Dissertation

VTT PUBLICATIONS 760

Maria Antikainen

Facilitating customer involvement in collaborative online innovation communities

VTT PUBLICATIONS 760

Facilitating customer involvement in collaborative online innovation communities

Maria Antikainen

Thesis for the degree of Doctor of Philosophy to be presented with due permission for public examination and criticism in Festia Building, Auditorium Pieni Sali 1, at Tampere University of Technology, Tampere, Finland on the 29th of April, 2011, at 12 noon.

ISBN 978-951-38-7730-9 (soft back ed.)
ISSN 1235-0621 (soft back ed.)

ISBN 978-951-38-7731-6 (URL: http://www.vtt.fi/publications/index.jsp)
ISSN 1455-0849 (URL: http://www.vtt.fi/publications/index.jsp)

JULKAISIJA – UTGIVARE – PUBLISHER

VTT, Vuorimiehentie 5, PL 1000, 02044 VTT
puh. vaihde 020 722 111, faksi 020 722 4374

VTT, Bergsmansvägen 5, PB 1000, 02044 VTT
tel. växel 020 722 111, fax 020 722 4374

VTT Technical Research Centre of Finland, Vuorimiehentie 5, P.O. Box 1000, FI-02044 VTT, Finland
phone internat. +358 20 722 111, fax + 358 20 722 4374

Edita Prima Oy, Helsinki 2011

Maria Antikainen. Facilitating customer involvement in collaborative online innovation communities [Asiakkaiden fasilitointi yhteistyöhön perustuvissa online-innovaatioyhteisöissä]. Espoo 2011. VTT Publications 760. 94 p. + app. 97 p.

Keywords online communities, open innovation, collaboration, intermediaries, motivation, rewarding, monetary, non-monetary, tangible, intangible, recognition, case study

Abstract

To intensify the new product and service development process, companies have to admit that they need to be enriched by new external knowledge outside the company. Utilising customers' or potential customers' creativity and innovation capability has a lot of potential in new product development and service design. The open innovation (OI) concept, lead-user literature as well as value co-creation literature provide interesting possibilities to companies to improve their innovation processes by utilising the customer community creativity. Collaborative online innovation communities can maximise users' innovation potential by enabling collective thinking, which is superior to the ideas of individual users.

Therefore, this study focuses on customer involvement in new product development especially in collaborative online innovation communities. The overall aim of this twofold research is to provide a framework for building and managing a collaborative online innovation community based on the knowledge of both sides: the users' motivations to participate and the maintainers' opportunities to facilitate the community especially through rewarding. To achieve the purpose of the study two research questions are answered: 1) Why users participate in collaborative online innovation communities and 2) How can maintainers facilitate collaborative online innovation communities by rewarding? The first question takes the user's perspective, which is then completed with the maintainer perspective in the second research question focusing on maintainers' ways of facilitating, especially by rewarding users in collaborative online innovation communities. The research questions are examined in five publications.

This multiple case study includes three online innovation communities: FellowForce, CrowdSpirit and Owela. The main empirical data was collected from the maintainers by e-mail survey and semi-structured interviews and from the members of the communities through a web survey during the years 2007–2008.

The respondents brought out various factors that motivate them to participate in collaborative online innovation communities. The factors they mentioned were: new viewpoints, a sense of efficacy, a sense of community and fun. Furthermore, interesting objectives, an open and constructive atmosphere, making and acquiring better products, winning and rewards, also motivated the respondents to collaborate.

The results indicate that the lack of proper tools inhibits collaboration in online innovation communities. Moreover, 92% of the respondents suggested that all group members should be rewarded in some way. In addition, the study suggests that the rewarding strategy should be clear and transparent. Rewarding should be based on the efforts and quality of the work, instead of giving rewards based on quantity of the ideas or lotteries. The system should be flexible and rewards should be valuable for everyone. In addition to tangible rewards (e.g. money and products), intangible rewards (e.g. recognition) are also relevant. All in all, the equity and the democracy of the rewarding system are important factors for online innovation community users.

This exploratory and multidisciplinary research represents a path opening in studies concerning customer involvement in companies' new product development processes in collaborative online innovation communities. From the managerial viewpoint the study contributes to providing valuable information for companies on building and managing collaborative online innovation communities.

Maria Antikainen. Facilitating customer involvement in collaborative online innovation communities [Asiakkaiden fasilitointi yhteistyöhön perustuvissa online-innovaatioyhteisöissä]. Espoo 2011. VTT Publications 760. 94 s. + liitt. 97 s.

Avainsanat online communities, open innovation, collaboration, intermediaries, motivation, rewarding, monetary, non-monetary, tangible, intangible, recognition, case study

Tiivistelmä

Menestyäkseen markkinoilla yritykset hyödyntävät yhä enemmän ulkopuolista tietoa tuotteiden ja palveluiden kehittämisessä. Asiakkaiden ja potentiaalisten asiakkaiden luovuus ja innovatiivisuus voivat edistää monin tavoin tuotteiden ja palveluiden kehittämistä. Tutkimukset avoimesta innovaatiosta, edelläkävijäkäyttäjistä sekä arvon yhdessä tuottamisesta avaavat yrityksille mielenkiintoisia mahdollisuuksia tehostaa innovaatioprosesseja asiakasyhteisöjä hyödyntämällä. Yhteistyöhön perustuvat ja verkossa kollektiivista ajattelua hyödyntävät innovaatioyhteisöt voivat maksimoida käyttäjien innovaatiopotentiaalin, jonka on todettu olevan ylivertaista yksilön tuottamiin ideoihin verrattuna.

Tässä tutkimuksessa tarkastellaan asiakkaiden osallistumista tuotekehitykseen erityisesti yhteistyöhön perustuvissa online-innovaatioyhteisöissä. Tutkimuksen tavoitteena on luoda viitekehys yhteistoiminnallisen online-innovaatioyhteisön rakentamisesta ja johtamisesta. Tavoitteeseen päästäkseen tutkimus lähestyy ilmiötä kahdesta suunnasta: käyttäjien motivaatiosta osallistua yhteistoiminnalliseen online-innovaatioyhteisöön sekä ylläpitäjien mahdollisuuksista fasilitoida yhteisöä erityisesti palkitsemalla. Tutkimuksessa vastataan kahteen tutkimusongelmaan: 1) miksi käyttäjät osallistuvat yhteistoiminnallisiin online-innovaatioyhteisöihin ja 2) kuinka ylläpitäjät voivat fasilitoida näitä yhteisöjä palkitsemalla? Tutkimusongelmia on käsitelty tarkemmin viidessä julkaisussa.

Tapaustutkimukseen valittiin kolme verkossa toimivaa innovaatioyhteisöä nimeltään FellowForce, CrowsdSpirit ja Owela. Pääosa empiirisestä aineistoista kerättiin vuosina 2007−2008 ylläpitäjiltä sähköpostihaastatteluin ja puolistrukturoiduin haastatteluin sekä käyttäjille tehdyllä nettikyselyllä.

Vastaajat toivat esille erilaisia tekijöitä, jotka motivoivat heitä osallistumaan yhteistoiminnallisiin online-innovaatioyhteisöihin. Näitä tekijöitä olivat uusien näkökulmien saaminen, tehokkuuden tunne, yhteisöllisyyden tunne sekä viihdyttävyys. Näiden lisäksi käyttäjät mainitsivat osallistumissyiksi myös mielenkiin-

toiset ideoinnin kohteet, yhteisön avoimen ja rakentavan ilmapiirin, parempien tuotteiden kehittämiseen osallistumisen, voittamisen ja palkkioiden saamisen.

Tulokset osoittivat, että tällä hetkellä kunnollisten työkalujen puute vähentää yhteistyömahdollisuuksia online-innovaatioyhteisöissä. Vastaajista 92 % oli sitä mieltä, että kaikki ryhmän jäsenet pitäisi palkita jollakin tavoin. Tutkimuksen perusteella palkitsemisstrategian tulee olla selkeä ja läpinäkyvä. Palkitsemisen olisi pohjauduttava ennen kaikkea työpanokseen ja työn laatuun, eikä käyttäjiä tulisi palkita aktiivisuuden tai arvonnan perusteella. Palkitsemisstrategian pitäisi olla myös joustava ja palkintojen arvokkaita kaikille. Aineellisten palkintojen, kuten rahan ja tavaroiden, lisäksi myös aineettomat palkinnot, kuten tunnustukset, ovat tärkeitä. Kaiken kaikkiaan tasapuolisuus ja palkitsemisjärjestelmän demokraattisuus ovat tärkeitä asioita online-innovaatioyhteisöön osallistuville.

Tämä eksploratiivinen ja monitieteellinen tutkimus edustaa polunavausta tutkimusalueessa, joka käsittelee asiakkaiden osallistumista yritysten tuotekehitysprosesseihin yhteistoiminnallisissa verkkoyhteisöissä. Manageriaalisesta näkökulmasta tutkimus kontribuoi tarjoamalla arvokasta tietoa yrityksille tällaisten yhteisöiden rakentamisesta ja johtamisesta.

