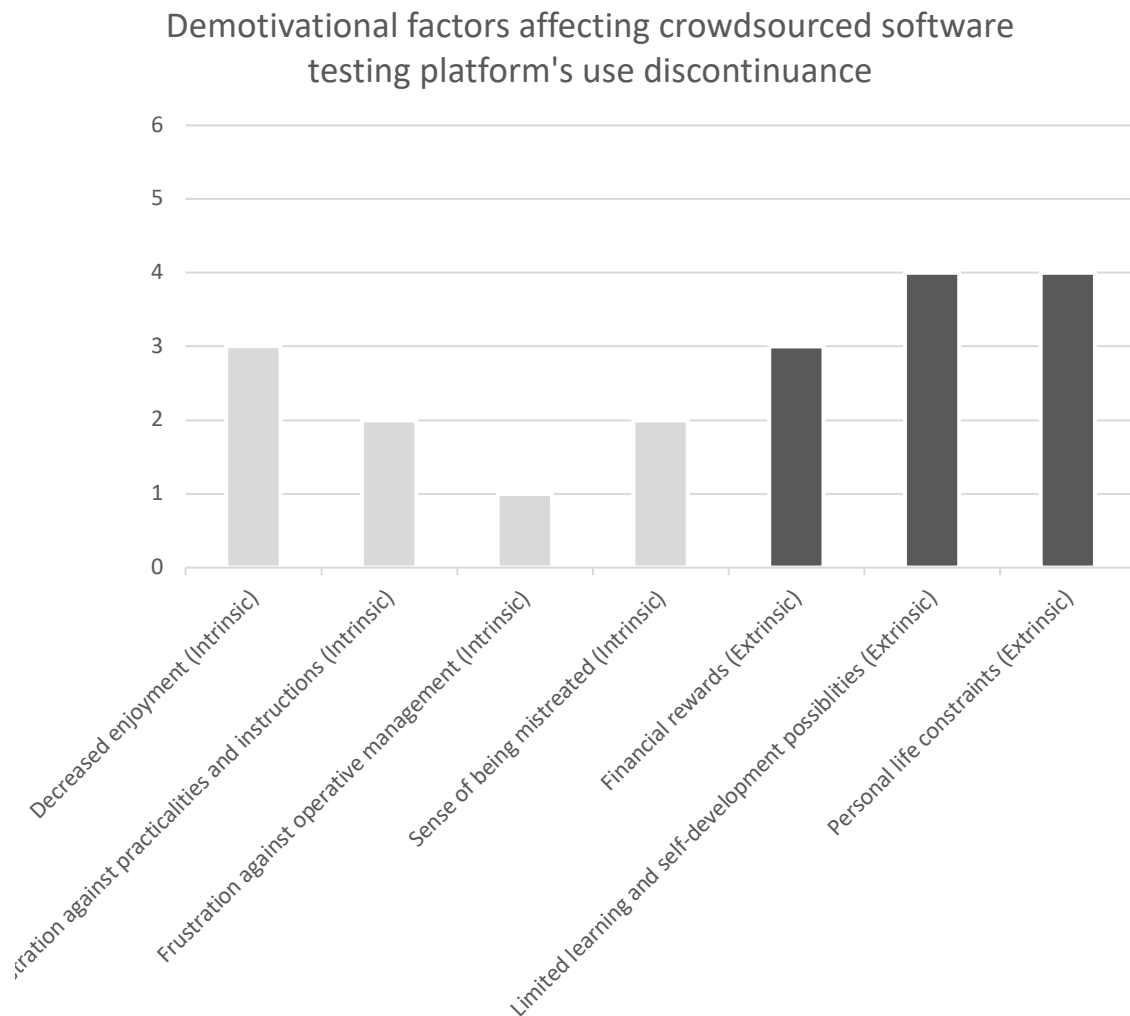


FIGURE 10 Demotivational factors affecting crowdsourced software testing platform's use discontinuance

5.5 Summary

This study was conducted to investigate why do users discontinue the use of a certain crowdsourced software engineering platform. Additionally, the purpose was to answer what are the motivational factors that drive individual user's decision to discontinue the use of such platform and how do motivational factors change during the service usage life cycle from adoption to discontinued use. The exact research questions are:

1. Why do users discontinue the use (i.e. quit using or switch to an alternative) of a certain crowdsourced software engineering platform?
2. What are the demotivational factors driving user's decision to discontinue the use of a certain crowdsourced software engineering platform?

3. How do motivational factors change during the service usage life cycle from adoption to discontinued use?

In this case the platform was chosen to be a crowdsourced software testing platform known as uTest. It was soon realized that in order to receive the answer to research question number one, the operant motivational factors affecting individual user's usage continuance would have to be examined first and this will yield the answer to research question two. The identified motivational factors affecting the studied users' use behavior through the information system usage life cycle are presented in figure 11 below. The figure depicts the main IS usage life cycle stages and related extrinsic and intrinsic motivations. Additionally, arrows pointing upwards and downwards were added to each stage. These arrows present the dynamics between the two types of motivations. For example, in adoption stage the extrinsically originated motivational factors were more dominant than intrinsically originated and vice versa in the continued use stage.

