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Passion for Participation

The Importance of Creating Support for Motivation

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Passion for Participation – The Importance of Creating Support for Motivation

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"If I make a path in the forest and others walk it after me, it will only be easier for me to walk it later"

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ABSTRACT

This thesis provides a study of an open source software project that focuses on the software development of an e-service in a municipal context. The focus is on environmental factors that either limit or promote the motivation to participate in the open source project, the "Parent-Teacher Meeting" project, a web-based communication and information channel whose purpose is to enhance the contacts between schools and parents. The empirical context is situated at the point where traditional information systems (IS) development meets new perspectives regarding organizational structures and boundaries and, as such, provides example of ongoing cross-organizational activities that break current local organizational standards. The objective of this study is to gain a deeper understanding of motivational factors for participation and adopts a sociocultural view on the topic motivation to participate.

The empirical material was collected through interviews, conversations, and meetings. Being a subproject (i.e. an initiative to develop an open source software application) within a triple helix project I found an extensive number of stakeholders. The choice was made to focus on the application development; thereby a central group of participants within the development project team was found and these became the focus within the study. Moreover, I have, in this thesis, chosen to conduct a contextual description of the participants and the course of events that lead to the start of the project of study. This has been done so as to present the context, which is the focus for this study, to the reader and to be able to use these descriptions within the analysis.

I have, methodologically, approached the problem from a descriptive angle with an interpretative character using a qualitative case study design. Within the thesis, the means by which the case study has been conducted is presented; i.e. the decision regarding research focus, design, and my role as researcher. In relation to

the data collection, the main source has been semi-structured interviews, which is consistent with an interpretive case study character and in which my intent is to highlight conditions and events that are important to both groups within the development team.

To support the investigation of those factors that can explain and assist with the interpretation of my empirical data, my description and interpretations are built on a theoretical framework based on concepts from IS theories and theories relating to human motivation. The framework, self-determination theory (SDT), is used as a lens to direct the focus onto the situated conditions that influence how individuals experience their participation within the software development project. Given the theoretical basis of an analytical comparison of ideal types of software development constructs, together with influences from motivational theories, the analytical framework used for collecting occurrences of motivational behavior and sociocultural conditions has been constructed.

After the findings and my interpretation of them with the assistance of my analytical framework have been presented, a discussion and conclusions are then detailed. The conclusions of the study are argued as being relevant as an explanation for the understanding of intrinsic and internalized extrinsic motivation to participate in a hybrid open source projects. The study contributes to our understanding of some of the challenges that are to be considered when putting together and managing systems or software development processes. In this way, the study may provide some basis for improving and meeting new demands regarding how development is adopted in a mixed scenario and this provides valuable knowledge to both practice and IS research.

Keywords: IS development, OSS development, participation, motivation, intrinsic and extrinsic, internalization, self-determination theory, cross-organizational, mixed scenarios, hybrid project.

SAMMANDRAG

Grunden för denna avhandling är en studie av ett öppen källkodsutvecklingsprojekt av en kommunal e-tjänst. Fokus ligger på ett sociokulturellt perspektiv på kontextuella faktorer vilka endera hindrar eller främjar motivation för deltagande. Öppen källkodsprojektet ”Föräldramötet” är en webbaserad kommunikations- och informationskanal vars syfte är att öka och förbättra kontakten mellan hem och skola. Denna empiriska kontext är situerad i en punkt där traditionell IS-utveckling möter nya perspektiv på organisationsstrukturer och gränser samt därigenom ger exempel på pågående tvärorganisatoriska aktiviteter vilka bryter mot nuvarande interna organisationsstandarder. Målet för denna studie är att nå en djupare förståelse för deltagandets motivationsfaktorer och anammar ett sociokulturellt perspektiv på ämnet deltagandemotivation.

Det empiriska materialet samlades in genom intervjuer, konversationer samt möten. Då Föräldramötetprojektet är ett underprojekt i ett trippelhelixsammanhang visade det sig initialt finnas ett stort antal intressenter. Det gjordes ett val att fokusera på applikationsutvecklingen; genom vilket en central grupp av deltagare inom utvecklingsprojektet identifierades vilka kom att komma i fokus för denna studie. Vidare har jag i denna avhandling valt att göra en kontextuell beskrivning av deltagarna och den händelsekedja som lett fram till bildandet av det studerade projektet. Detta gjordes för att i enlighet med denna studies fokus belysa sammanhanget för läsaren samt för att använda den inom min analys.

Jag har närmat mig problemet från en deskriptiv synvinkel med en tolkande karaktär användande mig av en kvalitativ fallstudiemetod. Inom avhandlingen beskrivs tillvägagångssättet för fallstudiens utförande, t.ex. hur beslut fattats angående forskningsfokus, fallstudiedesign och vad min roll som forskare inneburit. I relation till datainsamlingen, har den huvudsakliga källan varit halvstrukturerade intervjuer. Dessa har varit i konsekvens med en uttolkande fallstudiemetod och har i enlighet med min avsikt utformats för att belysa villkor och händelser som har varit betydande för bägge grupperingarna inom projektgruppen.

För att stödja undersökningen av de faktorer som kan förklara och hjälpa med tolkningen av mina empiriska data, har jag byggt mina beskrivningar och tolkningar på ett teoretiskt ramverk baserat på koncept från IS-teorier och teorier relaterade till mänsklig motivation. Det teoretiska ramverket ”self-determination theory” (SDT), används som en lins för att rikta brännpunkten mot de villkor som styr hur individer upplever deras deltagande inom det studerade

mjukvaruutvecklingsprojektet. Givet den teoretiska bas, som bygger på analytisk karaktärisering av idealtyper av mjukvaruutvecklingsmodeller sammantaget med influenser från motivationsteorier, har ett analytiskt ramverk, för att inhämta instanser av motiverat beteende och sociokulturella villkor, utvecklats.

Efter att ha redogjort för upptäckterna och mina tolkningar av dem, med hjälp av mitt analytiska ramverk, presenteras en detaljerad diskussion med slutsatser. Jag argumenterar för att dessa slutsatser är relevanta som en förklaring för förståelsen av inre samt internaliserad yttre motivation för deltagande inom detta öppen källkodsprojekt av hybridnatur. Studien bidrar till vår förståelse för vissa av de utmaningar som måste beaktas när man ska hantera system eller utvecklingsprocesser. På detta sätt kan studien bidra med en bas för att förbättra och möta nya krav på hur utveckling bedrivs i blandade miljöer och även med kunskap för både praktik och IS-forskning.

Keywords: IS-utveckling, OSS-utveckling, deltagande, motivation, inre och yttre motivation, internalisering, self-determination theory, tvärorganisatorisk verksamhet, blandade scenarios.

ACKNOWLEDGMENT

I have often compared the work with writing this thesis as sailing offshore. After having cruised, in strong head/adverse wind, and succeeded in finishing my licentiate thesis I went on the next part - the doctoral thesis you are now holding in your hand. Sometimes I ran aground in the shallows and needed repair at a ship yard. As with sailing larger ships, I would not have coped on my own, I have had a lot of help from others in bringing this ship ashore. Beacons have shown me the way, and I have also been lucky in being surrounded by bumpers and lifebuoys that have kept me afloat.

First of all, I want to thank all the contributors to this work, the members of the project team, which voluntarily let me dispose of both their time and knowledge. I am very grateful for them letting me study their work and interactions. A special thank goes to Robert Olofsson who helped me find information and navigate the project timeline, and not to forget – thank you for all the nice meetings and beers, I owe you one or two.

A ship can't sail without fuel or wind, for bringing me this I owe thank to VINNOVA. Being externally financed I also owe thanks to my employer Calaha where I have spent time together with Anders Larsson and his associate Ewa Mattson.

But, without the nautical chart, brought to me by my supervisors, I would never have succeeded in navigating and pass all shallows along the waterway. I am very grateful to my supervisor Katarina L Gidlund, who from the early start kept me on track, encouraged me and guided me in the direction wished for throughout this process. You kept me focused in the choices that had to be made, and Katarina, the title of this thesis is yours! I would also like to thank Johanna Sefyrin, who later became my second supervisor, but, due to maternal leave never had the opportunity to see me safely enter the harbour - good luck to you and your son.

Apart from my supervisors, there are many persons at the university who have had great influence on this thesis. Belonging to a multi disciplinary research group has been vital for my work. Getting and giving feedback at seminars along with fruitful discussions. For this, I am grateful to my colleagues at the CITIZYS research group, which, apart from Katarina, Johanna and Anders, consist of: Katarina Giritli-Nygren, Olof Nilsson, Gustav Lidén, and Sheila Zimic, who has given me much support during the part years. Thank you all for being the beacons along my sail showing me the colors of red or green.

Colleagues often play an important role; this sail is not an exception. I have had much support from many of my bumpers, especially at the pre-seminar; this is one of the milestones during the process of writing a thesis. I am grateful for all the comments and suggestions made by my opponents Lena-Maria Öberg and Thomas

Persson that helped me improve. Moreover, this thesis would never have happened if not for my colleagues Erik Borglund and Professor Karl W. Sandberg, who contacted me one summer and presented me with this opportunity.

Working and living in separate cities is exciting, but not always convenient, and sometimes also becomes lonesome without ones family or friends. I am especially grateful to you, my lifebuoys, Sheila and Åsa Nordin, who have not only been my colleagues but also my dear friends during many of my stays.

But, there are not only colleagues that should be thanked. There are several persons, friends and family, who have been involved on this sail. Thank you, Mia and the team, for all your support and positive thinking. You are my rails that stop me from falling aboard. And also I would like to give a huge thank you to Cecilia; you are the master of tools.

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Finally, I would like to thank the committee for taking an interest in my thesis.

Carina Hallqvist
Göteborg in February 2012

TABLE OF CONTENTS

LIST OF FIGURES

Chapter 1

INTRODUCTION

Software systems are being built not only by software engineers in traditional information systems (IS) development firms, but also by volunteers, in their spare time, with no pay but for the sheer joy involved (von Krogh & von Hippel, 2003). Researchers and programmers were early adopters in relation to sharing results, gifts or exchanging code so as to improve or to change it (von Krogh & von Hippel, 2003; Osterloh & Rota, 2007). As such, a great deal of software was, in the beginning, developed and shared in academic and corporate laboratories by scientists and engineers as working tools that assisted them in their work. A well-known example is the origin of the World Wide Web (WWW) created by Tim Berners-Lee while he worked on assisting high-energy physicists to share their work (Raymond, 1999). The WWW is not only an example of the academic community striving to share and improve results, but also an example of an important factor that contributes to individuals' motivation to engage – attempting to solve a problem or an interesting dilemma from a personal concern.

Up to the beginning of the 1980's, an actual software industry had not yet emerged. Code was exchanged freely among developers in both universities and commercial research institutes (Osterloh & Rota, 2007). However, when the technology achieved a certain level of maturity, commercial developers[1] became reluctant to share their code and this was the reason that various proprietary versions were released. As a consequence of this commercialization, many programmers viewed themselves as being excluded from the product they had helped to create (ibid., p. 16). One reaction to this involved the initiation of alternatives to this commercialization (e.g. the GNU project[2]) where the results of joint efforts could be distributed with free access. Consequently, free and open development projects and communities were shaped, sometimes divided by

1 E.g. AT&T and the history of Unix. http://www.unix.org
2 GNU is a recursive acronym for "GNU is Not Unix".

ideological differences, but still with the same purpose – to freely distribute the source code (further examples are given in Ljungberg, 2000).

Today, these software projects and communities attract both individuals and organizations in order to use the code and to participate in its development. They offer new kinds of sociotechnical work practices, development processes, and community networking (Scacchi, 2007). Much of the developmental activity is openly visible, the result publicly available, and there is generally no formal project management regime, budget or schedule (Scacchi, 2007). Research on the open source phenomenon has focused on how this open mode of open source projects can or has influenced the future of knowledge organization (Fitzgerald, 2006; von Hippel & von Krogh, 2002; Ljungberg, 2000; Sharma, Sugumaran, & Rajagopalan, 2002). Examples of early hybrid strategies from platform vendors are Apple Computer, IBM and Sun Microsystems[3], and more recently, mobile apps on closed platforms are moving to open platforms (e.g. Google). However, whether or not the recent platforms can be regarded as open has recently been debated by the free/libre software movement (i.e. Richard Stallman criticizing the Android 3[4]).

The focus of the early research was in relation to why people, often well-educated and well paid, choose to participate for no financial gain in open source software (OSS) projects and involved investigating the incentives for their motivation to contribute (von Krogh & von Hippel, 2003; Lakhani et al., 2002; Lakhani & Wolf, 2003; Fitzgerald, 2006; Osterloh & Rota, 2007) Some critiques have highlighted that this research has caused the focus to be inwards, dealing with the question of incentives and motivation of OSS programmers and few studies have examined the transformation of this OSS phenomenon or the competition between proprietary and OSS (Bitzer, 2005; Fitzgerald, 2006). Others have noted that open source projects represent an immense learning opportunity and studies have shown that the overall motivating factor is that contributing is intellectually stimulating and secondly, it improves skills (Lakhani et al., 2002). Later research has investigated how a framework can be created for hybrid open source communities while fewer have studied hybrid and mixed scenarios (Sharma et al., 2002).

This thesis provides a study of an open source software project which focuses on the development of an e-service in a municipal context. The focus is on the contextual factors that either limit or promote the motivation to participate. The empirical setting is a single case study of the open source project, "The Parent-Teacher Meeting" [5], a web-based communication and information channel whose

[3] Oracle acquired Sun in 2010

[4] Android is an operating system primarily for mobile phones, which consists of Linux (Torvalds's kernel), some libraries, a Java platform and some applications.

[5] In swedish: "Föräldramötet" (FM)

purpose is to enhance communication between schools and parents. To support the investigation regarding factors that can explain and assist in the interpretation relating to participation in the open source project, the theoretical framework for the thesis is based on concepts from information systems theories and theories involving human motivation.

The conclusions of the study are argued as being relevant as a model of explanation for describing and understanding what contributes to versus what hinders motivation with regards to participating in an open source project. The study should contribute to our understanding with regards to some of the challenges to be considered when organizing software development processes. In this way, the study may provide some basis for improving and meeting new demands regarding how development is adopted which could provide valuable knowledge to both practice and IS research.

Before going into further detail as to the purpose of the study, its related research questions, and the intended contributions, I will sketch the wider context in which my case study is situated.

Challenges when Understanding Participation

This thesis focuses on incentives that motivate both users and developers to participate in an open source software project. Because research on 'user involvement' or 'user participation' has a long tradition within the fields of IS development, it is felt to be important to offer some description of the context of this concept. A later chapter will elaborate and analytically distinguish between the differences of a traditional IS development versus an OSS development using ideal types as a model of description.

One distinction between the two opposed schools of software development given by von Krogh & Spaeth (2007) is the conventional closed source development, and the progressive open source development. They explain the differences as:

> *"Software development typically requires a dedicated team of software engineers and other specialists who assume different roles in the process, including specifying requirements for the products, creating a high-level roadmap of development, writing and documenting the code, and assessing and testing the product. OSS development, on the other hand, consists of hundreds of perhaps thousands of volunteers who assume*

different roles too, including founding the project and formulating its goals writing, reporting and fixing bugs, etc" (ibid.).

Participation in software development is well conceptualized and traditionally understood as being when participants are given a role in a development process. IS development is historically based on system requirement specifications and its focus lay mainly on software quality and system success, characterized by a large gap between those who design the technology and those who actually used it, while little was discussed in relation to the topic of user satisfaction and user motivation (Langefors, 1970). This behavioral view of participation has, over the decades, been extended to also include more attitudinal components such as importance and personal relevance (Ives & Olsen, 1984; Barki & Hartwick, 1989; 1994; McKeen et al., 1994; Iivari & Igbaria, 1997).

As such, several methods and methodologies[6] based on the notion of the participating user have evolved over time (Shibuya & Tamai, 2009; Heinbokel et al., 1996; Iivari and Iivari, 2006; Subramanyam at al., 2010). Iivari and Iivari (2006) discuss the fact that system development methods may be more or less user-centered. The authors also highlight, that it is commonly acknowledged within the IS domain, that success in IS development projects is difficult to achieve. Moreover, arguments have been strong concerning the case that increased user participation could have a positive effect on the success of IS development processes. At the same time, Iivari & Iivari (ibid.) stress the problem when users only act as providers of information or as objects of observation and suggest that the ultimate form of user participation is the situation where the user both *designs and implements* the system.

One main intrinsic motive for participation that has been identified regarding OSS programmers is that they, with a few exceptions, are *user-programmers* (i.e. the user-need for a particular software solution thus creating it themselves). Other motives referred to in the literature are the fun to play, and the desire to give a gift (Bitzer et al., 2004).

These are not the only differences in relation to how or why individuals engage and participate in closed or open source development and another prominent difference is how closed source projects appropriate and secure financial rewards. There are two principle means for this, one is the use of licensing arrangements based on copyright law, and the other is the protection of the software source code (von Krogh & von Hippel, 2003). Moreover, in closed source projects, teams often work under management related constraints (deadlines, budgets, etc.) which stand

[6] e.g. user participation, prototyping, Participatory Design (PD), Computer Supported Cooperative Work (CSCW), usability engineering, and user-centered design, as to mention some.

in contrast to open source software where these issues are solved by integrating the users of the software within the development process. OSS programmers write, read and revise all the code for no financial gain (Glass, 1999). Consequently, a central puzzle, raised by the success of OSS development, is why thousands of top-notch programmers appear to be contributing freely to the provision of the public good (von Krogh and von Hippel, 2003, p. 1152). I would argue that these questions about the incentives that motivate participation and contribution, would concern anybody, ordinary or top-notch, who participates in an activity by free will and their own choice. These are some aspects that spurred my interest and hence became a focus of this PhD thesis.

Research Objective

The empirical material presented in this thesis circles around a context in which traditional IS development meets new perspectives with regards to organizational structures and boundaries and as such, gives example of ongoing cross-organizational activities that break current local organizational standards. Openness and participation is the focus. The practitioners involved in a studied development project appear to have the same incentives for participation as the developers, not strictly different from that to be found in OSS projects. Moreover, the software that is acknowledged as the outcome of the project is per definition OSS. Therefore, one focus has been to analytically distinguish between OSS developments and traditional IS development.

Additionally, my research focus includes motivational theories and has a sociocultural view on regulatory processes that increase motivation. My contention is that the sociocultural perspective on motivation has contributed with means of insights regarding the individual and social and cultural dimensions of regulatory processes that promote motivation. I strive to add a focus to the interplay between knowledge, motivation and participation into the area of information system development in the light of participation as an ongoing social process.

Given the increased focus on user participation in software development projects and the contextual demands with regards to sustainable development, I find it highly relevant to conduct an empirical study that may assist in bringing to the surface, the link between incentives to participate in relation to information systems development in general, and open source software development in particular.

My wish is to provide a more in-depth understanding of how and why people (i.e. participants in a specific open source development project) have become involved and have participated in an IS development process. The means by which they perceive and explain their participation in the process and what motivated them to participate has provided the considerations that determined the purpose of this study, which is:

> *to create a deeper understanding of motivational factors for participation in a loosely structured software development project.*

The objective is to gain an understanding with regards to how users and developers experience personal satisfaction and to what extent it contributes to their motivation to participate. In order to address this issue, I have adopted a sociocultural perspective on human motivation in addition to traditional IS theories, with the focus being on how participants construct the incentives that drive them to participate in an open source software project.

My point of departure is that the framework of self-determination theory (SDT) can act as a valuable lens and assist me to direct my focus on the situated conditions that influence how both users and developers experience their participation in the OSS project. On a general level, reflecting on the overall purpose of the study may generate a better understanding of how active participation plays a role in software development processes, and how participation in collective creation and sharing can add to the body of knowledge about systems development.

On the basis of the purpose and the theoretical assumptions the following research questions have been formulated:

The overall research question is;

> *Why do people participate in loosely structured software development projects in a more than formally asked for manner?*

The specific research question is;

> *How could the motivational theoretical framework self-determination theory enrich the understanding of participation in loosely structured software development projects?*

With these research questions I wish to direct attention towards how users and developers perceive and are motivated to participate in a software development

project by focusing on the contextual support for internalization and the integration of satisfaction of individuals' basic psychological needs. Similarly, I wish to reflect upon how insights can be concretized in a way that assists us to better understand the interplay between motivation and participation in order to be better prepared to face the various challenges in IS practice. In order to address the purpose and the two research questions I would argue that we have to draw attention to the sociocultural context in which the participants in the OSS development project act. Applying the social contextual perspective taken in SDT allows us to show how elements of motivational factors are not strictly an individual business but also have social and cultural dimensions. It focuses on the participation of individuals with others in cultural practices thus considering both the individual and the environment.

The research questions were empirically investigated through a single case study of an open source software development project. I targeted two groups of participants and interviewed both users and developers. I have, according to the theoretical framework SDT, examined factors that enhance versus undermine intrinsic motivation, self-regulation, and well-being. My analysis focuses on three innate psychological needs – mastery, autonomy, and relatedness – which when satisfied bring enhanced self-motivation and mental health and when hindered lead to diminished motivation or well-being. The study is qualitative in nature and builds on a descriptive case study design, which is interpretive in nature.

Developing a Need for Understanding Motivation to Participate

This research is the result of a longer journey during which my experience and knowledge has grown and some questions have been answered and some new ones have arisen. As Walsham (2006) suggests, I have allowed my prior experience and knowledge to influence not only my choices regarding the research focus and design but also my theoretical framework. Prior to this study, I have worked and participated in several software systems development projects, both in open source environments and traditional IS. Additionally, I also bring experience from the educational field, where motivation and incentives for participation have become major issues. Moreover, these experiences have provided me with vital assistance in relation to work with some later projects. My pre-understanding in the IS field has given me a perspective from both the inside and the outside, as a participant (developer and user) and an observer (researcher). My research approach has

influences from educational theories discussing implicit learning from a cognitive perspective on motivation.

These experiences have meant that I have a growing interest in the question of participation and how individuals are or get motivated to take part in an activity. I believe my interest evolves from my background as a teacher at elementary school level where these questions are highly ranked. My first encounter with Vygotsky and Dewey's theories offered me a perspective regarding participation in a sociocultural activity (Vygotsky, 1987; Dewey, 1950, 1966, 1998). Vygotsky advocates challenges that are slightly more complicated than those which have been previously managed. He was specifically interested in what a child could learn on its own, without being influenced by adults. Vygotskij argued that development happens through interaction with your environment, rather than being an independent individual process. Other well-known pedagogues have gained significant influence on the topic of active participation in the learning process (e.g. Maria Montessori, Célestin Freinet, Rudolf Steiner and Paolo Freire). One basic common factor in the aforementioned pedagogues' suggestions has been the impact of active involvement, and participation in the process of learning. As such, they all have argued that active participation is a necessary building block in relation to knowledge production. Additionally, it has been argued that participation also leads to reflection and further, that learning by interaction has a positive influence on results. From these reflections I have come to regard the learning process as a pendulum between reflection and practice.

I am very much influenced by a sociocultural perspective that focuses its meaning on actions through interaction with the individual and his/her social and cultural environment (Öhman, 2008). My understanding is that it is through communicative interaction that we become part of the community knowledge and the moral values of that culture. Interaction occurs in a social and cultural discourse where knowledge is taken for granted and certain norms and values are considered as being right. This process of internalization of the moral discourse is an active process during which a social dialogue is transformed to an inner dialogue through reflection (Öhman, 2008).

I have developed a concern about a perspective regarding learning processes and development in which the communicative process is influenced by engagement and active participation in order to interpret meaning and motivation. In the learning process, one of the most important mechanisms is, and has always been, the everyday interaction and dialogue/communication face-to-face. I have experienced and would draw attention to the resemblance in the discussion on user participation in IS development.

With this background, I entered the stage of IS and started working with IS development in the early 1980s which, at this period, was very much influenced by

traditional IS development theories during which the development process followed a strict requirement specification scheme. I have experienced models and methods, and the evolution of software development. I discovered, at an early stage, that users were seldom included in the development process, and if they were, only as providers of information. I started my career at the larger software development companies, but soon looked for smaller alternative companies where it was easier to have both user involvement and communication with the users (and not so controversial). I soon discovered empirically, that the more interaction and involvement the user had in the development, the higher the satisfaction and acceptance our systems achieved.

Having to follow strict development procedures with few possibilities to influence the process, together with my earlier knowledge and experience, I started to look for other options. My concern was still based on the belief that satisfaction and to build up an individual's motivation to participate was important for the result. Consequently, my research has a basic grounding in areas such as IS development, knowledge production, and participation.

Later, I have had the opportunity to work in and to lead projects where the focus has been on active participation and the use of non-traditional methods using traditional technology with the purpose of discovering added value or simply to find use of common, simple technologies in new or alternative scenarios.
In the [demos]-project[7] (Hallqvist, 2006) we explored whether it was possible to develop technology that would support democracy for everyday communication processes. We developed a sms based platform together with students at an upper secondary school. I experienced that even if the aim of the project was to actively involve the users (i.e. students) our collaborating consultant company worked according to the traditional waterfall method in which the users were only involved in the pre-study.

During my years as a developer and user, I have evolved an urge to regularly use simple tools for larger purpose (i.e. for a better good) and which, to some extent, I have come to regard as being state of the art (Hallqvist, 2004a; Nilsson, Enskär, Hallqvist & Kokinsky, 2011). Meeting with high technological solutions for visualization, I soon discovered that the simplest solutions were often the ones that the most acceptable and useable. This was experienced when I worked at the Medialab at Chalmers University of Technology. I became familiar with high tech equipment such as the virtual reality cube and the haptical interface. We experimented with the equipment but found it difficult to determine its optimal use, and, in particular, to find relevant use for it.

[7] I was the project manager for the project at the Interactive Intsitute. The project was financed by VINNOVA

My interest in finding a use for technology was the main reason as to why I started the [miki-wiki]-project (Hallqvist, 2004a) in which I collaborated together with the Interactive Institute studio [12-21][8], University of Växjö and a national federation for youth, Tech Group. My effort was to combine my belief regarding active participation and using technology that was easy to use and accessible to everyone. The aim of the project was to investigate how "simple" technology (e.g. cell phones and other mobile equipment etc.) could be used in day-to-day communication for collaboration in distributed work scenarios, a context that was common and well known by all participants in the project. The project later generated sixteen concepts, prototypes or solutions (Hallqvist, 2004a, 2004b).

The name of the project originated from the 'Wiki concept' where users collaborate in forming content. As the name indicates the aim was to involve the users in all parts of the development process. People from each organization participated in the project as both users and developers. One of the results from this project highlighted the fact that cooperative design processes places the focus on integration and interaction and that cooperation does not occur by itself, but, given the possibilities and autonomy enhanced the opportunity for success. I have met the open source phenomenon repeatedly during my life span, both as a user and contributor and by "living with it". Much of what is found within the open source community is appealing. In creating the structure and principles of the [miki-wiki]-project I was influenced by the structure of open source projects.

This interest led me to engage in the study of the focus of this thesis. My curiosity was aroused by the fact that it was an open source project and that it was in cooperation with traditional formal organizations. I became curious over what incentives for participation were in place (Hallqvist, 2010).

A stereotypical view on software development is that it is done within formal traditional IS development organizations or developed by open source software communities. Nevertheless, participation and how participation is motivated is an argued topic within both views. This stereotypical view has motivated me to provide a description of two often contrasting ideal types (cf. Chapter 2). They differ in incentives, control, and coordination mechanisms (von Krogh et al., 2012). I find it important not only to understand what motivates participation in these development processes, but also to understand that OSS communities are fundamentally different from traditional organizations and enterprises.

The majority of the research relating to software development and motivation, circles around the phenomenon of open source software (for a recent review, see von Krogh et al., 2012) while only a few discuss hybrid-open source or OSS 2.0 (e.g.

[8] The Interactive Institute is a multidisciplinary researchinstitut within the area of digital media.

Sharma et al., 2002; Fitzgerald, 2006). The Cathedral and the Bazaar concept and its discussion (Raymond, 1999) have come to influence commercial software project managers to design their project organization structure accordingly (Lundell et al., 2010; Scacchi, 2007; Scacchi et al., 2006). OSS development is emerging as an alternative or complementary approach as to how to develop large software systems (Scacchi, 2007 p. 466). This is an evolution I have followed closely and is also based on my own experience.

The amount of influence the user has could also be analyzed with the lens of motivational theories. I have also found that the self-determination theory is the most widely used approach for investigating why developers are moved to contribute to OSS (von Krogh et al., 2012). However, this research has generally disregarded potential external influences and interferences, a link between context and individual motivation which is pointed out within the SDT (ibid., p. 14). In a recent review, von Krogh et al. (2012) found few OSS scholars that have investigated contextual factors. They found factors related to motivation in terms of governance, community sponsorship, and provision of rewards, license restriction, and social and technical exposure to the community. The authors suggest research in order to adopt a social practice perspective on OSS development.

To fill this gap, I position my research in the field of participation in software development where I discuss the characteristics of conventional software development and open source software development. By taking a sociocultural perspective on motivation I add to the discourse on both traditional and non-traditional software development. Given my background within pedagogy I propose that the process of learning is the link between reflection and practice, and that participation is a learning process that results in creating meaning. Several authors have noted that learning is an important incentive for participation in OSS development (e.g. Lakhani et al., 2003). By acting and reflecting we internalize and integrate values and regulations, important for the synthesis with one's self. I find it important to reveal all nuances linked to participation, by acknowledging and placing the focus on that which has been learned and on those who have experienced satisfaction related to the learning process. Bratteteig (2003) emphasizes, in her dissertation, these aspects that contribute to a more complex view, not normally included in system development literature. "Theory about how we learn is useful for planning and carrying out systems development. Theory about knowledge and knowing is useful for designing the system, for defining problems and solutions of the system. Involving users in the systems development process strengthens the need for understanding learning and knowing as a part of systems development" (Bratteteig, 2003).

Disposition

Chapter 1: Introduction. The first chapter sets the stage and positions the research. I have outlined the purpose of the study along with the related research questions. Furthermore, I have discussed my personal motivation and the relevance of the topic.

Chapter 2: Participation in software development. The chapter presented the first part of my theoretical basis - a research strategy of using ideal types to analytically distinguish between two separate phenomenons: traditional IS development; and OSS development describing processes and strategies.

Chapter 3: Motivation to participate. This chapter is the second part of my theoretical basis in which the motivation to participate is elaborated upon. The self-determination theory (SDT) is accounted for as being an important component of my analytical framework.

Chapter 4: Analytical framework and methodological choices. In this chapter I present decisions on the research focus, design, and my role in the process. I then present the methodological assumptions and describe how the work was carried out and what data collection methods were used. Finally, I present how I built the analytical framework based on SDT.

Chapter 5: Case description. This chapter introduces the organizational setting in relation to the stake holders of the FM project (i.e. the project team and their organizations). It starts with an introduction to the course of events that led to the start of the FM project. Then, a presentation of the project organization and the individuals involved in the project team is related.

Chapter 6: Findings: How participants experienced their participation. In this chapter I present and describe the findings from the empirical material. Internalized values and regulations together with social contextual factors that are experienced to promote or limit motivation are searched for.

Chapter 7: Analysis: How I interpreted how participants experienced their participation. The findings are analyzed in this chapter. I describe how I have interpreted the findings and placed them in the two dimensional analysis model of my analytical framework.

Chapter 8: Discussion and conclusions. The intention of this chapter is to conclude the case study process and to sum up and to discuss the research question stated. Finally, new questions and ideas for future research are presented.

Chapter 2

PARTICIPATION IN SOFTWARE DEVELOPMENT

In the introduction I highlighted the puzzle, raised by the success of open source software development, regarding "why thousands of top-notch programmers appear to be contributing freely to the provision of a public good" (von Krogh & von Hippel, 2003, p. 1152). Not all people experience this urge to participate in the same way; it is far from everyone that engages and participates in all activities. This chapter gives a description and introduction to the first part of the theoretical basis that I find useful and which has influenced my work. To me, the theoretical challenge consists of combining theories on participation in software development with theories on motivation that can help me to describe processes through which participation takes place in a loosely structured software development project. My effort is to present a theoretical approach that can assist in the investigation of contributing factors that influence individuals' motivation to engage and interact in software development. As such, my intent is to supply a theoretical language that enables a description of how participation and motivation interplay in such processes. My objective is to provide concepts that I have used as tools, in order to relate them to the empirical material in this thesis.

A first step in approaching this topic is to address the topic participation in software development and to analytically distinguish between traditional IS development and open source software development using ideal types that focus on their characteristics. I place the focus on, and describe three ideal type specifications: organizational structure; roles; and formal incentives. A second step is to apply a sociocultural perspective to motivation with the starting-point that our actions, thoughts, and development are situated in a social context – they evolve and are created in social practice. A sociocultural perspective can contribute by means of important insights on the social and interpersonal dimensions. My point of departure is that the theory on human motivation, the self-determination theory, can act as a valuable lens to direct the focus onto environmental factors that enhance versus those which undermine individuals' motivation to participate.

This and the following chapter present the tenets and vocabulary of these theories including some related concepts: participation, autonomous versus controlled motivation, intrinsic and internalized extrinsic motivation, and human basic psychological needs (i.e. competence, relatedness, and autonomy). Brought together, these concepts serve as the keystones for my theoretical basis and approach the purpose of my research study. Concepts will later be used to analyze and discuss the empirical data and to contribute to our understanding of what participants in our software development project in this study consider important for participation and why they are important. My objective is to go into more details of the various theories in order to put forward a theoretical basis that can support the purpose of my study and the questions posed. Now, having stated my position, I will now provide a description of the encompassed theories on participation, followed by the theories on motivation (cf. Chapter 3).

For the discussion in this chapter on participation, I depart from the perspective on user participation influenced by Iivari and Iivari (2006). Their perspective rests on a belief that users commonly act only as providers of information or as objects of observation, and an ultimate form of user participation is a situation where a user designs and implements the system (ibid. p.5). This ultimate form can be found in open source software development projects where the development process often starts with a personal need or just the love of creating. However, there is an essential difference in this later form of participation that separates it from the traditional software development processes, viz. the question regarding what are the factors and incentives that motivate people to participate, with the exception of those extrinsic motives such as pay (i.e. why we do what we do).

I have used Weberian ideal types as a tool to describe and to analytically distinguish between the different forms of participation often seen within traditional information systems (IS) development, and in open source software (OSS) communities. The IS development project, which is the focus for this study, circles around the context of an open source development project in a traditional municipality. Notwithstanding, being defined as an OSS project, this development process has demonstrated characteristics that are also found in traditional IS development. Thus, there is a thread weaving through the context of the phenomenon researched, which is that it falls between traditional IS and nontraditional OSS development organizational structures, roles, and formal incentives. My choice is therefore to lift up some characteristics within the two traditions with the help of ideal types and by this means, it is possible, I argue, to place the focus on the social context and regulatory processes.

Using ideal types provides the researcher with conceptual tools and serves as theoretical illustrations rather than depictions of actual research (Hekman, 1983; Huutoniemi et al., 2010). Ideal types aid an explanation in principle, which is

argued to be the field par excellence for ideal types (Bradach & Eccles, 1989). A comparison between ideal types and empirical cases identifies adequate causes and aids understanding for divergent historical developments (Ragin & Zaret, 1983, p. 732. Ragin and Zaret argue that, according to Weber, sociology uses ideal types to enable limited generalization about historical divergence (ibid.). Ideal types, according to Weber, were originally used in the analysis of administrative structure, with given ideal-typical specifications, and Weber himself treated ideal types as substantive conclusions (Udy, 1959).

Thus, to analytically distinguish between both differences and similarities for the traditional and non-traditional software development projects, this chapter introduces two parts: the ideal types of traditional IS and OSS development constructs. They serve, in this case, as a useful starting point for studying the organization of software development projects. However, there are two major problems with this premise. Firstly, elements of the chosen ideal types are in reality often found mixed together, for instance "the open source software phenomenon has metamorphosed into a more mainstream and commercially viable form" (Fitzgerald, 2006, p. 587). Secondly, the management and organization of open source software projects has changed and become less "bazaar-like" (Fitzgerald et al., 2003; Fitzgerald, 2006; Lundell et al., 2010). Therefore it should be understood that some of the given differences are not the only or even the correct way to describe development projects in general. Subsequently, this description is neither prescriptive nor proscriptive. Nevertheless, these caricatures on ideal types specifications can, I argue, assist in further discussions pointing out some important factors to consider. I shall consider three ideal type specifications: (i) organizational structure, (ii) roles, and (iii) formal incentives. The specifications will aid my description of the two caricatured types of software development projects, namely traditional software development projects versus open source software projects.

The first section elaborates forms of participation in traditional IS design projects starting with a brief overview of software design, starting in the 1960's and the second section presents participation in opens source software. Finally, a comparative summary of the two ideal types is given, conceptualizing the three specifications: organizational structure, roles, and formal incentives found. Using ideal types for comparison assumes heterogeneity between the two, the introduction (cf. Chapter 1) provided an overview of some of the research within the area of hybrid projects.

Forms of Participation in Traditional IS Development

In order to place the ideal type of traditional IS development in the context of this thesis, I begin with a short historical review with regards to how the software development evolution began in the 1960's and 1970's when computer systems were large and centralized and a great deal of commercial software was bundled together with computer hardware. Software was, in the beginning, mainly developed in academic and corporate laboratories by scientists and engineers. These programs were, at the time, working tools rather than commercial products. An actual software industry had, up to the beginning of the 1980's, not yet emerged. The organization was built around people who had a personal interest in contributing to the community (i.e. their colleges and co-workers). Code was shared freely among developers in both universities and commercial research institutes (Raymond, 2000a; von Krogh & von Hippel, 2003; Osterloh & Rota, 2007). However, as commercial interests gradually took over, a software industry was born and the era of the closed software projects started. As commercial enterprises took over the initiative as to whether or not software was to be built, the incentive for starting a development project was no longer a concern with regards to the user's needs (e.g. academics and R&D departments). Large organizations were built around software packages often included as a component of the hardware. New kinds of software solutions evolved as IT was used more and more and had proved itself as being economical in relation to providing administrative tools. Thus, the software industry found itself new kinds of users, namely those who seldom were included in the development process as software development was regarded as a question for skilled computer scientists (ibid.).

Formal historically structures of IS and IS development processes

The development processes for information systems, without delving into all its derivatives, traditionally starts with a *system requirements specification*, i.e. a list of the functional demands that the information technology should meet. A system requirement specification is often used as a clear-cut list that computer scientists can focus on in order to perform their task - to design a system. Much of the traditional IS development still belongs to the group Life cycle[9] models in which

[9] System life cycle (Rubin, 1972). The Swedish standard model SIS/RAS, a.k.a. the "waterfall model", is one example.

each phase uses the result of the preceding phase as a base. It uses systemization sequential phases, which separates planning from execution and regards the reality as objective and neutral. This represents a Tayloristic view on work, implying that planning and implementation are separate activities performed by separate groups of individual with different roles and responsibilities. A classic software requirement engineering process typically includes the recurring set of activities shown in Figure 1 (Davis, 1990; Scacchi, 2002, p. 28).

Figure 1. The classic software requirement engineering process

During the IS development process users can be, or are involved to different degrees, roles, and formal incentives (e.g. monetary reward). The power of this software development process, related to the requirement process (see Figure 1), has generally become situated in an organizational context, and the notion of user participation (i.e. user as end users) is a relatively rare topic. Structured meetings[10] with users are one example of an effort to generate better system requirements from this early period. They were used as an approach to speeding up the design process and an effort to enhance efficiency. This is an example of an aspiration to actually involve users in order to obtain better systems. However, it remained the case that little was discussed on the topic of user satisfaction and acceptance. A pertinent remark could be that today many IS development projects and larger organizations still appear to uphold this technical approach.