Academic dissertation

Supervisor Professor Saku Mäkinen
Department of Industrial Management
Faculty of Business and Technology Management
Tampere University of Technology
Finland

Reviewers Professor Marko Torkkeli
Department of Industrial Management
Faculty of Technology Management
Lappeenranta University of Technology
Finland

Professor Anna Triflova
Head of the Management and Marketing Department
Business School
Nizhny Novgorod Architecture and Civil Engineering State University
Russia

Opponent Professor Marko Torkkeli
Department of Industrial Management
Faculty of Technology Management
Lappeenranta University of Technology
Finland

Acknowledgements

My interest in online communities dates back to the year 2000 when I started to do my Master's thesis. After starting at VTT, instead of looking at them from the relationship marketing perspective, I was interested in the many, largely unexplored and unutilised possibilities for online innovation communities to enhance companies' innovation processes. As a result, my research in this field conducted during recent years is now collected into this article-based dissertation.

I consider myself privileged to be supported, guided and encouraged in many ways by a number of people. Thus, I want to convey my gratitude in several directions.

I am deeply indebted to Professor Saku Mäkinen for his intellectual guidance and valuable comments on my work. He was also encouraging, inspiring and giving me total support while pushing this process through at a rapid pace.

I have had the honour of having Professors Marko Torkkeli and Anna Triflova as my pre-examiners. I appreciate their insightful comments, their flexibility during the process as well as the time they spent on my doctoral thesis. In particular, I want to thank Professor Marko Torkkeli for acting as the opponent in my defence.

Naturally, the co-authors of the publications have a key role in this dissertation. I think that it was Mikko Ahonen who initially familiarised me with the concept of open innovation. Marko Mäkipää was the one from whom I learnt to understand the concept of mass customisation and its continuum towards open innovation. From Heli Väätäjä I have learned a lot from the innovation field as well as usability and user perspectives. Besides, I admire her attitude and passion towards learning new things and perspectives. I want to also thank Heli for her comments on the manuscript. I want to express my deepest gratitude to you all and I hope to continue our fruitful collaboration.

The support I have received from numerous people at VTT has been in a significant role. Besides valuable comments, Dr Katri Valkokari has been very supportive and given me the freedom to conduct the research. I also want to show my gratitude to technology manager Iiro Salkari who is mainly responsible for offering me the environment in which I had the opportunity to concentrate on this research. From the beginning of my career at VTT, research director Rauno Heinonen and development manager Petri Kalliokoski have also stood behind my ideas, offering me the resources to follow through things important to me. My sincere thanks go to all my colleagues at VTT with whom I have had the pleasure to share thoughts and work.

I am also grateful to Professor Mika Hannula, who showed his trust and guidance during my postgraduate studies. My special thanks go to secretary Marita Nikkanen at TTY, whose flexibility and helpfulness enabled me to go the through the process smoothly and quickly.

During this process I have attended various national and international conferences and workshops. I want to show my gratitude to all the people who have commented on my work. I also want to thank Asta Bäck and Pirjo Näkki for sharing with me the interest in collaborative innovation communities and helping me in many ways to compile the publications for this dissertation. For the same reasons I am grateful to Ruben Nieuwenhuis and Lionel David who also acted as sources of information.

My friends, relatives and family have always been the most valuable resource and support. I want to express my gratitude to all of you. Thanks also go to my brother and his girlfriend for their friendship and encouragement. Especially, I would like to thank my dearest parents and parents-in-law for their helpfulness and whole-hearted support. As grandparents of our son, they have played a major role in giving me the time to do this work.

Finally, I want to thank my dearest ones: my husband, Jari, without whom this second dissertation has never been written, and our boy Lauri, who really has taught me what is most important in this life. I want to dedicate this dissertation to you as well as to our new family member who is about to join us.

Tampere, March 2011
Maria Antikainen

Contents

List of publications

This thesis is based on the following original publications which are referred to in the text as I–V (Appendix A). The publications are reproduced with kind permissions from the publishers.

I Antikainen, M. and Väätäjä, H. 2008. "Innovating is fun" – Motivations to participate in online open innovation communities. In: Huizingh, K.R.E., Torkkeli, M., Conn, S. and Bitran, I. (eds.). *Proc. of the First ISPIM Innovation Symposium Singapore: Managing Innovation in a Connected World.* Singapore, 14–17 December 2008.

II Ahonen, M., Antikainen, M. and Mäkipää, M. 2007. Supporting collective creativity within open innovation. *Conference proceedings of the European Academy of Management (EURAM) Conference.* Paris, May 16–19, 2007.

III Antikainen, M., Mäkipää, M. and Ahonen, M. 2010. Motivating and supporting collaboration in open innovation. *European Journal of Innovation Management*, Vol. 13, No. 1, pp. 100–119.

IV Antikainen, M. and Väätäjä, H. 2010. Rewarding in open innovation communities – How to motivate members? *International Journal of Entrepreneurship and Innovation Management*, Vol. 11, No. 4, pp. 440–456.

V Antikainen, M. 2010. Towards collaborative open innovation communities. In: Kakouris, A. (ed.). University of Athens, *Proceedings of the 5th European Conference on Innovation and Entrepreneurship (ECIE 2010)*, Academic Publishing Limited, Reading, UK. Pp. 52–60.

Author's contribution

The author has made a substantial contribution for each publication in three aspects of authoring (Perry et al., 2003), listed below in Table 1.

Table 1. Author's roles in each publication (Modified from Perry et al., 2003).

	Conception and design or analysis and interpretation of data	**Drafting paper or revising it critically for important intellectual content**	**Final approval of the version to be published**
Publication I	Conception and design, and analysis and interpretation of data	Drafting paper and revising it critically for important intellectual content	X
Publication II	Conception and design	Drafting paper and revising it critically for important intellectual content	X
Publication III	Conception and design, and analysis and interpretation of data	Drafting paper and revising it critically for important intellectual content	X
Publication IV	Conception and design, and analysis and interpretation of data	Drafting paper and revising it critically for important intellectual content	X
Publication V	Conception and design or analysis and interpretation of data	Drafting paper and revising it critically for important intellectual content	X

The author's role in each publication is discussed below in a more detailed way.

Publication I: Users' motivations to collaborate in online open innovation communities

The author holds the main responsibility for the paper, writing the main body of the text including tables. The author conducted the interviews and their analysis, while the co-author did the quantitative data collection and was mainly responsible for the quantitative data analysis. The conception, design and final interpretations and revisions were conducted jointly.

Publication II: Supporting collective creativity within open innovation

The paper was designed and written jointly. The literature review was divided into three parts. The author was responsible for writing chapter three. The abstract, introduction, conclusions and discussion were written iteratively so that all authors participated equally.

Publication III: Motivating and supporting collaboration in open innovation

The author was mainly responsible for the paper, managing the overall process. Yet, the whole process was interactive so that everyone participated and contributed in some way in every chapter. The author wrote the main body of the abstract and introduction as well as the literature review concerning user motivation. She also composed Table 1 of the users' motivation factors for participating in OI communities and the summary of the users' motivation factors for collaborating in OI communities (Table 2).

Publication IV: Rewarding in open innovation communities – How to motivate members?

The author was mainly responsible for the writing process. Again, the process was iterative so that both authors influenced all the parts of the process, giving comments and sharing ideas. The author wrote the literature review on motivations and conducted the interviews including the analysis while the co-author correspondingly was responsible for the quantitative part. The conclusion was a result of the iterative writing process and discussion between the authors.

Publication V: Towards collaborative open innovation communities

The author wrote the paper by herself. Naturally, the paper was to some degree a result of cooperation with colleagues and the supervisor. Also the data used was gathered jointly with colleagues.

1. Introduction

1.1 Background to the research

One of the consistent themes in prior literature on innovation success and failure concerns the need to understand customer and market needs (Barcley, 1992; Hart et al., 1999; Tidd & Bessant, 2009). Previously, companies have sought to satisfy the varying needs of different customers and customer groups with product variety or with mass customisation strategies by producing personalised or customer-tailored goods or services (Da Silveira et al., 2001; Kottler, 1989). Yet, more and more often the existing solution space (Franke & Piller, 2003; Piller, 2004) is not enough in the tight global competition; instead, companies have to find new solutions and new appealing offerings at an accelerated pace.

To intensify the new product and service development process, companies have to admit that "the best people are not working for you", but companies need to be enriched by new external knowledge outside the company (Chesbrough, 2003). If we look to the past, we can see that users are sometimes ahead of the game. In fact, their ideas and frustrations with existing solutions have even lead towards new mainstream innovations (Tidd & Bessant, 2009).

Therefore, instead of treating customers or potential customers as passive recipients, they can become a key part of the innovation processes (e.g. Alam, 2006; von Hippel, 2005). Utilising the user's creativity and innovation capability has a lot of potential for new product development and service design, as shown by many recent studies (e.g. Piller, 2004; von Hippel, 2005). Thus, customer innovation is today becoming a key concern in new product development (NPD) (Mannervik & Ramirez, 2006). In the newer area of studies stressing the service viewpoint, called new service development (NSD), it initially places the customer in a central position of the value web. In NSD the customer experience is seen at the centre of a business's purpose (Chesbrough, 2011).