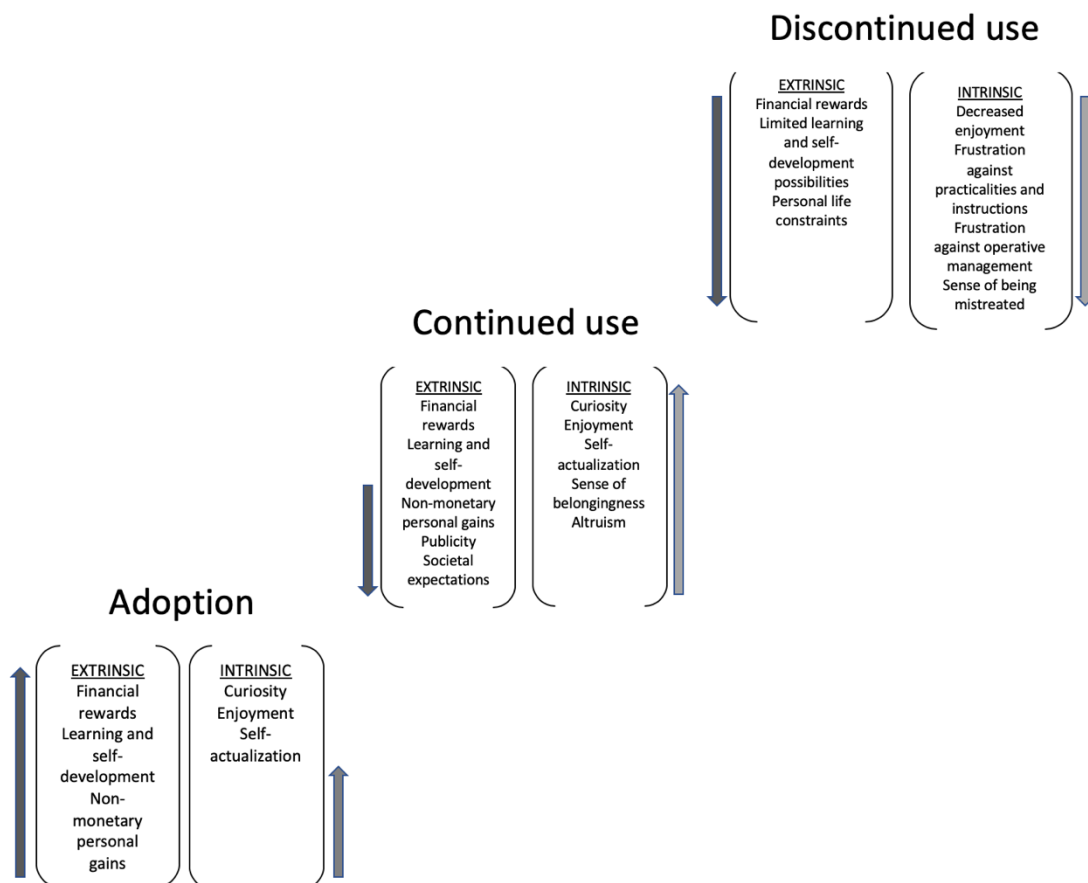


Figure 11 Identified motivational factors affecting users' use behavior through IS usage life cycle

According to the interview results, there was not just one motivational factor affecting individual's decision to continue the service use. Rather, there are multiple factors that affect individual's decision and they all seemed to have certain weight factor that is emphasized differently from individual to another. This can be seen in figures 8, 9 and 10 above, which present the motivational factors that were identified in each of the IS usage life cycle's stages and additionally, the occurrence frequency of each motivational factor in a specific IS usage life cycle stage. Furthermore, figures 8, 9 and 10 show how the motivational factors affecting individual user's decision to continue the use change from adoption to discontinued use.

The next chapter discusses the obtained results and presents this study's contribution to research and practice. Additionally, chapter 6 discusses the limitations and evaluation of the study, gives suggestions for future research topics and presents the final concluding remarks.

6 DISCUSSION

As already discovered in chapter 5, the interviewed users tended to value the importance of financial rewards greater in the adoption stage and in continued use stage. However, it seems that the importance of monetary compensation was actually dwarfed by learning and self-development and personal life constraints in discontinued use stage. This would imply that monetary rewards act as a tempting kicker to get users onboard but is not a lasting solution to retain them. Partly this is due to relatively small monetary compensations. Because of small monetary compensations the interviewed users sought other type of value from the service use and this learning and self-development. This finding reflects the statements received from the interviews. Another interesting point is that some of the interviewed users felt that they were mistreated by their superiors by not supporting their career growth in the service or giving a chance to progress to higher positions. This would inevitably decrease motivation to continue the service use. According to Lee, Lee and Hwang (2015), controlled extrinsic motivation (i.e. a reward obtained from certain activity is perceived to control the individual's behavior) such as financial compensation will undermine intrinsic motivation. In light of this, such negative use experiences would most likely be especially harmful for a service that is a mix of utilitarian and hedonic information system and which relies heavily on other factors than monetary compensations to retain its users.