An example of, and a description of traditional basic components of organization structure are - workers (supervised by an internal contractor) - produces a product -for disposition by the owner (Clegg, 1990; Mintzberg, 1983). Subcontractors and staff specialists and other, often externally hired, can also be included in the organization. Langefors (1970, p. 166) pioneered the question of user involvement and motivation in the Scandinavian IS community, highlighting the importance of considering the information requirements that are placed upon proper motivation during IS development. His early argumentation was based on experiments, pointing out the possibilities of the effect that a proper use of the group could result in (i.e. participation by one group member or complete participation of all group members in planning). Langefors had already argued in the 1970s, in correlation to my perspective, that the area of motivation research

[10] In the 1970's IBM created structured meetings with users as a more efficient tool to generate systems requirements (Berg, 1998).

was/is of utmost importance in administrative control and that a feasible research effort had to be brought about (ibid. p.165). These kinds of questions and studies were still new in Scandinavia and appropriated to social science.

The coming of "flexible corporations" in the 1980s furthered the "discovery of the user" in IS development. Management theories from this period stressed that organizations that wanted to survive had to be more client-oriented and had to empower their workers (Berg, 1998). This placed the user on many corporate and research agendas. A much more critical approach emerged in the 1970s and 1980s, "The Scandinavian approach". It emphasized the political nature of the gap between the users and the designers (Greenbaum & Kyng, 1991), by involving and empowering the users. Additionally, the field of CSCW merged the political drive of the Scandinavian approach with sociological and epistemological critiques of traditional systems design (Berg, 1998). During the 1990s object oriented (OO) modeling[11] evolved. OO modeling uses abstraction - inheritance – capsulation, and separates the view from the model, i.e. content vs. layout. These OO models demanded a deep understanding from its users and might therefore not be optimal if promoting high user participation.

A sociotechnical[12] view on IS development is where the organization is considered to be an open system in which participants receive different degrees of influence, and it also investigates work satisfaction. This approach is concerned with effective organizational change, while the trade-unionist approach merely refers to industrial democracy and the quality of the working life (Iivari & Igbaria, 1997). The so-called "Collective approach" emerged at a later stage and it has its origins in the Scandinavian approach (Greenbaum & Kyng, 1991). This approach focuses more on actions and processes rather than merely on systems requirements. In opposition to the two European structural approaches, the North American approach has had its focus in antecedents of user participation, aiming at developing and experimenting with various tools, techniques and principles to support effective user participation (Iivari & Igbaria, 1997). However, researchers in the USA, at the beginning of the 1990s, began to pay attention to the Collective approach, but here it was called "the Scandinavian School". The research focus within the IS area shows relatively large differences between the European and North American concerns. In their paper, concerning a Finnish survey, Iivari and Igbaria therefore promote research addressing European concerns, which should be conducted in order to provide a balance in relation to the North American bias of quantitative research on user participation (ibid.).

[11] Model View Controller (MVC), an approach or paradigm originating from Smalltalk-80.

[12] It has its roots in the sociotechnical systems design initiated by the Tavistock Institutes and also in the industrial democracy experiments in Norway (Juhani Iivari & Igbaria, 1997).

User involvement and user participation

The first part provided an account of an overview of the history and the evolution of the IS tradition with a focus on the early IS traditions. In later decades, newer, alternative organization models (e.g. network organizations) have emerged, very much as a result of the Internet expansion and thus new possibilities for participation and contribution are now offered. As such, organizations can exist independently of an individual's geographic position or work hours. Furthermore, it is made it easier to include actors from outside the institutions. Consequently, the view on user participation and user involvement has evolved through the IS development history. In the context of information systems, discussions and research on user participation show a long tradition. Several methods and methodologies based on the notion of a *participating user* have, in the IS area, evolved over time: user participation, prototyping, participatory design (PD), computer supported cooperative Work (CSCW), usability engineering, and user-centered design, to mention but a few. These methods are examples of different ways of involving the user in some way and/or to some extent.

From this evolution a common question has been cultivated – how can or are users involved in IS development and how do they participate. I depart from this view in that participation refers to, in everyday terms, the act of taking part in something – or participates in an activity. Individuals can participate through personal or representative action, alone or in groups; participation can also be formal or informal (Barki & Hartwick, 1994). A concept very much connected to participation is user involvement. Ives and Olson (1984) argue that user involvement generally refers to participation in the system development process by representatives of the target user group (for other examples see Barki & Hartwick, 1989, 1994). Moreover, Ives and Olson include an actual or perceived participation, giving an account in relation to a passive nature of participation). The authors argue that facets of user involvement as being varying types of participation and the degree of involvement, referring to the amount of influence the user has (ibid.). Ives and Olson (ibid.) present a descriptive model of user involvement, including antecedents, and outcomes of user involvement. It is argued that user involvement influences and leads to improved changes, systems quality, user satisfaction, successful system implementation, and systems use (e.g. Barki & Hartwick, 1994; Ives & Olson, 1984; McKeen, Guimaraes, & Wetherbe, 1994). Others argue that "the benefits of user involvement have not been strongly

demonstrated" (e.g. Ives & Olson, 1984, p.600 and for a more recent review see Iivari & Igbaria, 1997; He, 2004).

In a recent article, Iivari and Iivari (2006) provide a description of user participation and the different roles users can have in IS development. They argued that system development methods can be divided into being more or less user-centered (ibid.). As such, they have analyzed user-centeredness along four dimensions addressed in the existing UCD literature; (i) user focus, (ii) work focus, (iii) user involvement/participation, (iiii) system personalization. In Table 1 the four dimensions of the multidimensional concept according to Iivari and Iivari (2006) are presented.

Table 1. Varieties of views of user-centeredness (adapted from Iivari and Iivari, 2006)

Dimension	***Different views***
User focus	*Individual user – human factor – user profile – fictive user*
Work focus *- How to conceptualize and represent work?* *- How to introduce change?* *- Who has the power to decide about change?*	*- Local work practices – holistic work models* *- Technology driven – interactive – work process driven - emergent* *- Users – developers – managers*
User involvement/ participation	*Direct – representative – mediated (surrogate representation)*
System personalization	*Adaptive - adaptable*

The authors suggest that the four dimensions can be used for evaluating information systems development methods and approaches as to what extent they adhere to the ideals of user-centeredness, and analyze the variety of meanings of user-centeredness in the extant literature. They argue that in order to describe and evaluate system development methods and approaches, one should look into:

> *"to what extent they adhere to the ideals of user centeredness, including: focus on each individual user and his/her preferences and characteristics; thorough understanding and redesign of users work practices acknowledging also the political/organizational/cultural context; direct, active participation of users; and development of adaptable and adaptive systems to fit the user while the user learns during the system use (ibid., p. 7)."*

That success in IS development projects is difficult to achieve is commonly acknowledged within the IS domain, as discussed above. The arguments given are strong in that increased user participation could have a positive effect on the success of an IS development process. On the other hand, some empirical evidence has shown that user participation can also negatively influence project performance since it could make the process more difficult, lengthy, and less effective (Heinbokel et al., 1996; Subramanyam et al., 2010). This is further supported by Iivari and Iivari (2006), who note that the majority of participative design projects have been small, stand-alone applications of IT with low organizational complexity. A recent study on user participation in software development projects (Subramanyam et al., 2010) focuses on satisfaction, as being imperative for systems development success, not only from a user but also from a developer perspective. This study indicates that developer satisfaction improves considerably with increasing user participation in relation to the users, who felt less satisfied when they increasingly engaged in development processes. At moderate levels of user participation the study found the gap to be minimal compared to larger differences at low or high participation levels. At a low level of participation, users felt a higher level of satisfaction as the developers had the lowest grade of satisfaction. The opposite was found at the higher level of participation. Subramanyam et al writes: "Even though the satisfaction levels were not at their highest, developers and users seemed to reach a common ground when users engage only moderately in the development process" (ibid., p.139).

Summary: Traditional forms of user participation in IS development

The account of traditional IS development given above, presents a condensed picture with regards to participation. This summary narrows and lists the most important key concepts discussed above, which are to be discussed at a later stage in section 2.3.

The review of Ives and Olson from 1984, is often referred to in IS literature as still being a valid critique to weak and inconclusive results concerning the relationship between user participation and IS success, proposing more attention to the antecedents of user participation, and most important measures (Barki & Hartwick, 1994; Iivari & Igbaria, 1997). More recent research (see e.g. Iivari & Igbaria, 1997) focuses on the influence of the participants' organizational level, task variety and computer experience. Iivari and Igbara present a conceptual framework including age, gender, education, computer training, organizational

tenure and job tenure as control variables (ibid.). In accordance with Iivari and Igbara, I regard these variables as antecedents to user participation. It is, for me, important to include a sociocultural perspective and to explore not only the outcome variables of participation but also to investigate factors that precede participation.

Following the fact that traditional IS development uses a software requirement engineering process, the following can be found concerning the ideal type specification:

- In traditional organizations the structure and form is highly influenced by the traditional requirement specification.
- User participation, roles and formal incentives are dependent on organizational structures and boundaries.
- The type of system and stage in the development process affects user involvement.
- Decision rights are highly centralized with a separation of strategy and execution.
- Roles are given (e.g. employment, career), not informally taken. Participants are given roles and the degree of participation is dependent on contextual factors (e.g. organizational climate, development characteristic), i.e. it depends on what situation and what kind of system development is in focus.
- System quality and system acceptance are often measured as outcome variables of user involvement. This "narrow focus ignores the important underlying cognitive and motivational characteristics of individuals affected by the changes" (Ives & Olson, 1984, p.590).
- Relevant regulatory processes can range from consultative participation with external or introjected regulation to representative participation with identified and integrated regulation (Deci & Ryan, 2008b; Mumford & Weir, 1979; Osterloh & Rota, 2007).
- Extrinsic motives are benefits through extended functionality, reputation, and commercial motives, while intrinsic motives (pro-social and for the fun of it) are more seldom to occur in the closed and controlled traditional IS context (Osterloh & Rota, 2007).

I have now read up on the first of my ideal types, discussing organizational structure, roles, and formal incentives. These will be analytically distinguished at a later stage and further discussed together with the second contrasting ideal type stemming from the same origin of software development, but showing different structures, roles, and incentives.

Forms of Participation in OSS Development

To fully understand the phenomenon of open source movements, one might need to be a part of it oneself. Nevertheless, efforts in describing and analyzing the free software and open source software phenomenon are many (for early overviews of the open source phenomenon see Feller & Fitzgerald, 2000; Ljungberg, 2000; Raymond, 1999, 2000). In the following, some background and an overview of the free software and OSS phenomenon will be provided, the second ideal type to be described in this chapter. I will place the focus on three factors of the success of the open source movement:

- users seeking inexpensive implementations free of licensing restrictions;
- a philosophical movement rejecting the idea of software ownership;
- emergence of the Internet as both an enabler and objective for collaborative software development.

As previously presented, the sharing of free software is certainly not new. Programmers and researchers (both academic and corporate) were early adopters of shared and gifted code to improve or to change it (von Krogh & von Hippel, 2003; Osterloh & Rota, 2007). When the technology had reached a certain maturity, commercial developers (e.g. AT&T and the history of Unix[13]; Raymond, 2000) became reluctant to share their code and various proprietary versions were released (Osterloh & Rota, 2007, p. 16). A consequence of the commercialization was that many programmers found themselves excluded from the development

[13] For more on the history of Unix see http://www.unix.org

processes. The initiative of the GNU[14] project, as a *free* alternative to the existing commercial and propriety Unix version is said to be a reaction to this development. Other examples are related to specific hardware, operating systems, programming languages etc. e.g. software to the Amiga computer, the Apache web-server, Emacs, Lisp, Prolog (for a review see Ljungberg, 2000; Osterloh & Rota, 2007). Free software has a longer history than the open source term which was coined to eliminate the confusion on the meaning of "free", as to gratis or libertas (i.e. free speech vs. free beer), thus to remove potential obstacles to the commercial expansion of the concept (Feller & Fitzgerald, 2000; E. Raymond, 1999).

There are many versions of the history of free software and OSS in the academic literature (e.g. Feller & Fitzgerald, 2000; von Krogh & von Hippel, 2003; Ljungberg, 2000; Lundell et al., 2010; Raymond, 1999, 2000; Scacchi et al., 2006). For the full version of the history of free software I refer to the web pages of Free Software Foundation and the GNU project. Richard Stallman, who originally initiated the initiative of the Free Software Foundation (FSF) in 1984, started, at this time, his work on the "GNU operating system". An interesting example regarding the impact that has been had by forming a community of practice and sharing goals and OSS is the well-known and widely spread Linux operating system. It involves thousands of hackers scattered all over the world connected through the Internet, and all sharing the same goal. In the example, no in-depth or more technical discussions on operating systems and their structure will be given, as the intention is rather to give an indication regarding the impact that this developing process involving thousands of hackers, has had. Today, many computer users actually run (i.e. use) a modified version of this GNU system without knowing it. Linus Torvalds in 1991 started writing on an operating system kernel[15] that he named Linux. This kernel was the missing piece of the almost ready GNU operating system. A kernel is an essential part of an operating system, but useless by itself. As summarized by Stallman (on the GNU project webpage), Linux is normally used in combination with the GNU operating system: the whole system is basically GNU with Linux added, or GNU/Linux. Stallman points on the GNU project web page that all the so-called "Linux" distributions are actually distributions of GNU/Linux.

The main impact Linux gave to the community was based on the fact that Linus Torvalds gave the freedom to redistribute copies (i.e. freedom 2 according to FSF[16]) of the developed operating system kernel. It had never been tried before on complex software such as a kernel. Torvalds found himself surrounded by hackers

[14] GNU is a recursive acronym for "GNU is Not Unix".

[15] A kernel is the program in the system that allocates the machine's resources to all other programs running on that machine

[16] http://www.gnu.org/licenses/licenses.html or http://www.fsf.org/licensing/

who started to contribute to the software. This, for its time, was a new way of developing larger source code and was innovative and, of course, raised some interest from different groups and stakeholders. One of them was Eric Raymond, who had hacked and contributed in several OSS projects (e.g. the GNU project). He believed in, as did most of the developers at this time, small tools, rapid prototyping, and evolutionary programming (Raymond, 1999), i.e. the conventional closed source development. The most important software (here Raymond refers to operating systems and large tools like Emacs) "should be built like *cathedrals*, carefully crafted by individual wizards or small bands off mages working in splendid isolation, with no beta to be released before its time" (Raymond, 1999 p. 24). This "old" approach was now contrasted by Linus Torvalds whose style was the opposite, "release early and often, delegate everything you can, be open to the point of promiscuity" which Raymond resembles to "a great babbling *bazaar* of differing agendas and approaches" (Raymond, 1999 p. 24), i.e. the progressive open source development. Why and how this worked, and worked well was, at the beginning, confusing, but this theory of the bazaar was soon to be tested (Raymond, 1999). In later interviews given by Torvalds he explains his way as "just being lazy" and not wanting to do the entire job by himself, thus providing the motivation as to why he delegated and gave away his initial work.

The "Open Source Initiative" (OSI) began in 1997 with the publication of Eric Raymond's paper[17] "The Cathedral and the Bazaar". On the OSI webpage you can read: "In this paper, Raymond pioneered a new way of understanding and describing the folk practices of the hacker community". Raymond's (1999) article contrasts two different free software development models:

- The Cathedral model, in which source code is available with each software release, but code developed between releases is restricted to an exclusive group of software developers. GNU Emacs and GCC are presented as examples.

- The Bazaar model, in which the code is developed over the Internet in view of the public.

Raymond's analysis centered on the idea of distributed peer review and had an immediate and strong appeal both within and, rather unexpectedly, outside the hacker culture (OSI, 2010). It is also said that this triggered the company Netscape (including the Mozilla project) to announce that it planned to release the source code of their Web browser as free software (OSI, 2010). Moving from cathedrals to

[17] Raymond's presented the paper at the O'Reilly Perl Conference in September 1997

bazaar-like co-developments has, I think, created other incentives and also attracted new possibilities for participation that have also come to form how individuals act on the Internet today. Several OSS projects evolved (e.g. Solaris operating system and StarOffice from Sun Microsystem, and the Apache web server), but Linux is still the most well-known example.

History shows that there have been, and that there still are, differences and a tension between the two initiatives even if free and open source software are sometimes treated as one and the same. Licenses[18] describing the respective software would, I argue, be the easiest and most correct way to separate them. Moreover, these licenses are assigned to the beliefs or ideology of their practitioners regarding how and why software should be developed for sharing, modification, reuse, and redistribution (Scacchi et al., 2006, p. 96).

I highlighted above how the OSS term was coined in order to eliminate confusion on the meaning of 'free' and to remove potential obstacles to commercial expansion of software solutions. "Free software is always available as OSS, but OSS is not always free software" (OSI[19]). Table 2 outlines the regulating key conditions of the Open Source Definition (OSD) made by the OSI.

Table 2. Outline of Key Conditions of Open Source Definition (adapted from Feller and Fitzgerald, 2000)

Condition	***Commentary***
The source code must be available to user.	*The software distribution must include the source code (i.e., the original programming language), or else the code must be made available by free, public Internet download.*
The software must be redistributable	*The user of an OSS release is given full rights to reproduce and redistribute the software, on any medium, to any party, either gratis or for a fee.*
The software must be modifiable, and the creation of derivative works must be permitted.	*All users are given the right to modify the software or produce derivative works. There is considerable variation among licenses regarding whether or not modifications must also be released publicly under an OSD compliant license.*

[18] Free software generally appears licensed with the GNU general public license (GPL), while OSS may use either the GPL or some other license that allows for the integration of software that may not be free software (Scacchi et al. 2006, p. 96).

[19] There is a debate between the Free software foundation (FSF), led by R. Stallman, and the Open Source Initiative (OSI) on the term "free" in their context. This debate is rather ideological and sometimes even political; this is not my intent to promote in this thesis. The debate concerns rights when claiming code that is included in an OSS project. GPL license (FSF) wants to give all rights to the user, while the other part wants to give the rights to the copyright owner. Source: FSF and OSI

Condition	*Commentary*
The license must not discriminate against any user, group of users, or field of endeavor.	*In an attempt to counter overtly ideological content in software licenses, the OSD precludes any limitations on the possible uses of an OSS distribution.*
The license must apply to all parties to whom the software is distributed.	*While some licenses might allow modifications to be released under a non- compliant license, an OSS distribution cannot be "relicensed" by the user.*
The license cannot restrict aggregations of software.	*OSD compliant licenses cannot be limited to a particular distribution, nor can they seek to contaminate separately licensed software with which it is aggregated.*

There are two categories to consider: *non-copylefted* and *copylefted* software. For the non-copylefted software the author gives permission to modify and redistribute it, even to add restrictions to the modified version that could mean that the code is released as proprietary only in its binary form (i.e. without its source code). Copylefted software on the other hand, is not allowed to have any restrictions to the redistribution of the modified code. A consequence becomes that every copy or piece of code that has used copylefted code forces the redistribution to also be released as free software. If released under non-copyleft, OSS can still be redistributed only in binary format (i.e. without source code) as shown in Table 2 above. The redistribution then becomes proprietary software that has used open source code. The proprietary software is then referred to as *closed* software as opposed to *open* software. An important difference between free software and open source software is the trademarking of open source software to make it possible to keep control over the concept and to raise an alternative to the ownership (i.e. the copyleft) of free software (Ljungberg, 2000; Scacchi et al., 2006). An easy way to explain this, I argue, is that if the source code is released together with the software then it is open source software. When open source code is used within software but not released together with it (i.e. the software is only released in its binary form) it is proprietary code. The discussion highlights that just stating that a software development project is OSS does not provide a precise definition of its release conditions for the code.

Community characteristic

In the preceding part I focused mainly on the origin and definition of OSS (i.e. the code). This thesis concerns incentives that influence and motivate people to participate, therefore the following part of this section will focus on the characteristics of the OSS community (i.e. who, why and how people participate). There are several key dimensions that can help us understand the open source movement. One is as a form of gift economy. Raymond (1999) proposes the idea of OSS communities as being a *gift culture*. Moreover, "It is successful as a result of the gift economy that embraces activities in online communities" (Bergquist & Ljungberg, 2001, p. 305). Gift cultures are based on gift economies, in which social relations are not regulated by the possession or exchange of money or commodities, the social status is determined by what you give away, not what you control. Gift cultures are characterized by the creation and maintenance of social relationships based on the economy of gift exchange (ibid.). Rheingold (1994) ascribes to the notion of understanding the virtual community custom of giving away pointers, texts, advice or, common in open source communities, source code as a special "gift economy" that is inherent in a more general "gift culture". Rheingold (ibid.) describes this as 'a marriage of altruism and self-interest' (Bergquist & Ljungberg, 2001). Several research studies have found that this gift culture and the aim to *share* can be seen in most OSS projects and communities of practice (Bergquist & Ljungberg, 2001; Ljungberg, 2000; Raymond, 1999; Scacchi, 2007; Shibuya & Tamai, 2009). Additionally, Ljungberg (2000) has pointed out that it is important to differentiate between open source and other forms of virtual communities, such as communities of practice, on-line communities and virtual communities of more commercial nature. Others highlight the fact that gift cultures differ from exchanges cultures "in that the latter are characterized by scarcity and the former by abundance" (Bergquist & Ljungberg, 2001, p. 305). I have chosen to allow the concept of communities of practice to include open source communities with the support of a later definition made by Wenger and Snyder (2000a) where the boundaries and occurrence of these communities can be expected to occur anywhere. Accordingly, the present day communities of practice are different in one important respect: instead of being composed primarily of people working on their own, they often exist within large organizations (ibid.).

Most important for participation in OSS communities is the *motivation to contribute*. Critique has highlighted that OSS development resembles structures and processes of the scientific community with competitive motives of status and reputation rather than being driven by monetary rewards (Bezroukov, 1999a,b; Hertel, 2003). Recent empirical work (see for instance Glass, 1999; Feller & Fitzgerald, 2002; Bitzer et al., 2004; Lakhani & von. Hippel, 2003; Rossi &

Bonaccorsi, 2005; Scacchi, 2007) has shown that the incentives to contribute to the OSS communities, i.e. write, read and revise code for free, can be divided into two types of motivation, *intrinsic* and *extrinsic* motivation (cf. Chapter 3), and that contribution is a result of both. Extrinsic motivation works through indirect satisfaction of needs, especially monetary compensation, while intrinsic motivation works through immediate need satisfaction and the very pleasure of carrying out an activity (Osterloh & Rota, 2005). People tend to act with social motivation factors and participate in knowledge production in a sociotechnical web of OSS. The involved parties contribute to, and learn from the community. They strive towards earning respect and status, achieving "geek fame", being creative, advancing through evermore challenging technical roles, as well as giving and being generous with their time, expertise, and source code (Scacchi, 2007). The work content itself is an ideal incentive system for intrinsic motivation (Osterloh & Rota, 2007). Intrinsic motivation is often an enjoyment based satisfying flow of activity (e.g. such as playing a game or reading a novel for individual pleasure Csikszentmihalyi 1996). Osterloh and Rota (2007) review empirical work with regards to finding how programmers contribute to OS software for both intrinsic and extrinsic reasons. Extrinsic motives were benefits through extended functionality, reputation and commercial motives, and examples of intrinsic motives were for fun and pro-social motives.

Participation within OSS communities is not formally organized with a pre-assigned control structure; rather, they are meritocracies and reveal informal *structures*, *roles* and *relationships*. Participation in an OSS community varies between individuals and in time. Members can contribute in any way they wish (e.g. bug reports, sharing knowledge, improving code).

The roles of the members attached to an OSS project will shift during the project's lifetime according to the tasks to be performed. As within almost all kinds of communities of practices, people start as newcomers and socialize into the community during time (see Figure 2). In OSS communities this process is called "joining script" (von Krogh et al., 2003). Osterloh and Rota (2007) have investigated how rules are maintained within the community and factors that could interfere with them and they found three conditions to be relevant: (1) autonomy, (2) feeling of competence and (3) social relatedness. These are examples of human basic psychological needs and contextual factors that support or thwart motivation, which will be elaborated in greater depth in Chapter 3.

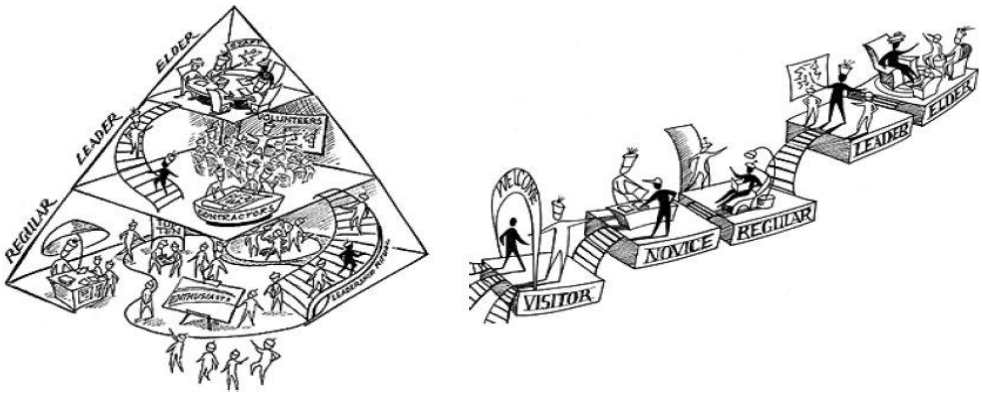

Figure 2. A pyramid meritocracy and role hierarchy (from Kim)

People participate and take on different roles during a project's lifetime, meaning, they are seldom formally allocated their roles as in traditional IS projects. Knowledge is shown by means of contributions that increase the merit/s of the members. Transition between the roles in the hierarchy, as shown in Figure 2, varies between different OSS projects. Some projects have a very centralized strict hierarchy while others have a looser more decentralized structure. The transition from "elder" can also go the other way when a core developer wishes to resign (become a regular or even leave the project).

The cognitive criterion (i.e. competence) is an important incentive for participation within OSS; to distribute ideas and knowledge and to produce good code. Open source projects are an immense *learning* opportunity (Lakhani, et al., 2002; Rossi & Bonaccorsi, 2005), programmers study the code and use it to implement new solutions and for sharing the knowledge. One basic idea behind participation in OSS is to *share knowledge* and to enhance it so that it enables others to improve upon what has been shared (ibid.). The key conditions shown in Table 2 above have been created to provide reassurance that the shared knowledge that is created within an OSS project continues to be shared. Open source projects represent an immense learning opportunity and studies have shown that the overall motivating factor is that contributing is intellectually stimulating and secondly, it improves skills (Lakhani et al., 2002). According to Scacchi et al. (2006), the reasons for participating in free OSS development are twofold. Firstly, participants have a greater opportunity for learning and for sharing what they know about information systems functionality, design and practices associated with specific projects. Secondly, since free OSS developers self-select the technical

roles they will take on as part of their participation in a project, rather than being assigned to a role in a traditionally managed IS project, in which the assigned role may not be to their liking, they are more likely to enjoy their OSS work and to be recognized as trustworthy and reputable contributors. Process-related elements associated with the task of coding, such as learning and enjoyment, are important (Lakhani et al., 2002).

Another important characteristic is that OSS participants are almost always also *users of the code they contribute to*. The implication of this is that open source developers are a subset of the open source user community, i.e. all open source developers are users, but not all users are developers (Gacek et al., 2004). Moreover, as Gacek et al. point out, this characteristic explains the fact that there are normally no precise specifications or requirements documents clarifying what are to be achieved in the project. OSS project are often started or initiated by a single programmer attempting to solve a problem or an interesting dilemma (ibid.). It is often the case that a project starts because there is a problem to be solved and one of the most well-known examples of this is the aforementioned GNU project, while another interesting example is when Tim Berners-Lee created the origins of the WWW while he was assisting high-energy physicists to share their work. There are many other examples, far too many to account for in this thesis. Nevertheless, the common feature for the majority, is that the software solution evolved from a problem that someone (a single person or a group) decided was necessary to solve and, most important of all, to share.

However, participation in OSS projects is a time consuming and knowledge-intense activity and a project is only remains live for as long as there are developers engaged. Research that covers the participation process in sponsored OSS projects are relatively scarce (Shibuya and Tamai, 2009) compared with research covering larger OSS projects (e.g. Linux and Apache). It is difficult to obtain useful information about a member's participation due to the lack of transparency, especially in sponsored OSS projects. Shibuya and Tamai (2009) relate this to the fact that core members in the project often work in the same company and therefore have other means of communication, i.e. internally within their company.

Comparative Summary

This section summarizes the discussion above and analytically distinguishes the two aforementioned ideal types.

Even though software development origininates from a tradition in which sharing code for free were an obvious feature, history has, somewhat, changed its original intent. Moreover, there have been, and still exist, infectious ideological discussions concerning what is defined as free and what is open (see e.g. Raymond, 2000), some of which has been discussed above.

An easy way to understand this disarticulation is to look at *license features*, from proprietary to open source software types (i.e. prize, redistribution, usage, availability of code and if it's modifiable or not). In the empirical material of this study, discussion in relation to what licensing to choose is evident. To protect OSS from being modified and converted into propriety software, all OSS are *copyrighted and licensed*, but – users do not pay any license fees for using a particular OSS product. OSS should therefore not be confused with public domain software (Open Source Definition[20]).

By using ideal types, I have, by means of my description of them, chosen to focus on three specifications: organizational structure, roles, and formal incentives that are also summarized in Table 6.

Traditional project organizations normally consist of a rigid structure within which skills, organizational and geographical boundaries, or economic constraints are taken into account, i.e. not far from the Cathedral model of early open source projects. Contemporary OSS projects often have a more dynamic Bazaar like construction where these constraints have no influence at all. They have loosely-knit participants of a community spread all over the world, contributing over the Internet, often, without being paid. Table 3 below provides an overview and a comparison of organizational structures between traditional organization and OSS communities.

Table 3. A comparison of organizational structures between OSS communities and traditional organizations (adapted from Sharma et al., 2002).

	Traditional organizational forms Functional/Divisional/Matrix	***OSS community***
Division of labour	*By inputs/By outputs/By Inputs and outputs*	*By choice and knowledge*
Co-ordination mechanisms	*Hierarchical supervision, plans, and procedures/ Divisional general manager and corporate staff/ Dual reporting relationships*	*Membership management, rules and institutions, monitoring and sanctions and reputation*
Decision rights	*Highly centralized/ Separation of*	*Highly democratic and*

[20] Articulated by the Open Source Initiative. The complete definition can be found at http://www.opensource.org/docs/osd

	strategy and execution/ Shared	*decentralized*
Boundaries	*- Core/periphery* *- Internal/external markets* *- Multipe interfaces*	*Porous and changing*
Importance of informal structure	*Low/ Modest/ Considerable*	*High*
Politics	*Inter-functional/Corporate-division and inter-divisional/Along matrix dimensions*	*Shifting coalitions*
Basis of authority	*Positional and functional expertise/* *General management responsibility and resources/* *Negotiating skills and resources*	*Reputation*

The structure and form of traditional organizations is highly influenced by a traditional requirement specification. Modern software engineering or traditional requirement engineering processes does not appear to be readily adopted or practiced in OSS development communities (Scacchi, 2002). The distinction in Table 3 shows that, in OSS communities, work is not assigned as in most traditional software development, it is rather chosen. OSS developers are often geographically distributed and work has to be coordinated through decentralized workspaces and asynchronous communication. Therefore, processes for decision-making have to be established. In addition, membership in an OSS community is fluid and the structure often changes over time and according to needs. Finally, OSS communities are based on meritocracy as shown in Figure 2 (Sharma et al., 2002).

To better understand these differences, Scacchi (2002) reports on findings and results from a study looking at the sociotechnical work practices and community forms in open source software development, investigating requirements for OSS and comparing them with traditional software engineering requirements specifications. In the Table 4 below, a conceptualization is made from the results presented by Schacchi (2002), which describes the findings of processes for open software requirements and relating them to the traditional requirement specification (as shown in Figure 1).

Table 4. Traditional Requirement Specifications vs. OSS processes for developing requirements (based on Scacchi, 2002)

Traditional Software Requirement Specifications	***OSS processes for developing requirements***
Eliciting requirement: identify stakeholders, goals, needs and expectations and system boundaries.	*Assertion of OSS software requirements*: articulated in a number of ways that are ultimately expressed, represented or depicted on the Web.
Modeling or specifying requirements: focus attention on the systematic modeling of both functional and non-functional software requirements.	*Continually emerging webs of software discourse*: requirements can emerge from the experiences of community participants through their discourse (email, bboards) – a continually emerging source of requirements.
Analyzing requirements: systematic reasoning of the internal consistency, completeness or correctness of a specification.	*Requirements reading, sense-making and accountability:* Developers within the community closely or casually read, make sense of it, consult other materials or one's expertise, and trust its reliability and accountability.
Validating requirements: assesses the feasibility of the modeled system solution, as well as to identify realisable, plausible and implausible system requirements.	*Condensing discourse that hardens and concentrates system functionality and community development:* requirements are validated with respect to the software's implementation. Is an implicit by-product rather than an explicit goal.
Communicating requirements: entails documenting requirements.	*Global access to open software webs*: requirements are organized and typically stored in a persistent form that is globally accessible.

Table 4 shows that requirements of engineering efforts in OSS development projects are 'implied activities'. This means that they routinely emerge as "a by-product of community discourse about what their software should or should not do, as well as who will take responsibility for realizing such requirements" (Scacchi, 2002, p. 37). Rather, OSS requirements appear as situated discourses within private or public email discussion threads and emergent artifacts (ibid.).

The governance structures of OSS projects provide conditions that foster a kind of pro-social motivation (Osterloh & Rota, 2007). Open source developers are said to show both intrinsic and extrinsic motivation (for a review see Bitzer et al., 2004; Rossi, 2004). Examples of motivations of open source developers from these reviews are presented in Table 5.

Table 5. Examples of Extrinsic and Intrinsic reward Motives within OSS communities (modified from Rossi, 2004; Rossi & Bonaccorsi, 2005).

	Motivations
Extrinsic	*Monetary rewards* *Low opportunity costs* *Reputation among peers* *Future career benefits* *Learning* *Contribution to the community* *Technological concerns* *Filling an unfilled market*
Intrinsic	*Creative pleasure (Fun to program)* *Altruism* *Sense of belonging to the community*

Monetary rewards are possibly the most common incentive for employed developers. However, it is, also the case that open source developers can work for pay. Several larger sponsored OSS projects have employed developers (e.g. the OpenBSD project amongst many) but are still meritocracies with important peer-reviewing processes. Extrinsic motives working both in the traditional IS and in OSS context are based on benefits through extended functionality, reputation and commercial motives, while intrinsic motives are pro-social and for the fun of it. Intrinsic motives are regarded as occurring more infrequently in the closed and controlled traditional IS context. Thus, the co-existence of intrinsic and extrinsic motives is absolutely vital to the success of OSS (Osterloh & Rota, 2007).

Elements of autonomy and competence distinguish OSS communities from traditional IS projects. Osterloh and Rota have compared three promoting factors often found within OSS projects, autonomy, mastery, and relatedness with controlled projects (ibid.). When people are intrinsically motivated, they feel a sense of *autonomy*, as opposed to being under surveillance or merely rewarded, which tends to make people feel *controlled* (Deci & Ryan, 2008). According to the self-determination theory on motivation, autonomous motivation comprises intrinsic motivation and well internalized extrinsic motivation (ibid.). Autonomy within OSS communities is high, in relation to traditional IS projects and contributors choose for themselves where and what they wish to contribute. Feedback that is not perceived as controlling enhances the feeling of *competence* (ibid.). In OSS communities rapid feedback cycles enable concurrent design and testing. OSS communities have strong identification with common norms that gives *relatedness*. Relatedness – the need to feel belongingness and connectedness with others is centrally important for internalization. OSS projects are formed

around communities which share. OSS communities are meritocracies where contribution and learning are highly ranked incentives for participation (Osterloh and Rota, 2007). Research has revealed that threats, deadlines, directives etc. diminish intrinsic motivation as in contrast to choice, acknowledgement of feelings and opportunities for self-direction which have been found to increase intrinsic motivation because they allow people a greater feeling of autonomy (Ryan & Deci, 2000). Still, the two types differ in that "intrinsic motivation is based on interest in the behavior itself (it is enjoyable), whereas integrated extrinsic motivation is based on the person having fully integrated the value of the behavior", it remains instrumental (ibid.).

In Table 6 the comparative summary above is condensed and occurrences within each ideal type related to the three specifications are presented.

Table 6. A Comparative Summary of the two ideal types and specifications

Ideal type spec.	***Traditional IS***	***OSS***
Organizational structure	• *Controlled* • *Rigid hierarchical structures* • *taking geographical boundaries or economical constraints into account* • *centralized decisions* • *Highly influenced by the structures of the system requirement specification*	• *Autonomous* • *Dynamic and democratic structures* • *geographical or economical boundaries are no constraints, participants spread all over the world* • *decentralized decisions* • *Community processes for developing requirements* • *Meritocracy*
Roles	• *Employed workers* • *User versus programmer* • *given roles*	• *User is also programmer* • *Membership is fluid, keeps changing with time and needs* • *Earning respect*
Formal Incentives	• *Paid – monetary rewards* • *Career opportunities* • *intrinsic motives are regarded to occur more seldom* • *To attain an outcome from license fees*	• *To share knowledge, to contribute* • *Contribution and learning are highly ranked* • *Licensing to protect code from being modified and converted to proprietary software* • *To share code for free, fun to program* • *Without pay – reputation* • *high grade of relatedness,*

		sense of belonging • *co-existence of intrinsic and extrinsic motives is vital to the success of OSS* • *elements of autonomy and competence*

I have now discussed participation in traditional IS and OSS projects, comparing them as ideal types, and am well aware that examples exist regarding alternative and hybrid forms of participation within software development. To conclude, open source is a nontraditional approach to build and to distribute intellectual property (Weber, 2004). Rather than protecting, constraining, and charging a fee for the right to distribute ideas (i.e. traditional software development), open source mandates that the knowledge in question must be openly available and widely distributed to the general public. OSS development projects display characteristics of self-governance, intrinsically motivated participants, transparent work structures, sustainable work processes resulting in a cognitive capital (i.e. knowledge and competence) and task ownership (i.e. autonomy).

Now, having discussed and analytically distinguished, with the help of ideal types, differences between traditional IS and OSS development I turn to the second part of my theoretical basis – Motivation.

Chapter 3

MOTIVATION TO PARTICIPATE

This chapter provides a description of and an introduction to the second part of a theoretical basis that I find useful and, which has influenced my work in combining theories on participation with theories relating to motivation, in order to describe processes through which participation takes place in a loosely structured software development project. My first step was to address the topic of participation in software development, highlighting differences between and the characteristics of traditional and non-traditional organizational structures, roles, and formal incentives (cf. Chapter 2). In this second step, consistent with the self-determination theory (Deci & Ryan, 1985), I apply a sociocultural perspective on motivation, arguing that our actions, thoughts, and development are situated in a social context – they evolve and are created in social practice. As such, my intent is to supply a theoretical language that enables a description with regards to how motivation and participation interplay in such processes.

In this section, I present the self-determination theory (SDT), which is also used in the development of a framework for analysis that enables a description of factors and contextual conditions that enhance versus undermine individuals' motivation to participate, act, think and develop. The SDT plays a dominant role in explaining OSS developers' contribution and is the most frequent framework used to justify and categorize motivation (see a recent review by von Krogh et al., 2012).

The Nature of Motivation

In the encyclopedias[21] motivation is commonly defined as the act or an instance of motivating, or providing with a reason to act in a certain way. A person who does not feel the urge to act or involve is thus unmotivated. People not only possess different amounts of motivation (i.e. level of motivation), but also different kinds of motivation (i.e. orientation of that motivation) (Ryan & Deci, 2000a, b). Before continuing with a discussion on the differences and types of human motivation together with environmental factors that facilitate or thwart the satisfaction of human basic psychological needs, I start with a description of the nature of motivation from a historical perspective.