The open innovation (OI) concept (e.g. Chesbrough, 2003), lead-user literature (e.g. von Hippel, 1986, 2005), and value co-creation literature (e.g. Edvardsson et al., 2006; Prahalad & Ramaswamy, 2000, 2004; Reichwald & Piller, 2005) provide interesting possibilities for companies to improve their innovation processes by utilising community creativity. Innovation communities where users act as individuals or groups can be a valuable source for learning and producing external ideas or even solutions for companies (e.g. Chesbrough, 2006a; Jeppesen & Frederiksen, 2006). Collaborative online innovation communities can maximise users' innovation potential, by connecting people without any geographical restrictions and enabling collective thinking, which is superior to an individual user's ideas (e.g. Hargadon & Beckhy, 2006; Thrift, 2006). Also prior studies have made evident that users prefer innovating in groups rather than as isolated individuals (Franke & Shah, 2003; Füller et al., 2006; Lettl et al., 2006; Lüthje et al., 2005). Furthermore, prior studies have suggested that ideas developed via the individual lead users might have low organisational fit with the technical, production, and market environment (Lilien et al., 2002). Therefore, instead of concentrating on an individual customer or a lead user, it is suggested that companies should support group or community creativity (Ahonen et al., 2007; Antikainen et al., 2010).

However, investment in a web-based online innovation platform is a waste of money if users' motivation factors are not understood. To make the strategy operational, it needs to stress the principles of user motivation. The question of 'Why would users come and participate in an online innovation community?' has to be answered. Collaboration needs even more time and effort than working individually, and therefore the value of collaboration should be clearly stated.

Although OI is a growing research area, so far much of the extant literature is concentrated on describing the phenomenon and its logic as well as defining competent business strategies and models for OI. On the other hand, the individual and group level aspects as well as in-depth exploration of collaboration and collective intelligence in the context of OI have remained an unknown, less researched territory (Elmquist et al., 2009; West & Gallagher, 2006). Prior literature has also inadequately described the motivational factors in the group level (Kurtzberg & Amabile, 2001; Hargadon & Bechky, 2006). Although there also exist many literature examples of toolkits for user innovation (von Hippel, 2005; Thrift, 2006) and for mass customisation (Franke & Piller, 2003), a wider perspective on the facilitation of collaborative online community innovation, in-

cluding methods and tools, has not been sufficiently covered in earlier literature. Furthermore, although there are studies on rewarding individuals (e.g. Deci, 1971, 1975; Lepper et al., 1973; Reeve, 2005), there are rather few studies on reward in the online community context (Lakhani & Wolf, 2005; Harper et al., 2008) and even less concerning group facilitation in this context.

Figure 1 illustrates the focus of the study. The research merges multiple literature streams, from which the most central are the new product development (NPD) literature and open innovation theories. The study focuses on customer involvement in NPD especially in collaborative online innovation communities. Specifically, this dyadic study concentrates on exploring why users participate in the communities and how to facilitate their participation, especially by rewarding.

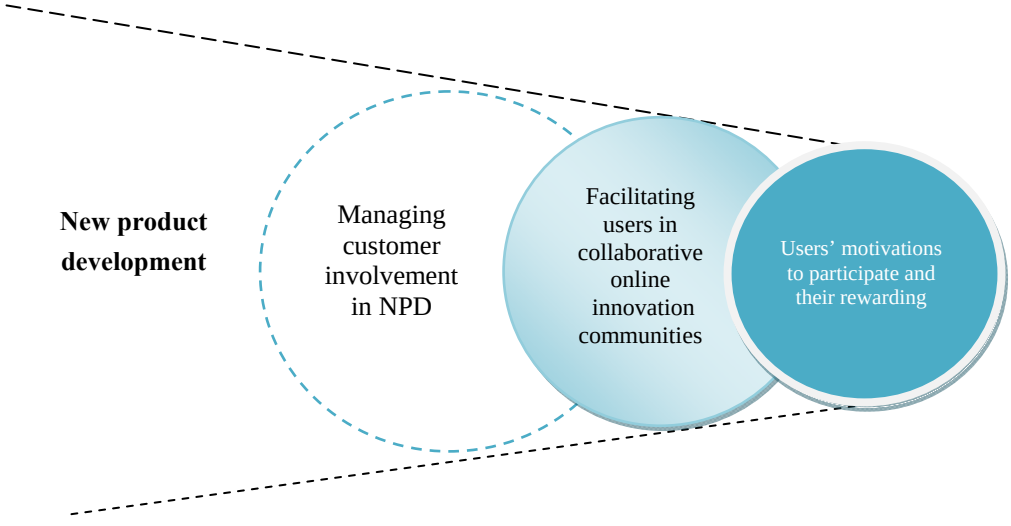


Figure 1. Focus of the study.

This exploratory and multidisciplinary research represents a path opening in studies concerning customer involvement in companies' new product development processes in collaborative online innovation communities. From the managerial viewpoint the study contributes towards providing valuable information to companies on building and managing collaborative online innovation communities.

1.2 Research objectives and the study setting

The overall aim of this twofold research is to *provide a framework for building and managing a collaborative online innovation community based on the knowledge of both sides: the users' motivations to participate and the maintainers' opportunities to facilitate the community especially through rewarding.*

To achieve the purpose of the study, the following questions (RQ1–RQ2) are answered:

RQ1. Why do users participate in collaborative online innovation communities?

RQ2. How can maintainers facilitate collaborative online innovation communities by rewarding?

RQ1 takes the user's perspective, which is then completed with the maintainer perspective in RQ2, focusing on the maintainers' ways to facilitate users in collaborative online innovation communities, especially by rewarding. Both of the perspectives were chosen in order to form a holistic understanding of the phenomenon. Without knowing users' motivations, it is not possible to facilitate their participation in an optimal way. On the other hand, knowing users' motivations is only a first step that has to be followed by considering how to facilitate their participation in different ways.

Both of the research questions are examined more specifically in publications. In order to answer the first question, Publication I starts with discussing users' motivations for participating in online innovation communities. Publication II continues this discussion by focusing on users' motivations for participating especially in collaborative online innovation communities. Furthermore, Publication II considers also how maintainers can facilitate participation in collaborative online innovation communities. Publication III takes a step further by deepening the understanding of these three concepts and creating a framework. During the process, the authors became interested in the possibilities of rewarding in order to increase users' motivations to collaborate. Contradictory research results, especially in the field of psychology, increased the need for further research in the context of this study. For this reason, rewarding was chosen as a theme of Publication IV. Furthermore, instead of answering one of the questions, Publication V takes the role of creating the holistic understanding and therefore aims to answer the purpose of the study. Figure 2 illustrates the composition of the publications and which of the research questions are answered by them.

Purpose of the research:

To provide a framework for building and managing a collaborative online innovation community based on the knowledge of both sides: the users' motivations to participate and the maintainers' opportunities to facilitate the community especially through rewarding

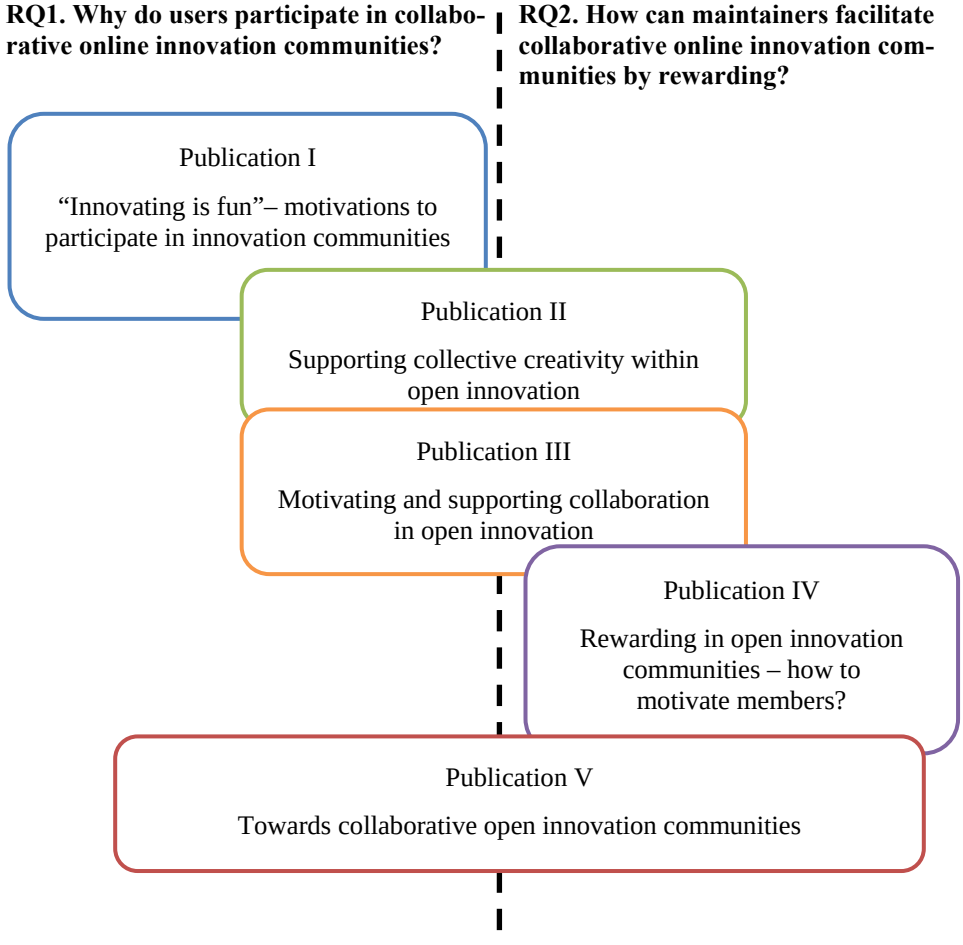


Figure 2. Composition of the publications and their relationships with research questions.