Additionally, new motivational factors - sense of belongingness and altruism - were introduced in the continued use stage compared to the adoption stage. This could be a result of an individual user perceiving the service use as a hobby and immersing himself or herself deeper into the service community. These motivational factors were realized only in the continued use stage, which would imply that engaging users more with the service community could improve retaining users. This seems to be in line with the interview results, since personal life constraints (e.g. individual getting a full day job offer) seemed to quickly dwarf the service use and thus, would imply that uTest was perceived more as a hobby rather than a job for the interviewed users.

Now, the number one question remains: why do users discontinue the use of uTest? Organismic Integration Theory posits that a person who is not motivated towards certain behavior is amotivated, in which case he or she is "... lacking an intention to act." (Ryan & Deci, 2000a, 61). One of the sources for this complete absence of a driving force can originate from the person not valuing the activity (Ryan, 1995). If we examine OIT as a continuum of motivation, amotivation can be found on one end of the continuum and intrinsic motivation on the other. Extrinsic motivation with its various types is located between these two extremities. Thus, it could be observed that a person is first amotivated towards certain activity, after which he or she becomes extrinsically motivated and along the way, he or she might ultimately become intrinsically motivated towards that activity. But does the person stay intrinsically motivated until the end of time? As many of us have witnessed before, people tend to get tired of carrying out certain activity. They tend to lose their interest in the activity or realize that it is

not giving them the same pleasure anymore. The cost-benefit ratio of carrying out that activity suffers an inflation and from individual person's point of view, the activity is not valued as high as it used to be. As a result, the person becomes amotivated anew towards the activity and the circle of this motivational journey closes.

Adapting this view against the empiric results, the interviewees were not informed about the service in the pre-exposure phase and hence, were amotivated towards the service use since they would not have been able to value it. In the adoption phase, the interviewees seemed to be motivated especially by the monetary compensations offered by uTest although they were driven by intrinsically originated motivational factors as well. As stated earlier, monetary compensations and extrinsic motivation seems to provide a good kicker to hop onboard and try the service. Gradually, the interviewees seemed to identify other, intrinsic motivations from the service use as well. Towards the end of the usage life cycle, fewer interviewees reported that extrinsic motivations would have affected their decision to quit using the service. In fact, the interviews indicate that the demotivating factors which actually affected the interviewees most, were intrinsically originated. Gradually, the interviewees' valuation of the service declined and eventually their motivation towards service use dropped. The interviewees became amotivated again. According to the empirical data obtained in this study, the user's motivational journey went from being amotivated (i.e. unawareness of the service) to first being mostly extrinsically motivated. During continued use, the users became more motivated by factors that are intrinsically originated and eventually the intrinsic motivational factors seemed to supersede extrinsically originated factors in terms of importance related to continued use. It should be noted that both extrinsic and intrinsic motivations co-existed at the same time. After a period of continued use both - extrinsic and intrinsic motivations - suffered an inflation as the users' valuation of the service use gradually diminished. Towards the end of the use life cycle, the users reported more demotivating intrinsically originated motivational factors compared to extrinsically originated (figure 11). Eventually, the users decided to quit using uTest as they became amotivated towards the service use. This state of amotivation resulted from the users perceiving the service use as taking more of their resources than what it gave to them - the cost-benefit ratio of the service use turned upside down. Thus, individual user's motivational journey through IS usage life cycle appears to progress from pre-usage amotivation through extrinsically and intrinsically motivated state to post-use amotivation. This motivational journey is depicted below in figure 12. However, the post-use amotivation differs from pre-use amotivation so that post-use amotivation seems to be a result of individual actually experiencing the service use whereas pre-use amotivation exists because of ignorance regarding the service. So in essence, post-use amotivation seems to be dependent on the individual's use behavior whereas pre-use amotivation exists as default already before the individual's actual use behavior.