At the beginning of motivational research, scientists proposed that there were two main drives which powered our behavior. The first drive, and the most simple to understand, is the biological drive that comes from within and is connected to our urge to survive (Pink, 2009). People strive to satisfy some basic needs such as hunger, thirst, and reproduction. This drive is fundamental and originates from the earliest days of mankind. As societies evolved, a more civilized behavior was created and motivation was steered by the seeking of reward and the avoidance of punishment. The second drive, the "reward or punishment", comes from without (ibid.). For decades these were the only ones considered within the established theories. However, some early experiments on learning[22], conducted by Harry F. Harlow in the late 1940s, indicated that there was a third drive which was as basic and strong as the other two. As opposed to the behavioral theories during this time, Harlow (1953) and White (1959) presented the concept of *intrinsic motivation* (Vansteenkiste, Lens, & Deci, 2006). An intrinsically motivated person performs an activity for no apparent reward but the activity itself, i.e. they experience enjoyment (Deci, 1971, 1972; White, 1959). At the time intrinsic motivation was contrasted with *extrinsic motivation*. Extrinsic motivation referred to the performance of an activity because it leads to external rewards, separable from the activity itself (ibid.).

Harlow's idea concerning intrinsic motivation was, at this time, considered to be extremely controversial. During the same period, Maslow[23] continued, within the field of humanistic psychology, to question whether human motivation was only restricted to the rat-like seeking of the positive and the avoidance of negative

[21] See e.g. dictionary.com, wiktionary.com

[22] Harlow is most known for his experiments on primates. Monkeys were given a mechanical puzzle and began immediately to play with them and solve it without being given any rewards or affection. The joy of the task was its own reward.

[23] A student of Harlow

stimuli. Maslow contributed largely to the positive theory building of motivation (i.e. theory of motivation) arguing that the *situation or the field* in which the organism reacts must be taken into account. He contends, while behavior is almost always motivated, it is also always biologically, culturally and situationally determined (Maslow, 1943). The social conditions and processes influence not only what people do but also how they feel while acting and, as a consequence of acting (Deci & Ryan, 2008a). Maslow (1943) contributed to the area of human motivation giving a classification of *human basic needs* (e.g. psychological, safety, love, esteem, self-actualization) for motivational behavior arguing that they are organized into a hierarchy of relative prepotency with a cultural specificity (Maslow, 1943). There are, however, certain conditions that are prerequisites for the satisfaction of basic needs and the feeling of safety is highly valued for it to occur. Maslow denominated people who are satisfied according to these basic needs "basically satisfied people"; they are also the ones we may expect the fullest and healthiest creativeness from (ibid.).

Two decades later, in 1969, Edward Deci continued the research on motivation, examining *environmental factors* that *foster or hinder* motivational behavior and carried out several studies[24]. Others, (for a review see Vansteenkiste et al., 2006) noticed that the need for competence and personal causation (related to the concept of autonomy) are energizing bases for intrinsically motivated behavior. Individuals were found to show 'causality pleasure' when they recognize themselves as initiators of their behavior (ibid.). Deci (1971, 1972) also found that human motivation appeared to operate by laws that ran counter to that which most scientists and citizens believed "[w]hen money is used as an external reward for some activity, the subject loses intrinsic interest for the activity" (Deci, 1971, p. 114). Verbal reinforcement and positive feedback as extrinsic rewards increased relative to the non-rewarded subjects in his experiments. Deci's work showed that external rewards can have a negative effect on motivation. As such, his studies confirmed much of Harlow's and Maslow's research. Together with Richard Ryan, Deci continued the research associated with their theory of human motivation, development, and wellness – the self-determination theory (SDT); following that human motivation is not only

> *"biological endowments. It also bespeaks a wide range of reactions to social environments that is worthy of our most intense scientific investigation (Ryan & Deci, 2000, p. 68)."*

[24] E.g. The Soma puzzle experiments

Self-Determination Theory

The initial research on human motivation viewed, as described above, intrinsic and extrinsic motivation as being each other's antipoles. As such, the common distinction was between two broad contrasting classes of motivation to perform or participate in an activity: extrinsic or intrinsic motivation (for a review see Deci & Ryan, 2008; Vansteenkiste et al., 2006). However, such conceptualization implies that intrinsic motivation is *self-determined* while extrinsic motivation *lacks self-determination* that is illustrated in Figure 3.

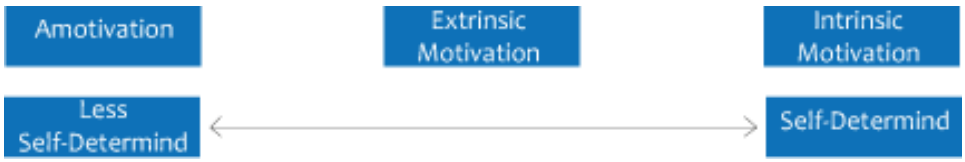

Figure 3. The types of motivation within self-determination theory, placed along the continuum of relative self-determination according with SDT

Initially, within the SDT tradition, this distinction was also made between intrinsic and extrinsic motivation (Deci & Ryan, 1985), but it was later extended by means of a differentiation of extrinsically motivated behavior related to its degree of autonomy or self-determination. Figure 3 shows a condensed representation of the three types of motivation placed along a continuum of self-determination. What appeals to me is that the theory treats motivation as different *types* of motivation rather than an *amount* of motivation, specifically autonomous motivation, controlled motivation, and amotivation as predictors of performance, relational, and well-being outcomes (Deci & Ryan, 2008; Vansteenkiste et al., 2006). The SDT maintains these different types of motivation and assumes that:

> *"most people are by nature active and self-motivated, curious and interested, vital and eager to succeed because success itself is personally satisfying and rewarding (Deci & Ryan, 2008, p.14)."*

An important factor for me in the building of my theoretical framework is that SDT also addresses the *social conditions* that enhance versus diminishes these types of

motivation. Subsequently, the theory proposes that all humans need to feel competent, autonomous, and related to others and that the degrees to which these *basic psychological needs* are supported versus thwarted affects both the type and strength of motivation (Ryan & Deci, 2000). Elements of SDT (i.e. autonomy support) have been examined in many field studies across several life domains, e.g. schools, homes, work, health care, sport, and close relationships (for a review see Deci & Ryan, 2008a). SDT highlights the importance of humans' evolved inner resources for personality development and behavioral self-regulation (ibid.). Its arena being:

> *"the investigation of people's inherent growth tendencies and innate psychological needs that are the basis for their self-motivation and personality integration, as well as for the conditions that foster those positive processes (ibid., p. 68)."*

A basic point of departure in my work is that people are motivated to participate in a sociocultural context (i.e. our actions, thoughts, and development are situated in a social context). It has therefore become important for me that SDT not only takes account of the different types of motivation, but also the conditions necessary for them, and that they are a result of "people's inherent active nature and the social environment that either support or thwart that nature (ibid. p. 14)". The SDT presents a framework that takes account of differences with regards to what motivates people and why some people show a more motivated behavior than others, together with describing environmental factors that hinder or promote each type of motivation. I have an interest in, as highlighted in the introduction, research that focuses on the question as to why often well-educated and well paid people choose to participate in open source software projects without financial gain or in a formally asked for manner, investigating the incentives regarding their motivation to contribute. A question that is applicable in most areas where people are involved and interact with their environment as the topic of motivation concerns what moves people to act, think, and develop. I have a particular interest in the part in SDT that researches the conditions that foster versus undermines positive human potentials as this:

> *"has both theoretical importance and practical significance because it can contribute not only to formal knowledge of the causes of human behavior but also to the design of social environments that optimize people's development, performance, and well-being (Ryan and Deci, 2000, p. 68)."*

Types of motivation

Early research separated intrinsic from extrinsic motivation, where intrinsic motivation was considered as being self-determined, whereas extrinsic motivation was thought to reflect a lack of self-determination (Vansteenkiste et al., 2006). In the following section, I will present how later research within the SDT paradigm has shown how external motivators (e.g. rewards) can also have an effect on intrinsic motivation and even undermine it. Additionally, is it possible for extrinsic motivation to be influenced by internalized regulations assimilated to the 'self'? I therefore conceptualize intrinsic and extrinsic motivation consistent with the SDT starting from the definition according to Deci & Ryan (2008), that:

- intrinsic motivation involves doing a behavior because the activity itself is interesting and spontaneously satisfying.
- extrinsic motivation involves engaging in an activity because it leads to some separate consequence.

The three types of motivation displayed in Figure 3 are the main categories central to SDT and the first level of distinction between autonomous motivation and controlled motivation.

Amotivation*:* Controlled motivation - is the state of lacking an intention to act. When amotivated, people either do not act at all or act without intent - they just go through the motions (Ryan & Deci, 2000). Amotivation results from not valuing an activity, not feeling competent to do it, or not believing it will yield an outcome (ibid.).

Extrinsic motivation: Degrees of controlled or autonomous motivation - cover the continuum between amotivation and intrinsic motivation, varying in the extent to which their regulation is autonomous (ibid.). There are different forms of extrinsic motivation which are dependent on contextual factors that either promotes or hinder internalization and integration of the regulation for these behaviors (see section “Differentiating extrinsic motivation” below). Examples are fame, financial success, and physical appearance. Extrinsic goals have an “outward” orientation

concerned with external manifestations of worth rather than with basic need satisfaction (Vansteenkiste et al., 2006).

Intrinsic motivation: Inherently autonomous motivation - is the state of motivation at the far rights of the continuum scale of self-determination. Classic intrinsic motivation is the doing of an activity for its inherent satisfactions. It is highly autonomous and represents the prototypic instance of self-determination (ibid.). Examples of intrinsically motivated goals, often referred to within SDT, are community contribution, health, personal growth, and affiliation. They are satisfying in their own right and they provide direct satisfaction of human basic psychological needs (see section below).

Central to SDT is the distinction between autonomous motivation and controlled motivation. Autonomy involves acting with a sense of volition and having the experience of choice (Gagné & Deci, 2005). Intrinsic motivation is an example of autonomous motivation. SDT postulates that autonomous and controlled motivation differ in terms of both their underlying regulatory processes and their accompanying experiences, and it further suggests that behaviors can be characterized in terms of the degree to which they are autonomous versus controlled. Autonomous motivation and controlled motivation are both intentional, and together they stand in contrast to amotivation, which involves a lack of intention and motivation (Deci & Ryan, 2008, Ryan & Deci, 2000).

Intrinsic motivation and environmental factors

I have already described how a person is said to be intrinsically motivated when he/she performs an activity for no apparent reward except the activity itself (Deci, 1971, 1972). Deci argues that people are moved to act by very different types of factors and are motivated because they value an activity or because there is strong external coercion. An abiding interest or a bribe can urge someone into action (ibid.). Behavior can also come from a desire of personal commitment to excel or alternatively from some kind of fear. These are familiar contrasts of having internal motivation versus being externally pressured (Ryan & Deci, 2000). Intrinsic motivation reflects the positive potential of human nature and its natural inclination toward assimilation, mastery, spontaneous interest, and exploration. It has an essential cognitive and social development, and is a source of enjoyment and vitality in our lives (Ryan & Deci, 2000). For intrinsic motivation to occur it requires supportive conditions for the innate psychological needs of people.

Studying influential factors on intrinsic motivation, research within the SDT confirmed that overall extrinsic rewards *decreased* intrinsic motivation (Deci & Ryan, 2008a). It was found that rewards (e.g. money used as an external reward) led people to lose interest in the activity, but, in contrast, the provision of choice was found to *enhance* intrinsic motivation (Deci & Ryan, 2008a). Social, contextual events such as positive feedback, verbal reinforcement, or non-monetaral rewards can enhance intrinsic motivation. Deci and Ryan (ibid. p. 15) explain these findings "that when people are intrinsically motivated, they feel a sense of autonomy as their basic need for autonomy is satisfied". Being threatened, being under surveillance or merely rewarded tends to make people feel pressured or controlled. An experienced control will diminish satisfaction in relation to the need for autonomy, as opposed to when a choice is offered where they experience a greater degree of autonomy satisfaction (ibid.).

For intrinsic motivation to be evident it is, according to SDT, not sufficient for people to experience competence unless they also experience their behavior as being self-determined. Immediate contextual support for *autonomy* and *competence* or abiding inner resources is required. Subsequently, research has revealed that threats, deadlines, directives etc. diminish intrinsic motivation as in contrast to choice, the acknowledgement of feelings and the opportunities for self-direction which have been found to increase intrinsic motivation because they allow people a greater feeling of autonomy (Ryan & Deci, 2000). However, negative feedback tends to undermine intrinsic motivation hindering individuals' need for competence, leaving them amotivated (i.e. with little intrinsic or extrinsic motivation) (Deci and Ryan, 2008). Amotivation is shown in figure 1 to the left side of extrinsic and intrinsic motivation thus representing the lowest grade of self-determination.

In contrast to tangible rewards, Ryan and Deci (2000) have found that social contextual events such as feedback or communications that are conducive towards feelings of competence during action can have an enhanced effect on intrinsic motivation. Competence is often perceived; even so, positive or negative performance feedback can enhance or diminish intrinsic motivation. Ryan and Deci (2000) notice that studies[25] have shown that a feeling of competence will not enhance intrinsic motivation unless accompanied by a sense of autonomy. Thus, autonomy and competence are highly ranked for producing variability in intrinsic motivation. Nevertheless, autonomy and competence are not the only factors within SDT which must be considered in relation to supporting intrinsic motivation and a third factor, *relatedness* should also be taken into account (ibid.). When an infant relates to its mother and is feeling secure, a similar dynamic occurs in "interpersonal settings over the life span, with intrinsic motivation more likely

[25] Referring to Fisher, 1978 and Ryan, 1982

to flourish in contexts characterized by a sense of security and relatedness" (Ryan & Deci, 2000 p.71). We can achieve more when we are motivated by a greater objective that we relate to (i.e. have a larger purpose), it can be intentional or non-intentional. Consequently, the same examples can be found in the school context. A warm, caring and engaged teacher can create relatedness to both him/herself and to the topic taught.

Relatedness: Internalization is more likely to be in evidence when there are ambient supports for feelings of relatedness. Feeling involved with and related to a family or group will facilitate internalization of values and behaviors endorsed in that setting (Deci & Ryan, 2008). For example studies have found that children, who felt secure and connected to their parents and teachers, had more fully internalized a regulation for positive school-related behavior (Ryan & Deci, 2000). Another example on relatedness from studies of infants and mothers has shown that both security and maternal autonomy support, predicts more exploratory behavior in the infants (Ryan & Deci, 2000). For example, individuals can feel connected and belonging to a group by cultural or personal (family) attributes, i.e. explicit or implicit endorsement of behaviors by significant others. Also, to feel a sense of security with respect to parents and teachers is important for children's attachment. Children relate to their parents, teacher, playmates, siblings etc., others relate to a community of practice, e.g. a clan within a virtual gaming community. Team building has appeared on many organizational agendas within our contemporary society. For me, team building is a good example of activities that are initiated in order to enhance an individual's feeling of belonging and being connected to a group.

Competence: The relative internalization of extrinsically motivated activities is also a function of perceived competence. The chances of fully internalizing a regulation of a behavior will be increased if an individual feels competent to enact the behavior. For example, it is possible for individuals who are directed to perform behavior or tasks, before they are developmentally ready for them or understand them fully, to only partially internalize it (ibid.; Csíkszentmihályi, 1996). Fully understanding and mastering a task, on the other hand, has a positive effect on a person's internalization. Examples of social contextual events that produce conducive feelings of competence are: feedback, communication, and rewards. Feedback can be positive or negative. Positive performance feedback is shown to enhance intrinsic motivation, whereas negative performance feedback diminishes it (Deci, 1975). In addition, optimal challenges can have a positive effect on perceived competence, whereas a task that is too challenging and difficult has the opposite effect – it can be experienced as too hard to master.

Autonomy: The experience of autonomy facilitates internalization and, in particular, is a critical element for a regulation to be integrated (ibid.). People must experience a sense of choice in order to maintain high intrinsic motivation. Context yields external and introjected regulations if there are rewards and threats, or, if a group endorses the activity and the person feels competent and related. But, contexts can yield autonomous regulation only if they are autonomy supportive, thus allowing the person to feel competent, related, and autonomous. For example, deadlines and freedom from demeaning evaluations can act in a negative way and diminish intrinsic motivation. Offered choice, instead of feeling pressurized and controlled tends to leave an experience of greater autonomy satisfaction.

These processes are facilitated by a sense of choice, volition, and freedom from excessive external pressure towards behaving or thinking a certain way (ibid.). To summarize, intrinsic motivation occurs when our basic psychological needs for autonomy, competence, and relatedness are fulfilled. But, there are regulatory processes that influence the grades of fulfillment of these needs when people experience greater autonomy as they internalize and assimilate them to the self. As a result of behavioral regulations and values being internalized, SDT have come to differentiate extrinsic motivation from the type of extrinsic motivation that was, at an earlier stage, contrasted with intrinsic motivation.

Differentiating extrinsic motivation

People will be intrinsically motivated only for activities that hold intrinsic interest for them. For other activities, not holding such an appeal, SDT discuss self-regulation of extrinsic motivation. People can feel autonomous while being extrinsically motivated (Deci & Ryan, 2008a). Extrinsic motivation can vary greatly in its relative autonomy (Ryan & Deci, 2000). In early examples of studies and research on motivation, it was often found difficult to see how it was possible to determine exactly, or even with security, if a behavior was extrinsic or intrinsically motivated. The early differentiating between motivation as being either strictly intrinsic or extrinsic is argued to be difficult to apply to cases where individuals performed a task without any apparent intrinsically motivated behavior. Therefore, the development of differentiating extrinsic motivation within the SDT was introduced to better suit the explanation of different types of motivated behavior. The development within the SDT has gone from treating intrinsic and extrinsic motivation as two separate entities, to differentiating extrinsic motivation, and to maintain that the needs for competence, relatedness, and autonomy are

basic and universal, focusing on concepts resulting from the degree to which the needs have been satisfied versus thwarted (ibid.). Thus, SDT focuses on social contextual factors and the internalization of extrinsic regulations and the values associated with them.

I have previously discussed how extrinsic motivation refers to "the performance of an activity in order to attain some outcome that one has to do or chose to do" (ibid.). Deci and Ryan (2000) highlight how individuals, after childhood, have to do or choose to do things that are not intrinsically motivated, as the freedom to choose is curtailed by social pressures to do activities that are not interesting because they have to take on new responsibilities. The authors raise the question as to how individuals acquire the motivation to carry them out and how this motivation affects them (ibid.). Their answer is that (ibid. p. 71):

> *"different motivations reflect differing degrees to which the value and regulation of the requested behavior have been internalized and integrated ."*

Within the field, *Internalization* refers to people taking in a value or regulation, and integration refers to the further transformation of that regulation into their own. As people internalize regulations and assimilate them to the self, they experience greater autonomy in action. A regulatory style tends to become more internalized or self-regulated over time and is separated by the type of extrinsic motivation associated with different experiences and outcomes (ibid.). For example, it is possible for students to do their homework merely because they understand that it could be valuable for their future career, or, the only purpose for doing it is to satisfy their parents, which points out two different extrinsically motivated behaviors. Both examples show that the work is not done based on enjoyment for the work itself and that extrinsic motivation also can be treated as a type of self-determined motivation. Motivation is regulated by some regulatory style. The extrinsic regulations in the first example above entail personal endorsement and a feeling of choice (it becomes integrated); opposed to the latter that involves compliance with external regulation (i.e. to satisfy the parents). Both examples involve instrumentalities rather than enjoyment thus varying in their relative autonomy.

I find it relevant to point out that a prompt based on the SDT is that it is important to notice that for this process of internalization and integration with "the self", people must experience satisfaction of basic psychological needs. SDT proposes three types of internalization with different degrees to which the regulations become integrated with a person's sense of self: *introjection*, *identification*, and *integration* (Deci & Ryan, 2008a). These three different forms of

extrinsic motivation and contextual factors that promote or hinder internalization and integration of the regulation for these organismic behaviors are shown in Figure 4, together with *external regulation*, the least autonomous form of extrinsic motivation.

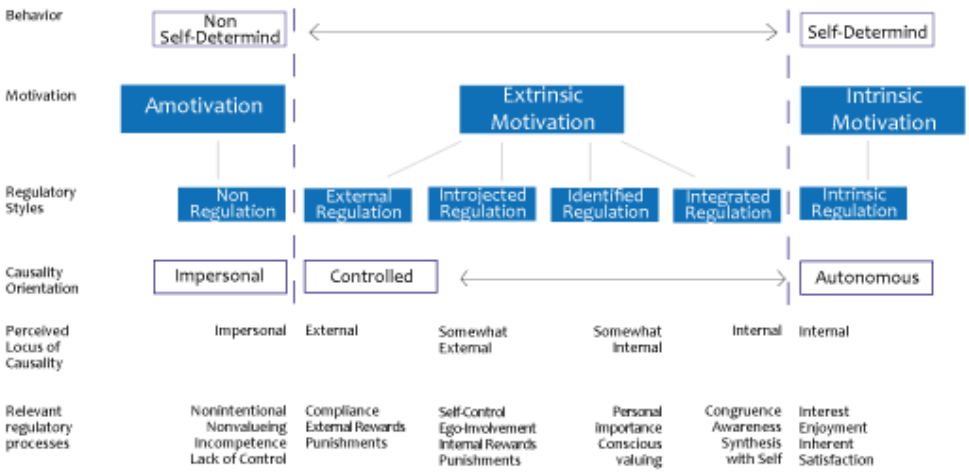

Figure 4. The Self-Determination Continuum showing types of motivation with their Regulatory styles, Loci of causality, and Corresponding processes (built on the SDT)

Figure 4 shows how; as people internalize regulations and assimilate them to the self, they experience greater autonomy in action, a process that can occur in stages over time (Ryan & Deci, 2000). The Figure 4 is a condenced overview adapted from Deci & Ryan (2000, 2008), Gagné & Deci (2005), and Ryan & Deci (2000a, b).

External regulation (no internalization): is placed farthest away from the other three types of extrinsic motivation, lacking the process of internalization. This is the prototype of controlled motivation, requiring extrinsic motivators with the intention of obtaining a desired consequence or avoiding an undesired one (e.g. I work only when the boss is watching; Gagné & Deci, 2005). External rewards and punishments are examples of relevant regulatory processes. This is the classic type of extrinsic motivation that was typically contrasted with intrinsic motivation in early lab studies and discussions (ibid.). External regulation can also occur, for example, when students study primarily because they know their parents will reward them for doing well or, a person who has no choice but to follow a strict diet or avoiding food due to health related problems (e.g. allergy or diabetes).

Other types of extrinsic motivation are a result of a behavioral regulation and when the values associated with it have been internalized. I follow Gagné and Deci's (2005, p. 334) definition of internalization, they write: "people taking in values, attitudes, or regulatory structures, such that the external regulation of a behavior is transformed into an internal regulation and thus no longer requires the presence of an external contingency (thus, I work even when the boss is not watching)". Consequently, SDT postulates that there are three types of internalized extrinsic motivation that differ in the degree to which the regulations become integrated with a person's sense of self. The least effective type of internalization is referred to as introjection. The second type of internalization is referred to as identification. Finally, integration is the third type of internalization.

Introjection: The first and least effective type of internalization of extrinsic motivation is the introjected regulation, a partial internalization taking in external contingency, demands, or regulation – not accepting it as their own. The perceived locus of causality is somewhat external. Relevant regulatory processes are: internal rewards and punishments, self-control, and ego-involvement. It involves people taking in an external contingency, demand, or regulation, but not accepting it as their own as if the regulation was controlling the person. This regulation offers pride and self-esteem and ego involvement as well as shame after failure (e.g. I work because it makes me feel like a worthy person). Behaviors are performed to avoid guilt or anxiety. Deci and Ryan explain introjection as representing regulation by contingent self-esteem, a classic form of introjection is ego involvement (ibid.).

Identification: is when people have accepted a behavior as their own acknowledging its importance for themselves. This means that they identify with the value of the activity and willingly accept responsibility for regulating the behavior (Deci & Ryan, 2008). The perceived locus of causality is somewhat internal. Identifying with the regulation, they engage with a greater sense of autonomy and thus do not feel pressured or controlled to do the behavior (ibid.). Thus, relevant regulatory processes are: personal importance and conscious valuing. An example of identification is when a person understands the importance of doing a task even if it is unpleasant (e.g. a nurse bathing patients, for the well-being of the patient rather than the personal dito). The action is accepted or owned as personally important. Other examples are: a student who studies a specific subject because he/she has accepted it as important as a self-selected goal (e.g. graduate from university); or a person following a diet in order to gain or lose weight. In the analysis I will look for traces of conscious valuing of activities and self-endorsement of goals.

Integration: is the type of internalized behavior in which people have succeeded at integrating an identification with other aspects of their true or integrated self (Deci & Ryan, 2008). Extrinsically motivated behavior becomes truly autonomous or self-determined. Actions characterized by integrated motivation share many qualities with intrinsic motivation, but are still extrinsically motivated, performed to obtain an outcome, as intrinsic motivation is performed for the inherent enjoyment itself. The locus of causality is internal. Relevant regulatory processes are: congruence, awareness, and synthesis with self, which I will be looking for in the analysis. When a person has fully internalized a behavioral regulation all the personal basic needs (i.e. competence, autonomy, and relatedness – see below) are satisfied.

To summarize, examples of types of motivation related to my research can be placed as both intrinsic motivation and internalized extrinsic motivation. The SDT continuum presented in Figure 4 above highlights how it is important to understand how integrated regulation of extrinsic motivation bears a similarity to intrinsic motivation, which can make it difficult to distinguish, with any certainty, from each other in an analysis. Still, the two types differ in that "intrinsic motivation is based on interest in the behavior itself (it is enjoyable), whereas integrated extrinsic motivation is based on the person having fully integrated the value of the behavior", it remains instrumental (Deci & Ryan, 2008a, p.16).

I have also presented how, according to the SDT, extrinsic motivation is differentiated through behavioral regulation and internalized values. The most important factor for doing so is, for me, to explain how, in building my analytical framework, relate to the SDT and which factors within this framework are used for an analysis of the empirical material. My beliefs are, according to SDT, the comprehension that context supportive of autonomy, competence, and relatedness "foster greater internalization and integration than contexts that thwart satisfaction of these needs" (Ryan & Deci, 2000, p.76).

Social contextual conditions

The conception of internalization of values and types of regulation (see Figure 4) have come to shift the primary differentiation within SDT of intrinsic versus extrinsic motivation to a focus on autonomous versus controlled motivation. As Figure 4 shows, external and introjected regulations are forms of controlled causality orientation, whereas identified, integrated and intrinsic regulation are forms of an autonomous causality orientation (Deci & Ryan, 2008a). Later research (experiments and field studies) has examined autonomous and controlled

motivation with a focus on the social contextual conditions that facilitate internalization and the autonomous enactment of behaviors (for a review see (Deci & Ryan, 2008a; Ryan & Deci, 2000). In my analysis, autonomous and controlling factors are treated as examples of limiting or promoting social contextual conditions for motivation to participate. Following Deci and Ryan's (2008b) definitions, causality orientation is general motivational orientations that refer to:

a) the way people orient to the environment concerning information related to the initiation and regulation of behavior, and thus

b) the extent to which they are self-determined in general, across situations and domains.

The three orientations are: autonomous, controlled, and impersonal (see Figure 4) that people have some level of each of the three, and one or more of these can be used in making predictions about various psychological or behavioral outcomes (ibid.). Together with these orientations of causality, SDT proposes that conditions supportive of the basic psychological needs would facilitate internalization and integration. Specifically,

> *"feeling involved with and related to a family or group will facilitate internalization of values and behaviours endorsed in that setting. Feeling competent to enact the behaviours will also increase the chances of fully internalizing the regulation of those behaviours, and being encouraged and supported to think about the value of the behaviour to oneself may facilitate identifying with and integrating the behaviour's value and regulation (ibid., p.17)."*

Summing up: Motivation to Participate and the SDT

As a result of the above discussion, I have conceptualized SDT's proposition of supportive social contextual conditions together with occurrences for peoples' basic psychological needs that would facilitate (or inhibit) support for intrinsic motivation, and facilitate internalization and integration of regulations, to comprise:

- *Competence* – the relative internalization of extrinsically motivated activities is also a function of perceived competence. Occurs through feedback, communication, and rewards

- *Autonomy* – the experience of autonomy facilitates internalization and, in particular, is a critical element for a regulation to be integrated. Self-determination presented as choice, acknowledgment of feelings, and opportunities for self-direction

- *Relatedness* – the need to feel belongingness and connectedness with others, is centrally important for internalization. Examples are exploratory behavior, sense of security (personal) and relatedness, caring/uncaring.

Deci and Ryan (2008a, p. 21) have made the conclusion that:

> *"SDT differentiates autonomous motivation, which comprises intrinsic motivation and well-internalized extrinsic motivation, from controlled motivation, which comprises external and introjected regulation. Autonomous motivation has been found to have a variety of advantages in terms of effective performance, especially on heuristic tasks, psychological well-being, and healthy development. Furthermore, autonomous motivation has been found to be more in evidence when people experience satisfaction of their basic psychological needs for competence, relatedness, and autonomy."*

Finally, an important remark often made by SDT researchers concerning the concept of autonomy is that, within SDT, the concept of autonomy refers to "the feeling of volition that can accompany any act, whether dependent or independent, collectivist or individualist" (Ryan & Deci, 2000, p. 74), rather than the antagonistic interpretation as not being independent, detached, or selfish such as individualism does. I also find it important to highlight this point while the individualistic interpretation is antagonistic to relatedness or the concept community, and as such does not support an SDT approach.

Chapter 4

ANALYTICAL FRAMEWORK AND METHODOLOGICAL CHOICES

This part is meant to provide some basic assumptions with regards to my choice of research method adding to the contextual descriptions in chapters two and three. The purpose of this chapter is to give an account regarding how the study has been carried out in practice, including how I entered the field, gathered data, and my role in this process. The reason for making myself visible is to be clear about my understanding of the field that interplays with the research process and design.

Firstly, I provide some of the background that preceded the decisions regarding the focus of the research, the design and my role in this process. Then, I read up on how I conducted a descriptive single-case study in practice, research methodology and choice of data collection procedures. Finally, I present the building of an analytical framework and how theories have been used in the process.

Decisions on Research Focus, Design, and Role

I have chosen a case study approach as this is well suited to studying a situation, individual, group, organization or whatever that is of interest (Robson, 2002), and it assists researchers to grasp holistic patterns of social phenomena in real settings (Numagami, 1998). My research focus is based on a single case, the development of a public e-service "The Parent-Teacher-Meeting" ("Föräldramötet" in Swedish), taking its dualistic context of traditional IS and OSS development processes into account. Moreover, my choice of conducting a case study has been influenced by some contextual restraints that have also affected the choice of data collection techniques. The software development process of the software application had been proceeding for some time in different phases, before I entered the stage. The initial phases had been completed and the process had evolved into a rather administrative phase. A case study design can then become a well-worked

example for a method where a description is made in retrospect. Moreover, a qualitative case study approach is a well-chosen approach for increasing the knowledge-base (Merriam, 1994). A qualitative case study is an intense and holistic description and analysis of a restricted phenomenon and includes both a theoretical and a philosophical perspective, and methods and techniques can be chosen in relation to the specific occasions (ibid. p.11).

However, performing a single case study might mean that some facets to be found from a comparison are missed. Others argue, that most studies, which have been reviewed, are based on survey data collection after a system development has been completed, and that studies across multiple systems usually fail to adequately control sample selection (e.g. Ives & Olson, 1984). The authors argue that single-system studies maintain a better control over sample selection, and that survey measures can be tailored to the particular system and environment "so that, although rarely demonstrated, internal validity was more likely" (ibid. p. 600).

My theoretical perspective is grounded in a sociocultural paradigm, where motivation and participation interplay. I position my choice of research approach in the descriptive paradigm, interpretive in character. Interpretive research has become an important part in information systems research (Klein & Myers, 1999; Walsham, 2006). Interpretive research assumes that knowledge of reality is gained through social constructions. It focuses on the complexity of human sense making as the situation emerges, and attempts to understand phenomena through the meanings that people assign to them (Klein & Myers, 1999 p. 69). I take the position, presented by Walsham (2006), that interpretive methods of research start from the position that our knowledge of reality is a social construction by human actors; our theories concerning reality are ways of making sense of the world. Following that "our theories concerning reality are ways of making sense of the world, and shared meanings are a form of intersubjectivity rather than objectivity" (Walsham, 2006 p. 320). Since my theoretical perspective is grounded in a sociocultural paradigm, where the motivation to participate and the knowledge through participation interplay, I position my choice of research approach in the interpretive paradigm.

That a case study is a strategy of investigating an empirical topic by following a set of specific procedures is agreed upon (Merriam, 1994; Robson, 2002; Yin, 2009), but where, when and the focus on the including steps are performed can vary. Mostly, an iterative process is argued (ibid.) consisting of: plan, design (identifying the case), prepare to collect case study evidence, collect case study evidence, analyze case study evidence, report case studies. In additions, when conducting empirical work of a case study, one should take into consideration the role of the researcher, techniques and methods used for data collection (interviewing etc.), and finally the analysis (Walsham, 1995). The following section will highlight the

continuous iterative process between data and theory that have preceded the choices within. It is a description of the decisions regarding the research focus, research design, and my role in the process.

I became engaged in a larger contemporary regional project[26] in the late summer of 2009. This project had been going for some time when I entered and one part of the project was the development of a web based application (described in chapter 5). My first encounter with the software development project, of focus in this study, was initially through the research group CITIZYS at Mid Sweden University, one part of the triple helix project. Based on my previous experiences from the area of IS development project, my research focus became the open source development process of FM. My main effort was, firstly, to learn and understand and to meet with the stake-holders and key figures within the "The Parent-Teacher-Meeting" project. The first presentation and encounter I had in relation to the web application was at a conference[27] shortly after I joined the project. However, soon I had the possibility to attend some meetings where I had the opportunity to meet with some important key informants in the project team.

The software development team consists of representatives from both the users and developers organization (cf. Chapter 5). Their positive attitude and engagement strengthened my decision to focus specifically on these positive attitudes and the engagement, motivation and satisfaction that were evident in both the user and developer groups. Moreover, this is something that I had often encountered and reflected upon in my previous work. However, one prominent difference and striking element this time was that the user group actually appeared to present the same level of satisfaction and engagement as the open source developer group. In traditional IS development projects, from my experience this level of engagement, motivation and satisfaction within traditional user groups is seldom encountered, but is the case for the scenario where a user is, simultaneously the developer – the case of most open source projects.

My research process progressed with the work on a theoretical basis that could support the components of engagement and motivation to participate that were found in the project. After a review of the literature on motivation to participate I turned to the framework of self-determination theory (SDT), which I found well suited to my needs and would assist in supporting me in relation to answering my research questions. Moreover, the most frequent framework used in the literature has been the self-determination theory (von Krogh et al., 2012).

[26] Public e-Services in Cooperation for Open Innovation (PECOI). PECOI works in active partnership between academic research, public administration and private companies

[27] Sundsvall42, 2010

I have used SDT in the building of an analytical framework where I operationalize and develop measurements used in the classification and interpretation of the empirical material.

It has been a highly iterative process, which also included my first round of interviews. They were of a thematic character and the objective was to provide me with an overview of the development process, to become acquainted with the participants, and most importantly, to offer me a more in-depth knowledge of the research objective. The research process will be discussed in greater detail, at a later stage in this chapter.

Using the knowledge gained from the first interviews, I continued my work with the iterative process of creating my research framework. These reflections made my decisions with regards to my initial research approach.

Being an "outside" researcher or an "involved" researcher is a topic often discussed within social science. Walsham (2006) highlights the topic regarding how attitudes have evolved during the last decade. His view on involvement as more of a spectrum, and changing over time appeals to me, as this has become a topic in some of the projects that I had previously been involved with. According to Walsham (ibid.) there is the "neutral" observer at one end of this spectrum and at the other end there is the full action researcher, attempting to change things in the way that they feel best (e.g. action researcher). He points out that neutral does not imply being unbiased, as we all are "biased by our background, knowledge and prejudices to see things in certain ways and not others" (ibid. p. 321).

As Walsham (2006) suggests, I have allowed my prior experience and knowledge to influence, not only my choices in the research focus and design, but, also my theoretical framework. Prior to this study, as a researcher I have worked and participated in several software systems development projects, both in open source environments and traditional IS. Additionally, I also bring experience from the educational field where motivation and incentives for participation have become major issues. Moreover, I have had great assistance from experiences in various projects for which I have been responsible. My pre-understanding in the field has provided me with a perspective from both inside and outside, as a participant (developer and user) and an observer (researcher). My research design therefore has influences from educational theories discussing implicit learning from a cognitive perspective on motivation, for which I find the SDT framework to be well-suited.

Research Methodology and Choice of Data Collection Procedures

We can watch, ask or look for evidence and occurrences – watching becomes *observation*; asking becomes *interviewing*, using questionnaires and administering tests. Looking for other evidence covers a variety of methods, including *documentary analysis*. What kind of information is sought, from whom, and under what circumstances are questions that decide our selection of method (Robson, 2002).

I could not perform observations as the development project had entered a rather administrative phase with only a few meetings. Therefore, the initial part of the work in collecting empirical material mainly consisted of informal interviews and conversations with key contacs. This part made the study exploratory in nature but, as data collection continued, it was hoped that other kinds of documentation (e.g. source code, minutes, or mail correspondence) for interpretation, which would be a descriptive aid, could be found.

Most commonly used in case studies are: documentation, archival records, interviews, direct observations, participant-observation, and physical artifacts. Examples of documentation are letters, memoranda, e-mail correspondence; agendas, minutes of meetings; administrative documents; formal studies or evaluations of the same case that are being studied. News clipping and articles appearing in media are also used. Archival records can be statistical data, service- or organizational records, maps and charts, survey data.

Interviews are considered as one of the most important sources of interpretive case study information (Walsham, 2006). Yin (2009) categorizes them into three types of case study interviews. The first type is an in-depth interview where key respondents are asked about the fact of matter and their opinions. A second type is a focused interview when a person is interviewed for a short period of time. A third more structured type, is a formal survey with structured questions. An interview guide should be used to keep track of the record regarding which subjects are in focus for the study and in what order to address them. An interview guide can describe, to a large extent, what subject is to be included or it can consist of a series of strictly formulated questions (Kvale, 1996 p. 121). I have in the study used all three types described above.

Other forms of field data in an interpretive study should if possible, supplement interviews, as Walsham (2006) points out. Surveys, media or other written documentation (e.g. internal documentation, e-mails, and minutes) in the organizational context are examples regarding what can be searched for. Observations are performed in-situ while interviews are conducted in places that

are decided on in relation to the occasion. Observations provide information on events as to when and where they occur. The observations can range from formal to casual data collection activities (Yin, 2009). Direct observation or participant observation of action should be considered if the possibility is on offer.

A final source of evidence suggested by Yin (ibid.) is a physical or cultural artifact, e.g. a technological device, a tool or instrument, a work of art. Using artifacts is often adopted within anthropological research.

There are a plethora of techniques to use as shown above, when and where to use the different examples must be decided upon within the research group and is dependent on how the researchers maintain access. The results of the initial exploratory part of the research process offered a good insight into the investigated phenomenon and provided me with a decision bases for a strategy built on a set of interviews. Therefore, at the time of my study, interviews became one of the most important sources of the descriptive and interpretive case study information. Findings from the first part of the empirical data collection, at a later stage, came to alter and place demands on complementary activities, as will be discussed in the following section. Below follows a detailed report on the research process and methodological considerations.

Preparing the interviews and collecting case study material

Based on initial meetings and informal conversations with two central key contact people from the open source development project team, a guide for the first interviews was constructed. With the assistance of these informal conversations, it was possible to determine a brief overview of the development project, participants and the project history. Parallel to the planning of the two main interview settings, assistance was provided in discovering the people who should be included, gaining access to them, and offering other sources of evidence. Yin (2009) refers to this close contact with respondents as an in-depth interview that can take place over an extended period of time, not just in a single sitting. One of the key contacts worked at the municipality and was also a key person in the FM project. The other key contact represented the developer organization and was likewise a key person in the project. The more these respondents assisted in my search and planning, the more they took the role as 'informants' rather than respondents (Yin, 2009 p. 107).

Based on data from the initial informal meetings I had with the key informants, a central project team could be visualized. I decided to focus on this central group as it contained much of what I was searching for. Consequently, others involved in

the development project, such as other members in the overbridging ECHOES project, were henceforth excluded from the focus of the study.