In this study the interest lies in such online innovation communities[1] that use electronic communication as a main communication channel. The researcher takes the viewpoint of an outsider or a spectator of the focal phenomenon. With the 'collaborative' term in this context, the study refers to such online innovation communities that offer both synchronous and asynchronous tools for collaboration. Although collaboration is often already included into the concept of online innovation communities, in practice users are currently usually innovating more or less individually. Therefore, the term 'collaborative' is used to spotlight the focus of the study. Yet, an in-depth consideration of the nature of the term 'collaboration'[2] is excluded from this study.

Users of the online communities have various roles such as random visitors, customers or potential customers of the maintaining company or employees of the maintainer. The term 'customer' in this study refers to both customers and potential customers. Yet, the users of the online innovation communities might not be the customers or even potential customers of the companies whose challenges they are solving. This situation crystallises, for example, in chosen cases that represent online innovation intermediaries. Therefore, the study mainly uses the term 'users' instead of speaking of customers. Based on the chosen cases and theoretical framework, especially lead-user theories, this study concentrates on B2C online innovation communities. Yet, with some modifications the results can be applied to the B2B environment as well.

Figure 3 illustrates the simplified model of the study setting. The arrows demonstrate that users' motivations for participating and having a contributing influence on the performance of the online innovation community. Furthermore, the maintainer's facilitation affects the user motivation and in that way the performance of the online innovation community. Ideally, as the users' performance increases, the amount of the users' rewards should also grow, which generates a positive cycle.

---

1 Online innovation communities are defined in Chapter 2.3.1.

2 Collaboration is defined in Chapter 3.2.2.

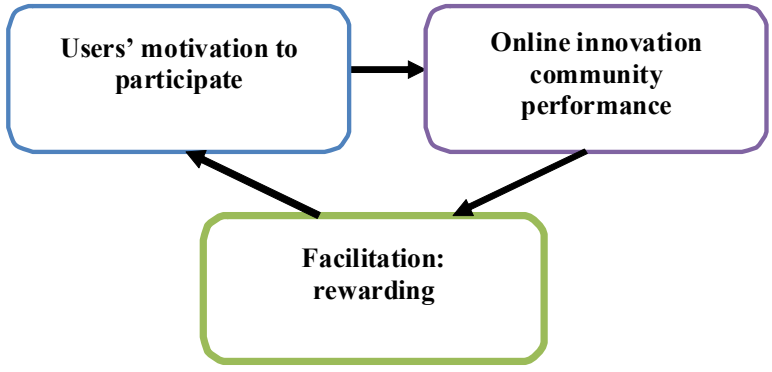


Figure 3. Simplified model of the study setting.

In this study the term 'maintainer's facilitation' refers to the ways how the maintainer can influence users' performance by affecting users' motivation to participate, especially by rewarding them. The maintainer of the community in this context may refer to a company for whom users are innovating, or on the other hand it can also be an intermediary acting between users and companies. Hence, to define the discussion, basic applications of the web service such as a discussion forum are not considered as facilitation in this study. Furthermore, this discussion is limited to concern only on non-technical issues and further considerations on technical solutions are left out.

In the study rewarding, as one of the interesting ways of facilitating users, is chosen for a more detailed discussion and exploration. Furthermore, the term 'new product development (NPD)'[3] has various definitions in prior literature. This study employs a wide definition in which NPD is used to refer both to new product development and new service development (also called as NSD) processes.

The study is multidisciplinary in its nature, and therefore there are numerous literature streams that are related to its themes. New product development and open innovation literature form the main theoretical framework of this study. In addition, lead-user theories offer a viewpoint towards an understanding of users' motivations and behaviour in collaborative online innovation communities. Furthermore, the use of customers as co-creators, co-developers and co-producers of new products is a relatively new, important, and growing field in the service and

[3] More discussion on new product development is in Chapter 2.1.

management research field. Also other management theories, especially innovation management and strategic technology management literature, influence the framework of this study. In the exploration of why users participate in collaborative online innovation communities, motivation theories from social sciences are utilised. Collaboration theories are used to expose the collaboration concept. Furthermore, organisation theory has been used to provide the knowledge on rewarding individuals and groups in organisations. Also information science plays a role in this study and especially in the discussion of the maintainers' ways of facilitation. Due to the background of the researcher, relationship marketing as well as consumer behaviour literature inevitably influence this study.

1.3 Structure of the report

The main body of this article-based doctoral thesis consists of an overview of the thesis, and theoretical exploration of the main issues and perspectives which have been approached in the existing literature, methodology as well summaries of the publications and contributions. Appendix A consists of five research publications[4], which address the research questions and objectives presented in Chapter 1.2. In Figure 4 the structure of the main body of the thesis is illustrated.

[4] The publications are presented briefly in Chapter 5 and attached in Appendix A.

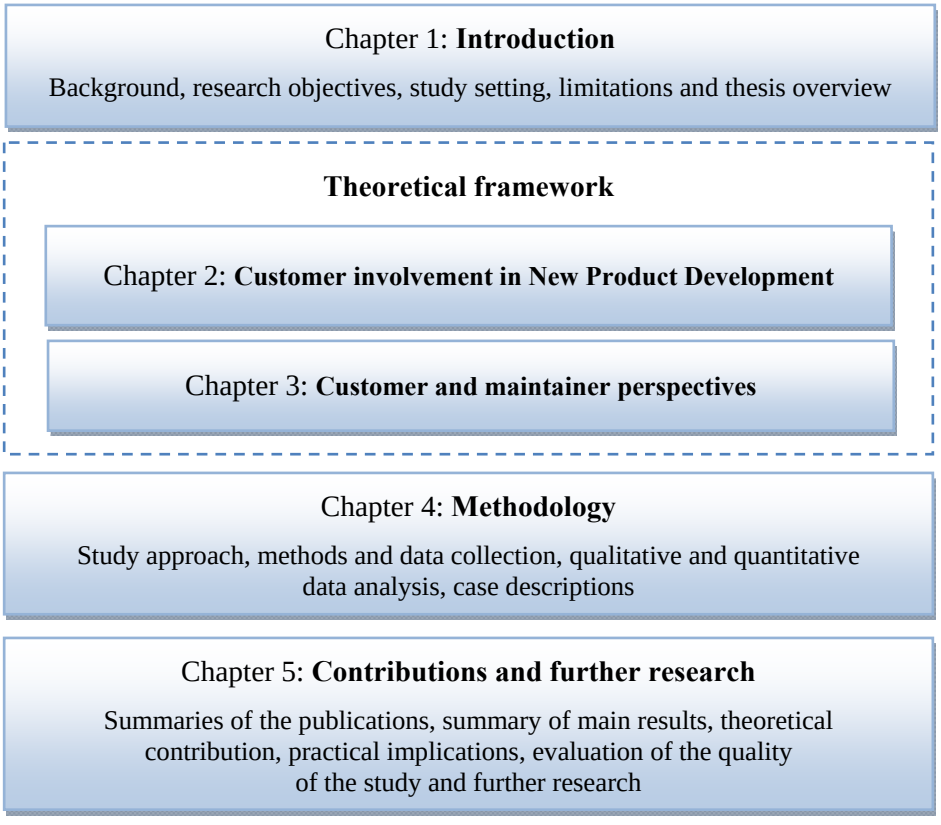


Figure 4. Composition of the thesis.

The study is based on the continuous dialogue between the empirical and the theoretical world; different phases are intertwined into each other. The first part of the report begins with Chapter 1 presenting the background of the research, the theoretical perspective of the research, the research objectives, and the study setting. Chapter 1 presents the starting points for the study.

In Chapter 2 and Chapter 3 the theoretical framework is constructed as Figure 4 illustrates. Chapter 2 starts with depicting the environment of the study, which consists of open innovation, online open innovation communities and collaboration. After that, a customer perspective focusing on users' motivations to participate in collaborative online innovation communities is discussed in Chapter 3. Then, Chapter 3 is completed with the discussion of the maintainer perspective, focusing on their ways of facilitating users. This discussion is necessary in order to gain a profound understanding on both perspectives.

In Chapter 4 the methodological considerations are done and justified. This chapter illustrates to readers how the study has been done. The case study approach as well as the collection and analysis of the empirical data are briefly presented. Also the cases are briefly presented in this chapter.

Chapter 5 starts with the summaries of the published publications. After that, the main results are presented. In this chapter the framework concerning users' motivations, maintainers' tools and requirements for the reward strategy is presented in a more detailed way. After that, theoretical contributions and practical implications are discussed. The chapter ends by discussing the criteria for evaluating the quality of the study and presenting future research paths.