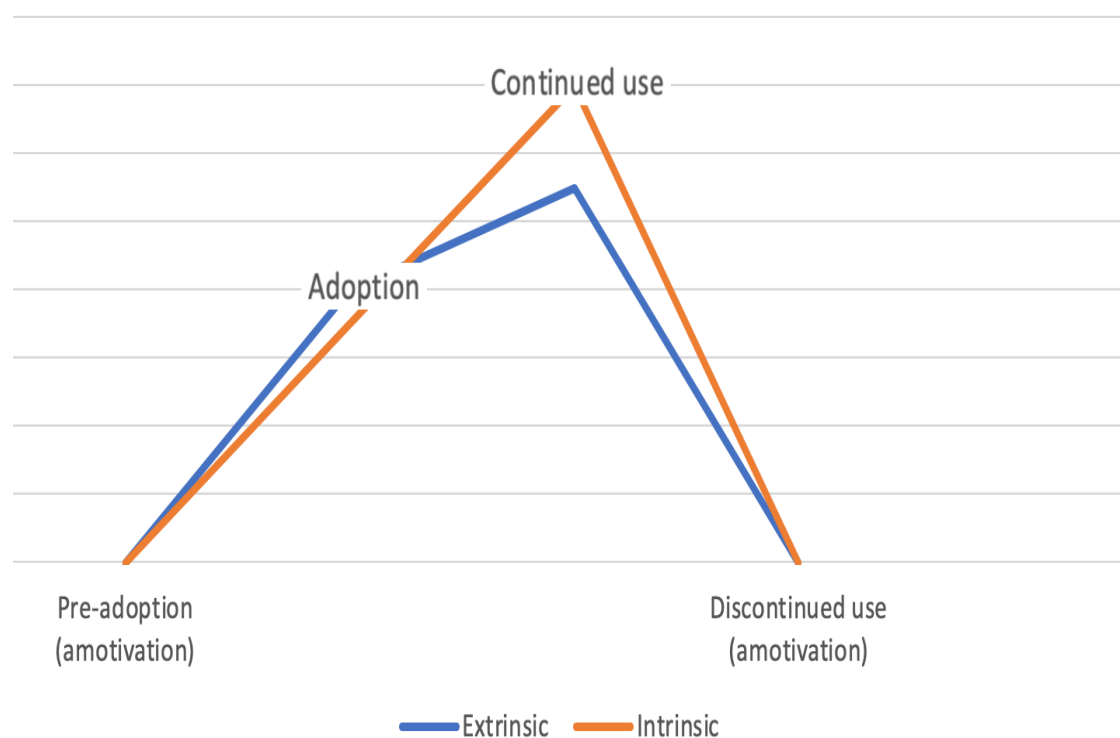


Figure 12 Individual user's motivational journey through IS usage life cycle

By reflecting these findings to previous research we can see that there is consistency between existing research results and the ones obtained in this study. A study on Amazon's crowdsourcing platform MTurk's use motivations by Kaufmann et al. (2011) revealed that immediate payoffs was one of the highest scoring motivational constructs that kept the users coming back to the service. However, it was also stated that the intrinsic motivational factors, especially enjoyment based, were actually perceived more important than extrinsic factors by the users. Similar results were obtained in a study by Soliman and Tuunainen (2015). The interviewed users were mostly driven by the possibility to earn money and of curiosity in the first stage of the service use - the initial trial and adoption of the service. After a period of continued use, the users started to become more motivated by intrinsically originated factors, such as enjoyment, and so the importance of the initial extrinsic motivational factors seemed to wear out. Brabham's (2010) study on user's motives to participate in an online crowdsourcing service called iStockphoto revealed that the possibility of earning monetary compensations was the number one reason to participate. In addition, peer recognition and possibility to learn new skills were perceived as important as well. According to TAM, user's acceptance and intention to use certain technology are mainly depicted by perceived ease of use and usefulness, which affect user's attitude towards using the technology. Since TAM was originally created for organizational context, perceived usefulness denotes to what extent the technology use will improve individual's work performance. (Davis, 1985.) Further, ETC posits that users' intention of continuing the use of a certain IS is determined by

experienced satisfaction over the information system use and by the perceived usefulness of using the IS (Bhattacharjee, 2001). Regarding uTest, usefulness seemed to be the most dominant factor affecting the adoption and continued use of the service. However, it should be noted that in the context of uTest and its studied users, perceived usefulness means to what extent the service use will improve individual's life. Hence, it would consist of the various motivational factors that were identified to affect the studied users' decision to adopt the service and continue its use. Additionally, the combination of the motivational factors differ from user to user, which reflects how the service use improves the users' current life. Hence, towards the end of the usage life cycle, the studied users would have not perceived the use of uTest enough useful anymore, which would lead to discontinuance. From ETC perspective, the perceived performance (i.e. the benefits of using uTest, such as monetary rewards, enjoyment, experience and learning) outweighed the expectations towards the service use which resulted in a positive disconfirmation and lead to satisfaction and continued use of the service. However, after a period of continued use, the perceived performance did not outweigh the expectations anymore. According to the interviewees, their expectations towards the service use did not raise during continued use, which would indicate that the perceived performance declined, which lead to negative disconfirmation and dissatisfaction regarding the service use. Eventually, the users terminated the use.

Some contradicting results from previous research were also found. A study by Baruch, May and Yu (2016) showed that the studied participants were mostly motivated by altruistic factors, which are intrinsically originated. The service under study was an online crowdsourcing service called Tomnod where participants investigate satellite images and try to identify objects and places in them. According to the study, the majority of the most active participants were people that had health problems, disabilities or were retired. Additionally, the service is completely voluntary in nature and hence does not have the leverage of offering monetary compensations to participants, which puts the service in another category compared to services like uTest and MTurk. These factors would imply that the nature of the service and participating individuals' life situation have a significant effect on the motivational factors of adopting and using a specific online crowdsourcing service.