My first interview guide consisted of, in the majority, open questions. Later, a second more formal set of interviews took place based on the findings from these first interviews and continuous work with my theoretical basis.

Semi-structured interviews were found to offer a deeper narrative advantage than was possible from observations in relation to the current context. Interviews, with a strict structure (e.g. surveys), place themselves at the opposite side of open semi-structured conversations. A qualitative researcher can choose the less structured as an alternative to standardized interviews. In a semi-structured interview answers and information is sought from all respondents following specific questions. But, when to ask questions, or in what order they are performed, does not have to be determined in advance. I have followed Kvale's (1996) proposition on semi-structured interviews where a guide can, to a large extent, describe the topics rather than using strictly formulated questions. "To interview is a craft work. It doesn't follow rules for methods, which hold independently of content and context" (ibid. p. 101). The absence of in advance determined rules gives the interviewer a possibility to develop her knowledge, insight, and intuition (ibid.). Thematizing leads to the discovery of "what" it is to be investigated, which for example could be to test a hypothesis.

Subsequently, the first interview setting with the focus group was designed to offer me a possibility to gain an insight and general knowledge about the development process, participants and their motivation, by giving them an opportunity to freely narrate. The questions were very informal and open. I used a hybrid of informal conversation with influences from storytelling techniques that I have worked with, and have had good results with from earlier studies.

My belief is that this thechnique can help me as a researcher to grasp an overall picture of a context together with occurrences and episodes within this. Storytelling can create visualizations from earlier activities and processes that can assist in our interpretations. Stories are powerful in conveying ideas, often more so than an articulation of the idea itself (Lave & Wenger, 1991). A positive effect associated with this technique is the possibility to discover aspects that matter that are probably never spotted when following a strict questionnaire. However, a risk associated with storytelling is that people tend to change the history in order to give it a more positive or negative meaning than it, in reality, actually had.

The first interview guide (see appendix 1) held three thematic parts; (1) static and warming up questions, (2) thematic questions, (3) questions on creativity, flow, and satisfaction. The first parts, the static, warming up part, consisted of questions that were easy for the respondents to answer. But, these questions also gave me important information on environmental factors of importance for the

respondent. The second thematic part, aimed for a description of work related occurences, not only in their ordinary work, but also to their work within the project team. In this I searched for a comparison and description of what they found to be different in the work with the development of the software, and their ordinary job assignment. Finally, the third part search for emotions of joy, well-being and satisfaction. I searched for a feeling of "flow" (Csíkszentmihályi, 1996) that occurs when individuals experience a drive that challenges them to constantly engage in new tasks (i.e. becoming better and better at something that is important to them). I took inspiration in Vygotsky (1987) who advocated challenges that were slightly more complicated than what one earlier has succeeded in managing.

1) Tell me some facts about yourself?
   i. How old are you?
   ii. Education
   iii. Family relations
   iv. Interests
   v. Prior work, etc.

2a) Tell me about an ordinary day at work
   i. Who do you meet during the day
   ii. Who do you talk the most to
   iii. Your role at work, degree of involvement
   iv. Incentives (pay, ...)
   v. What motivates you
   vi. Why did you chose this job

2b) Tell me about a day when you work with the project!
   i. Who do you meet during the day
   ii. Who do you talk the most to
   iii. Your role in the project, degree of involvement
   iv. Incentives (paid participation/own choice)
   v. What motivates you
   vi. Why did you engage in the project

3) Tell me about a "perfect" day
   i. What makes you happy
   ii. What motivates you

The included parts of the interview guide falls in line with the sociocultural position taken, framing terms of social and environmental factors. The questions in part one were constructed so as to provide information on antecedents to participation. How do the respondents' earlier experiences interact with their participation in the project? Therefore, questions about cultural background, social context and their individual dimensions were formulated. Together with the second part, information in relation to what precedes participation was sought (e.g. Barki & Hartwick, 1994; Iivari & Igbaria, 1997; Ives & Olson, 1984). Part two and part three investigate how the respondents experience their participation from a dualistic perspective of their ordinary work-day compared to their participation in the development project.

All parts above contained some common concluding questions, if they have not already been answered during the conversation: before/after scenario, expectations, time in project, meetings, goals. The time frame is important as change happens in the sociocultural context over time. Expectations and goals can also change over time which is why the questions were aimed at discovering how this had affected the respondents' participation.

Seven interviews were carried out through April-December 2010 (see Figure 5) by one researcher in a one-by-one scenario, and were audio recorded (mp3). Each interview took about an hour in length and was later transcribed. Using a recording device, according to Yin (2009 p. 109), "is a matter of personal preference". I used recordings to assist as there was thus no need to concentrate on taking notes while having a conversation with the respondents, as I performed the interviews alone. Prior to all the interviews, permission to record was sought. My small mp3 player did not appear to influence the situation and it appeared to disappear from mind after a short while as the interviews proceeded.

It should be noted that all respondents gave a positive feedback and we had light, friendly and easy on-going conversations. It should also be noted that respondents often gave private and off the record comments or information as our mutual trust grew. This information is, however, withheld from the presentation of the empirical material, but it greatly assisted me in gaining a deeper understanding of the researched phenomenon.

Based on the initial information given, a schematic overview over the respondents characteristics, extracted from the case description in chapter 5, is shown in Table 7 below. It should be noticed that, preparing and performing the first round of interviews, I did not separate or in any other way look at the respondents as belonging to separate groups or make any other exclusion, this distinction was the result of the first set of interviews.

Table 7. Respondents Characteristics

Organization	***Hierarchical level***	***# of persons***
Developer	*Senior consultant*	*1*
	Staff consultant	*2*
User	*Public relation officer*	*1*
	Pre-school executive officers	*2*
	Administration officer	*1*

The project team is composed of seven persons representing two different organizations, a private IT consultant company, and the children services and education office in the municipality of Sundsvall (cf. chapter 5). Initially, no difference was made regarding the relations within the project team, other than at an organizational and hierarchical level within their respective organization.

The dates planned for all interviews were within the same week, but as reality struck (sickness, important meetings, volcano eruption etc.) changes had to be made and a couple of the interviews had to be given new dates (see Figure 5). Eventually they were all completed and it was then possible to start the transcriptions.

After the first interview setting, and with its result at hand, a second set of interviews was planned and conducted as a complementary part in relation to filling in some of the questions still unanswered. As a better understanding of the context and complexity of the development team was achieved, there was an awareness of a power relation between some of the participants. Additionally, the first interview indicated that there were actually two groups within the project team, users and developers. I decided to delve this relation in greater depth and to investigate their cooperation processes. I also wanted to delve deeper into factors that motivated their participation in this specific software development process, focusing on contextual differences between the groups.

The second set of interviews consisting of more specific question following a stricter questionnaire format (see appendix 2), thus standing in contrast with the first more thematic interviews. The questions focused on experiences of open source software versus commercial software and the difference in their respective design process, searching for contextual factors that promote or hinder participation and how this was experienced. Three themes where identified: (1) earlier experience from the respective software design processes, (2) their role (if participant), (3) concluding questions on cooperative learning elements. The cooperative learning elements include: positive interdependence, individual

accountability, face-to-face promotive interaction, appropriate use of collaborative skills, and group processing.

The interview guide was designed to fit the different groups and thus some of the questions had structural differences in order to create meaning in its respective context. An example on this is the fact that the team members from the IT consultant company had a higher degree of experience from traditional IS design processes than the participants from the municipality. I decided to, in the following, focus on them as two specific groups, one user group and one developer group.

An illustration of activities for the collection of empirical data during the study along a timeline is illustrated in Figure 5.

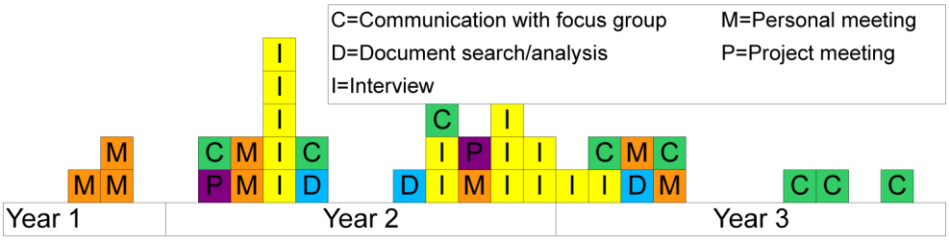

Figure 5. Collection of empirical data during the study

Collecting other field data

Documents are likely to hold information that is of relevance to the study. I have searched and asked for documents but realized that little had been written down or documented during the process. Nevertheless, some examples of what I have found are: log files, error reports, and minutes from meetings. Additionally, and more important, I found reports written on the case, i.e. the software development project, (Nilsson and Sefyrin, 2005; Nilsson, 2005; Nilsson, 2008) which are also included in my data collection. These reports helped me understand separate activities and the project timeline.

It was impossible to make observations, in its proper sense, because the project consisted of several groups and people in these groups were mostly conducting their ordinary work and only working with the project on a limited basis. Some observations could, however, be conducted by participating in some meetings etc.

and the opportunity did arise to sit in and attend a few meetings. During these I was allowed to record (mp3) and also to contribute to the meeting. This falls under what Yin (2009) calls participant-observation i.e. a special mode of observation in which you are not merely a passive observer.

I conclude my report on how I conducted fieldwork with highlighting a final field data source, a "physical" artifact – the software itself produced in the development project. Embedded in this artifact lies all the knowledge produced during the development process.

Now, having collected the empirical material following the case study design my work continued with finding relevant modes of analysis. Given the theoretical basis of an analytical comparison of ideal types of software development constructs together with influences from motivational theories, the following section is dedicated to describe how I constructed an analytical framework.

Building an Analytical Framework

The following explains the parts and measures associated with the building of an analytical framework used in my research. The success of the software development project that I followed in this case study and from which I have collected the empirical material, indicates that motivation and participation interplay. Based on my theoretical basis, I have chosen to investigate motivational factors for individuals' participation through the lens of the self-determination theory. Thus, the framework for my analysis, presented in this section, is built on the self-determination theory (SDT) presented in Chapter 3. The building of the analytical framework is also influenced by Vygotsky's and Dewey's view on the interrelated roles of the individual and the sociocultural environment which I have found to be consistent with the literature on motivation within SDT. Rogoff (1995, p. 140) writes:

> *"it is incomplete to focus only on the relationship of individual development and social interaction without concern for the cultural activity in which personal and interpersonal actions take place. And it is incomplete to assume that development occurs in one plane and not in others /…/ or that influence can be ascribed in one direction or another or that relative contributions can be counted."*

Concurrently, my analytical framework is built on two levels of analysis. The first level describes occurrences of regulatory processes found in the empirical material and interprets its grade of internalization of values, attitudes, or regulatory structures. The type and strength of motivation is affected by the degrees to which our basic psychological needs are supported or thwarted. I have operationalized these two dimensions of motivation within level one of the analytical framework in an analytical model of two dimensions shown in Figure 6. The second level of the analytical framework describes social contextual factors that support intrinsic motivation and facilitate internalization and integration of extrinsically motivated tasks through the fulfillment of human basic psychological needs.

(1) The first level of analysis: Motivational types and basic psychological needs operationalized in a two-dimensional analyticalmodel (see Figure 6).
(2) The second level of analysis: Sociocultural conditions that foster or hinder motivational behavior.

Subsequently, the remainder of this section is built upon the first level of analysis (the two dimensions of the analytical model presented in two separate sections). They are followed by a third section which accounts for the second level of the analytical framework, i.e. an operationalization of the social environment that influences the conditions for motivational behavior. Finally, the last section of the description of my analytical framework summarizes the two levels of analysis. However, a description of the two-dimensional model (Figure 6) used in the first level of analysis is now provided.

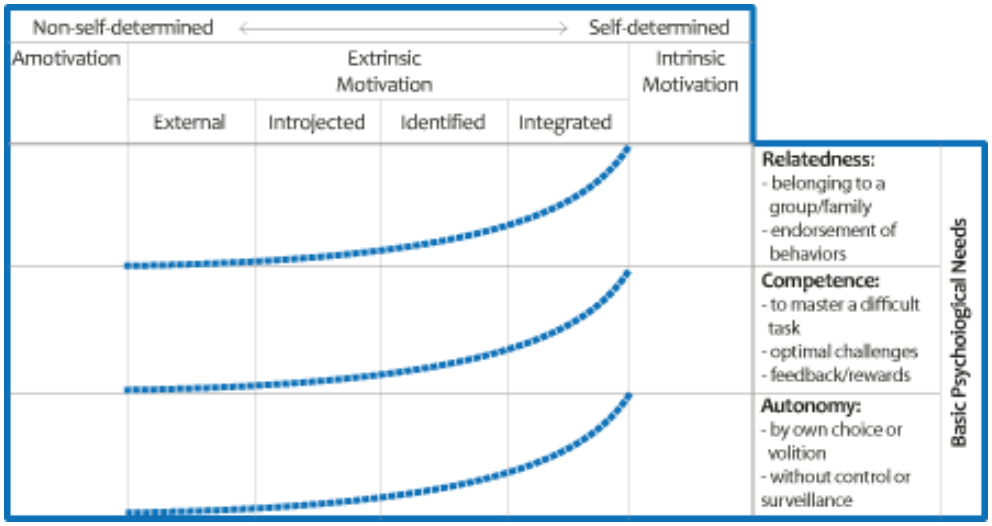

Figure 6. Analytical model with two dimension of analysis

The model in the first level of the analytical framework (see Figure 6) is built on two dimensions of analysis consistent with the SDT:

- Types of motivation which includes a differentiation of internalized extrinsic motivation.
- Grades of satisfaction of peoples basic psychological needs (shown as blue curves in Figure 6).

The examples given within the figure of the model, are the most commonly found within SDT research. SDT has been applied in various cultures and in many life domains (e.g. education, parenting, work, health care, sport, and close relationships, Deci & Ryan, 2000, 2008) and thus the majority of the examples

given, relate to these domains. Also, to enhance the readability of the figure above, only a few of the most basic examples from SDT are displayed, as a reference to the dimension of basic psychological needs. More examples and their descriptions will be provided below. Additionally, in the analysis of the empirical material, other examples and contextual factors will appear, but, are not included here in the presentation of the analytical model. The examples given here should therefore be treated as samples of earlier studies within SDT rather than instances describing the empirical context within my research material.

I start the description of the analytical framework with a section containing a conceptualization of different types of motivation along a continuum of self-determination. Then, I continue describing how, for autonomous or self-determined motivation to be in evidence, there are some natural human processes that require nourishing in order to function optimally. The SDT postulates that satisfaction of basic psychological needs provides the nourishment for intrinsic motivation and internalization (Gagné & Deci, 2005), which is also the second dimension of the analytical model in this framework. The empirical material will be interpreted in terms of satisfaction of the basic psychological needs (illustrated by the blue curve in Figure 6). I will therefore provide examples of regulatory processes for internalization and occurrences of associated processes in order to assist with an understanding of what has been sought for in my analysis of the empirical material.

This is followed by a review and conceptualization of the second level of the analytical framework "Environmental factors that foster or hinder motivational behavior".

First dimension of the analytical nodel: Types of motivation

The SDT accounts for different types of motivation which result from the interaction between people's inherent active nature and the social environment that either supports or thwarts that nature (Deci & Ryan, 2008). The first dimension of the analytical model uses three main types of motivation that I have conceptualized, consistent with the SDT: intrinsic motivation, extrinsic motivation, and amotivation. These types were also placed in the continuum of controlled or autonomous motivation:

- I have operationalized **amotivation** in terms of a result of not valuing or feeling competent to do an activity. The locus of causality is

impersonal and relevant regulatory processes are: nonintentional, nonvaluing, incompetence, and lack of control, which I will look for in the analysis.

- I also operationalized **intrinsic** motivation in terms of doing an activity for its inherent satisfaction. The locus of causality is internal and relevant regulatory processes to find in the analysis of the empirical material are: interest, enjoyment, and inherent satisfaction (see Table 8).

- Finally, I measure **extrinsic** motivation as involving in an activity because it leads to some separate consequence (Deci & Ryan, 2008). The perceived locus can be external, somewhat external, somewhat internal, or internal (see Table 8).

An important aspect within SDT is the proposition that extrinsic motivation can vary in the degree to which it is autonomous versus controlled. Internalization and integration will function more or less well. Therefore SDT has come to differentiate extrinsic motivations. *External regulation* is the kind of motivation that, in early lab studies and discussions, was typically contrasted with intrinsic motivation (Ryan & Deci, 2000). Relevant regulatory processes are rewards and punishment. It is a type of regulated motivation that is experienced as controlled and with low autonomy. In SDT external regulation is placed under the external locus of causality, lacking the process of internalization. To measure and to find externally regulated behavior I will, in the empirical material, look for regulatory processes with the character of reward or punishment with a causality orientation that is highly controlled.

Additionally, consistent with SDT, I conceptualized three internalized types of extrinsic motivation: *introjection*, *identification*, and *integration*. These are, together with external and intrinsic regulation operationalized in Table 8.

Table 8. Operationalization of internalization and integration of values and regulations

Regulatory Style	***Locus of causality***	***Regulatory Processes***
External regulation (no internalization)	*External*	*Reward and Punishments*
Introjected regulation	*Somewhat external*	*Ego-involvement* *Internal rewards and punishment*

Identified regulation	*Somewhat internal*	*Personal importance* *Conscious valuing*
Integrated regulation	*Internal*	*Congruence, Awareness* *Synthesis with self*
Intrinsic regulation	*Internal*	*Interest, joy* *Inherent satisfaction*

Introjected regulation: To measure *introjection*, my operationalization of introjection includes, for example, the case in which a person goes to work only to attain a salary, while not going there will have the implication of getting fired and losing the income. Further examples on introjected motivation are: a student who studies before going to play soccer because he or she would feel guilty if she or he did not; or when a person, trying to follow a diet chooses not to eat "forbidden" food because he/she would feel bad about it. The perceived locus of causality is somewhat external. Relevant regulatory processes are: internal rewards and punishments, self-control, and ego-involvement. I will, in the analysis, focus on occurrences that indicate an individual's ego involvement and approval from self or others.

Identified regulation: A second, somewhat more autonomous or self-determined type of internalization is *identified regulation*. It involves accepting the importance of a behavior for themselves, accepting it as their own (see the example above with the student doing homework making the parent happy). The perceived locus of causality is somewhat internal. Identifying with a regulation gives a greater sense of autonomy, not feeling pressurized or controlled – it becomes personally important. Thus, relevant regulatory processes are: personal importance and conscious valuing. In the analysis I will look for traces of conscious valuing of activities and self-endorsement of goals.

Itegrated regulation: The third most autonomous and internalized form of extrinsic motivation is *integrated regulation*. The locus of causality is internal. Only when identified regulations are fully assimilated to the self can integration occur (ibid.). Consistent with SDT I regard integration to represent the fullest type of internalization "and is the means through which extrinsically motivated behavior becomes truly autonomous and self-determined" (Deci & Ryan, 2008a, p.16). Relevant regulatory processes are: congruence, awareness, and synthesis with self, which I will be looking for in the analysis. For me, an example of a person who has

fully integrated a regulation is the medical doctor who has "become" his work, carrying it with him also in his spare time – "being a doctor".

But, for the process of internalization to operate effectively, people must experience satisfaction of the basic psychological needs (see the description below). To the extent that these needs are thwarted, people will be less effective at internalizing and integrating regulations (Deci & Ryan, 2008). Therefore, to describe what processes support internalization of work related values and practices, I provide the model above with a second dimension of analysis in order to aid and display a grading of the satisfaction of these needs.

Second dimension of the analytical model: Satisfaction of the basic needs

The SDT has proposed that all humans need to feel competent, autonomous, and related to others (Deci & Ryan, 2000). Social contexts that facilitate satisfaction in relation to these three basic psychological needs will support peoples' inherent activity, promote more optimal motivation, and yield the most positive psychological developmental and behavioral outcomes. In contrast, social environments that thwart satisfaction of these needs yield less optimal forms of motivation (ibid.).

That the need for autonomy and competence underlie intrinsic motivation is argued within SDT, but, additionally, a third basic need is crucial for internalization – the need for relatedness (Gagné & Deci, 2005). SDT postulates, "when people experience satisfaction of the needs for relatedness and competence with respect to a behavior, they will tend to internalize its value and regulation, but the degree of satisfaction in relation to the need for autonomy is what distinguishes whether identification or integration, rather than just introjection, will occur.

Consistent with the SDT, I have operationalized the concept of basic psychological needs for competence, relatedness, and autonomy to specify the stimuli that are necessary within a social environment for it to be classified as autonomous supportive, controlling, or amotivating and to relate them to my description of ideal types (cf. Chapter 2). As a guideline for the second dimension of the analytical model (see Figure 6), and, additionally to a later discussion on social contextual factors that could foster or hinder motivational behavior, I have conceptualized some examples related to the ideal types in the theoretical basis:

Relatedness:

- In the OSS context, license features are of great importance and are also a means of protect the code from being proprietary (i.e. to provide reassurance that the shared knowledge created within the group continues to be shared).

- Participation in an OSS community is not formally organized with a pre-assigned control structure; rather, they are meritocracies and reveal informal structures, roles and relationship.

- Programmers study the code and use it for implementing new solutions, and for the sharing of their knowledge.

- In OSS development, developers are almost always also users of the code they contribute to. This means that open source developers are a subset of the open source user community (Gacek et al., 2004).

Competence:

- In OSS learning and contributing knowledge are important incentives (i.e. to distribute ideas and knowledge and to produce good code). Programmers study the code and use it for implementing new solutions, and for the sharing of knowledge.

- In OSS development, developers are almost always also users of the code they contribute to. They are, in a way, experts within the problem domain.

- Peer recognition also plays a role in relation to motivating contributions (Gacek et al., 2004). Status is raised within the community by having their contributions recognized as having been appropriated and of good quality by the community (ibid.).

- To earn respect and to move up in the hierarchy of meritocracy, by means of a contribution and thus gaining a reputation, is an important incentive for OSS developers.

- In traditional ISS organizations, career opportunities provied an example as to when competence is important. Paid monetary rewards are another example of an extrinsic motivator.

Autonomy:

- Supervision by managers is a limiting factor for the satisfaction of autonomy (Gagné & Deci, 2005). E.g. In traditional IS firms, following a classic software requirement engineering process, roles and formal incentives are dependent on organizational structures and boundaries.

- Participation in an OSS community is not formally organized with a pre-assigned control structure; rather, they are meritocracies and reveal informal structures, roles and relationship.

- In OSS, developers self-select the technical roles they will take on as part of their participation in a project, rather than being assigned to a role. In a traditionally managed IS project, where an assigned role may not be to their liking, developers are more likely to enjoy performing OSS work and to be recognized as trustworthy and reputable contributors. The process-related elements associated with the task of coding, such as learning and enjoyment, are important (Lakhani et al., 2002).

- Decisions rights are highly centralized within IS firms but are also found within OSS projects. The grade of satisfaction for this need is influenced by the grade of support of autonomy. E.g. larger IS organizations are often built around strictly hierarchical structured project teams (developers supervised by project manager – Project manager supervised by owner). Within OSS projects these structures are different. There are examples of bazaar like communities where roles and structures are relatively transparent. But, there are also examples of OSS projects in which hierarchical structures are extremely apparent. Most code provided by contributors is peer-reviewed in one way or the other but, the decision as to whether or not the source code is to be included in a release can, in some projects, be steered by a very small group.

In analyzing the interviews, the focus in this group will be placed on looking for internalization and integration of work-related values and practices, which support or hinder the satisfaction of their participants' basic fundamental needs, as discussed above.

Studies have showed how contextual support for autonomy and competence, with a focus on autonomy, is required for a person to experience his/her behavior as self-determined (Deci &Ryan, 1985). Examples of contextual factors that hinder

or diminish internalization and intrinsic motivation are: threats, deadlines, directives, pressured evaluations, and imposed goals. In contrast, examples of factors that promote and are found to enhance intrinsic motivation are: choice, acknowledgement of feelings, and opportunities for self-direction because they allow people a greater feeling of autonomy (ibid.).

I have striven in the above discussion to show how autonomy is a basic factor for motivation and that it affects individuals' perception of competence and relatedness. In an analysis of these factors, it is possible for them to place themselves in multiple parts of the above analysis model; this can also differ between individuals. Take into consideration the following example: Teachers who are autonomy supportive (in contrast to controlling) produce a greater intrinsic motivation, curiosity, and desire for challenge in their students. In the example we find evidence which classifies it within both the autonomy and competence element. Other similar examples are: to succeed with a difficult task on one's own (competence + autonomy); to succeed as a team (relatedness + competence); to feel alone and abandoned, and also being supervised. Reports from studies within SDT offer evidence from results including multiple dependences. This highlights some of the difficulties connected with performing a quantitative analysis and thus provides the motivation to conduct a qualitative study.

Most of the above examples concern positive feelings and satisfaction, as they are examples during which some of these basic needs are fulfilled, thus resulting in high grade of internalization. In the final section of this chapter a discussion and some examples will be shown in relation to how contextual factors also have a negative effect on these fundamental needs.

Social contextual conditions that foster or hinder motivational behavior

In the first level of the analytical framework I highlighted how social contexts that facilitate satisfaction of individuals' three basic psychological needs will support peoples' inherent activity, promote more optimal motivation, and yield the most positive psychological developmental and behavioral outcomes. In contrast, social environments that thwart satisfaction of these needs yield less optimal forms of motivation (ibid.). Consequently, the following two tables are operationalized upon the suggestion within SDT that behaviors can be characterized in terms of the degree to which they are autonomous versus controlled by environmental factors.

In the analytical framework I take a sociocultural view on conditions that enhance versus undermine individuals' motivation to participate (i.e. contextual

factors that promote or limit intrinsically motivated behavior). As such, in my analysis, I have sought to find traces in relation to what happens during participation in a loosely structured software development process. Themes, concepts, and patterns are to be derived from the empirical data in order to reveal both contextual and individual factors that promoted or limited participation. In analyzing the data, specific attention would therefore be paid to searching for structure, themes and dimensions of motivation, i.e. autonomous or controlled. The focus is to describe what motivates participation and why it is experienced as being important to participate. One mode of analysis is therefore to trace occurrences and factors that are experienced as promoting or hindering motivation and participation in a software development project. As with the model of analysis described previously examples of contextual factors that either promote or hinder motivational behavior are given as samples of studies within research domains commonly found within SDT.

I have chosen to conceptualize the concepts promoting and limiting as synonyms to autonomy supporting or thwarting factors. It should also be noted that in many of the examples given within SDT, the notion of intrinsic motivation is used as the prototype regarding when all basic psychological needs for relatedness, competence, and autonomy are fulfilled (i.e. when the social context is supportive and facilitates satisfaction of these needs). Moreover, I have found that much research has discussed autonomy support as support from "one individual relating to target individuals by taking their perspective, encouraging initiation, supporting a sense of choice, and being responsive to their thoughts, questions, and initiatives" (Deci & Ryan, 2008, p. 18). In addition, I find it important to note that taking a sociocultural perspective also implies factors such as ambiences (e.g. classroom or workplace design), organizational structures (e.g. hierarchical levels, official rank), and sets of regulations (e.g. legal frameworks). Deci and Ryan (ibid.) writes: "When people's autonomy is supported, they often feel free to follow their interests and consider the relevance and importance for themselves of social values, mores, and norms".

In Table 9 and Table 10 below some of the examples found in the SDT literature are conceptualized. The collections have been extracted from reviews of articles within the field of motivation, in the search for examples that could act as support in my analysis. Therefore, they might not be the same as the occurrences within my framework of analysis. The main goal in relation to these examples is to enhance the comprehensibility regarding what factors may occur. Moreover, it should be noted that some of the examples were given in more than one article while I have chosen to display only one of them in order to enhance readability and to focus on the examples. Most of the given examples are from a recent review with regards to

both basic and applied research with a presentation of some central components of SDT (Deci & Ryan, 2008).

Table 9. Examples of contextual factors that promotes satisfaction of individual's basic psychological needs.

Promoting Factors
• *Provision of choice (Deci & Ryan, 2008)*
• *Positive performance feedback directly conveys positive competence information (Deci et al., 1999). E.g. a person who is trying to solve a puzzle is given positive verbal reinforcements "that's very good; this puzzle was a difficult one, showed an increase in intrinsic motivation for working the puzzle (Deci & Cascio, 1972).*
• *Teachers who believe it important for students to learn how to solve problems for themselves rather than to rely on the teacher to tell them how to do, to learn from both their successes and failures, and to try to solve problems for themselves rather than relying on the teacher to tell them what to do (Deci & Ryan, 2008).*
• *Children who have autonomy supportive parents are more likely to be more autonomously motivated at school. They become more mastery orientated, more likely to spontaneously explore and extend themselves (ibid.).*
• *Managers at companies that are more autonomy supportive (ibid.).*
• *Factors that support high-quality motivation also support worker's self (ibid.).*
• *Provision of autonomy support at clinics can help patients to become more motivated and perceive themselves to manage their treatment. E.g. studies on patients with diabetes, learning about their medical condition and given help to managing on ones own, led to improvement of controlling their glycemic index (ibid.).*
• *Individuals need to experience love and interpersonal contact to develop optimally – they need to experience warmth and affection (Grolnick, Deci, & Ryan, 1997).*
• *Feeling a sense of security (e.g. children's feeling with respect to parents and teachers, ibid.).*
• *Provision of autonomy supportive interventions in clinics (e.g. intensive sessions of physical activity counseling regimen; smoking cessation; Deci and Ryan, 2008).*
• *Classroom conditions or work environments (ibid.).*

- *Meaningful rationals for doing a task (Ryan & Deci, 2000).*
- *Explicit or implicit endorsement of behaviors by significant others (ibid.).*
- *Managerial autonomy support, e.g. managers' acknowledging their subordinates' perspective, providing relevant information in a non-controlling way, offering choice, and encouraging self-initiation (Gagné & Deci, 2005).*
- *Transformational or visionary leaders (ibid.).*

Table 10. Examples on contextual factors that limits satisfaction of individuals basic psychological needs.

Limiting Factors
• *Threats of punishment (Deci & Cascio, 1972)*
• *Negative feedback can cause negative value properties to be associated with the activity (ibid.).*
• *Deadlines (Deci & Ryan, 2008).*
• *Surveillance, tests and grades. E.g. controlling teachers that believe it is their job to be sure that students do things correctly can be experienced as limiting (ibid.).*
• *Tangible rewards (e.g. money; ibid.).*
• *Difficulties in mastering a task – too much challenge relative to a person's skills. E.g. if a person experience the task to be too difficult to master the person might even give up that activity. If the task is too easy that same person might loose interest in the activity (Csíkszentmihályi, 1996).*
• *Conditions that diminish the experience of satisfaction of the intrinsic needs to feel competent, autonomous, and related diminish and interfere with intrinsically motivated processes undermining the natural developmental tendencies (Deci & Ryan, 2008).*
• *Classroom conditions or work environments (ibid.).*
• *Managerial pressure of subordinates to behave in specified ways.(ibid.)*
• *Monotonous job tasks (ibid.).*

Occurrences can be events or activities in which people participate. Most research within SDT has studied autonomy support rather than the dualistic approach of promoting or limiting factors as given above. With reference to this, I would argue that the two tables above give an indication of only some of the factors as examples of occurrences to look for in a promoting or limiting context. The SDT framework has been used in research in various other domains – including virtual worlds, preserving the environment, politics, religion, psychopathology, and psychotherapy in which it was argued that the experience of autonomy, as well as of competence and relatedness, are important for effective performance and psychological health and well-being (Deci & Ryan, 2008). My examples come from the few domains mentioned within articles that mainly focus on describing the SDT framework rather than accounting for the results from these studies.

My intention is thus not to account for a review of the results from SDT research or how it is related to other current theories but, rather that it promotes the SDT framework and describes how I have used it as a model for my analysis. In my analysis model, autonomy support should have a prominent position with a focus on indexing identification and internalization. Moreover, it can be difficult to measure how each individual experiences these factors from an exact comparative scale, therefore the analysis model is qualitative rather than quantitative.

Summing up: Building an analytical framework based on the SDT

The theoretical framework SDT accounts for different types of motivation which result from the interaction between the inherent active nature and the social environment of people that either support or thwart that nature (Deci & Ryan, 2008). Central to SDT is the distinction between autonomous motivation and controlled motivation. Autonomous motivation involves acting with a full sense of volition and having the experience of choice (Deci & Ryan, 2008; Gagné & Deci, 2005). Controlled motivation involves "behaving with the experience of pressure and demand toward specific outcomes that comes from forces perceived to be external to the self" (Deci & Ryan, 2008, p.14). Intrinsic motivation is the prototype of autonomous motivation. The SDT has proposed that all humans need to feel competent, autonomous, and related to others (Deci & Ryan, 2000).

The analysis framework described above is built on two levels of analysis. The first level uses a two-dimensional model. The first dimension of the model focuses on a differentiation between autonomous motivation (which acoordingly with SDT

comprises intrinsic motivation and well-internalized extrinsic motivation) and controlled motivation (which comprises external and introjected regulation). The second dimension of the model looks into autonomous motivation in greater depth, as this has been found to be more in evidence when people experience satisfaction in relation to their basic psychological needs for competence, relatedness, and autonomy. In this case, I rely on studies within SDT that have found that more autonomous extrinsic motivation is associated with greater engagement, better performance, less dropping out, higher quality learning, and greater psychological outcomes (Ryan & Deci, 2005).

The second level of the analytical framework conceptualizes, consistent with the SDT, how sociocultural contexts, supportive of autonomy, competence, and relatedness have been found to foster greater internalization and integration of values and regulations than contexts that thwart satisfaction of these needs (Ryan & Deci, 2000). This is, I argue, of significance in my analytical framework as I wish to answer my overall question which is "why do people participate in loosely structured software development projects in a more than formally asked for manner".

With the analysis model above it is, I argue, possible to place occurrences of motivational behavior with a grading in relation to how, or not, satisfaction of basic psychological needs are satisfied. However, studying and analyzing individuals' behavior and to place them along the continuum of self-determination can be problematic, as there are several similarities between the contingencies that could prove difficult to extract. Most of my empirical material is based on interviews as to why the result of an analysis becomes influenced by what people say while it could be difficult to identify what they actually might have meant to say. Thus, my analysis is highly dependent on my own interpretation of what regulatory processes and locus of causality (i.e. external or internal) actually occurs in the material. Therefore, all examples given above are intended to offer an indication in relation to the kinds of occurrences we can search for in the empirical material but, will most certainly also include other examples and contextual factors.

Chapter 5

CASE DESCRIPTION: THE "PARENT-TEACHER MEETING"

Before I continue, I find it relevant for the following sections, to provide a comprehensive picture of the scene in which this study takes place. Therefore, this chapter will provide some necessary background information that encompasses my empirical case in relation to the focus of this thesis together with a description of the organizational setting.

First of all, I will provide an introduction to some of the course of events that had led to the initiative involved in starting the IS development project "the parent teacher-meeting". Secondly, the development process of the system is accounted for, followed by a presentation of the participants, roles and organizational structures. This chapter will, as such, provide a description of the case setting, and point out some of the main characteristics of the development project "the parent-teacher meeting". I will hereafter refer to "the parent-teacher meeting" (Föräldramötet in Swedish) as FM.

Course of Events Leading to the FM Project

The introduction mentioned some of the variety of efforts concerning the use of information technology as a means of increasing the economy and boosting democracy, amongst many others. Another important debate in Sweden has been the problematic area of communication between school and home. A lack of communication is said, according to a study from the Swedish National Agency for Education[28], to be one of the contributing factors as to why students leave school with insufficient grades.

[28] The Swedish National Agency for Education (2001), *Regeringsuppdrag 8 – Utan fullständiga betyg*, rapportnr. 202, available at

Many factors, such as language, socioeconomics, culture, education and occupation, or handicap, also contribute to an aggravation of school-home communication. For example, education and occupation can influence and differentiate parents' capabilities in relation to assisting with homework and most importantly how they communicate. Moreover, visual and hearing impairments, or reading and writing disabilities become problematic within school-home communication as this often occurs through telephone, meeting, or most commonly written notes.

This is the context that encapsulates the origin of the information system development project FM, focusing not only on Swedish activities, but also on local activities in the Municipality of Sundsvall. An article written by Nilsson (2008) describes the course of events in detail. As it is an extensive report, the choice has been to list some of the most important basic data and milestones below:

- The idea of using IT as tools in the governance, in the public administration or in the democratic process can be found in the governmental endeavor "The Information Society for all". Noticeable in *An Information Society for All*[29] and in the *Council Resolution*[30].

- Most municipalities have their own websites providing services, from information spreading to possibilities to take part in the local democratic process.

- Services concerning the compulsory school are a municipal responsibility and therefore it is natural to attempt to include in the municipality's website.

- The Child Services and Education Office in the Municipality of Sundsvall passed 2004-04-28 a communication policy[31], which states that IT "should be the leading tool for spreading of information and communication".

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http://www.skolverket.se/publikationer?id=871,

[29] Government IT bill 1999/2000:86, 2000, *Ett informationssamhälle för* alla, Riksdagens tryckeri, Stockolm, Sweden.

[30] EU, 2005, Council Resolution on the Implementation of the eEurope 2005 Action Plan, 5197/03 available at http://europa.eu.int/information_society/eeurope/2005/doc/all_about/resolution.doc

[31] Accessible 2011-06-01 http://www.sundsvall.se/Global/NYA%20Sundsvall.se%202010/Styrande%20dokument/Barn%20och%20utbildning/Kommunikationspolicy%20f%C3%B6r%20barn%20och%20utbildningsf%C3%B6rvaltiningen.pdf

- One goal in the policy says that "all parents who want to communicate with the school through electronic communication channels should be able to do that".

- In the lower grades home-school communication occur through written notes, weekly letter or a "logbook". At the senior level, messages are sent home more infrequently. "Generally, you can say that the frequency in the communication decreases the older the children become" (ibid., p. 2).

- January 2005, the ECHOES project was launched to improve the lack of communication expressed by both parents and staff at the schools, and to create the necessary conditions for the municipality to achieve their communication policy. The project is cooperation between Åkroken Science Park, the Child Service and Education Office, Municipality of Sundsvall and the CITIZYS Research Group at Mid Sweden University.

- A pre-study was initiated where Nilsson and Sefyrin (2005) released a report on an exploratory study within the project "Everyday school-home communication"[32] followed by a second study (Nilsson, 2005) as it proved necessary to extend the study with additional interviews for the teachers. This was the first step in the development process of a digital service for home-school communication. The result from the two reports gave proposition for an IT based communication platform.

The results from the two pre-study reports (Nilsson & Sefyrin, 2005; Nilsson, 2005; Nilsson, 2008) are shown in Table 11 below. The first column describes the result from the first pre study while the second column shows the result from the second additional study.

[32] "Vardagskommunikation skola-hem"

Table 11. Result from the interviews performed in two pre-study reports 2005

Parent Interviews	***Teacher Interviews***
The opinions about the everyday contact with the school range from a real dissatisfaction to lyrical descriptions. The pattern is: the younger the child, the more satisfied the parents. Both the dissatisfied and the satisfied refer to the vital role of the teacher.	*The teachers are more or less satisfied with the present situation.*
All respondents were in agreement that they should appreciate to receive more information from the teachers, e.g., about what happens at the school and in their child's 'own' class.	*All teachers have access to ICT at the school, but almost all schools lack common rules about how to handle the school–home communication.*
All respondents were positive to use ICT as a complement to the existing communication channels.	*There is a wide variation in how the teachers handle the communication with the parents.*

The FM System and Development Process

Meeting the demands based on the results of the two pre-studies (see Table 11) meant that a design framework and a systems requirement specification emerged (based on Nilsson, 2008):

- it should follow the guidelines for 24/7 authorities
- it should be based on the requirements from the parents and the teachers
- the e-services should be usable regardless of equipment and bandwidth
- an active participation of the potential users during the whole process
- the graphical user interface (GUI) should be detached from the functionality
- it should be developed under an open source license

At an early stage of the pre-study, three different layers of information in the everyday communication between home and school were categorized: general,

class-specific, and pupil-specific. At an early stage, the focus was decided to be on class specific information, i.e. information should not be connected to the individual, but rather concern a whole class (i.e. group) and thus it would be general and less sensitive. Due to Swedish laws and regulation (PUL) student specific information in the prototype was left to be solved in the future. In later versions, this has still been left out, as the focus has remained on group specific information rather than individual information.