2. Customer involvement in new product development

2.1 Towards customer integration in new product development

It is common knowledge that innovative organisations outperform their peers in terms of growth and financial performance. Yet, constantly rising development costs and shorter product life cycles have made it more and more difficult for companies to earn satisfactory returns from their innovation investments. Also the increased level of competition and more turbulent business environments have forced companies to seek new approaches to their innovation processes, organisation models and decision making. For instance, companies are increasingly trying to expand and speed up their innovative potential, as well as to gain cost and time savings by externalising their R&D. In addition, with the globalised markets offering constantly expanding variety of products and services for customers, companies have begun to involve customers in their processes to ensure the attractiveness of their solutions. (e.g. Tidd & Bessant, 2009).

New product development (NPD), which is defined in this study to include services development as well, is an activity that has previously been a highly closed process and involved only a few people in organisations. New levels of demand for innovativeness pose a new challenge for this model. Therefore, organisations need to be enriched by new external knowledge, which can be brought in by employees from related industries the organisation is aiming at, or by collaborations (Bröring & Herzog, 2008).

However, the development of new products and services is a challenging task. With the underlying knowledge base of most products and services becoming more diverse and dynamic, NPD teams are increasingly seeking out external resources to overcome the learning curves related to new technologies and new

markets (Holmes, 1999; Schilling & Hill, 1998). The potential of customers as an external resource for NPD has been recognised in theory and in practice for a long time (e.g. Freeman, 1991; Leonard-Barton, 1995; Rothwell et al., 1974; von Hippel, 1988). For example, customer involvement in NPD has been shown to enhance product concept effectiveness (i.e. product-market fit) and may result in ideas for potential business opportunities (Alam, 2006; Brown & Eisenhardt, 1995; Bilgram et al., 2008; von Hippel, 1986). Heiskanen et al. (2007) suggest that a more open-ended approach to concept testing is needed in order to encourage users to evaluate concepts more critically. Also one major benefit of customer interaction is the access to sticky information on user needs, user context and user experience, which is usually tacit and difficult to find (von Hippel & von Krogh, 2006). Involving users more in processes may also lower barriers to adopting new innovations (e.g. Alam, 2006; Rogers, 1983) as well as gain benefits in marketing and customer relationship areas (e.g. Gruen et al., 2005; McAlexander et al., 2002).

Positively, during recent years the transformation in the customer's role from passive object into active participant, co-creator and innovator has been rapid. In the business field as well as in academic literature, there is an ongoing shift from the product-oriented viewpoint towards service orientation. The mindset behind new service development (NSD) initially places the customer in the central position of the value web. In NSD the customer experience is seen at the centre of a business's purpose (Chesbrough, 2011).

Yet, despite these facts, customers have played a limited and largely passive role in the development of new products and services in most industries (Wayland & Cole, 1997). There are several reasons explaining customers' passive role in NPD and NSD, but limiting factors have been the poor connectivity with customers, possible lack of customer cooperation and existing information gap between customers and producers (e.g. Alam, 2006; Franke & Piller, 2004; Nambisan, 2002; Piller et al., 2005). Furthermore, the risks of confidentiality and lack of knowledge of how to interact with customers have influenced managers' willingness to involve customers into the NDP process (Alam, 2006; Ulwick, 2002).

Positively, new technologies can significantly support the connectivity between customers and producers in a cost-effective manner and to support new models of product and service development that involve customers as partners of innovation. The rapid development of information and communications technologies and social media, providing users with the possibility to create content easily and share it in communities, has enabled the transformation from passive

users into active participants on the internet. With the online tools and services, customers can be involved not only in generating ideas for new products but also in co-creating them with companies, in testing finished products, and in providing end user product support (Nambisan, 2002). Briefly, as a result of customer-centric orientation and supporting technologies, there is ongoing

> *"a shift from a perspective of exploiting customer knowledge by the company to a perspective of knowledge co-creation with the customers"* (Sawhney & Prandelli, 2000, p. 31).

2.2 Open innovation: collaborating with customers

The OI paradigm indeed suggests that companies can and should use external as well as internal ideas and paths to market in order to achieve long-term success in today's fast-moving market environment (Chesbrough, 2003). According to Chesbrough (2006a), OI can be defined in the following way:

> *"open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. [This paradigm] assumes that companies can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology."*

At the company's process level OI includes the *inside-out process* (i.e. selling knowledge and intellectual property in different markets; see e.g. Lichtenthaler, 2005) as well as the *outside-in process* of sourcing outside knowledge to the company (see Gassmann & Enkel, 2004), for example from customers, which is the focus of this study. Figure 5 illustrates the OI paradigm.

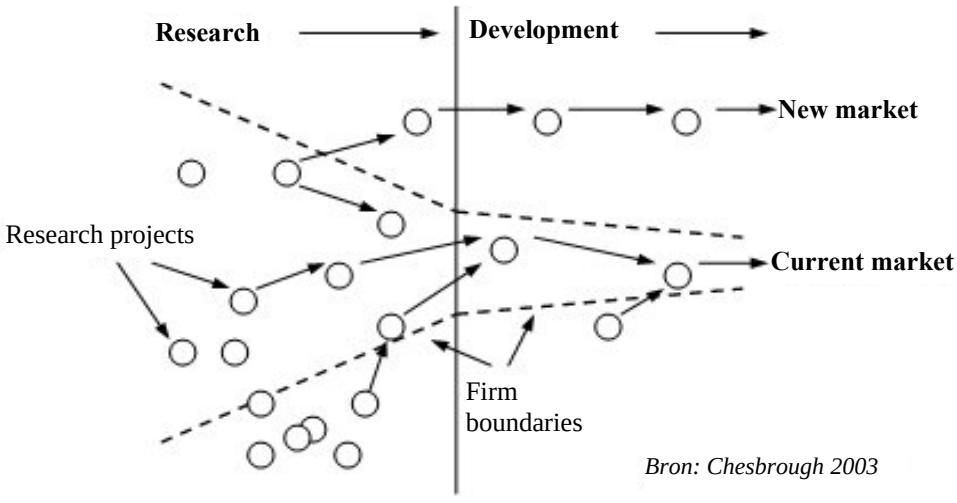


Figure 5. Open innovation paradigm (Chesbrough, 2003, xxv).

However, although both academics (e.g. Chesbrough, 2003, 2004, 2006a; Laursen & Salter, 2006) and practitioners (e.g. Huston & Sakkab, 2006; Rivette & Kline, 2000) consider an OI concept superior to close innovation model, its use has limitations (listed in Torkkeli et al., 2009). For example, OI embraces that knowledge sharing and collaborative innovation are the best ways for value generation. Yet, this idea contradicts the resource-based view of developing competitive advantage through the company's ownership of valuable and rare resources, which are difficult to imitate or substitute (e.g. Barney, 1991 & Peteraf, 1993). Therefore, companies need to carefully consider when OI is the superior choice for them and when it is not. Furthermore, there are different models and stages of open innovation, and companies need to choose the most suitable for them. For example, companies should choose how open their innovation process or their business model is (Chesbrough, 2006a).

Reichwald and Piller (2005) focus in their study exclusively on the cooperation of manufacturers and users or customers. In Figure 6 they distinguish different modes of collaboration between these groups in new product development. In Mode 1 companies listen to customers by utilising different sources, for example websites and search portals in order to explore unmet customer needs. In Mode 1 customers are considered as passive targets instead of activating them.

Mode 2 refers to the way that companies more actively ask customers about new product features or product concepts, using surveys, web-based conjoint

analysis, and other means to get access to customer preferences and needs. In Mode 2 the dialogue between customers and companies begins.

Furthermore, in Mode 3 customers take part in the NPD process by designing their own solutions in the user innovation platforms. In Mode 3 customers are considered as equal partners of the organisation. In this mode there exists manufacturer and intermediary-initiated and operated toolkits for innovation which enable users to design with visual drag-and-drop applications. In Mode 3 development happens jointly with customers. Manufacturers can also organise lead user workshops and there can be respondent's trade-off features against price or performance. Finally, users can also perform without initial motivation of the manufacturer and they can initiate their own platforms and toolkits for community innovation.

In Mode 1 of the model at hand the innovation model is closed, but the remaining modes follow the path of open innovation, involving customer actively in the innovation process.