The benefit of tracking down users' motivational journey from end to end as compared to focusing solely on one life cycle stage in the study, is that with multiple stages the researcher is able to capture the whole service use. Inevitably, when considering only one stage of the usage life cycle, the other stages are like black boxes. The researcher does not have the visibility on them, which limits the analysis of the results and the deductions that can be made.

6.1 Contribution to research

This research contributes to current IS continuance and crowdsourcing research in the following means: firstly, by addressing the less studied final stage of IS

usage, discontinued use. The study presents various motivational factors that were identified to affect individual user's decision to discontinue IS use. Additionally, the study introduces a stage model depicting IS usage life cycle. The model presents individual user's motivational journey throughout the entire life span of a specific online service's use and shows how the motivational factors change during the usage life cycle. Using OIT as a theoretical lens in the results analysis phase revealed that individual users would become amotivated again as a result of not valuing the service use anymore as a result of various interrelated intrinsic and extrinsic motivations changing dynamically over time. Thus, individual user's motivational journey through the IS usage life cycle appeared to progress from pre-usage amotivation through extrinsically and intrinsically motivated state to post-use amotivation. However, these two types of amotivations seem to differ from each other in a sense that the existence of pre-use amotivation exists already before the individual's actual use behavior whereas post-use amotivation depends on the individual's use behavior. In the pre-use stage, the individual is unaware of the service with its advantages and disadvantages and hence, cannot construct an opinion about the service use, which would then affect his or her motivation towards the use. Thus, pre-use amotivation exists because of unawareness. In the post-use stage, the individual is already familiar with the service use, has experienced its advantages and disadvantages and can construct an opinion of the service use. In this stage, the individual experiences post-use amotivation as a result of perceiving the service use to have more disadvantages than advantages. Secondly, the research contributes also by presenting the factors that drive individuals to adopt and later continue using a crowdsourced software engineering service and above all, what are the factors that reduce users' decision to continue the service use.

6.2 Contribution to practice

This research pointed out a few interesting points that could be improved by uTest. The studied users' actions suggest that uTest should invest more on establishing tighter relationships with its user base. A lack of support and alienation from the service community proved out to be especially harmful for the service in terms of retaining users. The interviewed ex-uTesters reported that they were interested in learning new things about software testing and earn a bit of money amidst an activity they enjoy. In the light of this, uTest should rethink their incentive system by promoting learning and progression even more on their platform. Additionally, their monetary compensation system could be improved as well since not everyone is after learning. The incentive system should also be custom-made for each user's preferences and this could be achieved by investigating each user's use motives by for example, monitoring their use behavior on a given service or by surveys and interviews. Better incentive systems would likely prolong each user's service usage life cycle and fortify user retention. This research presents a motivational journey of the studied users, which could be referred to when planning incentive system improvements.

In the end, crowdsourcing systems live on their user bases and that being said, other crowdsourced software engineering services and crowdsourcing services in general should have a careful look at the very same factors in their services. Individual users should not be overlooked since they are an essential part of a successful crowdsourcing service. Hence, similar services should invest in nourishing their user bases and strengthen commitment to the service. Of course it is a totally different case in terms of task complexity when comparing a service such as uTest and a service using crowdsourcing for photo recognition. Nevertheless, committed and motivated worker does usually his or her share of work a bit better than a worker with slight commitment and motivation. In terms of crowdsourced software engineering services, this study's results could be used as a reference for other crowdsourcing service's design as well.

For mixed systems this study revealed how important it is to invest in both utilitarian and hedonic features of the system. More importantly, the empirical results showed that each use stage has different weighting regarding features that promote users' extrinsic and intrinsic motivations. Mismatching these different natured features, for example by reducing monetary compensations, could possibly cut down the number of prospective first users in the adoption stage and likely lead to a failure when starting a new crowdsourcing service.

6.3 Limitations and evaluation

According to Eskola and Suoranta (1998), reliability of a qualitative research can be examined by evaluating each of the factors that constitute the criteria of reliability. *Credibility* as a criterion of reliability posits that the interpretations of the research results obtained and perceptions of the phenomena should match the perceptions of the examinees (Eskola & Suoranta, 1998). Here, the would consist of the interviewees. Since the results cannot be taken to the interviewees for an inspection, credibility of this research is ensured by contrasting the result interpretations and perceptions of the phenomena with existing research. Based on this evaluation, the results are deemed fairly credible. *Applicability* refers to how well the research results can be transferred to other studies, i.e. how generalizable and usable they are (Eskola & Suoranta, 1998). This research has its limitation regarding sample size, which was relatively small due to the fact that the service under examination operates in a highly specialized niche and that the research focused on studying users who were not using the service anymore. However, the interview results showed similarities between each interviewee's answers and thus, conclusions could be made. Also, the research focused on studying actual ex-users. This means that the interviewed individuals had actually quit the system use results instead of merely put it on hold for a while. These aspects fortify this study's credibility. *Certainty* means that the research takes into consideration possible pre-assumptions or expectations made beforehand (Eskola & Suoranta, 1998). This study did not hold any pre-assumptions regarding the research results and no there was no expectations made beforehand that would have affected the research. Thus, in this light, the certainty of the research would