The system was first implemented in pre-school and in this case not handling student specific information has actually become a strength for the system as it makes it easier and safer to use within the organization. When first introduced, the system consisted of the six key parts, shown in Table 12, and a separate function, e-mail résumé, for feeding information to all users when new information was added to the site.

Table 12. The six key parts of the first version of the FM system.

Key Part	***Description***
Calendar	*with all events and important dates*
Weekly letter	*information from the teachers about the past and the coming*
Photo archive	*where the staff at the school could upload photos from the daily life at school*
Discussion forum	*for discussion between parents and between parents and staff*
File archive	*with not only the weekly letters but also other important documents and protocols from meetings concerning school matters*
Link archive	*where the staff at school could upload hyperlinks useable for the parents.*

The following section describes the development process. A summary of the description is presented in the timeline given below (see Figure 7). The first version of the implementation, i.e. the prototype, was initially not introduced publicly as, at the municipality during this period, there was another similar system which was the subject of a procurement procedure. During this period no further development or installations were allowed. It could be imagined that the FM development process would grind to a halt until the procurement process had come to an end, but on the contrary - the FM system continued to grow. The success of the system spread and the programmers, together with user participants, kept on making improvements to the system.

As a result of the procurement, a complex proprietary system was bought, which was intended to work for the entire organization, from pre-school, compulsory school to high school. It was based on the individual student and his/her achievements and grades with little support for home-school communication. Moreover, the new system had no support for class specific information. Therefore, the pre-school organization argued for the continuing use of FM. As there were no significant costs involved in this system development, the pre-school was given authority to continue using "their" system. It started to spread and to be used by several pre-schools. A positive response from both parents and staff later led to the decision to implement FM at all municipal pre-schools in Sundsvall. This gave the project concrete users, namely the pre-schools, which was demanded for in relation to concrete development.

Now, the FM application started to attract attention from other schools and municipalities in Sweden, and there was also interest from Thailand, France and Canada (Nilsson, 2008). In 2006 the e-service FM was nominated for "Guldlänken[33]" where it reached the finals and has also received a Good Practice Label from the EU (http://www.epractice.eu/cases/2068).

The development process continued and improvements to FM were highlighted. At the same time, the stakeholders of the triple helix initiated their work with an open source foundation (Dragon Open Source Foundation) intended to deal with difficulties, generate knowledge regarding how to handle and to propose models for collaboration in development processes such as the FM-project. But, most of all, it was to create sustainable business models that could assist in demystifying the development and enabling the use of open source solutions within public administration (from PECOI project description).

At the end of the year the development of FM version 2.0 received a boost and the project group became more legitimate and also received some financial support. This second version, FM 2.0, was provided with better conditions, as opposed to the first versions, and could be developed and tested according to user demands. In September 2009, after three weeks of beta testing, the FM version 2.0 was successfully launched in the assembly hall at the municipality of Sundsvall and it received great plaudits.

During 2010 FM was installed at pre-schools in the municipality of Umeå in participation with Open Kvarken[34] which later contributed with a translation of the project from Swedish to Finnish. Presently, additional municipalities has been added to the users of the FM system and therefore more functionality has been added to the project.

[33] "The Golden Link", an award for the most valuable public e-service in Sweden.

[34] Open Kvarken is an Open Source project in the Kvarken region between Umeå in Sweden and Vaasa in Finland. Http://www.openkvarken.fi

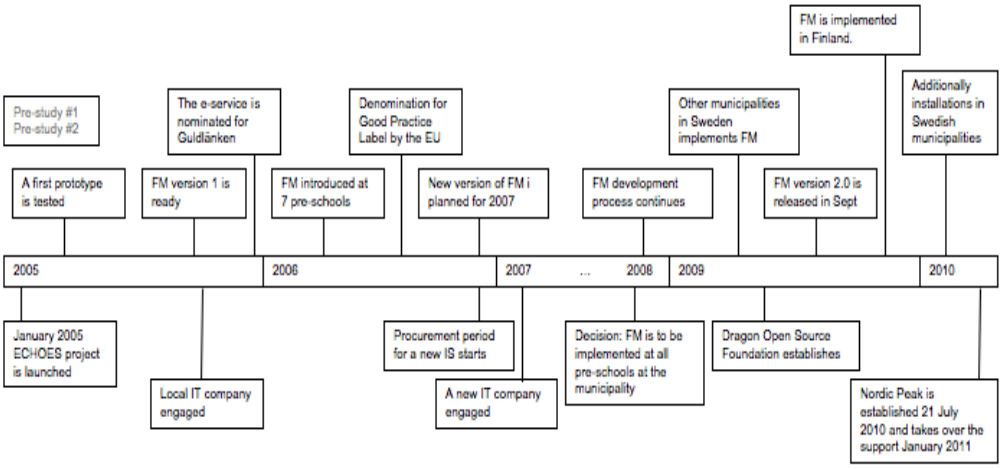

Figure 7. Development process Timeline of the web application "The parent-Teacher meeting" (FM)

Project Organization and Participants Characteristics

Over time, there have been many different stakeholders within the development project of the web based FM application (see Appendix 3 and Figure 7 for a summary). The organization around the project has a somewhat fluid character for an OSS project and its structure has changed with time and needs. What was initiated as a pre-study to improve the lack of communication between home and school has grown into becoming an open source software development project as the structure has migrated over time. In the first organizational setting, the pre-study, there were, in the main, representatives from academia who collaborated with an executive officer at the local municipality, i.e. the ECHOES project working-group. It was decided to develop the prototype software as a bachelor thesis which is the reason that two students at the Mid Sweden University became involved. Subsequently, a public relation officer from the child service and education office at the municipality of Sundsvall also became part of the development team as a representative for the office and the users at the pre-schools. Additional members have been affiliated to the project team as the process

has evolved. The team has been reinforced by two pre-school executive officers and one administration officer from the child service and education office, and additional developers have become involved. Moreover, the ECHOES project working-group has formed a steering committee with representatives from all the respective organizations.

After the graduation of the two bachelor students graduated, they were employed by a local IT company to which the support of the software was transferred as they were still personally engaged in the development of the software application. Subsequently, a formal agreement was made between the municipality and the IT Company. At a later stage, one of the two students moved to another city and the other one, *Håkan*, changed his employment. The responsibility for the development of the system and the support agreement followed Håkan to his new company. During this period, a project team took shape in order to continue working on the FM. Two additional programmers, *Martin* and *Caroline*, were introduced into the project team, which now consisted of three program developers and four representatives from the municipality (*Suzan, Kate, Bodil, and Charlotte*[35]). This project team is still active within the process and has become the focus group for this research study.

Presentation of the FM project team

The following sections will provide a more in-depth presentation and description of the project team members and their organizations based on some of the findings in the empirical material. Within the FM project, there is a core team consisting of four representatives from the user organization and three members from the developer organization (five female and two male). My study focuses on this core development team and thus, the other external partners, the ECHOES project, or the steering committee are not included in this presentation. From the first part of the first interview setting information was collected with regards to age, education, family relations, spare time, etc. The first interview setting consisted of three parts (cf. Chapter 4), the first part involving a "warming up" section during which aspects relevant to the respondent were discussed. It has been possible to add additional snippets of information from subsequent interviews.

The bachelor student, **Håkan**, was involved in the FM development project at an early stage. He also has a strong interest in developing and contributing to other open source projects. He loves to program (i.e. to code) and has his own portfolio

[35] All names in this description are fictitious

of software products. This was proven in his bachelor thesis, which was supposed to be rather theoretically based, but, as Håkan states: "I didn't succeed in that so it became a PHP[36] based prototype instead". This prototype was the first version that later became the FM application. Håkan became more and more involved in the process after the prototype obtained its first concrete users, i.e. the pre-school. As described previously, the project was initiated as a triple helix, for which the municipality of Sundsvall formed one part. After the municipality had engaged Suzan in the process as their representative, there were significant movements in relation to the project. Håkan, who always felt a great responsibility towards "his application", fought to take responsibility for the development and support along with him when he changed his employment, and, in this, he succeeded. Håkan now became the team leader for a group of developers at CompanyX. This company is a traditional and strictly hierarchical consultant firm working according to the waterfall methods. Nevertheless, within this team, they have developed an internal structure, thus creating a positive team dynamic. However, this structure has not proved to be satisfactory to Håkan as he would still like more freedom in relation to his work. For him it is also natural to use free/open code within his framework of tools. Håkan lives with his wife and child and during his spare time, he is involved in five to eight OSS projects and enjoys spending time working on his special cars in his garage. He has recently built a home video surround system, which is another of his favorite interests.

The first representative from the municipality to become involved in the project was **Suzan**. She is one of the main reasons, according to all of the participants, why they still find it so satisfying to work with the FM project. Suzan is a pre-school teacher and an IT pedagogue, now working with information and public relations at the office. On a day to day basis she has contact with the IT service department at the municipality. She lives just outside Sundsvall together with her husband and dogs, her children having, as adults, moved away from home. She likes to go out with her dogs on her spare time, but also to work. She says: "I always use my computer, I use it for everything". Her work means a lot to her and she wishes that there was time to do more. Suzan described her uses of her computer as:

> *"My work is such fun and so satisfying therefore I use it for monitoring the external environment, I love to learn! I often find interesting things and then I think that – this we could use for … and that we should do".*

[36] PHP as a recursive acronym and stands for PHP: Hypertext Preprocessor. Originally it stood for #Personal Home Page"

Suzan also loves to network and to create new and better opportunities for others. From the beginning of the FM project Suzan spent a great deal of time with the project. Presently, this has been reduced to, “just now and then” as the project has become more and more self-driven. Initially, she worked in the FM project, together with her chief executive, to give the software framework the identity that comported with the rest of the intranet and web portal at the municipality. Open source software was new for her and now that she has learned its principles, she has embraced them and “can't understand why not everything is developed this way”. Her incentives and drive is to gladden others, to give them what they need.

During the procurement process described in the timeline above (see Figure 7), a working group was formed at the municipality. Both Kate and Bodil participated as representatives for the pre-school. They are both pre-school officers each responsible for three or more pre-schools. **Kate** also has an additional education with an orientation towards Montessori pedagogy. She has two adult children, now living in another city, and is also a grandmother, and says that she “lives a rather comfortable life”. Kate describes how she is impressed by the manner in which her staff and most parents have adapted to FM, and who now demand more. She had never been involved in such a development project before and when she was asked to participate she felt satisfied that something was finally aimed towards the pre-school. To learn from this process is challenging and Kate's mission is to help others and to broaden her own horizons.

Bodil is the other pre-school representative in the team. She is responsible for a couple of pre-schools in a smaller village outside Sundsvall. Bodil is a “genuine local” from several generations back. She had her children (now grown up) early in life and also finished her education early. She started to work as a pre-school teacher but soon moved to a post as an officer in a tough region which had many problems. As Bodil says: “it was years of hard labor with little sleep, but maybe I did some good after all. I like it to be tough rather than too easy, otherwise nothing happens. I get a kick out of having to do, to feel the satisfaction from having accomplished something”. Looking at her son and how he used IT for much of his daily work and planning, that parents of today expected this kind of service to be accessible, convinced Bodil.

As is the case with Kate, Bodil never had met this kind of development process and she is fascinated by the principles of open source. She is impressed that by sharing their results they could actually achieve more.

At the CompanyX was found two additional co-workers within Håkan's team, Martin and Caroline. **Caroline** was contracted to assist, after the long procurement process had taken place and, as the software was finally to take its next step, version 2.0. Caroline is a young mother of three who likes sport. She started off working in health care but decided to further develop her dream, to work with

web design. Caroline was drafted into the project while doing her final thesis. She then continued working at the CompanyX and was included in Håkan's developer group. Her version of FM is another example of how well the communication framework it is built upon works in other contexts. Caroline is a very positive person who loves every task she is contracted to do – I love to learn, every day brings something new, she says.

Martin also joined the group slightly after Caroline. He had previously worked with other projects as an in-house consultant at CompanyX. In his spare time, which he would like to have more of, he likes to participate in sport (e.g. skiing, running, work out, or running his snow scooter). After graduating from high school, he developed a larger interest in relation to computers and programming. Martin likes to be involved in the FM project, as it involves working with an interesting and nice group of people that he has come to like very much.

Charlotte works at the municipality as an administration officer. Her present task is to support and develop help for the department. She is the youngest within the user group, with her own children at pre-school. She decided that she would work at the office after a visit during high-school and after finishing her studies she started to work at the municipality. Charlotte is very engaged in her development and in helping out and being a support to others, but, wishes she would have more time to do what "she is there to do". Like most of the respondents she experience a lack of time that makes it harder to perform her tasks as there are always new ones requiring her attention. Her story, and her relation to the others in the project team, is slightly different from the others, coming from another angle. She is the perfect person to ask about rules and regulations, which are so important to consider when working with children.

Other characteristics found for the participants in the project team

Some variables, common to all of the respondents, and also not in focus for this study, have been excluded from the table. Nevertheless, they can be found in the documented material. One example is the variable **working hours,** all respondents worked 100 %; none of the participants have a part time assignment. Another variable not shown in the table is **family relations**. All participants' live in a relationship and six of the seven respondents have children. The participants from the IT company represents a younger section of the focus group, as they have infants, while the participants from the municipality, all but one, represent an older part of the selection with grown up children (and also grandchildren).

Additional education: After graduating from high school some of the respondents started to work and/or raise a family while others continued directly to college. One of the respondents had never continued to higher education. The respondents could be looked upon as representing an ordinary cross section found in the majority of the present day population. Moreover, it is, especially within the teaching profession, quite common to continue to work towards an additional higher education, which gives a complementary, specialized competence required to advance within teaching.

IT competence: This area highlights large differences within the team. Many of the participants from the municipality are self-educated in their use of computers and IS. They have learnt to use the Internet (email, web) through their own interest. In addition, in relation to the larger information systems used within the organization, the majority had had little or no formal training. This is in contrast to the participants from the IT Company, all of whom have a bachelor degree and good IT skills. Additionally, in the participant group from the IT Company, there was evidence of self-education in relation to the more private use of IT. Both groups had a private interest in using computers, not only within their work, but, also in their spare time.

I focused, in my theoretical framework, on the ideal type specifications: roles, organizational structure, and formal incentives, to help me to describe and to highlight different forms of participation. This last part of the respondents' characteristics is also focused according to these specifications.

The Team and Group dynamics: The focus group has formed a development team where roles are said to be taken not given. Within the group of participants from the municipality I found three pedagogues used to working in a team and with team development, thus being used to taking mutual responsibility for group dynamics and actions. In addition, the participants from the IT Company are used to working with processes. All decisions were said to be made in cooperation within the team and when problems occurred, the group took a mutual responsibility. The three pedagogues from the municipality are often in contact with each other, which indicate that one of the participants from the organization is left somewhat in the periphery. The three of them also describe themselves as a "main team" when asked who is involved, leaving the developers and one of their colleagues out. As Bodil noted:

> *"Well, yes my primary team is Suzan and Kate, and me of course, exactly – us together. Then there are the developers … they are their own, so they are the counterpart or joint partner, both I imaging … joint*

partner of course as we cooperate and work together. But they are also a counterpart to exchange ideas with."

Also, respondents from the developer organization do not really conform to the term customer to describe their relationship:

"I would not use the term customer, it is so emotionally charged. I would say they are part of the team".

Within the developer group one of the respondents appears as the team leader of this group, which is also his hierarchical level within his own organization. This organization is a strictly hierarchical corporate group in which employees have little influence.

Roles and organization: Roles are taken not given is an apprehension within the municipality. Most of the participants from the user group have never been asked to participate they "just got involved" – "it just happened". In the IT organization, on the contrary, the team leader is the one who has contracted the other two developers involved in the team. In the IT organization they usually work according to a closed design process using a waterfall development model. In the interviews, the consultants reveal that most of the consultants at the firm want to join their theme as they "go outside the box, creating their own work processes within the organizational frame", and this has become very popular. Still, the participants from the IT Company have their strict internal organizational roles. The team leader is also the inventor of the system and therefore feels more attached to the process than the others. Moreover, one of the respondents from the user organization is mainly an administrator of systems used at the Child Service and Education Office at the municipality not working at a pre-school. She describes how she contributes mainly as a "listener" but also with an inside perspective, being a parent with children in pre-school. Her responsibility includes systems administration for other systems used at the Child Services and Education Office, and to support her colleagues at the office.

Key persons within the process: Even though most of the participants state that they all have the same importance and that the roles are taken not given, I have found two key people from the respective organizations. This is exemplified by means of the following statements:

"I regard Suzan as important for our group, and there is also Håkan, who has been the uniting and important link./.../you see, this is Håkan's heart, in a way it is his child".

".../because no one have ever stepped on the break, and the key … the most important of all … one should not talk in percentage or so but it becomes easy to call it 99, but if we call it 99% – it is Suzan".

Benevolent climate: All respondents talk, one way or another, about the open and benevolent climate within the development group.

"When I think of, specifically, this engagement from their side. It is so different and we don't get the feeling towards them that they are in it only for the money. You never get this kind of feeling, never! They come and attend to demonstrations (referring to larger presentations of FM) and they gladly help out if there are questions. You never get the feeling that they only participate to attain benefits from it. They are a part of FM them, and … that is FM, and this is something very special!"

"Once, when I had a major presentation in the great hall, it was somewhat about 200 people there, and they sat and listened which made me feel secure. If there was to come any difficult questions, they were there, and that felt really good. And I also had Kate and Bodil there, who sat in front and gave me encouraging looks all the time. Well, yes it is a super team."

I will allow Bodil's description of the project team, with an interesting visualization, end this chapter:

"There is this project team without project manager, but without Suzan there would not be anything even if it is not so formal. The formal part is that it is we who have the assignment and Suzan "serves" us. But this is not how we work together at our meetings. We know what to do and new assignments aren't given, they are taken. We are in a cloud that has an irregular shape that curves in and out in different directions. We have no locomotive driver, instead we are all wandering on and of within the cloud. Some of us not as much as the others, - but differently".

Epilogue

After the interviews took place and during my work with the analysis, Håkan together with Martin and another colleague from CompanyX started a business of their own and they were now able to work according to their own ideologies and ethics.

A new procurement period also took place at the municipality concerning FM, from which the result was that Håkan and the team at this new company are now responsible for the support of the FM software. They will support the FM software and development in close cooperation with the IT department at the municipality. They still develop add-ons for the framework that will also be included in newer releases of the FM software, which is still licensed under GPL. Moreover, most of the individuals found within my material and described above are still working, in one way or another, with the FM project.

Chapter 6

FINDINGS: HOW PARTICIPANTS EXPERIENCED THEIR PARTICIPATION

This chapter presents the findings regarding how expressions and traces of motivation can explain the participation of the members in the FM development project. The focus is on how the participants in the project team perceive and explain what the incentives are that motivated them to participate. In this way, the research findings presented in this chapter should be considered in the light of the purpose of the thesis as well as its related research questions. Here, I want to remind the readers that the purpose of the study is:

> *to create a deeper understanding of motivational factors for participation in a loosely structured software development project.*

And the related research questions are:

> *The overall research question is; why do people participate in loosely structured software development projects in a more than formally asked for manner?*

> *The specific research question is; how could the motivational theoretical framework self-determination theory enrich the understanding of participation in loosely structured software development projects?*

In order to address the purpose and the two research questions I argue that we have to draw attention to the sociocultural context in which the participants in the OSS development project act. Applying a sociocultural perspective allows us to show how the components of motivation and participation are not strictly an

individual business but also have social and cultural dimensions. It focuses on "participation of individuals with others in cultural practices" (Rogoff, 1995) thus considering both the individual and the environment.

This analysis deals with how the process of motivation to participate can be understood and investigated from a perspective of motivation found within the framework of SDT in an environment connected to an open source development project. Moreover, it focuses on attracting social contextual events of motivation to participate that can be traced in the empirical material of the study.

The analysis is divided into consecutive steps. The findings obtained by addressing the first research question helps to clarify the conceptions by which the participants value their participation in the development project. Consequently, the first step in the analysis was for a search for the internalization of work related values and practices. Occurrences are then reviewed in a second step during a search for factors that are either experienced as limiting or promoting participation. The findings obtained by addressing the second research question, assist in the interpretation of the components that the focus group considered as being important in relation to their participation in the project.

One important initial step in the analysis was to understand the context of the researched phenomenon and to obtain a good overview of its empirical content. Adopting a sociocultural approach, I argue, gives a means of looking upon the relationship between the individual and the environment, where values are created. It can, through direct observations of what is said and done, become possible to generate knowledge about the individual values. Therefore multiple readings of the interviews were made to elucidate concepts and themes by investigating, in greater depth, the circumstantial use of the concept itself.

The analysis started with a study of the occurrence as a whole. The most important aspect has been to attract "the big picture", in relation to what the conversations were about, to be able to catch the over-bridging purpose of the activities, and to find moments where the conversation takes important turns. As motivation will flourish if circumstances permit, I therefore looked for circumstances. In the initial review of the transcriptions all dictum of regulatory processes that included motivational behavior and reflection were noted. Furthermore, the result from this part of the analysis also provided a description of the participants, which was presented earlier in the case study description (cf. Chapter 5). Quite early in the analysis of the dictum, occurrences of circumstantial factors that had both hindered and promoted (pros and cons) the development process came to the surface. I also found circumstances concerning a range of incentives that drove the participants to participate (i.e. what motivated their participation).

In search for Internalized Values and Behavioral Regulations

The SDT framework suggests that social environments can facilitate or forestall intrinsic motivation by supporting versus limiting the innate psychological needs of people (Ryan & Deci, 2000). We must also look deeper into the nature and dynamics of extrinsic motivation (ibid.). The first dimension of my analysis model searches for motivational types and categorizes intrinsic motivation and well-internalized extrinsic motivation from controlled motivation. Additionally, a second dimension of the model focuses on autonomous motivation and grades satisfaction of human basic motivational needs (i.e. relatedness, competence, and autonomy).

The empirical material has been interpreted in terms of satisfaction of the basic psychological needs; I will, in this Chapter, elaborate upon the analysis procedure. I have looked for evidence of *autonomy*, self-determination presented as choice, acknowledgment of feelings, and opportunities for self-direction. Furthermore, I have looked for *competence*, searched for occurrences of feedback, communication, and rewards. Finally, I allowed for evidence of exploratory behavior, sense of security (personal) and *relatedness*, caring/uncaring indicate relatedness. The selected values are presented in this chapter under their respective set of values. Moreover, I saw social contextual conditions that both supported and limited the respondents' feelings of relatedness, competence, and autonomy. SDT postulates that "social contextual conditions that supports one's feelings of competence, autonomy, and relatedness are the basis for one maintaining intrinsic motivation and becoming more self-determined with respect to extrinsic motivation" (Ryan & Deci, 2000).

It should be noted that all values and occurrences in this chapter have been selected from the material because they are found to be related to the FM development process. Thus, other values found, which are not directly related to the FM process, are not included in the Table 13 below, but are accounted for and can be found within the interviews in the appendices.

Table 13 Sets of values and regulations and their definitions

Sets of values and regulations	***Definitions***
Values and regulations related to relatedness	*This manifests itself in an individual's sense of belongingness and connectedness with significant others.*
Values and regulations related to competence	*Refers to perceived competence. This means that offering optimal challenges and effectance-relevant feedback facilitates internalization.*
Values and regulations related to autonomy	*Relates to an underlying continuum that supports internalization and is a critical element for a regulation to be integrated.*

The values and regulations relate to different occurrences within the FM development project. Initially they are presented according to the dimension of satisfaction of basic psychological needs according to my analysis model. I start each description with occurrences that are common for the two groups within the project team. Variations, if there are any, between the two groups are described last.

Values and regulations related to Relatedness

The two groups involved in the FM development project (i.e. developers and users) appear to have rather similar conceptions of how they relate to the team and also to the software. Values that relate to relatedness can be found, manifested through descriptions of other people engaged in the team and the dynamic within. Both groups are found to talk about how they are affected by the work climate and the positive attitudes they experience, both within the group and from other users at the municipality. One of the participants from the user organization exemplifies this by saying:

> *"We have a very open climate in our team. When we sit down together, one gets all fired up and just flings out a thought so to say and … yes, it is very open and permitting."*

Another of the participants from the developer organization states:

> *"We have a very open dialogue about everything. Nothing is really wrong, if someone thought or understood wrong, we kind of have a dialogue where we can say – well, this was maybe not so god, but if we do like this instead … We welcome a dialogue about things. You go back and redo, there are no such things as – oh no, now I screwed things up. Such stupidities do not exist here!"*

In the second citing above, the developer not only underlines the open climate within the group, and also exemplifies how the team works out their solutions, together and through good communication. In this last statement, we also find examples of some ethical and moral values. There is a benevolent climate within the team that promotes a positive working situation. Wrongs or faults do not appear to receive a great deal of attention as the team appears to be extremely goal orientated, thus not focusing on problems. One of the participants from the user organization describes the benevolent climate with the following:

> *"Yes, we have our disagreements sometimes, but it's never a big deal. It never leads to any conflicts or anything."*

In many of the dictums the benevolent climate within the team was highlighted as being important to create a feeling of security. The citation above indicates that there are no, or few, conflicts within the team caused by personal disagreements or feelings of insecurity. One of the most important factors for relatedness to occur, according to SDT, is providing a sense of security, belongingness and connectedness to a person or a group (Ryan & Deci, 2000). The empirical material contains many occurrences, similar to those chosen above, that support the sense of security and belongingness within the team.

Connectedness is often mentioned as a description of how individuals relate to a group. Once the feeling of security was gained, the participants reflect on how they relate to the team and how they experience their participation. One of the participants reflects on this in the following:

> *"Being a small group, you become related with everyone, which also makes it easier to continue and to take on from where we stopped last time you met. The size of the group … and also…. I think that prestige is less important when you have this open climate. I think we have a creative, permissive group with many ideas. "*

I found that this was not an isolated occurrence but was also given as an account by all of the others. This is accounted for in the following dictum where a second object of relatedness also occurs – their relatedness towards the software itself. One of the representatives from the user organization says:

> *"It will be fun to stay with the project and see what happens with "our baby". It will also be interesting with new, different tasks, it will broaden my horizon. This will give me different feedback and different forms of communication. We also had a student who interviewed the parents; this will also give us a new and different angle of our work. "*

Talking about the software as "their baby" is something that was repeatedly found.

Many of the participants describe their relation towards the software in rather possessive terms, still wanting to share the result. Moreover, in many of the dictums, simultaneously, other factors are described, other than that in focus in each section. In the example above, not only relatedness is described, but also, competence is included as a contributing motivating factor for the experience of relatedness.

To obtain feedback and attention is one kind of reward often mentioned within SDT as contributing to the support of the need of relatedness. However, most important in the example above is nevertheless the occurrence in which the result of the FM development project, the software, is referred to as "our baby". I have, in the empirical material, found several similar statements that support this finding. Both groups gave similar statements, for example one of the developers said:

> *"The project came to a halt during the procurement for almost one and a half year before it came alive again. It was horrible; they had a server with no backup or administration. They phoned me sometimes and I helped out, off the record so to say. I felt a responsibility towards them; after all it was my project. I didn't like to se it go down the drain, so I kept it floating. "*

This dictum further reflects an individual connectedness towards the software. Even if some of the dictums indicate a rather possessive attitude towards the software, contribution is often mentioned. Not only to contribute to their own result and organization but also to contribute to the greater good for others was mentioned during the interviews.

That the software is being built as open source is also referred to as an important factor for the success of the software. The participants from the user organization are used to working with closed systems and thus experience a great difference in this project as to how development is performed. They have understood the possibilities and the flexibility of their software.

> *"I think this is fantastic. You pick up a web based program that doesn't cost anything (emphasis). You co-operate with the municipality or university, just pick the functions you need, and it can work in so many different contexts and situations. You can't put a price tag on this! It's far superior the other bought programs. … (reflects over the difference between user-development and commercial development)… They should study profits and life-time, how many users. The other program (refer to FM) also sell of course, but here it's more about the developers taking care of their baby instead of only making money. There's a common spirit in this way of working … that you can turn something that's built around only one framework into so many different branches."*

One of the basic ideas behind OSS is to share knowledge and to enhance it, as that enables others to improve upon what has been shared. In the following example the focus was on the impact of the software. It describes how, when it was discussed, how willing they are to share the result with others, for free, the answer was:

> *"Of course we could look at it like if we have put so much time into it, couldn't you pay some money for it to. But why not use it as it is, it doesn't matter. If others want this stuff to, you hope that they add something to it as well; they need to develop it for themselves. It doesn't get more expensive for us as a municipality if someone else uses it. I feel like this: - If I make a path in the forest and others walk it after me, it will only be easier for me to walk it later. It's OK that it becomes easier for them to walk, it doesn't cost me anything. I will use that path later anyway."*

Following the framework of SDT, this example shows well reflected, internalized intrinsically motivated behavior. Not only is it acceptable to share and contribute to their own organization, but, also, to contribute through cooperation and sharing with external partners is also mentioned as an added value that contributes to providing a sense of belongingness. The user group often presents the software at

conferences and at other municipalities in Sweden. Networking has become an important activity to share the FM software.

> *"One more thing that I think is the point and advantage with all this, it is cooperation, networking with other municipalities, you know. And, that cooperation together with Mid Sweden University and all sorts of other, authorities and enterprises, occurs. This is a huge matter, this doesn't occur otherwise when you acquire commercial software for example, then there is no cooperation. "*

> *"I love to contribute with development of our practice. So much is happening."*

Contribution has become an activity that has come to enhance the user group's feeling of relatedness, and also the motivation to share their results. In some of the dictums above I highlighted other occurrences of values other than relatedness. The most commonly found values and regulation in many of the dictums are related to competence.

Values and regulations related to Competence

The experience of a high grade of competence is often reached through positive feedback, communication and rewards. SDT postulates that to enhance the feeling of competence, contextual support must be in evidence (Ryan & Deci, 2000). Competence is often described as when goals are adopted and internalized by the self. An important factor to facilitate internalization is to understand the goal and to have the relevant skills to succeed at it. Feeling competent is important for intrinsic motivation to occur (ibid.). One of the team members exemplifies this with saying:

> *"It felt very good to have been involved in the development of FM and to have influence in the process. It has been good to test solutions (prototypes); it becomes more close to practice. What is most satisfying with the process is that I actually can see my own facets that I have brought with me from my collegium, being implemented. There is always a dialogue of what we want and what they are able to implement."*

Contribution is found to contribute to an enhanced feeling of competence. One of the most prominent descriptions of how and when the participants felt competent was through the positive feedback that they met. Even if a person has not fully understood or has the formal skill, learning can occur and thus contribute to satisfaction and rewarding feelings. The relatedness described earlier and the satisfaction from contributing to a greater good also gave the participants a feeling of being competent. This is well described in this dictum from one of the participants in the user group:

> *"I have not always understood everything; actually, sometimes I hoped and told myself "he must have meant this". But, I think we <u>all</u> (said with emphasis) have learnt from each other in this process. "*

In the material I have found many examples of the occurrence of a learning process that has also been experienced as an important incentive for participation. An interesting finding is that, the majority of these examples are to be found within the user group. This group consists mainly of pedagogues, used to reflecting upon learning as a process. One of them says:

> *"Before I worked with FM, I had never met with or know about any other "system", never even thought about it. I have learned so much about fonts and colors, and specifically the data security law. All this knowledge is new for me. Moreover, the fear from adults and parents how to handle this has been an interesting challenge to handle. "*

Another participant from the user group describes the feeling of satisfaction of the need for competence as:

> *"Then, we are supposed to <u>develop practice</u> and to <u>inspire</u> others. I am happy to have so many good pedagogues in my practices. I learn myself as much as they do, which also feels inspirational."*

These kinds of findings relates well to the framework of SDT that argues that social contextual events such as feedback and rewards that are conducive towards feelings of competence during an action can enhance intrinsic motivation for that action (Ryan & Deci, 2000). Positive performance feedback is found to enhance intrinsic motivation rather than to undermine it (Deci et al., 1999).

Another interesting finding is that the team members describe only positive feedback from their users (parents and staff). In the interviews I could not find any occurrences of any negative feedback at all. How the users and other people connected to them expressed this is exemplified through one of the participants:

> *"When I had web based enquires for both staff and parents we got really, really many answers. And from these, amongst others, we got answers concerning each function in FM, every module, and what they wanted us to improve. Then, we took these viewpoints of what they wanted to be improved to be presented at the 2.0 release. This felt really good. Now they had got what they wanted, this was what they wanted to have. Every day I have … almost everyone I meet with have children in pre-school. Once, my colleague told me - oh, how good this is, imagine, before I had to … we didn't have this … I didn't know we could do it this way - and she showed me what her pre-school had added".*

> *"One just has to do this, you get lifted up by so many, because they like it, they lift us up … everyone who likes it and thinks it is good lifts us up in a way. This doesn't apply to any specific person but rather everyone lifts it up."*

The examples above describe how some of the participants experience an optimal satisfaction (e.g. getting wings, flying) from receiving positive external feedback. Another example of this kind of feedback is given by one of the users:

> *"The first thing I remember about FM and the impact it has was when I had been questioning those who had tried it for a period. When I asked - "what's been bad?" it was quiet for a really long time. No one could come up with anything that had been actually bad; the only negative that came up was that it maybe had been too little. It could have been more developed (the reason that nothing had been delivered during the procurement where the procurement process)."*

A reflection during the interview was that this meant that it was a good thing when the user could not think of any downsides. One reason for this, often explained by the project team, was that the software development project is "based on the users, built by the users, for the users".

Values and regulations related to Autonomy

Satisfaction of these basic needs from the examples above will not happen unless accompanied by a feeling of autonomy (Ryan & Deci, 2000). As highlighted previously, many of the examples given also include threads of the occurrence of autonomy as a contributing factor for experiencing relatedness and competence. Autonomy is often identified as doing something from one's own choice or just for the fun of it (ibid.).

All respondents in this setup answered that they participated through their own choice or from an interest in learning new challenging things driven by the positive feedback from their users. Being in the development team by their own choice or voluntary was often highlighted in the interviews, for example:

> *"I don't have to participate at all. I am surely not participating because I have to; it is totally by free will. "*

Most participation and engagement in activities connected to the FM software development process was shown to occur by their own choice. Individuals participated in presentations and contributed with their specific competence in order to help others in the team, or to secure the image of the software remaining positive. One respondent describes how she together with her colleague (who was also part of the team) held presentations of FM at different pre-schools in the region. The purpose was to inform, train, and to help the staff to use the system. This was an activity done completely throught their own choice, because they felt "it was needed". They choose to do it without being asked to, by free will and joy. How the team (both developers and users) have helped each other out several times is well described in the following example:

> *"It's such a comfortable feeling having the others so close. When I had a presentation in the city hall, it was about 200 persons there, and then Håkan and his group were there, sitting listening. It felt comfortable to have them there answering questions I couldn't answer – this happened a couple of times and it felt great. Then, I also had Kate and Bodil who sat up front with encouraging glances all the time. Yes, it is a super group!"*

The example above visualizes how well the team supports each other and work together. It is also an example on how the participants relate to each other and to the FM software. Other traces of the satisfaction of the need for autonomy were found in descriptions of their work practices. Most of them experienced that they were responsible for their own actions and planning. There are superiors and others above them in the hierarchy, but they, generally, experience themselves as being self-directed. Many of these examples place them high on the continuum of self-determination discussed within SDT. The following citation describes how they relate to their organizations:

> *"NN is my closest executive, and then there is … (gives account for others in the hierarchy). I feel I always can get in contact with them if I need to, but I seldom do. I feel I have NN's fullest confidence concerning the work I do with FM."*

> *"My boss has little insight in how we perform our jobs. She knows we deliver in time, so … I could use Perl as well as Java and she would not care about how I solved it. I sort of break this trend; I take responsibility for what I am doing. "*

But there are also findings that indicate the feeling of pressure, not having enough time to do what one want to do. This pressure could limit the internalization of intrinsic behavior according to SDT:

> *"A day at work is only 40% coding, the rest is administration. Thereof comes my motivation to code when I come home."*

Other values found in the empirical material

When I started to analyze the material several occurrences were found that became difficult to place within the analysis framework. This section gives a description of some of these findings that are felt to be important to highlight, sorted under their relating keyword.

Licensing:
Licenses are assigned to the beliefs or ideology of their practitioners with regards to how and why software should be developed for sharing, modification, reuse, and redistribution (Scacchi et al., 2006, p. 96). The FM project started with many parts involved, which is why an early decision was made to release all the code under GPL licensing. This example describes the incentives for this action:

> *"Most of the code is licensed under GPL which has been useful in the project. Otherwise we should probably have seen proprietary versions of this today. There are many that have been "in" and looked at the code. There are also other projects with other licenses. Why we chose GPL was because there were many actors that have been involved and contributed to it. That's why we didn't choose LGPL. Everyone should trust this. No one should be able to take it all and make it their own. Everyone contributed, who is them to owe? We all get the same set of game rules, that is – it's a strategic decision. "*

Economic benefits:

Several examples from the material also indicate that there are economic benefits to be found from the project. It is based mainly on descriptions as to how the project has benefited from improved source code at no cost, meaning that other parts have contributed with translations to other languages and other add-ons. The developers are using the code framework in several other projects, which is also a contributing factor to how the municipality actually has gained added value and thus economic benefits. The findings show how the user group is also aware of this, which they appreciate and value highly. The following citings can describe this.

> *"I think this is fantastic. You pick up a web based program that doesn't cost anything (emphasis). You co-operate with the municipality or university, just pick the functions you need, and it can work in so many different contexts and situations. You can't put a price tag on this! It's far superior the other bought programs."*

> *"We can expand and contribute to, and share our experiences without any costs."*

> *"At company X, we have an administration that sells hours. In our team we use a lot of open source software tools and frameworks. Therefore,*

other projects (like FM) can benefit from solutions developed within other projects. Sometimes they don't even notices that they have got more and sometimes we tell about the news. They know about this evolution, and maybe they also expect it to be there now that they know about it. This adds value to their application. "

Experienced alienation:

Often described in the material is the alienation towards other software companies' solutions due to negative feedback and low interest from the companies concerning their needs. This alienation has, I think, also become a factor that has strengthened the participants' relatedness towards the FM software. They describe how they came to feel more connected towards FM than towards the other software.

"During the procurement we looked at X (another proprietary software solution) but they had very little knowledge about pre-school practice. They said – we don't have this, or it doesn't exist. You will get "this" they said, while we said – we don't need "this", we need that. The answer was 'well you will get it anyway'. It was school based software, and we are working with groups, not with individuals, that are why it doesn't fit our communication with the parents."

"Well, I refer to our administrative applications (e.g. salary and economy) and of course I have used a couple of applications over the years. I'm the kind of user that run the application and doesn't understand anything, closed it, and then waited for someone else to react and to solve the problem, that is, if it really wasn't of great importance and could wait. For example, like it is for the moment with the new invoice application. It is really problematic and doesn't work properly. My respect for it is not high why it doesn't become very important for me. But, if an invoice is due, then I have to check it up so it is paid. And now we have a new system again! Just when I got the first one to… But, there is no problem until you actually make it one."

"We asked simple enough questions to answer. It ought to be simple for them to understand, but they didn't meet us halfway. They didn't want to understand how simple it was. I think it had to do with their not knowing that there are people who actually know what they want, they

only have to listen. I experience their credibility for others experience as low."

This was an interesting finding as it shows how the user group describes how they found it hard to relate to "the other" software. It also indicates how little (or not at all) they were engaged in the development process. Moreover, they often compare the systems at the municipality, for which they had no possibilities to influence, with the FM software, which was developed in cooperation:

"This is completely different, in this case I question every … moment and why, and what consequences there could be, from my own angle as a user, and from the angle of the parents … so I think both ways. I test the system how it works for the parents and how it looks if I do or present information in a specific way."