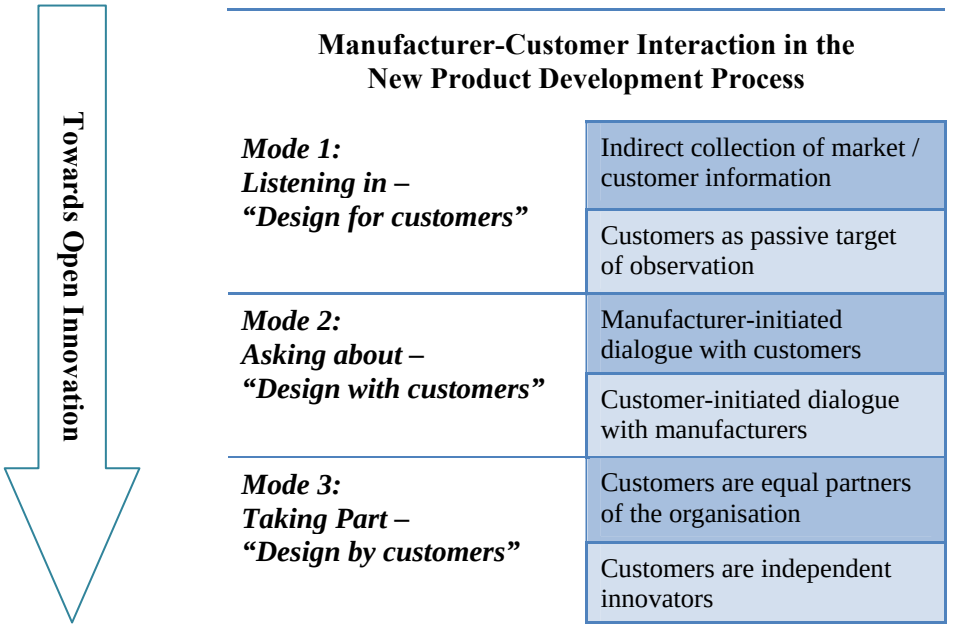


Figure 6. Different modes of customer involvement in NPD process (Modified from Reichwald & Piller, 2005).

In addition to open innovation literature that takes the user-centred view in NPD, there are many related concepts covering the same issue. Lead user literature by Eric von Hippel (1986, 2005) and other scholars, has been one of the pacesetters suggesting that users can become a key part of the innovation process. Furthermore, the concept of value co-creation introduced by Prahalad and Ramaswamy (2000, 2004) stresses the empowerment of the customers and sees them as active participants in companies' processes. The perspective is thus value creation for, by, and with customers (Edvarsson et al., 2006). The same idea is in the term 'co-configuration', which is defined as a form of work orientated towards the production of intelligent, adaptive services, wherein ongoing customisation of services is achieved through dynamic, reciprocal relationships between providers and clients (cf. Victor & Boynton, 1998).

Moreover, the concept of Interactive Value Creation (Interaktive Wertschöpfung), a term developed by Reichwald and Piller (2006), is closely linked to customer experience literature (see Pine & Gilmore, 1999). Interactive Value Creation means that customers are a strategic resource for manufacturers and closely integrated with them in the value creation network. The value proposition of some pacesetter companies is no longer the products or services that they have to offer, but methods, tools, and opportunities for Interactive Value Creation where customers themselves create much of the value they obtain (Reichwald & Piller, 2006)

The concepts of "wisdom of crowds" (Surowiecki, 2004) or crowdsourcing are closely related user-centric innovation literature. Crowdsourcing is defined as

> *"an act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call. This can take the form of peer-production (when the job is performed collaboratively), but is also often undertaken by sole individuals." (Howe, 2006)*

2.3 Online innovation communities

2.3.1 Definition of online innovation communities

Since users' needs are often heterogeneous and the information drawn on by innovators is often more or less sticky, user innovation tends to be widely distributed rather than concentrated among just a very few innovative users. There-

fore, it is important to find ways to cooperate with others in order to combine and leverage those efforts (von Hippel, 2005, pp. 10–11). In online communities, users cooperate directly and informally, for example in discussion forums (and before them in bulletin boards) by sharing information. More organised collaboration happens in networks and communities that provide platforms and tools for their interaction and distribution of innovations. These communities are called innovation communities and aimed at increasing the speed and effectiveness of the innovation process by enabling manufacturers to develop, test and diffuse their innovations. They also can increase the ease with which innovators can build larger systems from interlinkable modules created by community participants. More specifically, in these communities innovations are revealed voluntarily by users. Innovation communities include users and/or manufacturers as members and contributors (von Hippel, 2005).Von Hippel (2005) defines innovation communities as

> *"Meaning nodes consisting of individuals or companies interconnected by information transfer links which may involve face-to-face, electronic, or other communication. These can, but need not, exist within the boundaries of a membership group. They often do, but need not, incorporate the qualities of communities for participants."*

Furthermore, 'communities' are defined (Wellman et al. 2002, p. 4) as

> *"networks of interpersonal ties that provide sociability, support, information, a sense of belonging, and social identity"*

Innovation communities can act as a source for learning and producing external ideas or even solutions for companies (Chesbrough, 2006a; Jeppesen & Frederiksen, 2006). In online innovation communities users and companies can develop and test and diffuse their innovations in a collaborative way (von Hippel, 2005). When aiming to utilise online communities in NPD processes, companies have several choices. Companies can for example 1) build their own communities, 2) use existing social media services as Facebook or Twitter, 3) use existing online communities related to their products and services, like brand communities 4) look for hobbyist communities, or 5) utilise existing communities on the web that act as intermediaries in this field (Antikainen & Väätäjä, 2010; Chesbrough, 2003; Chesbrough, 2006b; von Hippel, 2005).

Franke and Shah (2003) studied the value that innovation communities can provide to user-innovators developing physical products in the field of sporting equipment. Based on their study there is a clear analogy to open source innova-

tion communities. The collective or community effort to provide freely revealed innovation has traditionally been explored in the literature on "collective action" (von Hippel, 2005). Von Hippel (2005) sees that innovation communities appear to be more robust with respect to recruiting and rewarding members than the literature would predict. Yet, instead of direct monetary rewards, von Hippel and von Krogh (2003) stress that users innovate because getting the best possible products for themselves is a reward in itself.

2.3.2 Different types of online innovation communities

Good examples of collaborative online innovation communities are free and open source software projects that form a relatively well-developed and successful form of online innovation communities (von Hippel, 2005). However, innovation communities are by no means restricted to software or even to information products and they can play a major role in the development of physical products.

In fact, a wide range of communities with different purposes fall under the rubric of online innovation communities. Next, some of them are briefly presented. Firstly, as discussed before, *OSS (open source software) communitie*s have been a very successful form of innovation community where users develop software in a public, collaborative manner. All in all, OSS communities can even be regarded as a trendsetter for innovation communities, existing since the mid 1980s and changing the technological landscape of the computing industry, affecting the strategic dynamics of some commercial enterprises, including interactions among proprietary software developers, hardware manufacturers, and makers of network products (Vixie, 1999). Traditionally, OSS communities have been based on free work and researchers have considered ideological issues as well as enthusiasm for the code writing as users' main motivators (Lakhani & Wolf, 2005; Stewart & Gosain, 2006). The role of monetary incentives has recently increased as many companies have noticed the possibilities of OSS communities in new product development and started to utilise them more actively. One way for companies to participate in and influence OSS communities is paying for their employees to work there. Actually, the trend for OSS communities seems to be that more and more monetary incentives are used.

The second type of online innovation community is a highly diversified and fast-growing group, called *companies' online innovation communities*. In these communities customers interact to solve problems or to innovate new designs or products for example, and their role can be anything from a supporter to an en-

abler of the business model. They extend the model of social capital by Wasko and Faraj (2000) to include the impact of commitment on both the online community and the host company and reciprocity on quality and quantity of knowledge contribution. A traditional example of such communities is Lego Factory (www.legofactory.com) where users can innovate and design their own original custom Lego model, and then purchase all the bricks and elements they need to build their model for real. Users can also publish their own model so that others can buy it. Thus, Lego Factory bridges mass customisation by letting users customise their own models and open innovation by encouraging users to innovate.

Another example of *companies' online innovation communities* is Threadless (www.threadless.com) which is an online design community where anyone can sign up, download a "tee" (T-shirt) template and submit ideas, which are then evaluated by the Threadless community for seven days. The most popular designs as scored by the community are then printed and sold. In this case the designer gets a fee. The business model is based around the community utilising users' motivation to be rewarded designers as well as their desire to get nice T-shirts and share ideas on the topic. In this way Threadless gets innovative designs even from tomorrow's top designers with low costs, low risk and high flexibility.

The third type of this review is formed by the *volunteer work communities*, such as Wikipedia (www.wikipedia.com). In these communities users are volunteers working for free similarly to OSS communities, but instead of developing software they create content. Based on their study, Anthony et al. (2005) state that there is a strong correlation between the quality of contributed contents and the level of contributions made by individual authors. In Kittur et al.'s study (2007) the authors try to confirm the theory that, after an initial period in which contributions usually came from registered users with a high level of participation, these days Wikipedia receives the majority of its contributions from those users with a very low level of participation. However, their point of view is challenged by Ortega & González-Barahona (2007) who continued the previous work (Kittur el al. 2008; Viegas et al., 2007; Voss, 2005) on communication patterns in Wikipedia, developing an automatic quantitative analysis method for classifying authors by their contributions during specific periods of time, instead of using their total number of contributions over the whole life of Wikipedia. Furthermore, Peddibhotla and Subramani (2007) report that in public document repositories, such as Amazon.com, a small minority of active contributors makes a high volume of contributions. In line with Anthony et al.'s earlier study (2005), Peddibhotla and Subramani (2007) conclude that the active minority's

contributions are also more helpful than contributions made by the majority. In addition, they suggest that the same minority is among the earliest contributors of content.