be fulfilled. The last criterion, *verifiability*, means that the interpretations made in the study should be supported by earlier research on similar phenomena (Eskola & Suoranta, 1998). Comparing the obtained results and interpretations of this study with prior research one can find commonalities between the studies.

Hirsjärvi, Remes and Sajavaara (1997) conclude that the reliability of qualitative research can be evaluated by the accurately the research process has been described by the researcher. The conducted research process was explained from literature review to the final analysis of the results. Regarding interviews, background information of the interviewees and interview settings and the durations of the interviews were presented. Additionally, an appendix was provided for the interview protocol with example questions that was used in the interview sessions and a report of the process of finding and gathering potential interviewees. Regarding the analysis of the interview data, a classification scheme was used for systematic analysis. Finally, the interpretations of the results were amplified with direct quotations and contrasted with existing theories to address the reliability of the research.

This research has some other limitations that should be addressed in order to evaluate the study's validity and reliability in a solid manner. Qualitative research is always bound to a certain situation and context. In this case, the studied information system service exploiting crowdsourcing as its core operating mechanism to provide testing services for other companies through internet could be classified as a highly specialized service. This makes it somewhat hard when it comes to generalizability of the obtained empiric research results in IS discontinuance context.

Due to the fact that the service under study is operating in a relatively small niche constituted another challenge from a research perspective. In order to realize an empiric study and obtain research results, the entities of the unit of analysis (i.e. uTest ex-users) had to be reached out and convinced to take part in the research as interviewees. As already mentioned above, this quest turned out to be rather difficult and thus, the studied sample size used in the thesis remained relatively small.

The chosen research method (i.e. theme interviews) seemed to be suitable for this kind of research. However, since the researcher and the interviewees were located geographically dispersed, the interview sessions had to be carried out using CMC strategy. It was not possible to temporally or financially perform the interview sessions face-to-face. Obviously, this affects the richness of the interviews since the researcher/ interviewer was not able to make proper observations on the interviewees facial expressions, motions, attitude, possible distractions other than distractions detected with auditory sense) or any other observations. However, this limitation was strived to reduce by using video capability in the interviews when possible.

6.4 Topics for future research

This study focused on investigating what are the motivational factors that affect users' decision to discontinue IS service use in a context of crowdsourced software engineering service, which specialized in software testing. In this light, it would be interesting to conduct future research on a service that is less specialized in a small niche. Such a service could be for example some large and known social media platform. This would give a better understanding of the phenomena since the motivational factors will most certainly vary depending on the service that is used. The service under investigation in this research was a mix of utilitarian and hedonic qualities. Thus, it would be interesting to study a service that is either mainly utilitarian of nature or hedonic.

As mentioned in the above sub-chapter, the sample size used in this study was evaluated as being too small. That in mind, it would be more effective to conduct a study with bigger sample size to improve the reliability of the study and make results more generalizable.

This research considered only what are the motivational factors affecting discontinuance and it did not take into account how, for example, technology-task fit or prior experiences would affect user's continuance decisions. Human behavior is affected by multiple factors and thus, a proposal is made for a multidisciplinary future research topic that would include various other theories related to user satisfaction, IS adoption and IS continuance. This would deepen the understanding of human behavior related to IS usage and it could offer a more comprehensive model for future research.

Additionally, it would be interesting to conduct a quantitative research to investigate extrinsic and intrinsic motivations' interrelationships and dependencies from numerical perspective. Such a study could shed more light on each motivational factor's importance related to continuance decisions. Thus, quantitative approach would provide interesting insights into valuation of each motivational factor's importance on a given IS usage life cycle stage.

6.5 Concluding remarks

This thesis was undertaken to study what are the motivational factors that affect individual user's decision to discontinue the use of a crowdsourced software engineering service. First, the thesis presented crowdsourcing and its various aspects. Essentially, crowdsourcing consists of three main building blocks which are the crowdsourcees (the crowd layer), the crowdsourcer (the client layer) and a platform that brings these two parties together and takes care of orchestrating and managing the crowdsourcing process. It was also pointed out that crowdsourcing has its advantages and disadvantages and that it has been implemented in various settings. Nowadays contemporary software engineering companies have started to exploit crowdsourcing more and more and this is mostly

due to technological advancements, which have made crowdsourcing a lucrative way to conduct software engineering business.