The comment above describes how one of the users relates to the FM software on a different level than to the "other" systems that are used within the municipality and how she can add to it, and not feel in the least engaged.

Key persons within the team:

Another occurrence that often came up during conversation was the importance of key persons within the project team, specifically two of them. They were said to be the reason why this project was such a success. When asked, they themselves gave credit to the rest of the team rather than to confess to their own impact on the project.

"I think that Suzan has influenced a lot how the development has been able to continue. Because when it becomes a controlled process, one really does not have anything to say about things. "

"I regard Suzan as important for our group, and there is also Håkan, who has been the uniting and important link./.../you see, this is Håkan's heart, in a way it is his child."

"…/because no one have ever stepped on the brake, and the key … the most important of all … one should not talk in percentage or so but it becomes easy to call it 99, but if we call it 99% – it is Suzan".

Absence of superiors

When I asked if there was a question that I should have asked or if there was anything important that they wanted to tell me, I received a surprising indication of the occurrence of a high autonomy and self-direction. Having reflected the development process, some of them highlighted the absence of top management thus indicating a high grade of self-direction.

"The absence of controlling management. How much do they actually know about us and the process? How much do they care? This development process has not been noticed so much."

As I have previously discussed, the feeling of autonomy support is essential for the other needs to present themselves. The developers appear to have created an autonomous region within their company as have the user group within theirs. In the interviews I found several descriptions of autonomous behavior within traditionally hierarchical organizations.

In Search for Social Contextual Conditions

A second part of this framework of analysis has been to trace finding, themes, and/or key-words within the material that indicates occurrences of limiting or promoting factors for the satisfaction of basic psychological needs. For this, I have looked for circumstances within the conversations. Reading through the transcriptions and listening to recordings I highlighted occurrences that were repeated and recurred often in the material. Using pros and cons is an easy means, I find, of classifying and sorting the empirical material. These can be either externally or internally regulated. I found factors associated with organizational structure, competence, pressure or control, economy, and ethics.

Occurrences of limiting factors

Limiting factors are cons that hinder or interfere with the process of internalization and regulation in any way. The most often referred to factor was the organizational structure, which is why I start with a descriptions of the findings related to it.

Organizational structure:
Limited time due to other job assignments is often mentioned:

> *"It is a pity when things take turns that makes me become too much of an administrator."*

> *"Now, every Monday is used for meetings. A day at work is only 40% coding, the rest is administration. Thereof comes my motivation to code when I come home."*

> *"An ordinary work day for me is not ordinary, it is shattered. Some days it feels like I haven't done anything."*

> *"My task is to support and manage the systems for the department, today; this task is hard to keep up with."*

> *"I work 100%, without any time for FM. Time is the limit, I would like to accomplish so much more, to circulate our result, networking with all of our external partners."*

The internal hierarchical organization at the CompanyX was highlighted in addition to only having a limited time to perform their job. The developer group was supposed to work according to a waterfall method (cf. Chapter 2 for an explanation), which they experienced as limiting their possibilities in relation to informal contacts with customers. This was, however, often "worked around" as described in the interviews.

Procurement processes and economy:

Apart from these examples regarding how the participants experience that time has not been put aside formally for the FM project, the *procurement procedures* or *economic incentives* were often mentioned in the interviews. Even though they, as representatives from the pre-school, were involved in the procedure, they did not experience that they were listened to.

> *"When nothing happened (referring to a procurement period) suddenly my users (i.e. staff and parents at one of the pre-schools) wanted so much more and did not want to wait. Bodil gives example on a blog that was started at one of the pre-schools."*

> *"It all started with me being a part of a procurement process, as one of the representatives for the pre-school. I actually became interested from an "anti-angle", because our opinion within the procurement group wasn't counted for as I had expected. I expected the software companies to be there to sell, they should cringe and offer what we wanted, but they didn't do this towards us in the pre-school group. We were omitted and our questions unanswered. They couldn't give us what we were looking for and they didn't care to give it to us either. It became etheric and we did not like any of the presentations in contrast to the rest of the municipality, they were treated differently and got more attention from the software companies."*

This kind of reflections goes further with reasoning about the contrast between the rest of the organization at the municipality and the smaller section that the pre-school represents. This was argued as being one of the major reasons for the representatives from the pre-school to start looking for another solution, namely, the solution provided to them by FM.

Another participant describes the same incident and also reflects upon the result of the decision that finally came from the procurement together with the difference of the result when users are cooperating in the development process:

> *"Compared to "software x", I was involved in the procurement for it, when I showed FM I showed it for the whole group, elementary-, upper secondary-, and pre-school then it came to be totally dumped due to the procurement. We were not allowed to use FM or tell anyone that we used it. Now when I work with procurement procedures I understand that this is what has to happen. But anyway, when I demonstrated FM it became*

clear that the software x didn't have any of the functions that we needed. I tried to tell them (i.e. the rest of the procurement group and the software companies) this, that everything that we needed could be implemented in the FM software, but no one cared to understand, they were promised functionality within the software x. But, to what costs and to what dissatisfaction? In our organization we don't experience any dissatisfaction with FM!"

Economy:

Economy was also a topic found in the material and the following examples represent a few dictums on this topic:

"The threshold is not to get the users to use or need it – everyone wants it. The problem is to get the politicians to understand … to accept the cost for something we didn't have before."

"No, I can't see any problems within the group. I rather see problems with what we saw. We wanted to add more, more hours than we got. And there you can spot a conflict. The municipality only wanted to pay for a limited amount of development."

"I believe that the child services and education office does not understand or have seen the impact this actually have had for the pre-school practice. Now, everyone is used to have access to information. The demand comes from the practice and from the parents. The possibility for further development is there. There is so much more to achieve."

These examples testify how the organization at the municipality has not taken into consideration the differences that occur between the separate units within the department. School and pre-school work differently and ground their focus on the individual student or the whole group, which are two contradictory views.

Competence:

There are divergent computer skills between staff and parents and also between the different pre-schools. Moreover, some of the parents appear to be concerned and worried about "the web" and the possible threats connected to it. For example, one pre-school does not use computers at all. Also, there were differences in competence experienced within the team.

"It is sometimes hard to communicate with the "IT language", but Suzan has always acted as our interpreter."

"Before this I was never engaged in any software development processes."

"Differences between younger and older pedagogues concerning fears and resistance have been obvious, mostly related to the demand of how communication is expected to occur."

"There was a fear of computers at some of the pre-schools before the FM software was implemented."

An interesting finding is that most of the pedagogues find this rather intriguing and also motivating to learn more in order to help out and to be able to explain.

Documentation:

Documentation was also discussed as a limiting factor for the success of the project. There have not been any formal procedures for this.

"We lack good documentation, this should be said, and we often discuss this while analyzing the background for discussions and disputes. The energy was never put on documentation, we just wrote down some minutes or like. Well, this makes it harder to secure the quality as it becomes harder to measure and look into what and how …"

I found, within the empirical material, reflections over the lack of documentation that had and still were occurring. The developers seek documentation from their log files, while the user group looks into the minutes taken from each meeting.

Occurrences of promoting factors

Promoting, and boosting factors are circumstances that assist in a process. Group dynamics was one of the foremost mentioned factors in the material.

Group Dynamics:

> *"The way we cooperate is in a way also a profit, it is not just the FM software that is a profit but also the practice. There is nothing bureaucratic or irrational that hinders or tells you that you have to do it this or that way - which is often the case within a municipality."*

> *"It just kept on going. It's a small group, the smaller the less complicated."*

> *"When something became a problem or halt to the process the solution was always, at least to 99 % been Suzan."*

> *"I experience our relation within the group as being benevolent, you can call the customer anytime and, for example, ask "do you really want to do this way or don't you rather want us to do it like this."*

The citings above gives a reference as to how the group experience themselves. In the material I found several dictums of group dynamic and the benevolent climate within.

Ethics and attitudes:

The participants all kept the system afloat during the procurement process as no one wanted it to obtain a bad reputation. But, why would anyone do this without being asked, I asked them. Many of the interviews revealed attitudes and ethical stand points commonly shared by both groups in the development team. The following citings illustrate this rather well:

> *"These boys and girls are also expected to earn some money, but there is also something else, it is about being in from the beginning nurturing your own child. There is a basic spirit within the system that makes it possible to base upon one framework being possible to develop application suited for other enterprises."*

Also, one of the participants argues that the possibility is always there, it has always been there; if you want to develop the practice:

"It is hard to come up with really good positive ideas and still getting denied."

Autonomy:

One of the participants describes the procurement procedure and the fact that their software did not cost anything as a reason for allowing them to continue. "Something I think is needed to point out – the absence of the authority". She experienced it as that they (i.e. their peers and above) were allowing it to continue for a while as it was "not a big deal", they were autonomous. She says:

"This freedom is important to lift up. We asked for a small amount for development and we have showed the impact of the software and the amount of use."

"We don't wait - we go ahead anyway and we will find some path. Nobody cares anyway."

"My boss has little insight in how we work. She knows that we will deliver in time. I could just as well code in per or java and she would not care how I solved it."

These are only a few, but the most prominent, of the occurrences found within the material. For a full review of the interviews I refer to the appendices.

Chapter 7

ANALYSIS: HOW I INTERPRETED HOW PARTICIPANTS EXPERIENCED THEIR PARTICIPATION

I have, in my work with the empirical material (i.e. interviews), looked for internalization of work related values and practices, reviewed, through a lens, consistent with the self-determination theory, in the search for limiting or promoting contextual conditions. As presented in the previous chapter, the findings obtained by addressing the first research question helped to clarify the conceptions by which the participants value their participation in the development project. Consequently, in my analysis I focused on social contextual factors that lead to the internalization of responsibility and sense of value for extrinsic goals or, how they lead to an alienated type of extrinsic motivation associated with low interest and involvement (Ryan & Deci, 2000).

Motivation varies not only in *how much* (i.e. level) motivation but also more importantly in *what type* (i.e. orientation of that motivation) of motivation (Ryan & Deci, 2000). Orientation concerns the "*why*" of actions, the underlying attitudes and goals that give rise to action (ibid.). SDT distinguishes between different types of motivation (cf. Chapter 3) b If I make a path in the forest and others walk it after me, it will only be easier for me to walk it ased on different reasons or goals that give rise to an action. I have, with the help of my theoretical framework (i.e. by addressing my second research question), found support for a description and the interpretation of what processes participants found to be supportive to their internalization of values and practices.

This chapter summarizes and shows how I have interpreted the process of internalization and integration of values and behavioral regulations in accordance with SDT and my analytical framework. My interpretation is based on behavioral measures for intrinsic motivation, the free choice measure and the use of self-report of interest and enjoyment of the activity per se (ibid.). I have, in the analysis, focused on internalization and integration of values and behavioral regulations (Deci & Ryan, 1985).

Table 14. Values and regulations mentioned by the team members

Sets of values and Regulations	***Definitions***	***Values mentioned by the team members***
Values and regulations related to relatedness	*This manifests itself in individuals sense of belongingness and connectedness with significant others.*	*- Belonging to a group* *- Group dynamics and positive, open climate* *- Feeling secure within the group* *- Belonging to something "big"* *- The software referred to as "our baby"* *- The software is built for the pre-school* *- To contribute to the group/software* *- To share their experience* *- To share the result*
Values and regulations related to competence	*Refer to perceived competence. This means that offering optimal challenges and effectance-relevant feedback facilitates internalization.*	*- Positive feedback from users (parents and staff)* *- Positive feedback from team members* *- Prototyping used as feedback and tool for communication* *- Good communication within the group* *- Learning from each others* *- Mastery of challenges*
Values and regulations related to autonomy	*Relates to an underlying continuum that supports internalization and is a critical element for a regulation to be integrated.*	*- By own choice* *- Interest* *- For fun* *- Small group, informal structure* *- Confidence from superiors* *- Transparency between work hours and spare time*

Internalization is "the process of taking in a value or regulation, and integration is the process by which individuals more fully transform the regulation into their own so that it will emanate from their sense of self" (Ryan & Deci, 2000, p. 60). In Chapter 6, I gave an account of the values and regulations that were found in the empirical material and related to the findings of human basic psychological needs for relatedness, competence, and autonomy. Table 14, shows how I interpreted and

placed the occurrences within each set of values and regulations. I also interpreted occurrences of limiting or promoting sociocultural factors.

The empirical material consists of recordings and transcriptions from interviews with seven participants. This section summarizes the findings for each person. In the appendices, a detailed description of the occurrences chosen from the transcriptions is provided. In the following I will give my interpretation of the seven analyses and how they were categorized.

Suzan

In the interviews, Suzan often describes how the FM application has several benefits compared to "the other system" that is used at all schools at the municipality. She has been personally involved since the beginning of the process and, for her; the application has also become "her baby". This is something she shares with many of the other participants in the project team. The simplicity of the system and that it has been developed by the users for the users is something she often highlights. She relates to the application giving evidence of an intrinsically regulated behavior.

Moreover, she often argues that the team dynamics was and still is a contributing factor for the team success. The dynamics and structure of the team and the fact that the process has not been formally structured could also be compared with an organic evolution. The complicity, everyone comes up with ideas, and everyone listens to everyone else. One can always influence. She explains:

> *"You can influence! It is hard to tell what or why. I would explain it as: open source - open dialogue. The lack of structure makes it so fun."*

> *"You feel happy for a whole day after having attended a FM meeting."*

Within the empirical material Suzan's incentives for participation are highly visual. She participates from joy and through her own choice. To network and to share the result is important to Suzan. She "loves to meet with people and tell them about FM". Often, when she has presented FM, she becomes fired up from the positive feedback she receives:

"They all thought it was so good, they really liked it, and it was great fun".

From interviews with the other team members I found that Suzan is regarded as a person who, with her positive attitude, always finds solutions. My interpretation is that most of what she does is from her own joy or satisfaction. Much of the examples found within my material have therefore come to place this evidence at the high end of the continuum of self-determination. In the examples above, I have identified intrinsically regulated behavior with, to a high extent, an internal locus of causality. The only externally regulated process that I found, concerned the procurement process, which also was a feeling she has in common with the rest of the project team.

Håkan

Håkan is one of the developers who likes to discuss not only his own participation but also the software and open source phenomen and principles in general. One of his comments on the FM source code was that it is "one of the siblings that were not perfect". Håkan identifies this fact to relate to the low budget and short time period to develop it (i.e. he made it as his bachelor thesis within only 6 months). I understood him to mean that he was not completely satisfied with the result. Still, it is one of "his own" products and in his description of the process and of his own engagement an intrinsically regulated behavior becomes visual.

He identifies, as do many of the others, the team dynamics and lack of formal structure as being the most important contributing factors to the success of the project. He says:

"Other projects have a lot to learn from how we have worked. It is like in other OSS projects where there is a road map but no formal ultimate goal. It is iterative and nightly built which means that all new demands or changes occur continuously."

This example points to integration of an awareness of how things are and why they are so. My interpretation is that he finds congruence with his self and how he prefers things to be, which is why I have placed it as an integrated regulation of behavior with an internal locus of causality, highly autonomous.

Håkan often talks about his personal satisfaction that comes from being able to do things that later turn out to be useful for so many more. In everything he does, he has a positive and simple solution as to how things are: "happy customers – happy co-workers, this is a simple equation"! For him, to contribute to the happiness of others is satisfying and rewarding. Additionally, he takes pride in being competent with what he does and describes the satisfaction of contributing a good solution or perfect code. Relevant regulatory processes in these examples are enjoyment and inherent satisfaction. Håkan, together with Suzan, demonstrates, more often than the other participants within the project team, a higher level of intrinsically regulated behavior.

The organization within CompanyX differs between the different offices around the world. At his office, Håkan experiences a high grade of autonomy (but not complete), which I have found to be related to his nearest executive officer. She is satisfied, Håkan explains; when results are achieved and she does not really interfere in how the work is actually performed. Håkan has, within the organization, built up a development group around him, sharing the same values and ethics as himself. It should be noted that from the start, also Håkan had to work according to the demands and principles of the company. I have interpreted this as an example that starts out with an external locus of causality that later become internal due to regulatory processes steered by Håkan himself. This awareness and synthesis with self have helped him create an internal locus of causality. I have therefore found it hard to define this example as either being an identified or integrated regulation. He still experiences some external pressures from the organization.

Kate

Kate talks about the procurement process and describes how she felt alienated towards the project manager responsible for the procurement procedures at the municipalitym and the software companies that were there to demonstrate their products. She reflects how little they actually cared for their (i.e. the pre-school) opinions or demands. I have interpreted this as an example of highly external regulation that has moved from its starting point as an identified regulation. She identified, at the beginning, with the need for software that could support communication on a daily base and, lost not only interest but also respect for the software company and their representatives. Now, today, she describes how "it has been talked about" the other system, that it does not work as well as was

intended. Kate explains that she thinks that this depends upon the process and that the other system does not fully support the users' needs. Most of all, it was not developed together with the users is her explanation towards this. This reflection, I mean, is a regulatory process with an identified regulatory style.

Kate reflects on the team dynamics and how they have collaborated. She did not know "the language" from the start but has experienced that the developer group have listened and attempted to understand, asking when something has not been sufficiently clear. "It has been a great collaboration". I think this is an example of a fully integrated process well synthesized with self. The last exclamation also made me interpret this locus of causality as internal, making it intrinsically regulated.

Her role within the team has been to take in the opinions and needs for development from the users at her pre-schools. She has then discussed these with the rest of the user group, after which they decided together, which solutions they wanted to put on their list (i.e. requirement specification). They always discuss each suggestion and how to solve it together with the developer group, in cooperation. I have interpreted this example as an integrated regulation with an internal locus of causality. It gives evidence of awareness and synthesis with self, a well-internalized behavior.

That nothing happened during the procurement process, and the fact that they were not allowed to use or work on the FM made most of them feel powerless and even frustrated because they wanted to continue. Additionally the users in pre-school were asking what had happened and that they wanted to continue. Not only Kate but also the others in the team have reflected on this and they all give evidence of a perceived external locus of causality where they had no possibilities to influence the activity.

Bodil

When Bodil reflects upon her ordinary work and her mission at the pre-schools, which she is responsible for, she describes it in terms of "her mission". Her concern is development, both for others and herself. She has integrated it and it is in congruence with herself.

Group dynamics: it has been a small team; she thinks this has had importance to the project and also to the possibility to work within an informal structure. Bodil is convinced that Suzan is the reason for this success, her personality and her ability to "work around" problems. This example of conscious valuing and

identifying what is important to herself, places it in the continuum as an identified regulation close to becoming integrated. In my interpretation, I have only what is said to rely on, what was meant is not in evidence in an example, as such, which is why the perceived locus of causality becomes difficult to decide.

Mostly, when Bodil talks about the team, she refers to the smaller user group (i.e. herself, Suzan, and Kate). The developers are a counterpart or a partner. Suzan is the coordinating link in their group, and in the other group they have Håkan. She has fully synthesized that it is Håkan's heart and in some manner his own child. Also, this example is placed as an identified regulation, somewhat internal, but, not totally integrated with the self.

She describes the development process:

> *"It all started with us, the pre-school, in need for a tool that supports home-school communication. We then went to several presentations of expensive software solutions that didn't meet up with our demands. Kate had tested FM earlier and knowed that this was what she needed and wanted. So I looked at it too and it felt so simple and obvious".*

This is an example of how Bodil relates to the FM application in contrast to the other software that was presented at the time. She starts to engage in the project with, what I have interpreted, as a somewhat internal locus and identified regulatory processes. Later, when she had learnt more and had become more deeply engaged the regulation becomes integrated with the self. In some instances of the occurrences she even shows an intrinsically regulated behavior. An example is when she explains how she relates to the contributing and sharing of their results:

> *"If I walk on a path in the woods and later there are others that come and use my path, I look at it like this; the path will only get easier for me to walk on later. I don't mind if someone else is using my path. It doesn't cost me anything; I will walk this path anyway. That's how I look upon our software – we are all winning helping each other."*

Martin

Martin is a person who gave several evidences of a regulatory style of behavior that has become more internal over time. From the start he worked with assignments having an externally regulated style. Later he identifies what is of personal importance and when he entered Håkan's developer team at CompanyX, his examples become even more internally regulated. He talks about the FM as Håkan's baby reflecting upon his own relatedness as not being the same as it is for him. Feedback from users and the user group within the team gives him satisfaction and contributes to his motivation in an intrinsically regulated manner, "it is more personally related".

It has become important for Martin to master his tasks and to contribute and to share. He is proud of the impact the FM application has had at the municipality, which he relates to his contribution. Martin has also synthesized the huge difference he has experienced within other more formally structured projects compared to the FM project. He often reflects upon how things are done differently and how he prefers it to be.

Caroline

Having changed job, beginning to study, and now working with the developer group at CompanyX, gives Caroline high satisfaction. She describes her satisfaction from changing employment and now not having stomach pains every day before going to work, which she experienced at her earlier employment. This is an example of how she reflects and compares the externally regulatory processes that made her feel bad to the integrated and intrinsic processes she relates to now.

Her motivational behavior is mostly integrated but when it comes to her joy and happiness over learning new things every day, feeling satisfaction with her work, an intrinsically regulated behavior becomes evident.

Charlotte

Charlotte has a good insight into all software systems at her department, and what it is that needs to be done but a lack of time stops her from performing a good job she thinks. This situation is, for her, an unsatisfactory situation that she has little control over. She has identified what is personally important but she is still thwarted by externally regulated processes.

Charlotte has a different angle of approach towards the FM software. She experiences herself as being experienced but as hindering the project sometimes. Nevertheless, she feels competent and proud of what she is able to contribute. Competence is important to her and her relatedness towards the FM application and the project team is somewhat less related, she gives evidence of not belonging to the team in the same way as the others. She identifies this as being her role and contribution to the project, and describes it as a positive complementary contribution of competence.

Summing up: Analyzing the Research Findings

To analytically distinguish the ideal type specifications, presented in Chapter 2, I have made the following analysis. The ideal type specification of traditional IS and OSS development consisted of three parts: organizational structure, roles, and formal incentives.

Organizational structures

My analysis of organizational structure is built on occurrences in the empirical material that directly refers to the participants' respective organizations. The participants in the OSS development project come from two separate organizations with very different formal organizational structures, which contrast highly to the informal structure within the project organization. It is therefore important to separate these structures from each other.

Both organizations are experienced as being controlled and with rigid hierarchical internal structures. However, within their respective organizations, the participants experience a sense of autonomy on a personal level. A conclusion made in the analysis is that they experience autonomy with respect to their own work together with the absence of a controlling peer or above. They all, in one way or another, describe how they have created an "island of autonomy" within their organization.

Nevertheless, the rigid organizational structure has had a negative effect on the development process. This is mainly found in the examples on procurement processes at the municipality.

The internal structures in the OSS development project differ from their respective organizations but are affected and dependent on organizational demands. Economic incentives control much of what is to be developed. The user group uses a form of requirement specification that is used for ordering and prioritizing. But, what in the end is prioritized is a decentralized decision within the team. Moreover, the participants from the user organization are active users of the application, which gives them insights and competence to participate in these decisions. My analysis is built upon their internal structure within the project team being close to the community processes for the developing requirements, which is found in OSS.

Roles

Many of the occurrences in the material describe how roles are taken, not given within the team. I have interpreted this as the informal structure between the participants that allows them to participate on their own terms. This shows similarities with the OSS projects in which membership is fluid and keeps changing with time and needs. Still, all the participants are employed workers at their respective organizations. However, I found several occurrences that also showed how the participants often worked for free during their spare time.

In the ideal type of OSS, the user is also the programmer. The participants describe how the user group is never involved in the code development, as they do not possess the skill and thus it is natural to leave this to the developers within the team. In the developer organization, I found the creator of the code who described how he actually started developing the framework because he needed it in another context.

Incentives

I have found that participation was often initiated through their own choice or by being asked by a friend rather than by a superior. OSSs are said to be meritocracies where learning is an important incentive for participation. To be asked to participate in the project team appears to be an important factor for starting. This incentive later appears to evolve into a high grade of relatedness rather than for gaining reputation.

In my analysis I found many examples of intrinsically motivated behavior, which is often also found within many of the OSS communities. A common finding from the majority of the project team members was that there were several occurrences that gave evidence of similarities as to how OSS projects are organized.

One formal incentive for OSS is licensing in order to protect code from being converted to proprietary software. In the FM project the code is released as open source. My analysis shows that the developers understood and found this important while the user group from the beginning actually did not grasp its full significance. However, this has changed over time as the user group fully grasp its importance and have also found several advantages associated with it (e.g. other external developers adding on functionality without cost for the project).

Concluding remarks on findings in the analysis

I have used the analytical framework above to highlight findings on motivation with regards to participating in an OSS development project. I have found important factors promoting internalization of motivational behavior such as group dynamics and satisfaction. These factors were related to the locus of causality and regulatory processes.

I have analytically distinguished between ideal types of traditional IS with OSS development projects in relation to the FM project. The project is defined as an OSS development project and the code is released as open source. I have, however, found a rather formal organization working with requirement specifications. The project team is also organizationally divided into one user and one developer group. This is not by any formal demands but rather how they are connected to their respective main organization.

The analysis highlights several occurrences that provide evidence of a rather unusual internal structure and incentives found within the project team. The roles

and incentives for participation are closely linked with those identified in the ideal type of OSS. The result from the analysis shows that this is actually not an OSS project per definition, nor is it a traditional IS development project.

Finally, from the findings in chapter 6 and the analysis above I would like to highlight the following regulatory processes that I found as having influenced how the participants internalized and integrated values and behavioral regulations. These points will also be discussed in the next chapter.

- Team Dynamics and self-determined participation
- Experienced autonomy within the organizations
- Feedback from contribution and sharing
- Relatedness towards the team and the FM software

Chapter 8

DISCUSSION AND CONCLUSIONS

The purpose of this study was *to create a deeper understanding of motivational factors for participation in a loosely structured software development project* not to argue whether or not to use influences from OSS in IS development. My intention was to offer a possibility to draw some general suggestions as to how a software development project could be performed by identifying some of the events and conditions found in the empirical material. The analysis could provide new insights into how nontraditional software development has an impact on both the user and developers involved in the development process by providing the results of this case study. A better understanding of the different types of motivation for participation and the effects of social contextual conditions regarding our motivation could contribute to our understanding of their influence in practice. For this, it may be useful to sum up some of the findings presented in the analysis. The intention of this chapter is to conclude with a discussion of some of the research findings that I find to be important.

Team Dynamics and Self-determined Participation

The analysis highlights how a person might start an activity because of external regulations and later, over time, find support for intrinsically supportive properties. Or, starting with a high interest that is somewhat internally regulated, end up with losing interest in the activity (Ryan & Deci, 2000). Studies within SDT have shown how the general regulatory style of people does tend to become more internal over time and in relation to growing cognitive and ego capacities (Ryan & Deci, 2000). For instance, participants entering the team at a later stage soon

showed higher internally regulated behavior. They feel that they are related to the rest of the team and also towards the software. Moreover, they experience their participation to be self-selected and they feel a responsibility for their own contribution.

In the analysis it became clear that both groups considered their participation to be self-determined, i.e. by own choice or self-selected. The user group started to participate by their own choice mainly because they found it interesting and they needed a solution that worked for them. Roles are taken, not given, and each of them describes how they contributed with their own skills, which give them a feeling of satisfaction.

From the analysis we also learned that the participants, internally within the project team, regard themselves as two different groups with clear borders, i.e. the developers and the users. Part of the user group even describes itself as the "main team" responsible for the requirement specifications targeted for the developers. However, towards the FM software they joined forces and united as one group. All decisions were said to be made in cooperation within the team and when problems occurred, the group took a mutual responsibility. Furthermore, I found a centering around two key persons from the respective groups. All participants mentioned one or both of them as being essential to the success of the project. Most open source software projects are organized with a central person responsible for the project.

These findings thus highlight how the collaboration process follows the rather formal requirement specification principles. However, group dynamics, values and ethics are close to open source communities. The participants do more than is expected of them, through interest and joy, and they help each other whenever there is a need for this. They do not experience any borders between the two groups themselves. The result highlights common properties within the two groups' values and ethics that are close to the OSS values. The user group consists mainly of pedagogues, which has proved to be an important factor for the group dynamics and the result. They are used to work with problem-based solutions and in work development processes. Additionally, the developer group is used to working with non-traditional methods with influences from the open source community.

Experienced Autonomy within the Organizations

Deci and Ryan (1980) tied perceived locus of causality (PLOC) to people's need to feel autonomous, suggesting that "contextual events affect intrinsic motivation and the quality of functioning because they influence the extent to which people experience autonomy while engaged in an activity" (ibid.). SDT highlights how prior experiences and situational factors influence the continuum of self-determined motivation. I have, in the study, found evidence of autonomous behavior in both groups of participants. The developers had within their own organization created an area of autonomy where they choose for themselves how to solve a problem or what tools to use. The user group also worked rather freely, without supervision from peers or above. One contributing fact could be that they already had delegated responsibilities within their respective organizations. Furthermore, a common attitude found in the material was that the distinction between work hours and spare time was transparent. It was interesting to learn new things or to be able to do things at one's own pace or own choice.

Feedback from Contribution and Sharing

Participation in the FM development project may be perceived as participation though choice (i.e. self-determined), but, for a high level of intrinsic motivation people must experience satisfaction of the needs both for competence and autonomy (Ryan & Deci, 2000). Much of the findings from the analysis also show support for satisfaction of the need for competence as an effect of rewards, feedback, or other external events in accordance to SDT (ibid.).

For instance, the participants often describe the joy and satisfaction that they feel when they obtain positive feedback from users and at presentations. They all share this pride in having created something that became "useful for so many". The development project started in a small setting and solved a need for school-home communication in a simple way. Users became involved from the beginning and soon the open source project was an established fact. Raymond (1999) argues that the best hacks start out as personal solutions to the author's everyday problems, and are spread because the problem turns out to be typical for a large class of users. Findings show that the solution has had a large impact not only to the internal organization, but also to the surrounding. However, in OSS projects

the users are often also the developers of the code. In the FM project I have given an account of several occurrences that indicate a similar motivation – an urge to solve a problem and to fill a gap. In the studied context, the solution became to create a mixed team who were contributing with mixed skills in order to fill a need. Their incentives for participation have been to make the FM better and to share their competence because it was important to them and the positive feedback they received from it made them happy and gave them satisfaction.

The analysis also contributes with knowledge of some other impacts of this kind in relation to a hybrid project, which could have benefited from the attitudes and ethics that the participants contributed. This was, for example, found in an instance given by one of the developers. He described how they competed within the team to be the one that corrected the most errors reported through the mail log. All users of the application can also report errors via mail and system failure is automatically reported the same way. Competence and to learn more is an important factor for them. This was an incentive given to explain why they compete between themselves to be the one that succeeds in correcting the most errors. This lead to the fact that errors seldom stay uncorrected for long periods, and other errors are corrected "on the fly", just for fun and because someone just happened to find it. For instance, the analysis highlighted how one of the developers reflected over this as being extra beneficial for the municipality compared to a traditional customer relationship where this kind of process is, generally, strictly formal and has to go through several instances (and to be paid for). The developer highlights how, in this latter example, the customer seldom gets something extra other than what is reported or ordered.

Relatedness Towards the Team and the FM Software

In the material the participants often talk about the FM software as "our baby". The analysis highlighted several evidences of how they related not only to the software itself but also to "their team". In SDT this is called relatedness (Ryan & Deci, 2000). Hence, the theory of SDT becomes relevant in examining what goes on in such a process. Ryan and Deci (ibid., p. 64) suggest that together with support for autonomy and competence, "the groundwork for facilitating internalization is providing a sense of belongingness and connectedness to the persons, group, or culture disseminating a goal". Thus, the participants give several evidences of support for facilitating internalization.

Other Findings with Implication for Practice

A Hybrid project

The analysis highlights how the project team collaborates internally rather traditionally and with formal requirement specifications. For instance, the user representatives present a requirement specification, which is then discussed together in the larger team. Pros and cons concerning the suggestions are worked through and thereafter all suggestions are prioritized. Working according a formal customer – deliverer scenario is forced upon them because of the structure at their respective organizations. There is a budget to follow that also limits the development process. On the other hand, the atmosphere and communication within the team proved to be very informal during this collaboration process. Moreover, participation occurred by own choice and by joy. Additionally, due to the autonomous context the team has built an informal cross-organizational platform suitable for their need and demand.

This collaboration and composition of mixed teams revealed, in the analysis, a high degree of motivation, in which each person in the team counts and makes a difference. Findings, such as quick releases of new versions and feedback from bug correcting are not the only evidence of advantages, but also engagement and satisfaction above what is ordinarily shown from participation in collaboration.

OSS development is also emerging as an alternative approach in traditional IS development regarding how to develop large software systems (Scacchi, 2007). As a result, OSS development is thought to offer new kinds of practices, processes, community networking, and organizational forms to discover, observe, analyze, model and simulate (Scacchi, 2007). Raymond's bazaar-like concept sharpens the question of the open source community, by providing "hard evidence that it is often cheaper and more effective to recruit self-selected volunteers from the Internet than it is to manage buildings full of people who rather be doing something else" (Raymond, 1999). This can also act as an example with several parallels from the FM project. As the analysis showed, most user participants considered themselves to be self-selected. They started to participate by own choice mainly because they found it interesting and they needed a solution that worked for them.

Procurement procedures

As a contradiction to the positive effect of intrinsically supportive properties, stand the procurement procedures at the municipality. It appeared clearly in the analysis as an example of an externally regulated process that was found to be evident in every one of the participants. This seemed to be an external regulation that has been difficult for all participants to internalize. In the material I also found examples as to how they instead became alienated towards "the other system". Also, the fact that the procedure of procurement was forced upon them is an example of an external regulation that they found difficult offer any motivation. The participants appeared to find it hard to be motivated by the procedure, as their system "didn't cost anything". There were no license fees and almost no development costs to negotiate. Rather, it was discussed amongst the participants as to how the municipality ought to attempt to understand the positive effects that were implied by open source software, together with the impact it had. To be part of a larger vision, contribute to and obtain benefits from other contribution, for free. Also, to be able to cooperate with other municipalities thus sharing costs was a point they often made.

Concluding Remarks

The analysis highlights how support for relatedness and competence facilitates internalization and how support for autonomy additionally facilitates the integration of behavioral regulations in accordance with the findings in the area of SDT (Ryan & Deci, 2000). Ryan and Deci (ibid., p. 65) concludes: "When that occurs, people not only feel competent and related, but also self-determined, as they carry out extrinsically valued activities".

My thesis is based on a viewpoint of an interplay between motivation and participation that is reflected in several open source communities, which I find could also be of importance within traditional IS development. In doing so, I have placed IS development in a larger context and thus excluded some of the perspectives on participation that can be found within the Participatory Design

(PD) community. Participation is rather focused on the intrinsic power that motivation to participate can attain and the human striving for satisfaction of basic psychological needs (i.e. relatedness, competence, and autonomy). A well-known and investigated fact within behavioral science is that the traditional if-then-rewards (i.e. the higher the reward – the higher the performance) are terrible for creative tasks and do not work (Pink, 2009). A whole set of studies on motivation has shown that once the level is above rudimentary cognitive skills, extrinsic rewards do not work (Deci, 1971, 1972). Past a certain point, what really motivate people are intrinsic incentives such as: autonomy, mastery, and relatedness (Bitzer et al., 2004; Deci, 1971, 1972; McKeen et al., 1994; Ryan & Deci, 2000; 2005; 2008). Research guided by self-determination theory has had an ongoing concern with the issues relating to the conditions that foster versus undermine positive human potentials. My argumentation leans towards Ryan and Deci (2000; 2005; 2008) who argue that research on these conditions has both a theoretical import and practical significance because it can contribute, not only to formal knowledge of the causes of human behavior, but also to the design of social environments that optimize people's development, performance, and well-being. Consequently, my point of departure has been that we could find a potential model of explanation in the above argumentation to answer my research questions, and that this contributes to the IS research tradition by generalizing from the OSS development case in the study.

To raise questions about human motivation, how work is organized, and to better understand what motivates participation in OSS projects could improve or lend inspiration to software development processes in general. Research originating in various disciplines can shed considerable light on the OSS phenomenon (von Krogh & Spaeth, 2007). In contrast to the research on participative design projects (Iivari and Iivari (2006) previous empirical and theoretical research on OSS projects have had their focus on prestigious, visible OSS projects (Bitzer et al., 2004). Bitzer et el. (ibid.) stress the fact that a majority of OSS projects have rather emerged from non-prestigious, non-sensational and humble software problems than those of the larger and more prestigious. Literature is far from settled on the issue of participation. Von Krogh and Spaeth (2007) review selected research contributions regarding the OSS phenomenon from different fields and argue that a trans-disciplinary dialog is important. They have made an attempt to define some characteristics of the amount of research on the OSS phenomenon as: its impact, its transparency, theoretical tension arising from the phenomenon, communal reflexivity, and proximity between science and the phenomenon. "As open source software has shown, an important challenge of social science is to identify new theories and research designs to understand existing phenomena more efficiently and/or effectively" (von Krogh and Spaeth

(2007, p. 250). Also, fewer have examined the competition between proprietary and open source software (Bitzer, 2004). Bitzer (ibid.) even argues that OSS projects, developed by volunteer programmers, pose a threat of "creative destruction" to proprietary software producers. Nonetheless, the phenomenon of OSS is of great interest to many having a robust functioning in the marketplace together with its novel modes of operation posing exciting new questions regarding matters ranging from economics to the organization of work (von Krogh & von Hippel, 2003). Additionally, Ljungberg (2000) suggests that the most important influences that can be learnt from open source and to study further are: as a way of knowledge sharing; as a way of coordinating development projects; as a customer relationship model; as an organizational model; and as a business model. This thesis contributes with a focus on supportive social contextual conditions that enhance individuals' motivation to participate, and also encourages the need for further research on the OSS phenomenon and hybrid projects specifically.

Finally, the development process of the FM software has several similarities with traditional system development as presented in chapter 3, from pre-study, requirement specification to the implementation regulated by some agreement. But, it also gives an example with regards to how individuals create their own environment in which shared ethics and group dynamics play an important role. Examples are given that describe how they are motivated to engage, with a common goal, even though they no longer, formally, have to participate. At the municipality, the principles of procurement are, for this rather small project, shown to be a formal external regulation that has had a negative effect on the development process. Also, being employed at a larger IT company with internal demands regarding how development takes place, forced the programmers to work according a waterfall model. Additionally, the municipality has to formally order new functions, following a strict budget that can be transferred to requirement specifications.

Despite this formal structure, the analysis presented several evidences of an informal structure in which the project team members collaborate on the future development of the FM application. This informal structure has resulted in that, during the often long and biding period of procurement, the development process has continued without money or external demands. Participation became a "personal business". Another important informal benefit is that the source code is released under open source software license, which has led to that new functionality, versions and other add-ons always are included in the latest implementation at the municipality. In the pre-study reports the development process is referred to as a citizen-driven process. Moreover, the source code is released under GPL, which should make it an open source software development project. The analysis highlighted that this development project is an example of a

process with traits from both traditional IS and open source software development processes.

By answering the two research questions and by addressing the purpose of the study, the findings shed some light upon social context and individual differences, which support satisfaction of the basic needs and promote natural growth processes of intrinsically motivated behavior. Similarly, it contributes to the IS research by providing a deeper understanding of motivational factors for participation in a loosely structured software development project with implication for IS management.

Future Research

This research describes how motivation is created through interaction in a sociocultural environment. My study addresses social contextual conditions and events that either facilitate or forestall the process of internalization and integration of values and regulations in a hybrid scenario.

My research also opened up new questions with implication for IS management that require further exploration. I focused on a sociocultural interplay between motivation and participation. Another question that follows is how an individual's social practices[37] and basic principles affect motivation to participate. Additionally, it should be asked how environmental social practices and basic principles affect an individual's motivation to participate.

Moreover, the empirical material collected in this study can be used to evaluate according to new measures or to be hypothetically tested.