The fourth group of the online innovation community is constituted by *Q&A sites and micro-task market communities*. Examples of such communities are Yahoo! Answers, Google Answers and Amazon's community Mechanical Turk. The common feature in most of these communities is that they a task is described, a reward and time period stated, and during the period users compete to provide the best submission. At the end of this period, a subset of submissions is selected, and the corresponding users are granted the reward, which can be monetary or non-monetary. Non-monetary rewards can for example take a form of reputation points for the user in the community. Yet currently most of the crowdsourcing sites do not seem to have a solid reward strategy; instead they rely on ad-hoc design choices or trial and error when determining these rewards (DiPalatino & Vojnovic, 2009).

The number of the fifth type of the online innovation communities, *online innovation market places or innovation intermediaries* acting between innovators and companies (or 'solvers' and 'seekers'), is constantly increasing. The basic idea with intermediaries is that they maintain an online innovation community for users who are having ideas (ideating) online collectively or individually. In many of these communities, third-party companies seek ideas for their challenges and announce these for community members to solve. The ideas or innovative solutions provided by the members can be further utilised by the company. Well-known examples of this more and more common type of open innovation intermediaries are InnoCentive (www.innocentive.com), NineSigma (www.ninesigma.net) and IdeaWicket (www.ideawicket.com). InnoCentive supports four different types of problems: ideation, theoretical, reduction to practice (RTP), and electronic request for proposal (eRFP). Rewards vary based on the scale of the task and the level of challenge. RTP problems require a precise description and evidence of solution optimality, and thus this type of problem usually offers the biggest reward to the solvers. On the other hand answering eRFP problems does not directly offer any monetary rewards. The base idea of InnoCentive is that terms are directly negotiated between seekers and solvers case by case.

Table 2 summarises the different types of online innovation communities giving an example of them and describing some characteristic features.

Table 2. Different types of online innovation communities.

Type of online innovation community	Example	The basic idea
OSS (open source software) communities	Linux	A successful form of innovation communities where users develop software in a public, collaborative manner, traditionally based on free code and free work
Companies' online innovation communities	Lego, Threadless	Companies involve their customers or prospects to participate into their innovation processes
Voluntary work communities	Wikipedia	Users create and develop the content voluntarily
Q&A & micro-market communities	Yahoo! Answers, Google Answers, Mechanical Turk	A task is described, a reward and time period stated, and during the period users compete to provide the best submission
Open Innovation intermediaries	InnoCentive, NineSigma, IdeaWicket	Act between innovators and companies who pay for the innovators of their ideas

In addition to the above-mentioned types of innovation communities concentrating on innovation and users' ideas, there are many kinds of online communities where users ideate together. Such communities are for example *hobbyist and brand communities* that are formed around the common interest and can be user or company-maintained. In any case, these are the communities that companies should actively follow especially if their brand is well known or if the brand is used by some enthusiastic user group. For example, a company called Suunto producing premium sports watches has a large user community that is interested in discussing not only their hobby but also how the watch can support them and how to develop it further. To utilise users' knowledge and gain insight into their opinions, Suunto (http:www.suunto.com) has its own community, but these discussions also happen in other related communities. Also, for example, using a Facebook group is common way for companies to enable customers to innovate for example brand names for companies. Thus, it is not appropriate to try to make a clear definition or distinction between what is an online innovation community and what is not, since ideation can happen in any kind of online community. Instead, it is more important to understand the phenomenon itself in other ways.

3. Customer and maintainer perspectives

3.1 Customer perspective: User motivations to participate in online innovation communities

3.1.1 Intrinsic, extrinsic and social motivation

The word motivation is coined from the Latin word for movement [(movere) Steers et al., 2004, p. 379]. According to Ryan and Deci (2000) motivation concerns energy, direction, persistence and equifinality, all aspects of activation and intention. Motivation has been a central and perpetual issue in the field of psychology, for it is at the core of biological, cognitive, and social regulation. In the real world, motivation is highly valued because of its consequences: Motivation produces (Ryan & Deci, 2000). Because of that it is a very central issue for organisations, companies and all society.

Numerous definitions of motivation equally stress the existence of factors or events which strengthen, direct and maintain human behaviour (Steers et al., 2004, p. 379.) Reiss (2004) sees that motives are reasons people hold for initiating and performing voluntary behaviour. They indicate the meaning of human behaviour, and they may reveal a person's values. Motives often affect a person's perception, cognition, emotion, and behaviour. According to von Rosenstiel (2003), motivation originates from specific situations in which a person notices incentives that activate certain motives belonging to different classes.

In the literature, motivation has been divided into intrinsic and extrinsic reasons which separately or jointly cause motivation (Deci & Ryan, 1985; Amabile, 1996; Lindenberg, 2001, p. 317, Ryan & Deci, 2000). Extrinsic motives refer to the consequences of a certain activity, perceiving the task itself as a means to an end (Amabile, 1993). A person may contribute valuable information because he

or she feels they have some effect on the environment, which is called a sense of efficacy (e.g. Bandura, 1995; Constant et al., 1994).

Intrinsic motivation refers to the situations in which a person does something because it is inherently interesting or pleasant (Deci & Ryan, 1985). A person experiences feelings of competence, fun and self-determination when pursuing intrinsic motives (Deci, 1975). Lindenberg (2001) divides intrinsic factors into enjoyment-based and obligation/community-based. In this study, the latter are called as social motives according to Motzek (2007) who stresses the impact of social motives in a person's code of conduct, and, therefore, divides social motives into a third category.

The essential question concerning motivation is when and in which way these categorised motives actually produce motivation that triggers human behaviour. Multiple theories of motivation try to answer that question. Beginning in the mid-1960s, process theories contrasted the earlier content theories (Steers, et al., 2004, p. 381). Probably the best known content theory is Maslow's need hierarchy (1954) of human needs assuming five hierarchically arranged classed of human needs which determine most human behaviour (Pinder, 2008, p. 60). In contrast to the static approach of content theories, process theories take a dynamic perspective concentrating on the processes leading to motivation (Steers et al., 2004, p. 381). Process theories aim to reveal causal relationships between factors such as time and events when analysing the stimulus of human behaviour. Thus, the main idea of most process theory models implies that individuals will pursue those goals for which the expected value of utility multiplied by its probability is highest (von Rosenstiel, 2003). Perhaps the best known of the cognitive theories is expectancy (or expectancy-valence) theory. Expectancy theory derives from the early work of Lewin (1938) and Tolman (1959), who saw behaviour as purposeful, goal-directed, and largely based on conscious intentions (Steers et al., 2004, p. 382).

3.1.2 Users' motivations to participate in online communities

The first step in understanding how to build online innovation communities is to explore the reasons why users participate in and contribute to online communities. Studies on why people visit, join, participate in and contribute to different kinds of online communities have been made from varying perspectives. The study follows the model by Motzek (2007) in categorising the motivators in this paper.

Intrinsic motives to participate in online communities

One of the interesting perspectives is provided from the viewpoint of OSS communities where a considerable number of people are working on a voluntary basis without receiving direct monetary reward for their efforts. In OSS communities, ideology has been considered one of the motivational factors that explain why developers contribute (Lakhani & Wolf, 2005; Stewart & Gosain, 2006). In open content communities such as Wikipedia, ideology also seems to be an important motivation factor. However, in Nov's (2007) study, a high ranking of the ideology as a motivation factor was not coupled with a strong correlation to the contribution level.

Furthermore, enjoyment, fun and recreation seems to be important motivation factor in many kinds of online communities (Antikainen & Väätäjä, 2008; Lakhani & Wolf, 2005; Nov, 2007; Osterloh et al., 2004; Raymond, 2001; Ridings & Gefen, 2004; Torvalds & Diamond, 2001; von Hippel & von Krogh, 2003). In addition, intellectual challenges s stimulation, interesting objectives and learning and improving skills are essential motives for contributing to many kinds of communities, such as OSS communities, company-hosted problem-solving communities, communities of practice and newsgroups (Hars & Ou, 2002; Lakhani & Wolf, 2005; Ridings & Gefen, 2004; Wasko & Faraj, 2000; Wiertz & de Ruyter, 2007).

Hars and Ou (2002) suggested that while internal factors such as intrinsic motivation, the joy of programming and the identification with a community play a role, external factors have greater weight in OSS communities. Also, Oreg and Nov's (2008) study suggested that software contributors place a greater emphasis on reputation-gaining and self-development motivations, compared with content contributors who placed a greater emphasis on altruistic motives. Yet, in contrast, Lakhani and Wolf (2005) and Hertel et al. (2003) argue that although academic theorising on individual motivations for participating in OSS projects has posited that external motivational factors in the form of extrinsic benefits (e.g. better jobs, career advancement) are the main drivers of effort, enjoyment-based intrinsic motivation, namely how creative a person feels when working on the project, is the strongest and most pervasive driver.

Extrinsic motives to participate in online communities

User needs and influence on product/service development have been identified as motivation factors in different kinds of online communities (Hars & Ou, 2002; Lakhani & Wolf, 2005). Von Hippel (2005) summarises that user innova-

tions in general, as well as commercially attractive ones in particular, tend to be developed by lead users. He suggests that one central reason for lead users participating in the innovation process is their willingness to customise products for themselves.