After introducing the essentials of crowdsourcing, the thesis moved on to present the theoretical background used in the research. This study relies heavily on Ryan and Deci's work on human motivation. Ryan and Deci's Self-Determination Theory posits that human motivation can be divided into intrinsic and extrinsic motivation based on the origin of the motivation. Intrinsically motivated person is self-motivated while extrinsically motivated person expects some instrumental value for performing certain behavior. This thesis focused on examining users' motivational factors related to discontinued service use from the point of view of SDT and its sub-theory OIT. Besides presenting Ryan and Deci's theories, the thesis gave an overlook to some of the other theories been used in prior research regarding information systems use.

Theoretical background was followed by a chapter which described how the study was conducted. This included a debriefing of the research approach and methods used, research questions, research context and process and how the analysis of the results was performed. This research was conducted as a qualitative research with theme interviews as the main research method. The research context in this case was a crowdsourced software testing service called uTest and the unit of analysis was its individual users. The research questions set for the study remained as follows:

1. Why do users discontinue the use (i.e. quit using or switch to an alternative) of a certain crowdsourced software engineering platform?
2. What are the demotivational factors driving user's decision to discontinue the use of a certain crowdsourced software engineering platform?
3. How do motivational factors change during the service usage life cycle from adoption to discontinued use?

The next chapter revealed the obtained research results and presented an analysis of the results in addition to suggestions for future research topics along with a discussion and evaluation of the limitations of this study. The motivational factors affecting user's decision to discontinue the use of a certain crowdsourced software engineering platform were presented in figure 1 in chapter 5.5. It was observed that the motivational factors changed during the service usage life cycle and this was showed in figures 9, 8 and 10 in chapter 5 which presented all the identified motivational factors. Finally, the users' motivational journey from pre-adoption to discontinued use was described in chapter 6 with a supporting graphic illustrations of the journey (figures 11 and 12).

There was not a single reason for discontinuing the service use. An interesting observation regarding some of the extrinsically originated motivational factors (e.g. monetary rewards) seemed to lose their importance during the service use, especially towards the end of the use and were replaced by intrinsically originated motivational factors in terms of importance. During the time of use the

“thing” that kept users returning to the service (e.g. monetary rewards, enjoyment, learning) started to wear off until the users stopped returning to the service. Organismic Integration Theory provided a theoretical lens to examine this closer and track down the journey of users’ motivation through the service use from adoption to discontinuance. Against this backdrop, the interviewed ex uTest users seemed to be first amotivated since they were unaware of the service. After discovering uTest they became especially motivated by extrinsically originated motivational factors, however both extrinsic and intrinsic motivations co-existed at the same time. During the service use new intrinsically originated motivational factors seemed to be discovered and intrinsic motivation gained more ground in terms of importance regarding the service use. Eventually intrinsic motivation seemed to supersede the extrinsic factors in terms of importance. Ultimately, the perceived value of the service use declined until the user’s quit returning to uTest. The absence of perceived value regarding the service use made the users become amotivated to the service use. Thus, individual user’s motivational journey through IS usage life cycle appears to progress from pre-usage amotivation through extrinsically and intrinsically motivated state to post-use amotivation. Also, it was observed that the service was perceived more as a hobby (as opposed to a job) that was easy to abandon once a more lucrative or time consuming activities were found. Additionally, some of the users even felt that they were mistreated by the service management. These factors seemed to affect users’ attitude towards the service use negatively, which further had a negative effect on continuance.

This research showed also that CS is not a silver bullet and anything but a trouble-free way of organizing work (at least from the employees’ perspective). Based on the interviews, some of the drawbacks of the service use from the users’ point of view were small compensations, unfair work distribution between users, unfair advancing possibilities and employees feeling that they were treated as a resource. These disadvantages were apt to negatively impact individual user’s attitude towards service use and thus, make him or her quit using it.

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APPENDIX 1 INTERVIEW PROTOCOL WITH EXAMPLE QUESTIONS

INTERVIEW THEME 0: Interview session introduction and background information

- Session introduction (“I’m doing a research on the motivational factors affecting crowdsourcing service/ platform use. Your participation to this interview is completely voluntary and you can discontinue whenever you want.)
- Interviewees background information (age, sex, occupation, education, country of residence)
- Interviewees role in the service. A short briefing.

INTERVIEW THEME 1: Adoption of the crowdsourcing service (and its platform)

- How and where did you hear from the service/ platform?
- What made the service appeal interesting?
 - Clarifying questions
- What made you decide to try the service/ platform?
- What kind of expectations did you have towards the service/ platform?

INTERVIEW THEME 2: Continued use of the crowdsourcing service (and its platform)

- What made you continue to use the service?
- How long and how actively did you use the service?
- Did you use multiple similar services at the same time?
- Did the expectations change between the adoption stage and continued use stage?
 - If yes, how? Clarify.
- What was the most motivating thing about the service/ platform?
- Did you have any favorite tasks?
 - If yes, what? Clarify.
- If the service did not offer money, would you still have participated?
- What was the most interesting thing about the service at that time? What did you enjoy the most when using the service/ platform?
- Did you get familiar with the service community?