[37] "värdegrund" in Swedish which includes ethical conciderations of social practice

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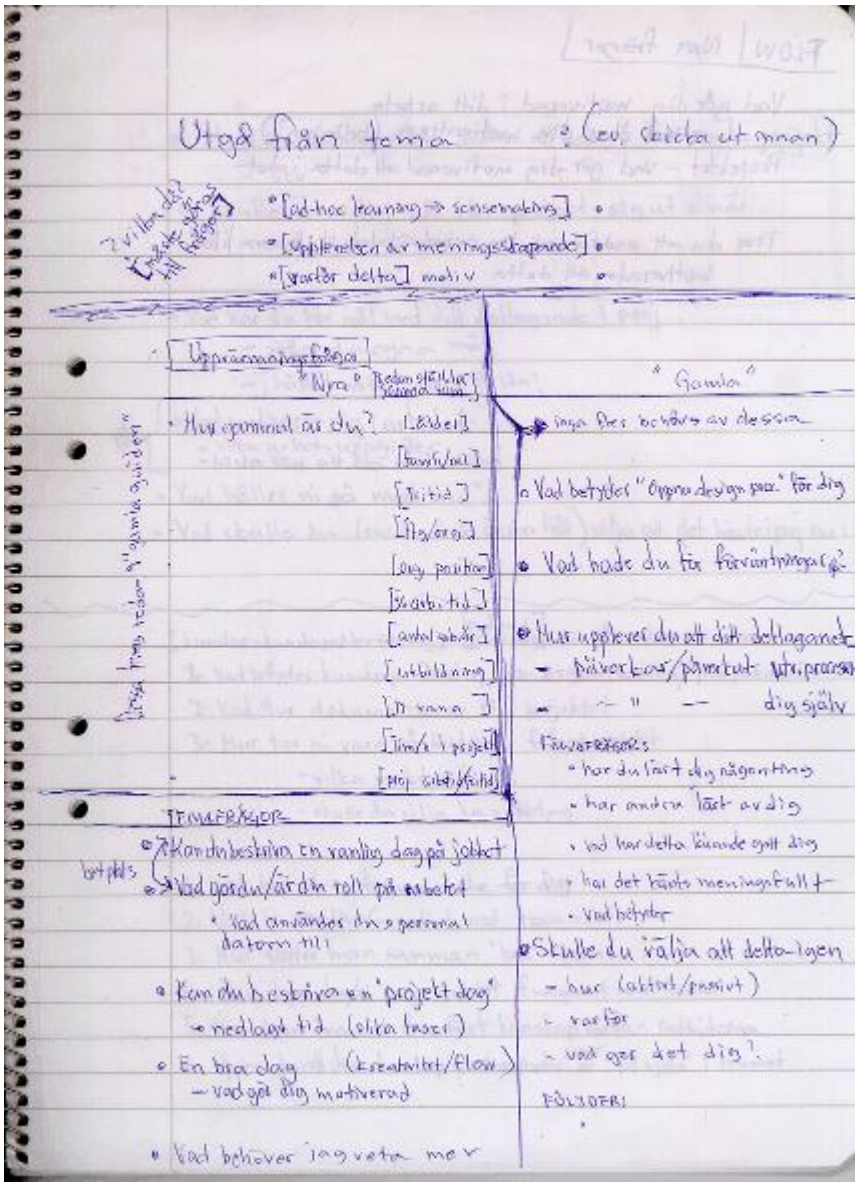
APPENDICES

Appendix 1: Interview guide 1
Appendix 2: Interview guide 2
Appendix 3: Timeline with milestones in the FM development process
Appendix 4: Analysis from interviews

- Table A1. Kate
- Table A2. Håkan
- Table A3. Martin
- Table A4. Caroline
- Table A5. Bodil
- Table A6. Suzan
- Table A7. Charlotte

Appendix 1: Interview guide #1 for single interviews



Appendix 2: Interview guide # 2 for single interviews

RESPONDENT (UTVECKLARGRUPP): NN		
LÅSTA DESIGNPROCESSER	***Notes***	***Egen reflektion***
(i) Tidigare erfarenheter av arbete med systemutveckling: *Hur har tidigare uppdrag presenterats för dig?* *Var du delaktig i verksamhetsanalys och kravspecifikation(när kom man in i processen)?*		
(ii) Hade man någon roll i relation till de systemen: *Tilldelades/tog du någon roll?* *Var den rollen formellt befäst på något sätt?*		
(iii) [Cooperative Learning Elements] *(1&2) Om någon i teamet misslyckas, hur reagerar teamet? Hur uppfattar du det? Vem ses som ansvarig/vem får lida?* *(3) Hur arbetar du helst med dina uppgifter i projektet? Arbetar du enskilt, arbetar du enskilt i gruppen, arbetar gruppen som en?* *(4)Hur upplever du att teamet hanterar, tillitsskapande, ledarskap, beslutsfattande, kommunikation, konflikthantering?* *(5)Vad upplever/tänker du att ni alla har nått (måluppfyllelse), har man uppnått målen, har man utvärderat processen, har man gjort de identifierade förändringarna?*		
ÖPPNA DESIGNPROCESSER		
(i) Tidigare erfarenheter av arbete med systemstöd: *Har det introducerats andra system i din arbetsvardag?* *Hur presenterades de (färdiga/under konstruktion)?*		
(ii) Hade man någon roll i relation till de systemen: *Tilldelades/tog du någon roll?* *Var den rollen formellt befäst på något sätt?*		
(iii) [Cooperative Learning Elements] *(1&2) Om någon i teamet misslyckas, hur reagerar teamet? Hur uppfattar du det? Vem ses som ansvarig/vem får lida?* *(3) Hur arbetar du helst med dina uppgifter i projektet? Arbetar du enskilt, arbetar du enskilt i gruppen, arbetar gruppen som en?* *(4)Hur upplever du att teamet hanterar, tillitsskapande, ledarskap, beslutsfattande, kommunikation, konflikthantering?* *(5)Vad upplever/tänker du att ni alla har nått (måluppfyllelse), har man uppnått målen, har man utvärderat processen, har man gjort de identifierade förändringarna?*		

RESPONDENT (ANVÄNDARGRUPP): NN		
LÅSTA DESIGNPROCESSER	***Notes***	***Egen Reflektion***
(i) Tidigare erfarenheter av arbete med systemstöd: *Har det introducerats andra system i din arbetsvardag?* *Hur presenterades de (färdiga/under konstruktion)?*		
(ii) Hade man någon roll i relation till de systemen: *Tilldelades/tog du någon roll?* *Var den rollen formellt befäst på något sätt?*		
(iii) [Cooperative Learning Elements] *(1&2) Om någon i teamet misslyckas, hur reagerar teamet? Hur uppfattar du det? Vem ses som ansvarig/vem får lida?* *(3) Hur arbetar du helst med dina uppgifter i projektet? Arbetar du enskilt, arbetar du enskilt i gruppen, arbetar gruppen som en?* *(4)Hur upplever du att teamet hanterar, tillitsskapande, ledarskap, beslutsfattande, kommunikation, konflikthantering?* *(5)Vad upplever/tänker du att ni alla har nått (måluppfyllelse), har man uppnått målen, har man utvärderat processen, har man gjort de identifierade förändringarna?*		
ÖPPNA DESIGNPROCESSER		
(i) Tidigare erfarenheter av arbete med systemstöd: *Har det introducerats andra system i din arbetsvardag?* *Hur presenterades de (färdiga/under konstruktion)?*		
(ii) Hade man någon roll i relation till de systemen: *Tilldelades/tog du någon roll?* *Var den rollen formellt befäst på något sätt?*		
(iii) [Cooperative Learning Elements] *(1&2) Om någon i teamet misslyckas, hur reagerar teamet? Hur uppfattar du det? Vem ses som ansvarig/vem får lida?* *(3) Hur arbetar du helst med dina uppgifter i projektet? Arbetar du enskilt, arbetar du enskilt i gruppen, arbetar gruppen som en?* *(4)Hur upplever du att teamet hanterar, tillitsskapande, ledarskap, beslutsfattande, kommunikation, konflikthantering?* *(5)Vad upplever/tänker du att ni alla har nått (måluppfyllelse), har man uppnått målen, har man utvärderat processen, har man gjort de identifierade förändringarna?*		

Appendix 3: Specification of the Development Timeline

Date	*Activity*	*Comment*
Late 2004	*Two pre-study reports (Nilsson and Sefyrin, 2005; Nilsson, 2005) are made by researchers at Mid Sweden University in Sundsvall*	*The Child Services and Education Office in the Municipality of Sundsvall asked Mid Sweden University (Miun) to do two reports based on their communication policy (passed 2004-04-28)*
January 2005	*The ECHOES project was launched.*	*A working-group for the development project was formed consisting of five representatives from Åkroken Science Park, the Child Service and Education Office, Municipality of Sundsvall and the CITIZYS Research Group at Miun.*
	A prototype for a web based communication platform is designed and developed.	*Two Miun bachelor students develop a prototype for the ECHOES project.*
May 2005	*The prototype is implemented for testing at one school in the municipality of Sundsvall.*	
Autumn 2005	*A private IT-consultant company is engaged for the implementation of the system.*	*The bachelor students graduated in May 2005 and begin to work at a local IT company that becomes a partner in the project.*
Late 2005	*The first version of FM is ready*	*This version is not publicly introduced but starts to spread and to be used at several pre-schools*
Spring 2006	*the system was introduced at seven schools and pre-schools in the municipality.*	
	e-service nominated for "Guldlänken"	*"The Golden Link", an award for the most valuable public e-service in Sweden.*
Autumn 2006	*Procurement process for a new IS at the municipality starts*	*This process continued for a longer period of time where no further development or dissemination was allowed until a decision was made.*
2006	*Denomination Good Practice Label by the EU*	*http://www.epractice.eu/cases/2068*
2007	*New version release is planned to late autumn 2007*	*A project team is put together with representatives from the municipality and the IT company.*

Autumn 2007	*Another private IT-consultant company is engaged.*	*As the students got new employment the support followed the creators to their new company.*
Late 2008	*A decision is made to implement FM at all municipal pre-schools in Sundsvall.*	*Now the project gets legitimate and also holds a budget.*
April 2009	*Dragon Open Source Foundation is established*	*Stakeholders of the triple helix initiated their work with an Open Source Foundation*
Sept 2009	*FM version 2.0 is released.*	
Late 2009	*Other municipalities implement FM*	*The application spreads and is installed at more municipalities in Sweden.*
	Finland implement FM	*The finish part of Open Kvarken develops a fi/sv translation*
2010	*More functionality is added to FM through Open Kvarken. Installations at additionally swedish municipalities.*	
July 2010	*Nordic Peak is established the 21 july 2010.*	*Two of the core developers start a new company. According to earlier agreement the support of FM remains with the IT company. The two developers are not allowed to work with FM for the rest of the year.*
Jan 2011	*Nordic Peak takes over the support of FM*	*After a new procurement period at the municipality the support goes to Nordic Peak, a local IT company.*

Appendix 4: Analysis from Interviews

Table A1: Interviews with Kate

(My translation)

Amotivation	Extrinsic Motivation				Intrinsic Motivation	
	External	Introjected	Identified	Integrated		
	7		3, 17	2, 9, 10, 16, 25, 26	6,8,12,21,22,24	**Relatedness**
			3	1, 9, 13, 16, 20	4, 6, 8, 12, 19, 22, 27	**Competence**
	7			5	3, 4, 11, 15, 18, 21	**Autonomy**

1	*Then, we are supposed to develop practice and to inspire others. I am happy to have so many good pedagogues in my practices. I learn myself as much as they do, which also feels inspirational.* *Keywords: learning, mastery, inspiration; integrated*	*C*
2	*I love to contribute with development of our practice. So much is happening, and I might not be needed in the future, which feels good but still, I want to belong.* *Keywords: contribution, belonging; integrated*	*R*
3	*(Kate reflects on earlier work and how her knowledge from this has been useful within current practice). Meeting with people, looking at their needs and to guide them. But, wanted more, changed practice and started to study, (which Kate never have regretted).* *Keywords: learning, own choice*	*R* *C* *A*
4	*Working hours and spare time interact, they are transparent. I have never been a person that draws this kind of lines. There are so many benefits from being able to sit at home and think and to organize. To do things when I have time, with nobody that interrupts, and I can practice (emphasis)!* *Keywords: transparent working hours, by own choice, learning*	*A* *C*
5	*Kate does not remember if she actually was asked to participate in the project. She*	*A*

	thinks she was automatically included and asked to participate when she enlisted to engage in procurement, "and after that everything just rolled on". *Keywords: by own choice, interest*	
6	*What I think is so funny with FM is that is aimed for the pre-school. There has been a shortage of tools, and we are always put last in line. So, when something like this comes up you get all fired up. You really want it to be something good. And now when it has spread, it becomes even more fun. We can expand and contribute to, and share our experience without any costs.* *Keywords: fun, aimed for, contribute, share*	*C* *R*
7	*During the procurement we looked at X (another proprietary software solution) but they had very little knowledge about pre-school practice. They said – we don't have this, or it doesn't exist. You will get "this" they said, while we said – we don't need "this", we need that. The answer was "well you will have it anyway". It was school based software, and we are working with groups, not individuals.* *Keywords: alienation, negative feedback, bad communication* *My interpretation: concerns only how Kate related or not towards the system and the representatives from the company.*	*R* *A*
8	*Therefore (referring to the incident described above #7), it felt very good to have been involved in the development of FM and to have influence in the process. It has been good to test solutions (prototypes), it becomes more close to practice. What is most satisfying with the process is that I actually can see my own facets, which I have brought with me from my collegium, being implemented. There is always a dialogue of what we want and what they are able to implement.* *Keywords: involvement, influence, contribution, feedback, communication* *My interpretation: relates to how Kate interacts in the developments process, not how NN relates to the system.*	*R* *C* *A*
9	*We have had a really good cooperation. I don't understand "the language" (referring to the more technical developer language) so to say, but I have been able to explain with <u>my</u> everyday language, and they have embraced it. For example being asked "did you imagine it like this".* *I have not always understood everything; actually, sometimes I hoped and told myself "he must have meant this". But, I think we <u>all</u> (said with emphasis) have learnt from each other in this process.* *Keywords: cooperation, communication, feedback, learning*	*C* *R*
10	*I think it was important for us, in the beginning, to have regular meetings where we met face to face. If we had started with having meetings only when we needed to, I don't think it had become such a success. Needs might not have been advanced. If people are forced to meet things happen!* *Keywords: face to face communication*	*R*
11	*NN is my closest executive, and then there is … (gives account for others in the hierarchy.) I feel I always can get in contact with them if I need to, but I seldom do. I feel I have NN's fullest confidence concerning the work I do with FM.* *Keywords: autonomy, confidence*	*A*
12	*NN is going to get some new task assignments: It will be fun to stay with the project and see what happens with "our baby". It will also be interesting with new,*	*R* *C*

	different tasks, it will broaden my horizon. This will give me different feedback and different forms of communication. We also had a student who interviewed the parents; this will also give us a new and different angle of our work. *Keywords: new tasks, fun, related, broaden competence, feedback, communication*	
13	*Before I worked with FM, I had never met with or know about any other "system", never even thought about it. I have learned so much about fonts and colors, and specifically the data security law. All this knowledge is new for me. Moreover, the fear from adults and parents how to handle this has been an interesting challenge to handle.* *Keywords: knowledge, mastery or challenge*	*C*
14	*It's easier for me to engage in the system. Because it is <u>my</u> information that has to be distributed. But, it also becomes easier for the teachers to send out <u>their</u> information; it influences their work situation to. Moreover, this process restores much of the responsibility to the parents, they now have all the information they need, and we don't have to support them with it anymore.* *Keywords: communication, responsibility.* *My interpretation: Kate relates to a new situation where parents are more involved than before, i.e. a new form of relation of power.*	*R*
15	*I don't have to participate at all. I am surely not participating because I have to, it is <u>totally</u> by free will.* *Keywords: participation, by own choice*	*A*
16	*I have learnt a lot about developmental of society. Pre-schools also have to participate in this, but in our own way, not just getting ready made solutions, but participate in development. The system origins from our context. It has been tuff to realize what we actually wanted in the beginning and testing and using prototypes has worked well. And, most of all – cooperation. We meet, we walk parallel, together. It is not something we get, no, we help out. It is active. Active!* *Keywords: learned, participate, development, prototype*	*R* *C*
17	*The process is ongoing. We develop. We want to go further, to develop more. One never knows where this is going to end. Now we are /.../ I don't se any end, it is rather my own or the groups limits that could be the end that I can se.* *Keywords: ongoing process, limitations* *My interpretation: traces of conscious valuing place it under an identified regulation.*	*R*
18	*When nothing happened (referring to a procurement period) suddenly my users (i.e. staff and parents at one of the pre-schools) wanted so much more and did not want to wait. Kate gives example on a blog that was started.* *Keywords: wanted more, don't wait*	*R* *A*
19	*I do believe that you always should jump on the train from the beginning. Things aren't so readymade; you are allowed to make mistakes and to search for good solutions. (Kate compares this process with one of the other proprietary systems she uses (invoicing) where she is not the least motivated to search for new ways or experiment. She then takes the easiest way out and does not sit and figure out in the same manner as with the FM where she often looks for new functionalities).* *Keywords: motivation to master a task*	*C*

20	*You looking at this and us (referring to my study) is also a stimulator, it deepens our knowledge. It's very exciting; it makes you feel the importance of it all! It also becomes a learning process for us, more grounded than just our own experiences.* *Keywords: feeling of importance, learning*	*C*
21	*Kate describes how she and Suzan held presentations of FM at different pre-schools in the area. The purpose was to inform, train, and to help the staff how to use the system. This activity was done by their own choice because it was needed.* *Keywords: compare with other system, voluntary, own choice*	*R* *A*
22	*We have a very open climate in our team. When we sit down together, one gets all fired up and just fling out a thought so to say and … yes, it is very open and permitting.* *Keywords: open climate, team*	*R* *C*
23	*Yes, we have our disagreements sometimes, but it never is no big deal. It never leads to any conflicts or anything.* *Keywords: communication, collaboration, roles*	*R*
24	*Describe a "good project"* *Well, then I would say, my way, that I think that this kind of project with this dialogue and the possibility to reflect, test, see, and to improve. I don't really understand how they (referring to the decision makers at the municipality who promotes proprietary systems) were thinking during the procurement, how they could be so narrow. It is important to be involved, and to have possibilities to affect, to be participate of and to understand more than when it comes a readymade product that we have to use.* *Keywords: project, process, relatedness to process* *My interpretation: I have looked how Kate relates to the project and the process and how they have worked.*	*R*
25	*Being a small group you becomes related to everyone, which also makes it easier to continue and to take on from where we stopped last time you met. The size of the group … and also, I think that prestige is less important when you have this open climate. I think we have a creative, permissive group with many ideas.* *Keywords: small group, close relationship, security, creativity*	*R*
26	*The origin of the project was to support communication and Suzan was there from the beginning, together with those who initiated it. Mostly, it so "just in time" and the pre-school is also those who meet the "new parents" first. Parents of today have a different and new way to communicate.* *Keywords: new ways to communicate, "in time"* *My interpretation: I give this as an example of how Kate relates to the importance and impact the project has had towards its users.*	*R*
27	*Regarding the result and the process:* *I think that Suzan has influenced a lot how the development has been able to continue. Because when it becomes controlled one really does not have any say.* *Keywords: communication, feedback* *My interpretation: is related to how feedback and communication is perceived.*	*C*

Table A2: Interview with Håkan

(My translation)

Amotivation	Extrinsic Motivation				Intrinsic Motivation	
	External	Introjected	Identified	Integrated		
	15b	5	3, 13c	12, 13b, 15a, 19, 21, 24	7, 8, 13a, 16, 20, 22, 25	**Relatedness**
	15b	14	13c	1, 13b, 15a, 24	8, 9, 10, 11, 13a, 16, 17, 20, 25	**Competence**
	15b	5, 14	2, 3, 4, 13c	6, 13b	9, 13a, 18, 22, 25	**Autonomy**

1	*Sees himself as creative, likes to construct and to solve problems.* *Keywords: creative, problem solving* *My interpretation: it is hard to place this under a specific regulation. I have chosen to place the statement as a well-integrated regulation.*	*C*
2	*FM was his bachelor dissertation. It was not what he actually wanted to do; he and a friend had a company where they wanted to do a project for pay rather than FM. After some persuasion from supervisor, they took on the project and it "became something".* *Keywords: participation* *My interpretation: is that this choice was not completely by his own heart but, later became synthesized with his self.*	*A*
3	*I work in a large foreign concern. I am the consultant at the lowest in the pyramid. Have around 15 managers above me, but they are all in London. Locally, we only have one regional manager who never gets involved in our work. After a deal is signed we have no contact with the manager. NN then becomes responsible for the process and the project (implementation, quality, planning, budget, and costumer relations).*	*R* *A*

	Keywords: role, autonomy; Identified *My interpretation: is that he identifies and relates to his responsibilities. It is ok but …*	
4	*Håkan's role has changed since he started at the company. Now, he is responsible for several projects and is also responsible for how they are performed.* *Keywords: change, role, work process* *My interpretation: Håkan has been able to change some (not all that he wants to) work related processes to become more satisfactory. His own work contribution is highly autonomous.*	*A*
5	*It was a tricky situation. After the bachelor thesis we worked for Company X and thought that things would start to happen. But, the company showed to not understand the principles of selling and what open source meant. They wanted to draw up price models and … so, we felt that this wasn't so good.* *Keywords: non-related, organization, no choice; introjected*	*R* *A*
6	*We finished the project and had the municipality as customer. Then we said stop and explained that we no longer wanted to work according to their principles. We split and I started to work at another company and FM followed me to them.* *Keywords: networking, organization, choice* *My interpretation: my focus has been on the action to change company. This indicates an integrated behavior to gain freedom and choice or actions.*	*A*
7	*The project came to a halt during the procurement for almost one and a half year before it came alive again. It was horrible; they had a server with no backup or administration. They phoned me sometimes and I helped out, of the record so to say. I felt a responsibility towards them; after all it was <u>my</u> project. I didn't like to see it go down the drain, so I kept it floating.* *Keywords: reputation, good will, costumer relations* *My interpretation: this example has a high degree of relatedness and bears many traces of intrinsically motivated behavior.*	*R*
8	*At company X, we have an administration that sells hours. In our team we use a lot of open source software tools and frameworks. Therefore, other projects (like FM) can benefit from solutions developed within other projects. Sometimes they don't even notices that they have got more and sometimes we tell about the news. They know about this evolution, and maybe they also expect it to be there now that they know about it. This adds value to their application.* *Keywords: contribution, tacit improvements, surplus value, common framework, add-ons;* *My interpretation: an example of community contribution, contribution to others which add value to the code and good will to themselves. It gives them satisfaction.*	*R* *C*
9	*My boss has little insight in how we perform our jobs. She knows we deliver in time … I could use Perl as well as Java and she would not care about how I solved it. I sort of break this trend; I take responsibility for what I am doing.* *Keywords: autonomy, responsibility, promoting factors* *My interpretation: The company does not care how or if they contribute (i.e. lack of interest or knowledge), if they even know about it. NN is satisfied to use his own competence and to be responsible for what he does.*	*A* *C*

10	*"Happy customers – happy coworkers", this is a simple equation!* *Keywords: satisfaction; intrinsic* *My interpretation: this satisfaction is a kind of rewards to NN*	*C*
11	*Java is in its syntax grateful but clearly it's visible in the code. We all aim at the same target. The code should be good and clean. However, the coders' amount of experience varies. The code should be well organized.* *Have you always felt like this?* *No, in the beginning it was all trial and error. I improvised. I made all ASCII-based games. At the time I didn't even know what code formatting was. At college I discovered more, like indentation. It has improved and is still improving. "**It should be nice and clean**" (28.31). Follows the conventions for uniform Java coding. Self-documenting code. It has become something of an ethic in the Java community. "if you don't, the screen will, like, slap you in the face" (29.25).* *Keywords: clean code*	*C*
12	*Most of the code is licensed under GPL which has been useful. Otherwise we should probably have seen proprietary versions of this today. There are many that have been "in" and looked at the code. There are also other projects with other licenses. Why we chose GPL was because there were many actors that have been involved and contributed to it. That's why we didn't choose LGPL. Everyone should trust this. No one should be able to take it all and make it their own. Everyone contributed, who is there to owe? We all get the same set of game rules, that is – it's a strategic decision.* *Keywords: contribution, trust, licensing; integrated* *My interpretation: this is an example of an activity that Håkan can integrate with his self. The choice is still somewhat controlled why I chose not to plot it as an intrinsic factor.*	*R*
13 a *13 b* *13 c*	*How was the project introduced to you?* *Well, I would define three different kind of projects. The ones you do <u>by your own at home</u> where you take the initiative because it is something you would like to do, need, or it is just a good idea.* *Keywords: by own choice, for own purpose; intrinsic* *Then there are the open source projects that I do, they are often introduced by … they are seldom presented as – now we are going to do something good through this, a thing like that or … <u>The goal is rather the "thing"</u>.* *Keywords: purpose, goal, own choice; integrated* *Then there are the commercial projects, they can be completely … they can have any focus whatsoever.* *Keywords: any focus, not by own choice; identified* *These are the three kinds of introductions I would say I have met, which represents three different approaches. Am I going to do something myself, I do it because I personally likes and I know I am good at, or because I need something. Then there is no discussion, open source is best for when we do things and we wants it to be good. There is no discussion about that.* *Keywords: choice, DYI, result, can do, need*	*A* *C* *R* *R* *C* *A* *R* *A*

	My interpretation: in this example NN gives three different views on participation and projects.	
14	*Yes, at the time it was more "sit here, do this". Then there was not much to influence, but rather just: "do this piece of the jigsaw". And then it was just do it. Well, the commercial part... At CompanyX that was huge. When we finished there, we felt that for consulting companies, what you did was not really important. It was for an hourly fee and we coded Java or C++, whatever was chosen had less importance. Rather "There is this 2000 hour project, go and do". And most often that is what is in focus of a commercial project. It's more like, at least from a consulting company's point of view, which is my main experience, it's only about the hours.* *Keywords: pressure, no choice, limiting factor; introjected* *My interpretation: an example of no own choice, low degree of job satisfaction, a high degree of pressure and control. I chose to classify it as an introjected motivator rather than an external as NN's reflection indicates some internalization.*	*A* *C*
15 a	*(Describe different kind of projects you have worked with.)* *I have met customers who have collected a team of people with different skills and where you all work together towards a common and visual goal. Not so strict borders, we helped each other and our competence overlapped.* *Keywords: competence driven participation; integrated*	*R* *C*
15 b	*Then I have worked in much closed projects. I would say that they are very ineffective. Each person was supposed to do only his own work, no overlapping at all. (He gives several examples of situations when he sat waiting for someone else to do his part, not being allowed to help, which was experienced as extremely frustrating).* *Keywords: strict roles, rigid organizations, for pay, dissatisfaction, limitations; external* *My interpretation: these examples compare two rather controlled project types. The last example is interesting as NN can't take it in, he can't internalize it.*	*A* *C* *R*
16	*Yes I see what you mean. I think I'm special in this case. I am social individual but [when] I solve problems I like to really socialize with everybody involved, really have the grasp on what I am supposed to do. I really want to investigate and include all parameters there are. And then I want to know that these are the pieces I have. At that point, I just want to shut myself in inside a chamber and just think. Because I am the kind of person that doesn't start to program before I have thought things through. And then, when I start to think that I have it all solved [click], then I sit down and most often just write the code from the start to the finish. So I believe I'm sort of special, but that is how I most often.. I socialize until I get the picture.* *Keywords: socialization, work style; intrinsic* *My interpretation: here I found a high grade of reflection of "the self" and how and what is the ultimate work style.*	*R* *A*
17	*No there are [both kinds] of projects that did not reach their goals, and I guess it's both, all, kinds. But I think I see in the cases where I've had more free projects, there are more goodwill from the engaged people, from their engagement. These projects are definitely differently driven.*	*C*

	Keywords: job satisfaction, good will, rewards; integrated *My interpretation: I chose to focus on NN's example on the good projects, satisfaction.*	
18	*Well yes, we have one (???) it has been ongoing. However not, there are more municipalities which uses it as well so there it is in addition to (???). So, the development has continued* ***in a much higher pace now that we switched companies and then there is no need for [counting] the hours*** *but rather we feel that it should exist, so we fix.* *[twice]* *Keywords: new company, contribution*	*A*
19	*The users were our sounding board, but we were developers. We had to deliver something at first. Then we had this insecure procurement period. Everything went quiet and we didn't know what would happen when the municipality acted like that. We were new at the business that time, our first assignment. But, it still spired, it did not disappear as one could have thought, it spired. We understood there was hope after all and we thought that, ok, let's reconsider and pick up where we left of. At this time I and Monica were fighting for it to survive and it started to generate some results. I now worked at company X and asked Camilla and later Mattias to contribute, it was very informal and when it was needed.* *Keywords: hope, new start* *My interpretation: an example of a high level of relatedness, but it is still externally controlled*	*R*
20	*You regard the relationship as a customer relationship?* *I would not use the term customer, it is so emotionally charged. I would say they are a part of the team. (He describes how they work and interact as a greater team with frequent communication; each group contributes with their own skills). All feedback is welcome and contributes to the result and the process of making the system better. Everyone wants to do improve it. Then, we have Monica and her group of experienced pedagogues; they have a unique ability to understand the reality. While we, the developers, knows about the most common pitfalls and what to watch out for. But together we work towards a common goal! Everyone contributes with what he or she is good at and wants to.* *Have I understood right? You have different roles based on what your contribution is?* *Competence! We contribute with competence.* *Keywords: roles, relationship, feedback; integrated relatedness, intrinsic competence* *My interpretation: The relationships with others are examples of integration while the attitude towards feedback to enhance the system is intrinsically motivated behavior.*	*R* *C*
21	*Mistakes? How do you react within the team?* *We have a very open dialogue about everything. Nothing is really wrong, if someone thought or understood wrong, we kind of have a dialogue where we can say – well, this was maybe not so god, but if we do like this instead … We welcome a dialogue about things. You go back and redo, there are no such things as – oh no, now I screwed things up. Such stupidities do not exist here!* *I would say that within this project we are very goal driven, it is an iterative*	*R*

	process. The result is what counts for. (NN then reflects over how different they work at his company) *If someone makes a mistake?* *B. Well, you are, I would like to state that you have, since it's such an open dialogue about everything, I'd like to state that you have a rather forgiving atmosphere. Like it doesn't matter. It's like always, it's never wrong to say this [it didn't turn out the way we intended to]. It's allowed to say this an d then it's easy to also carry on the discussion: OK this was not very good, maybe we should do like this instead. That question is always very welcome, so it's not intimidating at all. It happens that that when doing one something, and then, well this wasn't really like this, then you just do a restart, it's natural. It's not like, oh no, there he blew it, let's shut him out. Such stupidities are not in the game.* *B. It is my point of view in this project, that we have always had a really, what to say... The end, the end result is what's important and it's like the process [iterative]. It is given that you check that you are on the right track at the first try. It is somewhat building. That's the process we work with. If we are working with projects like [rup or something] going down the drain, but you haven't planned to do thing over four times. Then its' more like, then you have, then it is (???). This is not how work is done here but... Yes, but we were supposed to make this component and it was like triangular, but maybe it should have been pentagonal. It's not much to make fuzz about: oh so it is triangular, well then we must do something about it. And that is like what I believe...* *Keywords: process, result oriented, communication; integrated* *My interpretation: an example of good relationship between participants.*	
22	*B. Well, that's purely how you have gone through things together. We have, like Monica and me, we ran this for a very long time, and we are still running it. Then it becomes natural that people, we work very close so it's like just working and then it becomes into this... Mattias came along and Caroline came along, it turns into closeness. But you are allowed to work freely so there's no obligation to work together.* *Keywords: relationship, close communication, freedom; integrated*	*R* *A*
23	*B. No, I think that this process has been found interesting by so many because that it is unique. Partly, the project is rather small, it's like possible to concretely [see all] involved [and understand them]. And [that's how] we've done it. I think it's pretty unique, I don't think anyone has pinpointed that.* *Keywords: unique, small project; integrated*	*R*
24	*B. Yes, I think the best system is to include the user, and share clear goals. We are to provide a means to this end. We have the end-user onboard and all interested parties are there and all are like equals. This is what we should do. I also think that when you work towards... yes, when you work towards a solution that it should be good, rather than other things should matter like there is nothing that can restrain the potential of the solution, if you put it like that., That is what I think is the best [system]. That is how we try to work [at Nordic Peak]. We see the client in*	*R* *C*

	most cases, we discuss the business, not only what we need, but also what they need. Then we try to transform it to a technical [gadget] that they can look at and see if that was what they needed. And when you are equals, I think it's optimal. *Keywords: cooperation, communication, satisfaction, customer relations; integrated*	
25	*A day at work is only 40% coding, the rest is administration. Thereof comes my motivation to code when I come home.* *Keyword: satisfaction, coding, motivation; intrinsic* *My interpretation: NN's motivation to code on his spare time comes from a need within.*	*R* *C* *A*

Table A3: Interview with Martin

(My translation)

Amotivation	Extrinsic Motivation				Intrinsic Motivation	
	External	Introjected	Identified	Integrated		
			1, 2	3 → 5, 6, 12, 16, 18	9, 20, 21	**Relatedness**
	8		1, 2. 17a	3 → 5, 15, 16, 18	4, 7, 9, 10, 19, 21	**Competence**
			1, 2	12, 14, 17b	3, 9, 13, 20	**Autonomy**

1	*Do you create a border? Working/spare time?* *It depends on what you are doing. If I do something, that might be useful at work, maybe it should be looked upon as work. If the time is motivated, then he registers it as working time.* *Keywords: spare time versus work hours, contribution; introjected?* *My interpretation: traces of ego involvement*	*A*
2	*Then you check how the system looks, has something occurred (mail-logging, now he refers to FM). There is mail-logging of pure errors. Then you check the agenda. What we have to do right now (development, items of the maintenance that ought to be done) and then you put check marks on them. We synchronize the tasks between each other's (there are priorities). If the schedule is tough, maybe there is someone else that can relieve things. Such are the days, they pass. Sometimes there are more urgent things. Perhaps, then you have to put lower priority stuff aside.* *Keywords: practice, pressure, priorities; identified* *My interpretation: this example includes all three factors, how he relates to others in the work flow and also his own priorities and how he can master a task. It is externally pressured but conscious valuing.*	*R* *C* *A*
3	*Yes, I must say that I got in immediately; I have to tell I did. I've also been part of*	*R*

	*the later revision's development. All the way, I guess. You look at it, maybe not as much like Robert, it has become his **baby**, and I think it's become mine as well. Especially when you see... you get good **feedback**. There's seldom anything else. I don't know if it's the kind of **people and systems**. You get good feedback. It's more **personal**. In fact, I have spent time on FM that I haven't chalked up as working time. Some parts have not been motivating (chargeable) and we may not have been able to charge. We have to show that the hours we spend generate revenue. Anyway, at times I have felt like I've done that.* *Keywords: ownership, feedback, relatedness with others, personally, for free; integrated/intrinsic* *My interpretation: this example contrasts to #1 where he does not contribute in his spare time. But, FM is not one of his ordinary projects and he relates very differently towards this project. I have found it easier to define autonomy as intrinsic in the statement as the other two, why I chose to put them in between integrated and intrinsic.*	*C* *A*
4	*It is a fun project "just this that people are so happy" (19.14). You feel that you **contribute**, and that it is being **used**. S municipality has 5000 users. It affects so many, so you can aid in doing something better.* *Keywords: contribution, useful, satisfaction; intrinsic* *My interpretation: he is satisfied to se how his contribution is used and gets rewarded through positive feedback from others, inherent satisfaction*	*C*
5	*More on the level of giving feedback to an open source project that they are using the tools of. Find bugs, that's what I do. And you get response from their side. Nothing strange, there.* *Dragon open source foundation... talks about forum (is a member). People are writing there (he regularily checks it). We have people living in Umeå and they write in the forum and I'm there and replies.* *Keywords: contribution, membership, participation; integrated* *My interpretation: he contributes to the community when he for example finds bugs in the code or knows the answer to questions on the forum.*	*R* *C*
6	*Most days are really good, but then there are days that don't turn out quite the way you planned (today, planned doing stuff, but other things came in between). Feels very content with this profession. I could clearly envision myself doing more projects like FM. It's some kind of fun development. You deal with funnier things (comparing another system with computations). Prefers the kind of development that is in FM.* *But if I should choose between FM and another customer-owned project (and not open source) then I would choose FM.* *B. No I don't think so... that... this specific project is so fantastically fun and I think it depends a bit on the kind of users. I think that it is a bit different if you do an administrative system, like for... for a few people, now it's like... now it's so many that are using this. So I believe much it also... that is, you know it's so darn appreciated.*	*R*

	Keywords: practice; integrated *My interpretation: a reflection over what type of project he prefers where he relates moreto FM, there is a congruence*	
7	*There is seldom a reflection upon that... But specifically these bits, where other people becomes content and happy. When it relieves like e.g. in FM. All the pedagogues, when it aids in their work. The development around FM (S municipality), they who decide what should be developed; they are the users, like pedagogues, parents. Monica carries out investigations concerning what's bad and what's good, what would you like to have. "You know when it has come to Monica, and then to a requirements spec. and then to an order, then we know that what is being developed is something that the users really need" (33.28). Mainly the pedagogues, it aids in their work, but the parents extract even more from FM. If you carry out work and others appreciate it and are content then I feel a personal satisfaction "and motivation" (with emphasis). That's it: motivation! It really becomes a motivator. If we look back. Motivator, it is just that. Furthermore, we know that if we develop something we are doing, I know that the users... that it is being used. If I develop something and I know no one would use anything – then I know I don't like it.* *Keywords: contribution, usefulness, work satisfaction, motivation; intrinsic* *My interpretation: a reflection over how his competence comes to use.*	*C*
8	*I have had a smaller project once, at that time it was like that... (talking about a development project)... (37.37). That project was developed but wasn't used. They haven't even installed it. That doesn't feel good, I spent two weeks. But at the same time, in that case it was enough that I got wages. Their motivation on why they have [not] installed it was a blunder in the requirements. They didn't specify in what environment it was meant to run (we had full freedom of chice, we develop in Java). But their environment was totally .Net-based, their environmental policy dictated that there were no exceptions allowed. ...MH reasons and explains why he today feels that is OK – but he still thinks it to a bit sour, because in fact it [the result] was good, and they were content [with the result].* *Keywords: dissatisfaction, feedback; external* *My interpretation: this example shows on dissatisfaction when his competence does not come to use and contrasts #8. He had to do it (no choice) also, he was satisfied with his result but it was never used (negative reward/feedback).*	*C*
9	*It (giving an example of the development of the new revision) added up even in my spare time. That was during a period of two months. You are supposed to keep track of it. Hard, in your spare time you don't do that.* ***I don't even reflect over how much it is****. However, that is what I must do "sitting in this chair" (the office). We keep books over our time with codes and you must think carefully about which account to put the time in (43.44). In the chair at home, there you don't have to think about the time spent. It feels pretty good. In this "home chair" you can go on doing other stuff. What you choose to work on at home is mostly "going with the flow, what you are currently dealing with". If you haven't solved something at the time you leave work. Issues you've thought about for a long time, they tag along. Sometimes it is sufficient to eat dinner, and then you've cracked it. A break may*	*R* *C* *A*

	make a difference. It's not a conscious choice; it just "stays around". *Keywords: contribution, endorsement of behaviors, mastering a task; intrinsic* *My interpretation: when he is personally involved or interested, time does not matter, he contributes by own choice and interest.*	
10	*I have spoken mostly of the municipality of S, **but actually there are soo many more that benefit from it**. Anyone can participate (refer here to the principles of open source). Now, everyone can be a part of it!* *Yea, yeah, this is because it is open source that ... and in the case of FM anoyone can download the code and make it their own and ...* *Keywords: contribution, contextual; intrinsic* *My interpretation: this example shows how he relates his contribution also in a wider context and how he has endorsed the OSS context.*	*R*
11	*B. To learn this has always been one of my goals. To educate one self is one thing, to start working another. My goal is to develop as much as possible.* *I. Why?* *B. Several resons. It's fun to lear about new things and it is fun to become very good at certaing parts. If one compare with sport, there it is always a question of getting better and better at things. You **need** to get better in order to keep up or else all the others will catch up with yoy. I don't regard what I am doing as a competition as in sport but in this business one really has to get better all the time just to catsh up, keep one self á jour.* *One wants to develop. I know that others are satisfied with wath they got For me it is at the same time my interest too what I do at work, and having them both – it overlapps. Actually, if you only do it at work, then you will not be able to catch up with all the new stuff!* *Keywords: learning, fun, mastery, development; intrinsic* *My interpretation: learning and mastering are in focus here. It is important for him to learn and to develop his competence.*	*C*
12	*B. I have never perceived it as we ever have displayed publically in any way. Rather ... at least, I mean them – the ones I worked with were **really good/nice people** to have around. Actually, I still believe this (laughter). I mean, everyone is human and are allowed to make mistakes, it stays on that level sort of.* *B. If I have worked with a certain solution and I have made a mistake well, then I have to fix it because the mistake was on me. It becomes natural; I am the one who have coded it and therefore I outhgt to be the one who knows the code the best I guess.* *B. No one gets punished but one maybe ought **to punish one self** at these occasions ... it's in a way to put certain demands to yourself and to feel that one should not have missed that.* *Keywords: group dynamics, communication, reflection, responsibility, punishment;* *My interpretation: he reflects his own role in the group and how responsibilities where divided or experienced (tacit).*	*R* *A*
13	*B. I think I am best suited for **working alone within the group** I would say. You **delegate** the tasks and then you **take your part** and work on it. Then when you are ready, then you check what to do next.* *B. You always give feedback to the group on the process. In this group we have*	*A*

	continuous balancing so that no one is stuck. I think we have an allowing and benevolent climate, you can always ask someone in the group for help. You never know if the others have the same opinion but it is very easy to just pop the question anyway, it does not matter that we might have different oppinions, it's giving. *Keywords: group dynamics, work practices, cooperation, feedback; intrinsic* *My interpretation: an example that describes how the group divides tasks between them and is personally responsible.*	
14	*B. Yes, he (refer to Håkan's role as group leader) was designated to be … sort of the leader of the group and to be the one who pulled the wires. But he is not that kind of leader who tells "now you must do this and that-NOW", no he askes which part we are interested in taking and so on.* *Keywords: roles, relations; integrated* *My interpretation: compared to #13 this example describes the relationship in the developer organization (not FM). Possibilities for own choice is still rather low.*	*A*
15	*B. in an early stage there was no actual continuous evaluation. It happens sometimes that you have developed something and after installation discovers that "this was not such a good solution sor the users", the users begins to make errors because of us not having built in logic or usability. Sometimes we are becoming rather limited as developers. That's why I like to work closely together with the users!* *B. I don't believe that I got so very much negative feedback, I'm not sure if this is me … I must do well or the customer moght not dare to tell differently (laughs).* *Keyword: reflection, evaluation, feedback; integrated* *My interpretation: after implementation he experiences a higher grade of feedback and reflection within the FM project.*	*C*
16	*B. Yes, sure … but in my spare time I mostly work and develop open source … which I also did before.* *Aa. So, you developed and contributed before you engaged in FM so to say?* *B. Yes, but not extensively, it rather evolved after I started to work at the CompanyX and got more involved in the FM project. After that it took a further step in that direction.* *B. We have a continuous development around our main tool eclipse, one can not see this as a finished product. You discover daily bugs and inconsistensies which we contribute to report.* *Keywords: personal development, contribution, own choice; integrated* *My interpretation: this reflection describes his personal development regarding OSS.*	*R* *C*
17a *17b*	*[Compares traditional projects to FM]* *B. I would say that with this one it's harder to make errors … when you develop FM than if I compare with the work I did for (the project X). In that project I had to know more about the organization and contextual structures, it was more* ***complex****. Of course I have to* ***understand*** *the context and organizational demands concerning pree-schools too, but it is so much easier to grasp and to ask.* *B.In this other project we actually had more freedom and had to come up with suggestions. In FM everyone already knows what they need and wants. It's the opposite one could say. At the same time we have to come upp with the soulutions, how to solve and to implement their wishes. That's why we use prototyping, so we*	*C* *A*

	can show them … we can do it like this or we can do it like that … soo they understands what we have done and we understand what they meant. *Keywords: competence, organizational differences, knowledge, valuing, importance to self; identified* *My interpretation: he is consciously valuing his own knowledge as input in different projects and where responsibility was situated.*	
18	*B. We have already discussed the other alternative modes of work styles, and compared to working alone I would prefer to work in a group. To work completely on your own … I rather work in group, juggling ideas with others. Otherwise one might have made a solutionhalfway through that does not work all the way, instead of discover it in an early stage.* *Keywords: participation; integrated* *My interpretation: this example reflects how relatedness to a group supports participation and contribution.*	*R* *C*
19	*B. Well, yes regarding the FM … there was actually little followup … they (refer to the user group) made one, it was not even we at CompanyX, but the municipality themselves made an enquiry amongst parents and staff about their attitudes towards the FM application. It was great fun for us developers to take part in what the users thought about it. This ought to be done all the time after implementation I believe; to check how the users experience it as this is what is all about.* *B. The enquiry resulted mostly in that everyone wanted more so to say. Much has been implemented today, not only by us. So one could say that the users got what they wanted and more.* *Keywords: evaluation, feedback from users; intrinsic* *My interpretation: en example on how he evaluates the feedback from users as being personally importance.*	*C*
20	*B. The personal engagement one meet in the FM project. We discussed it earlier, it is more profound in this kind of development than the traditional. I would never do work in my spare time if it wasn't for this personal engagement. As with the work on the project-X I told you about, it was only a traditional project at the CompanyX. The customer paid but did not engage at all in the process. They just bought a solution no one actuall cared.* *I believe if they had been as fired up about their solution as the participants in the FM project one might find it motivating to work on the solutions also on ones spare time, to burn for.* *Keywords: engagement, contribution, self selected, relatedness; intrinsic* *My interpretation: personal engagement and own choice is important in this example.*	*R* *A*
21	*B. If you have worked with a traditional administrative system it often does not reflects over if it is a good well done system or not. The user just uses it without reflecting – "well it is my tool, it has to be good". I believe the key to success and to my satisfaction is that we actually gets this feedback and and appretiation. You get to know about how you made peoples work days easier and so on.* *Keywords: contribution, feedback; intrinsic* *My interpretation: an example on the importance of positive feedback*	*R* *C*

Table A4: Interviews with Caroline

(My translation)

Amotivation	Extrinsic Motivation				Intrinsic Motivation	
	External	Introjected	Identified	Integrated		
				5	3, 4, 6	Relatedness
				2, 4	1, 6	Competence
				7		Autonomy

1	*I would like to work with web design, I still do. I regard the design parts to be more fun, so when I can choose I choose these. That is, the visual part, the part one meets, that is what I like the most. The design should be pure and simple, easy to understand. It ought not "blip and blop" and not too much information at once, I like to divide it.* *Keywords: feel competent, satisfaction; intrinsic* *My interpretation: how she sees her competence in general*	*C*
2	*I started to work with the application "pensiostorm", for my bachelor thesis, which was built on the FM framework. I developed a website. This was my first encounter with the FM. I then finished with my exam and later got employed at the CompanyX as developer. I then got involved in the development of the FM application version 2.0. I began with rewrite the basic foundation for FM and after that we all helped out eith the rest. Technically, I believe I have worked with the more simple parts.* *Keywords: contribution; identified* *My interpretation: she relates to her contribution to FM, low.*	*C*
3	*For the moment nothing is done in the project. Earlier there were more work to be done, I sometimes check the logfiles. Moreover, in the beginning much work was done at my spare time, I had to learn. Still, I have to learn so I do a lot at home. I live to learn and develop.* *Compared when I worked at the hospital. Well, at the beginning I sometimes felt that it was fun, but in the end I never felt that. This work is huge difference! I*	*R* *C*

	experience satisfaction everyday. Now, I don't go home feeling bad everyday. To change job is the best thing I ever have done! *Keywords: learning, joy, satisfaction; intrinsic* *My interpretation: she describes a high level of job satisfaction and compares it with her earlier work*	
4	*If I have ideas that pop up I often play with them at home. I have found something that is really what I love to do. I don't work at home everyday and of cource there are differences between the projects I am involved in. I prefer the ones who include new thinking; I want to go forward, to do good things for the users.* *The FM application is really something that I would have loved to have when my own children attended pre-school. I am rather forgetful with pen and paper, one have access to the computer all the day and night if you need.* *Keywords: contributes, interest, forward, relate;* *My interpretation: an example of contribution by own choice and joy of learning. She also relates to the software (FM) on a personal plane*	*R* *C*
5	*An advantage is that you share (refer to code). Maybe it's because I am a "beginner" and doesn't have any relation to "my code". For me it feels natural to share everything. I can't see any disadvantages with that.* *Keywords: contribution;* *My interpretation: she reflects as sharing was a natural state of mind and that it always should be like this. Intrinsically behavior.*	*R*
6	*Aa. Imagine a perfect day.* *B. I believe I have this feeling now and then (with emphasis). You are asking the wrong person (laughs).* *Everything is still so new and exiting so I'm having fun all the time. One example could be when things are solved faster and better that expected, I believe I can experience the feeling of flow then.* *Keywords: satisfaction, joy, mastery;*	*C*
7	*If I had to choose, I would choose projects like FM, absolutely. I would take <u>all</u> the design parts (laugh). They are few. In the FM application there was someone else who took this parts.I only created them, I didn't descide their look. I prefer making the design from scratch. We have other projects that are built on the FM framework too. In these projects I am allowed to do all design my self. Actually it still is the same code. But, at home I try do some projects on my own where I descide everything.* *Keywords: controlled contribution, own decisions; integrated* *My interpretation: she prefers a situation where she can decide herself about design issues.*	*A*

Table A5: Interviews with Bodil

(My translation)

Amotivation	Extrinsic Motivation				Intrinsic Motivation	
	External	Introjected	Identified	Integrated		
	16, 22		10, 15	1, 4, 5, 6,7, 17, 18a, 19, 21	8, 9, 11, 13	**Relatedness**
			3	5, 6,7, 17, 20	2, 12, 13, 18b	**Competence**
				5, 14	13	**Autonomy**

1	*Of importance, for her participation in the FM project (said with emphasis) is her own grandchildren in pre-school. She has experienced her own children using FM as a communication tool. She understood how young parents of today take the access to and use of communication tools for granted, and that they expected it to be provided for. "Therefore it is our duty to provide for it whether we like it or not!"* *B. Actually, I have already thought of this. I thought about what a revolution this actually is. It shows on … younger and elder pedagogue … all the resistance and fear there was from the beginning about having to communicate or to give information this way (refer to the implemenatation of the app. FM).* *B. The younger generation … my own son inspired me very much. I mean, your thoughts are influenced by the context you are living in and what one carries with her. So, when you live in close relation with the younger generation you tend to act in new ways, getting involved in a completely different manner and understand things from this perspective. The necessity … yes …* *Keywords: incentive for participation; integrated*	*R*
2	*Bodil gives an example of when she was given a touch job: "It was a hard school, years of hard work and bad sleep. But, I hope that maybe I did some good as well". She likes hard work, prefers it to be challenging. "Otherwise nothing happens. It should be just a little too much. One should have to swim hard to reach above the*	*C*

	surface". She gets a kick from "having to do, to have a little pressure on me". To accomplish, and to be satisfied with the accomplishment. *Keywords: challenges, expectations, needs; intrinsic* *My interpretation: an example of search for optimal feeling of flow (well-being).*	
3	*And that's what happened after that assignment at the next reorganization, I chose for myself. Or maybe not, I choose peace and quiet. Had then gotten increased responsibility in another area. A sweet little village that have everything and know everything. Very Fascinating. But then I don't feel like I'm as useful. You feel like everything's so good already. It's not as rewarding,it's not as close to what I want. I will work with tougher things again sometime in the future. But I'm content. That's where I am at the moment. But I've had some other assignments during this time (like FM).* *Keywords: less challenging; identified*	*C*
4	*The first thing I remember about FM was when I went out interviewing those who had tried it for awhile. When I asked "what's been bad?" it was quiet for a really long time. No one said anything that had been bad; the only negative was that it had been too little. It could have been more developed (the reason that nothing had been delivered during the procurement where the stagnation process). Reflects that it means that it's good when the user can't think of any downsides. It's based on users.* *Keywords: reflection; integrated*	*R*
5	*(Answers questions about her spare time):* *I can't say I use that much spare time. Having a manager agreement I work 24-, it's difficult to divide between things. I login, check what's on and so on, I don't use IT more than anything else.* *Bodil doesn't regard herself as being a driving spirit concerning application development. Rather, she regards her engagement as a* ***self-evident part*** *of her employment.She is engaged in her work to support the customer."I think about this all the time, this is what the parent's want,* ***their right to get it****".They demand to get information this way. If I see good example I spread it.* *Keywords: freedom of choice, customer relations; integrated* *My interpretation: examples of autonomous possibilities for planning and work. Also example of how she relates to the users of FM, and how she contributes to the development process as a part of her employment.*	*R* *C* *A*
6	*Tell me about a day with the project:* *We sit down and reflect in a good way. (she thinks their working method suits them well). We sit around the table checking wht is done and what is not. At this point we put forward what we have attracted from our pre-schools (refer to comments from both parents and staff). We discuss and value what is to be implemented, what are we going to continue using, how are we using it (refer to functions withing the software). Maybe there is stuff that should not be there or needs to be reengineered. Priorities. We often get stuch there. For example, I and Kate often have opposite oppinions about prioritizing and it can become really funny. I think she is very talented and have a good mind on oppinions, but still, we have different styles in thinking. I believe she and her employes works more intense with this while I mostly work more breadthways.* *Keywords: work practices, reflected competences; integrated*	*R* *C*

	My interpretation: reflects a view on interaction of competences within group participation and her own contribution.	
7	*We like to think that we base it on the users, and also the teachers. We've always wanted it to be user friendly and therefore not so time consuming. Time has been the biggest issue with the teachers, you/they don't have the resources and equipment. Therefore the focus is on simplicity and that requests have been met quickly. It's meant that you will notice that things get done if you say something, that's when you get stimulated.* *Keywords: target group, purpose, enhanced stimulation; integrated* *My interpretation: relates to "who is the target group" and the purpose of the project (implies her own participation)*	*R* *C*
8	*I think this is fantastic. You pick up a web based program that <u>doesn't cost anything</u> (emphasis). You can co-operation with the municipality or university. Just pick the functions you need and it can work in so many different contexts/situations. You can't put a price tag on this. It's far superior the bought programs.* *Reflects over the difference between user-development and commercial development. Should study profits and life-time, how many users.* *Other programs also sell, but there it's more about the developers taking care of their baby than making money. There's a common spirit in this way of working.* *That you can turn something that's built up one way into so many different branches.* *Keywords: no cost, multi functional, valuing impact, spirit; intrinsic* *My interpretation: relates to the system and the impact it have had, and can have in the future to, being built as open source.*	*R*
9	*Of course we could look at it like if we have put so much time into it, couldn't you also put in some effort and pay some money and contribute to it. But why not use it as it is, it doesn't matter. If others want this stuff you hope that they add something to it as well, the need to develop it for themselves.* *It doesn't get more expensive for us as a municipality if someone else uses it. I feel like this:"If I make a path in the forest and others walk it after me, it will only be easier to walk it later". It's ok that it is easier for them to walk, it doesn't cost me anything. I will use that path later anyway.* *Keywords: own contribution, external contribution;* *My interpretation: relates to the open source software and how it can be shared with others*	*R*
10	*(I have earlier got to know that there might be a conflict in access to the resource FM between the public pre-schools at the municipality and the private or cooperative owned schools. Therefore I brought the conversation towards this topic):* *No, they are not allowed to use it (in a very joking voice, laughing). No I can't say I think they are not supposed to … it doesn't matter actually (refer to "walking on the path"). I believe there are a lot of engaged pedagogues there who could contribute with good things and solutions. But the again, my own engagement in this is different depending on who I am cooperating with. I have a comprehensive view regarding the municipality where I would contribute with marketing and information also for free.This I would never give away to our rivals, I would not give away my time to them.*	*R*

	Aa: Who are the rivals/contestants? *B. The private pre-schools (she laughs). They are rather a complement. (During the rest of the conversation it shows that they talk "with each other" but they don't cooperate).I would never invite them to participate if it costs me (refer to her budget) more, but they are allowed to use it. My assignment does <u>not</u> include supporting them.* *Keywords: rivalry, sharing, participation; identified* *My interpretation: relates to how anyone can use FM for free (e.g. #10). <u>But</u>, has a restriction when it comes to give away her own time or effort, especially if there is a cost attached, to others outside her assignment at the municipality.*	
11	*Most important is that she's been a part of the development and she is proud of it. It's fun to help bringing it up where it doesn't go so fast. Blames the parents, wants to pop the bubbles. When others get it better we also get it better.* *Keywords: importance, participation, goal; intrinsic* *My interpretation: important to have participated, feels proud of her contribution. Both in development and implementation.*	*C*
12	*Feels content when something that's been in a stalemate has been solved. When someone that's been stuck gets a kick. As a principal that's when I get personnel to feel really successful at their job. When it grows happiness. When I in a group of teachers hear an happy individual who feels successful-"that gives me wings"(It shows that the greatest satisfaction is when others feel good).* *She has brought this from associationism and tells about a orienteering contest when no litter were left because everybody really helped to clean. That makes her delighted. If you only have the joy and the will you can overcome any obstacle. It's easy to say that you don't have time, don't have computers.... (she is well aware of...)* *Keywords: satisfaction; intrinsic* *My interpretation: an example of a high level of job satisfaction.*	*C*
13	*Bodil mentions once again Kate and how different they are in a positive manner: We are very different as person which I believe nitrifies our cooperation. You verve, it makes things happen and one can creatively continue to work. When attitudes are non prestigious, then you are allowed to have different oppinions. This is a good mode. You are allowed to look at things from different angels. It is not equality and super well-being, it is differences and inspiration.* *Keywords: complementary differences, creativity, prestigeless, inspiration; intrinsic* *My interpretation: she relates to how differences between members of the team contribute to the process <u>and</u> work climate as an example of an optimal work situation.*	*R* *C*
14	*Nothing that showed up (concerning the implementation of FM) has been real resistance, it has more to do with fear or that you don't want to. But there is always someone at each unit that is interested in going forward with this. We pass the obstacles. It might be from the management, but we can walk around that since we have the parents that expects and requests that it exists.* *Keywords: managing problems; integrated* *My interpretation: an example of how they are free to work around problems and solves them as they come during the process.*	*A*

15	*A. Do you have anything you would like to highlight or tip me on?* *B. The management! How much do they know about us and or project? How much do they care about this? Our development project has not aroused much fuss.* *And also - the absence of managerial control!* *Keywords: management engagement; identified* *My interpretation: an example of her reflection towards how the management has been absent during the development process.*	*R*
16	*B.I had never been involved in this kind of development project before this, where we had had any influence in any way. As user one gets involved using other systems at the office, but without any influence what so ever. Well, they say we have influence and want us to reflect upon our experiences – which I am realy bad at. If something is wrong I complain and grudge but I don't do anything, I hope that someone else will solve it for ur because I am not that interested.* *Well, I refer to our administrative applications (e.g. salary and economy) and of corse I have used a couple of applications over the years. I'm the kind of user that run the application and doesn't understand anything, closes it, and then waits for someone else to react and to solve the problem, that is, if it really wasn't of great importance and could wait. For example, like it is for the moment with the new invoice application. It is really problematic and doesn't work properly. My respect for it is not high why it doesn't become very important for me. But, if an invoice is due, then I have to check it up so it is payed. And now we have a new system again! Just when I got it to work with the first one ... But, there is no problem until you make it one.* *Keywords: relatedness to other systems, participation, influence; external* *My interpretation: an example of she relates to other systems where she as a user has no influence, and thus are not engaged in.*	*R*
17	*This is completely different, in this case I question every ... moment and why, and what consequences there could be, from my own angle as a user, and from the angle of the parents ... so I think both ways. I test the system how it works for the parents and how it looks if I do or present information in a specific way. I take a dualistic viewpoint.* *Keywords: engagement, relatedness to FM; integrated* *My interpretation: relates to FM on a different level than to the "other" systems used within the municipality and how she can add to it.*	*R* *C*
18a	*Aa.(Desctibing their respective roles in the project team):* *B. Well, you take on a role ... by yourself. In this group we take on our own roles. We are not more people in the group than ... we are asked ... what you think, and then we bandy out questions and difficulties together. But in the same way we become a role of course. I feel that in a way I have had a balancing role in the group. That is, when "my" areas of interest comes up, I balance them, and if they weigh towards eachother I reflect over which one to prioritice first or argument between.* *At this point, I like to listen to the others and like to argue the opposite. I use my method of work, that is to state the opposite. "I hear what you say but I don't agree". Sometimes it become really stupid and then we realize that "this is the way to solve this, it's so much better – well then we do it like that". Opponent, this is*	*R*

b	*what I could be called.* *Aa, Do you mean that you act like "devil's advocate"?* *B. Absolutely! That's my name (laughs).* *Aa. Why do you do like this?* *B. That's my method! I work like this. Often but not all the time, it depends on the occasion, but quite often.* *Keywords: role, team work, method; integrated/intrinsic* *My interpretation: an example of how she sees her own role and competences within a group.*	*C*
19	*Aa. (talking about internal responsibilities and group dynamics) But, isn't that a common responsibility?* *B. Yes, it has been and it <u>is</u> common responsibility, and I think … now I am talking about me, Kate, and Suzan because it is like **we are the ones** who had met mostly. So, in this group we are three pedagogues who are used to work in team and with team development together with Håkan who is used to work with processes. So we work like this, it is our style. That's maybe no one ever going to back stab the other. That doesn't exist, no!* *Even if someone thinks one or the other is more or less active or passive, or fails or not, then … then there is the filosofi behind that … why didn't I react before rather that why didn't he do this or that. No, you think – gosh, why did we miss that … we should have noticed and if we didn't – bah! This is how we work.* *Keywords: group definition, responsibilities, group dynamics; integrated* *My interpretation: reflects on group responsibilities and also defines "who is in the group".*	*R*
20	*B. My way of working (method) is to listen and to feel. I bring with me my experiences from the area to the development process to the meetings with this team. The only work I do on my own is when I collect oppinions and results. Suzan always knows about everything because someone hs emailed her about it earlier.* *B.Actually, come to think about it I work on my own all the time. I am the manager out there in the reality, holding my tentkles out to listen and to ask while I try to attract everything. Then when I return to the team an measures … I hear this but I see this I would say. How can I put this together?* *Aa. Is this the way you prefer, together with the group?* *B.Yes, absolutely. There is nobody who ever told me to work this way, on the contrary, I have got credit for working like this – that is why I continue in doing it.* *Keywords: method, participation; integrated* *My interpretation:*	*C*
21	*No, I never thought about this as a project in that manner, we just wanted to do … we really wanted to have this (refer to the FM) and we wanted to prove how good it was and the use we have had.* *Keywords: tacid* *? identified*	*R*
22	*Aa. The larger companies? But also they could have done a simple system?* *B. <u>No</u>! (said with explamation)* *Aa. Could they not make a good solution for you?* *B. Well you see, they were not interested in us, they didn't meet up at all. After at least one of them came up to us at a fare (they had a demonstration of FM at this*	*R*

	fare) and showed some understanding. "We didn't understand that it was this simple solution you needed". *B. It could have been soo easy for them to understand … maybe too easy.* *We asked simple enough questions to answer. It ought to be simple for them to understand, but they didn't meet us halfway. They didn't want to understand how simple it was. I think it had to do with their not knowing that there are people who actually know what they want, they only have to listen. I experience their faith and believe in others is low.* *That's why we want to showe that we can do what no one else could do.Everyone can do today. Exept for me (she jokes) I'm not so used, but the next generation they do!* *Keywords: no feedback, alienation ; external* *My interpretation: en example of the high grade of alienation that they have felt towards "the other" software provider.*	

Table A6: Interviews with Suzan

(My translation)

Amotivation	Extrinsic Motivation				Intrinsic Motivation	
	External	Introjected	Identified	Integrated		
				3, 6, 7, 8	1, 2, 5, 11, 12, 15, 16	Relatedness
				3, 10	4, 5, 13, 14	Competence
	10 ->				9	Autonomy

Comment: Suzan often describe how she relate to everyone else and less about how her and her role. She always promotes "all the others".

1	*B. From the beginning … I did not work at this department, now I got responsibility for our Intranet. Before I spent a lot of time visiting pre-schools and schools. Håkan and I together and afterword … then it took about 40% of my time. But after that it has become self-acting.* *B. For me, there is almost nothing that … now we have Anders who take the first line of support. My work is mostly to disseminate and attend conferences and meetings. Recently we were at the Älvsjö fare; it was "**super fun**". Everyone thought it was extremely interesting and good. A lot of other municipalities liked it very much - it was **great fun**.* *Keywords: dissemination, satisfaction;*	*R*
2	*Spare time?* *B. None, I love my job why I use it to keep up and scan my surrounding world. Well, it's private but in the same time I learn new things myself. I believe that's because I always think about what could be useful at work. One could say this includes the FM and the intranet.* *Keywords: transparent working hours*	*R*
3	*Suzan describes the tim line of the FM project and the first prototype:* *B. I built it together with NN, who was my superior at the time … out of the needs*	*R* *C*

	we understood the parents at our pre-schools had. And, then of cource we had to take care of our staff (refers to the differences in computer skills). Everything had to be as simple as possible for them because, we did nt want it to imply any extra time or effort for using the system.Simplicity! It should be easy enough to grasp what and how to do things within the application. That was our main goal. *I was introduced in the process being responsible for information and content at our web portal at the municipality.* *We started with me giving feedback and working with the usability. I contributed with thoughts and comments and then I was invited to the next meeting, and the next … and after this it continued and I wanted to participate all the time.* *Keywords: endorsement of others needs, own competence as input*	
4	*(discusses open design processes)* *B. I never heard of open source before NN told me about it … I had no idea, but now I only see the advantages with it. This is what has made it happen and I really like when we develop something concurrently with user needs. That is what motivates me in this process.* *B. And I have learnt so very very much. I knew most about our pre-school context before so … but, to work with Håkan, NN and … well, everyone has made me learn so much more than before. For example, the positive effects of sharing our result, I had never worked with open source before. I think it is unbelievably good! I even have influenced my present superior to understand and to like these pronciples, and she really loves it.* *Keywords: learning,*	*C*
5	*B. And I believe what drives me in this is when you experience the joy from everyone else when they get what they need or aksed for. And to have been able to give it to them. Or, when you succeed in convincing them that this is something useful for you. Their needs is what drives me and when I succeed in creating something useful for them – then it is wonderful and fun* *Aa. But, if you focus on yourself, what do you gain, you personally?* *B. The joy from everyone, to be useful to them!* *Keywords: incentive, satisfaction, users need, joy* *My interpretation: the joy from others*	*R* *C*
6	*One more thing that I think is the point and advantage with all this, it's cooperation, networking with <u>other</u> municipalities, you know. And, that cooperation together with Mid sweden University and all sorts of other, authorities and enterprises, occurs. This is a huge matter, this doesn't occur otherwise when you acquire a commercial software for example, then there is no cooperation.* *Keywords: communication, external partners*	*R*
7	*B. Nowadays, I am often out promoting and talking to other municipalities about our intranet to, and we have now a unique collaboration with our IT sevice department. And they also have close communication with Håkand and his group, soo … it works better now. More communication cross-organizations.* *B. We often work in group together with IT service and there descides on, and discusses user needs and demands. Out of these descissions we then make a requirement specification on how we want it done and then discuss this with IT service that brings it up with the provider. We buy it soo to say… but it costs and yes we buy. I believe this is what makes this unique.*	*R*

	Keywords: internal communication, cooperation; integrated	
8	*(discusses standard systems and impressionableness)* *B. Somewhat, but much has been readymade and not negotiable. I participate sometimes in the developergroup, which has been important as I am the one who is meeting our users and it is very important that they are satisfied. Othervise everything becomes wrong.* *Keywords: user satisfaction;* *My interpretation: relates to a mission to satisfy the user/customer*	*R*
9	*B. A lot changed after NN quited as my superior, FM was no longer on the agenda. But then, after a while, I started up the project again. We had no superior so when the procurement procedure started, I took it as my own responsibility to start it up again.* *But we still had no contract with any provider … we used Håkan's living room one could say, where we had our server.* *(Despite organizational changes ...)* *B. We were supposed to get new job assignments, everything turned up side down. Everyone seemed to argue that my department, communication and marketing, should have anything to do with system maintainance, which I could agree with. This implies that we have bandyd the topic out several times.But, because this was such a success, my superior wanted us to keep the FM as it helps us market the municipality of Sundsvall very much. That is why I still have the role as system administrator.* *Keywords: by own choice, organization, changes, ownership; intrinsic* *My interpretation: en example that shows a high grade of autonomous behavior, by own choice*	*A*
10	*B. I have not had the time I could wish for the FM, I ought to document much much more and better, which I have not done.* *Keywords: pressure, time limits, desire; integrated; external/introjected* *My interpretation: example of how time limits and pressure to do other tasks interfere with a persons desires to perform better and to be satisfied with her achievements.*	*C* *A*
11	*(talking about team dynamics)* *We have never, ever had any conflicts within our team and according to my opinion, we like each other as individuals.* *Keywords: personal relations;* *My interpretation: they relate to each other also on a personal plane.*	*R*
12	*B. A thought I would like put forward is the engagement. The engagement within the team is very different, you never get the feeling that Håkan or Martin is only there for the money, which they ought to be. You never, ever get this feeling, they even turn up for important presentations, supporting me and help to answer difficult questions from the auditorium – they do this without getting paid (said with exclamation). They are a part of the FM, you understand – the FM, it is something very special.* *B. Moreover, this really makes me feel secure. For example, when I had this big presentation at the city hall, it was about 200 persons there, and then Håkan and his group were there, sitting listening. It felt comfortable to have them there*	*R*

	answering difficult questions I couldn't answer – this happened a couple of times and it felt great. Then, I also had Kate and Bodil who sat up front with encouraging glances all the time. Yes, it is a super group! *Keywords: group relatedness, own choice; intrinsic* *My interpretation: they also relate to each other in the larger group, and help out on there spare time, by choice and interest.*	
13	*When I had web based enquires for both staff and parents we got really, <u>really many</u> answers. And from these, amongst others, we got answers concerning each function in FM, every module, and what they wanted us to improve. Then, we took these view points of what they wanted to be improved to be presented at the 2.0 release. This felt really good. Now they had got what they wanted, this was what they wanted to have. Everyday I have … almost everyone I meet with have children in pre-school. Once, my colleague told me - oh, how good this is, imagine, before I had to … we didn't have this … I didn't know we could do it this way - and she showed me what her pre-school had added.* *One just have to do this, you get lifted up by so many, because they like it, they lift us up … everyone who likes it and thinks it's good lifts us up in a way. This doesn't apply to any specific person but rather everyone lifts it up.* *Keywords: feedback, rewards;* *My interpretation: a clear example on how some of the participants experience optimal flow (getting wings, flying) from positive external feedback.*	*C*
14	*B. We also have to … one has to evaluate continuously, I believe, to keep up with development. We can not stop and think – oh, how good we are. No, we can't allow us to do like that, we have to develop all the time. New studies are needed … to see where there is a need, or changed conditions, for example using sms and such. Then, we have to develop upon these grounds.* *Keywords: advance, learning;* *My interpretation: an example on participation for the good of learning and getting better at things for the group and selfs inherent satisfaction.*	*C*
15	*B. Our meetings, they are many, but lately not many enough. I have never experienced going to meetings as a burden. No, it has rather been fun to meet again and this I believe is somewhat … somewhat special in our context.* *B.You always knows that during these meetings lot of interesting ideas pops up that you take with you home. It is fun, it is great fun. I belive this depends on the people involved, or that our mutual climate was good already from the beginning and has become better and better. Everyone engage in this positive environment, which feels good.* *Keywords: fun, group dynamics, engagement; intrinsic* *My interpretation: a total endorsement of group behavior and enjoyment from participation*	*R*
16	*Aa. Would you recommend others to participate in similary projects?* *B. Absolutely.* *Aa. Why?* *B. I believe because we all want to share and contribute.* *Keywords: share; intrinsic* *My interpretation: my choice is to plot this example as how she relates to others in general.*	*R*

Table A7: Interviews with Charlotte

(My translation)

Amotivation	Extrinsic Motivation				Intrinsic Motivation	
	External	Introjected	Identified	Integrated		
		3	4, 5, 9, 10	6		Relatedness
		7, 11	1, 4, 5	6, 8		Competence
		1, 7	2			Autonomy

1	*Charlotte describes an ordinary "day at work"; telling about her main tasks. The time to spend on them have since she started, been more and more reduced due to new (extra) task. "I wish I had more time to spend on systems administration (which is her primary task), it is hard to keep up with it". There have also been problems with new routines that have not worked properly. Moreover, she describes that one of her tasks is to make the daily work simpler and easier for her "customers" at the municipality. "When things do not work properly, when she can't, or doesn't have time to, develop and add functionality, it becomes like a bunch of cockroaches all over the place. I would really like to have more time to support the needs than I actually have".* *Keywords: routines, problems, dissatisfaction, feedback; introjected* *My interpretation: negative feedback, external dependencies makes it hard to perform her tasks. Also, time has become a limiting factor which makes it harder to reach satisfaction from mastering tasks (not fully accepted).* *Keywords: pressure, dissatisfaction, time is a limit; introjected* *My interpretation: an example that shows en external pressure which she is not happy about and have little influence on.*	*C* *A*
2	*Being asked how cooperation and communication works with their IT department she answered: "They do other things". At her department they rarely have any cooperation with them; they are self-directed, managing one specific part of the municipality (i.e. all systems used at the Child Services and Education Office).*	*A*

	Keywords: organization, self-acting; identified *My interpretation: the example shows how she experiences her unit to be self-acting towards other units administrating other systems.*	
3	*"About FM, as I told you earlier I might not have that much to add. I have not been involved in the work like the others have".* *Keywords: low relatedness; introjected* *My interpretation: a reflection that describes her feeling of not belonging*	*R*
4	*She started to participate in the FM development process at the same time as several other IT systems were implemented at the municipality. NN describes how she contributed mainly as a "listener" but also with an inside perspective, being a parent with children in pre-school. Lately, shortage of time has led to that she has been unable to attend to meetings with the FM group.* *Keywords: participation, contribution; identified*	*R* *C*
5	*But of cource, I sometimes take a kind of square or stiff bureaucratic perspective.* *Aa. How do you mean?* *B. Well, I mean like this – how do we take care of individuals with protected identities? This kind of questions. And of cource, FM being the kind of system it is makes it possible to do almost anything. Then, I turn to somewhat of a stopper (bromskloss) and inform that this information we already got.* *It was for example then when I started to discuss schedules etc. But, wait! – Stop and think. We are actually doing the same thing over and over again (she gives an example where she describres how things are done twice in separate systems).* *On the other side, it becomes rather rigid. This demands that information in one system is correct, and if it is not – the other system has to wait for it to be corrected. It is "error in – error out" (skit in – skit ut) and this is what we have to deal with, sometimes manic. To see to that things are correct that's my role which cause me to have opinions in the matter.* *Aa: Is it a second perspective or opinion that you add to the project?* *Yes, and then I take a standpoint from there. I am sometimes regarded as a "stopper" (bromskloss).* *Aa: Do you experience that the others also regard you as a "bromskloss"?* *B: Yes, when we discussed the matter of protected identities I recall that I felt that they were thinking "oh, how handful it became" ... But they solved this in some way I know. I am not sure that I would like it if I know how they did it. This it when I turn somewhat "square".* *I believe that talking about individual responsibility and I as a parent tells it is fine for my child to appear on photos etc., then it's ok until something happens and we turn up in the newspaper. Then it's our (the municipality's) lack of responsibility. So, actually it's about protecting our employees also. I have the same attitude towards the FM system too.* *Keywords: participation, role, perspective; identified* *My interpretation: this example describes how NN sees her own role and perspective which she defines as being contrasting "the others". It shows how she has reflected her contribution and relation towards the others in the group.*	*R* *C*
6	*B. No, I do not recall that I felt this participation as being an extra job assignment – I rather felt that it was interesting as I did not participate from the beginning. Kate*	*R* *C*

	and Suzan had been involved for so long time and know everything about the application. Everything seemed to be already done, complete. Despite of this so much has happened since! *I sometimes feels fascinated by attending meetings and discussing "I would like to have this" and the answer was "yes, we can do that", exchanging ideas and solutions from a common basis. This was something I never had met.* *Keywords: participation, knowledge, fascination; integrated* *My interpretation:*	
7	*Asked for "a perfect day scenario":* *This period has been insane! Working all day and still feeling that you haven't accomplished anything. I have come to a point where I feel this doesn't hold. I have a small group of three persons who need me more than I can give. They have to cope on their own far to mush. I have often thought how fantastic they are to handle this situation. There have been a lot of changes in our infrastructure where administration has moved from the municipality to the parents. We have to create a sustainable information flow and there is little time for this.* *A perfect day would be to go back to become system administrator and really concentrate on the job instead of all these other things that has to be done and takes all the time.* *Keywords: pressure, dissatisfaction, dreams; introjected* *My interpretation: an example on external pressure that comes from to many tasks and small possibilities to provide for her staff and to be able to help others. NN dreams of an ultimate day. It is important to herself, but the situation is not fully accepted.*	*C* *A*
8	*(reflecting over systems available at the office):* *B. I started to look at the damned PC. What could it help me with, what can it do. I found Write and started to use that. Then I converted to Word. After that I actually participated in a beginner's course in Word privately, on my own. This was a kind of verification of – yes, I had actually understood it correct. It was d.y.i, you learn from everything.* *Keywords: challenges, learning, mastery; integrated*	*C*
9	*When I entered the scene there were no agreement verifying how, how much, when, and how. How much could we as customer demand from them (refers to the developer organization) and how much could they … well, vice versa. I felt it was vague. It was over all a good cooperation with a lot of will and efforts from both sides.* *I think there was an agreement eventually where a descided amount of hours was to spend. Somewhat unclear. I felt we lacked competence from our part but there were never unnecessary misunderstandings that never were sort out.* *B. I recall one occasion when we discussed a misunderstanding. It was something about password or … saving files with separation characters that locket the application completely. Think about all of our users that could do wrong! Well, I recall that there were some discussion about requirements specification and how things worked in the digital world. We had a discussion about who should pay for the extra hours, our budget or …* *It was finally agreed that we should take this cost (they had at the time an agreement*	*R*

	with CompanyX). This was during the period of procurement. We had no money and they (the developers) had done a lot of work and support for free during this period. Now we have learnt and our requirement specifications are so much better today. *Keywords: cooperation, vagueness, ignorance;* *My interpretation: NN identifies how the lack of in advance written agreements actually has had importance to the process. Her responsibility (i.e. in her ordinary position) is to handle this kind of tasks, why she highlights that there has been a conflict.*	
10	*B. There you see, I don't know. I was not invited to the last meeting which I understand because I have not been able to attend to meetings during this autumn. I believe that they did not find it meaningful.* *Keywords: participation, reflection; identified* *My interpretation: this example describes further how she relates to the group, and reflects (valuing) that she is left out sometimes. She identifies it as caused by herself.*	*R*
11	*You know how I am! Surely I 'm supposed to know about computers, especially earlier. Now, we are not allowed to touch them. Everything is managed through our IT support. We are not supposed to know anything or solve any problems on our own. We have "locked" computers and we can't do anything (installing, upgrading ...) with them. I remember when we were our at our districts, we fixed smaller issues all the time. I think I am quite good at handling thes kind of stuff. Now we sit and wait for things to work.* *Keywords: competence, choice, controlled; introjected* *My interpretation: from the beginning being able to master a task, this example describes how NN now have to sit and wait for help (without own choice). She describes a controlling scenario.*	*C* *A*