INTERVIEW THEME 3: Discontinued use of the crowdsourcing service (and its platform)

- Did you discontinue participating in any similar crowdsourcing initiative?
 - Clarifying questions.
- What made you quit using the service/ platform?
- What were the factors affecting your decision to discontinue (quit) using the service (i.e. prior to discontinued use)?
 - Clarifying questions.
- Where and how did the idea of discontinuance come up to you?
- Did the interesting features of the service/ platform I earlier asked, change towards the end of the use or did they remain the same?
 - If yes, clarify.
- Was there any particularly irritating about the service/ platform?
- What were the downsides of the service/ platform?
- Are you missing anything about the service and its use?
- Have you since participated in any similar crowdsourcing initiatives? Would you?

INTERVIEW THEME 4: Ending of the interview session

- Thank you very much for your time and patience, I am truly grateful for your contribution!
- May I contact you if I have more questions to ask or some of your answers needs to be re-checked?
- I will be in touch with you regarding the final thesis and the research results. All the best for you and thank you again!

APPENDIX 2 THE PROCESS OF FINDING AND GATHERING POTENTIAL INTERVIEWEES

Finding suitable interviewees and convincing them to participate in the study was not exactly a walk in the park. In fact, this turned out to be a rather cumbersome task to accomplish. How to reach out people that have been using certain information system in the past, but are not using it anymore? This appendix opens up the process of finding, contacting and eventually convincing the persons to take part on the study and be interviewed.

First, potential interviewees were looked for from reddit.com. Reddit is a social network community with a dedicated platform (i.e. the website) for people to create their own sub-communities on almost any topic, where they can share links and content, discuss about the topics and vote for discussions and stories (Reddit, 2018). The search was conducted by posting a query on several communities' discussion topics related to crowdsourcing about the research and with a request to participate in an online interview. The idea was to contact potential interviewees directly when shown interest towards the study. However, this did not result with any contact that would have led to an interview. At the same time, an inquiry was made directly to the company managing the uTest platform asking if they could help to get in contact with some of the former users. Unfortunately, and expectedly, they were unable to provide any employee information, thus the next step was back to the drawing board. This resulted the following plan: find the company providing the uTest platform in LinkedIn, search people that have worked for that company in the past and contact that population. However, a slight hiccup was encountered again: LinkedIn user with freemium subscription cannot directly contact other users that are not his or her first contacts using LinkedIn's Inmail messaging. Most often, people do not provide any additional contact information in their profiles, so in order to tackle this challenge, the LinkedIn account had to be upgraded to premium. Within premium subscriptions there are four alternatives to choose from: Career account for job application purposes, Business account for business purposes (e.g. growing ones network, branding, etc.), Sales account for sales people and Hiring account for recruiting purposes). Depending on the premium account, user gets different set of tools and monthly price varies. Additionally, the amount of Inmail messages that can be sent is limited and the amount depends on the subscription. (LinkedIn, 2018.) The account for recruiting purposes included most Inmail message credits and thus, was chosen as the alternative. After the account was updated, the population consisting of the former uTest employees was then taken under examination. Potential interviewees were selected based on the following criteria, which was presented for the first time in chapter 5.1 Interviewees' background:

- the person could be contacted via LinkedIn Inmail messaging service (some have restricted how and by whom they can be contacted. This naturally ruled them out being potential interviewees),

- the person had worked for uTest according to his or her LinkedIn profile,
- the person was not working for uTest anymore at the moment according to his or her LinkedIn profile and
- the end date of the uTest work period was not more than three years ago. This requirement was set to ensure the person still remembered the time he or she was using the crowdsourcing platform and hereby was able to answer the interview questions.

Within the selected population, first 15 potential interviewees were contacted via LinkedIn's Inmail messaging service. The contact contained a brief explanation about the research and a request for an interview session. Since the premium account had a fixed amount of Inmail credits to be used (though more credits could have been bought), only a certain number of messages were first sent. Some of the credits were conserved in case the person who was contacted replied using LinkedIn instead of email address as guided in the proposal message. Such replies forced the researcher to send another Inmail message for that person, which again consumed the Inmail credits. The first inquiry resulted in only two confirmed interview sessions. After a two-week time period another 10 potential interviewees group was contacted, which resulted in one confirmed interview session. The last five messages were then sent to different five-person group of potential interviewees and this resulted in one person replying for the inquiry and showing interest towards the interview. However, the person did not eventually give a date for the interview despite several later contacts and was therefore not interviewed. The last two interviewees were found through the researcher's occupational connections after a few of months of searching. During autumn 2018, the search was continued in LinkedIn and also within the work community of the researcher. Additionally, a couple of more online forums were contacted with an interview proposal. Nevertheless, the number of interviews remained the same. All in all, the process of acquiring the interviewees for this study took more than ten months and the sample size was still evaluated as being too small for the study.