Furthermore, reputation and enhancement of professional status (Lerner & Tirole, 2002; Lakhani & Wolf, 2005) have been stressed in OSS communities, where developers may prove their skills to potential employers as well. In addition, members might participate in online innovation communities because of the possibility to show their skills, for example as potential employees.

Jeppesen and Frederiksen (2006) suggest that company recognition is even more important than peer recognition in company-hosted online communities. As an explanation, Jeppesen and Frederiksen (2006) point out that innovative users are advanced users and may want to identify themselves more strongly with company developers than with their peers. Another reason, suggested by Jeppesen and Frederiksen (2006), is that company recognition comprises peer recognition to a great extent, meaning that achieving company recognition also leads to recognition by peers.

In contrast to experimental findings on the negative impact of extrinsic rewards on intrinsic motivations, (Deci, 1971; Deci et al., 1999), Lakhani and Wolf (2005) claim that being paid and feeling creative on OSS projects does not have a significant negative impact on project effort.

In their study on Yahoo! Answers, Harper et al. (2008) found that the answer quality was typically higher in fee-based sites than in free sites and paying more money led to better outcomes. Interestingly, Chen et al. (forthcoming) studied Google Answers and ended up with the conclusion that paying more leads to longer answers but not better quality. Instead, they suggest, a higher reputation of the respondents provides better answers.

Furthermore, Kittur et al. (2008) studied Amazon's community for micro-task markets called Mechanical Turk where small tasks can be assigned to the large community of users. The community offers a potential paradigm for engaging a large number of users for short time and small monetary costs. Since the tasks in Mechanical Turk are often very simple and do not demand creativity, it can be assumed that one of the main motivators to contribute is money. They concluded that in order to motivate users and to gain answers with good quality it is important to formulate tasks carefully, which was also one conclusion of the Di-Palantino and Vojnovic's (2009) study.

Social motives for participating in online communities

Since online communities are based on the idea that members share some common interest and purpose, it can be assumed that social motives for participating in online communities are important in order to create a sustainable online community. Furthermore, in the innovation online community context, users' commitment to innovation activities is evident. Therefore, social motives can be seen as essential when enhancing collaboration between members.

Wasko and Faraj (2000) stated that people do not use the forum to socialise, nor to develop personal relationships. According to their study, giving back to the community in return for received help was by far the most cited reason why people participate. They suggested that members are not simply interested in a forum for questions and answers but appreciate online dialogue, the debate and the discussion around topics of interest. Members help each other due to the possibility of reciprocation. In other words, they expect interaction to be available in the future.

Furthermore, altruism, attachment and/or commitment to the community and community interest have been explored as a motivator, especially in open content and company-hosted communities (Kollock, 1999; Wasko & Faraj, 2000; Nov, 2007; Wiertz & de Ruyter, 2007). In other words, the good of the group enters one's utility equation (Kollock, 1999).

Seeking friendships and 'hanging out together' was recognised as one motivator for participation in online communities at the beginning of the rise of online communities. (Hagel & Armstrong, 1997; Ridings & Gefen, 2004; Wasko & Faraj, 2000). In addition, achieving peer recognition also motivates users to participate in OSS communities as well as in other online communities (Lerner & Tirole, 2002; Jeppesen & Frederiksen, 2006).

Summarising the previous research on motives for participating in online communities

In Table 3 motivations are categorised under the three main categories: intrinsic, extrinsic and social motives. Most of the motivation factors can be found in different kinds of online open innovation communities. The studies are made from different perspectives and in various contexts. However, the focus of this study, users' motivations to participate in collaborative online communities, is not covered in prior studies.

Table 3. Previous research on motives for participating online communities.

	Users' motives for participating in online communities	Authors
Intrinsic motives	Ideology	Lakhani & Wolf, 2005; Nov, 2007 Stewart & Gosain, 2006
	Enjoyment, fun, recreation	Lakhani & Wolf, 2005; Nov, 2007 Osterloh et al., 2004 Raymond, 2001 Ridings & Gefen, 2004 Torvalds & Diamond, 2001 von Hippel & von Krogh, 2003
	Intellectual challenges, stimulation, interesting objectives	Lakhani & Wolf, 2005 Ridings & Gefen, 2004
	Learning, improving skills and knowledge exchange	Antikainen, 2007 Gruen et al., 2005 Hars & Ou, 2002 Wasko & Faraj, 2000 Wiertz & Ruyter, 2007
Extrinsic motives	Company recognition	Jeppesen & Frederiksen, 2006
	Reputation, enhancement of professional status	Bagozzi & Dholakia, 2002 Lakhani & Wolf, 2005 Lernel & Tirole, 2002
	Sense of efficacy	Bandura, 1995 Constant et al., 1994
	User need, influencing the development process	Hars & Ou, 2002 Lakhani & Wolf, 2005 von Hippel, 2005
	Rewards	Antikainen & Väätäjä, 2010 Lakhani & Wolf, 2005 Harper et al., 2008 Kittur et al., 2008 Wasko & Faraj, 2000
Social motives	Altruism, reciprocity, care for community	Kollock, 1999; Nov, 2007; Wasko & Faraj, 2000 Wiertz & de Ruyter; 2007 Zeityln, 2003
	Friendships, "hanging out together"	Hagel & Armstrong, 1997 Rheingold, 1993 Ridings & Gefen, 2004
	Peer recognition	Lerner & Tirole, 2002 Jeppesen & Frederiksen, 2006

3.2 Maintainer perspective: Facilitating customer involvement in collaborative online innovation communities

3.2.1 General issues on managing online communities

The rapid evolution of technology and social media has influenced the development and management of online communities significantly. During the last fifteen years, social media with easy to use tools, referred to as Web 2.0 tools, have enabled individuals and groups of users to easily create and share many kind of content including videos and pictures.

Technically creating an online community is fairly easy for companies since there are many choices available from free software to complete service concepts. For example, companies only need to register with Facebook or to Twitter to start building customer communities. Thus, rather than being a technical issue, building an online community is a challenge from the managerial point of view. An ongoing administration of an online community needs both resources and knowledge. Gartner's study (2008) on social software noted that "about 70 percent of the community typically fails to coalesce". In other words, a prevailing assumption among maintainers is still: "install and they will come". Indeed, the study argues that many social software projects fail because IT managers wrongly believe that successful communities form spontaneously after social software tools are installed. Furthermore, the study pointed out that of the 30 percent of the communities that do emerge, many revolve around interactions that planners didn't envision, that don't provide business value and that may even be counterproductive.

One of the major challenges for start-up online communities is to attract customers to online communities, which is not an easy task on the internet environment. Therefore, companies need to have a clear purpose and to know what attracts their customers (Antikainen 2007). Gartner (2008) suggests that most successful social sites start with a defined purpose and a limited scope suggesting that users need a well-defined purpose of appropriate scope around which to mobilise, and that a good purpose for a social application has seven key characteristics known as magnetic, aligned, low risk, properly scoped, facilitates evolution, measurable and community-driven.

In creating a sustainable community strategy, Howard (2010) stresses content creation, group formation, engagement tactics, expert discovery efforts, knowledge

sharing practices, and employee participation. He states that once the strategy is clearly defined, goals and objectives can be identified, clear measurements for success (return on investment) are marked, and the community life cycle becomes the map or playbook for understanding how to reach those goals and objectives.

Many authors underline the need for understanding the life cycle as a key to building a comprehensive community strategy, specifically when it comes to moderation and management (e.g. Kim, 2000; Howard, 2010). One of the existing categorisations of community life cycles divides them into four stages of On-Board, Established, Mature, and Mitosis (Howard, 2010). According to Howard (2010) the On-Board stage is the starting point of the community, in which the main value is created by the maintainers. In the second step, Established stage, the value is co-created with members and maintainers, as in the third stage Mature the community value is created mainly by users and the maintainers' role is already smaller, yet important (Howard, 2010). In the fourth stage, Mitosis, the conflict emerges as core community members become disenfranchised with new members who do not share same values. At this stage the community should be able to split into smaller nodes, thus returning to an Established phase and repeating the life cycle process (Howard, 2010).

Furthermore, Warms et al. (2000, p. 1) stress that an in-depth understanding of potential members, community programmes that engage members, and technologies that support those programmes should be combined in order to develop a successful online community. The term *active management* is used to describe a continuous process of managing, analysing and optimising community programmes over time (Warms et al., 2000). There are three core elements in active management: *active listening, evaluation, development and maintenance*. Active listening is an ongoing process for capturing information: member opinions, preferences, experiences, intentions, and needs (Mäntymäki & Mittilä, 2004). Evaluation is an activity or a series of activities that comprise the formal and informal perceptions by the parties involved, and the assessment of the impact of the perceived objects on the focal issue while development is the process of designing the specific community programmes that members will engage in.

In the management of online communities, it is important to consider what kind of relationships should be formed (Szmigin et al., 2005, pp. 486–488). By supporting members in different life cycle stages, it is possible to encourage them to develop in a community life cycle. Such activities are, for example, creating a visitors centre including all the information newcomers need, rewarding regulars, empowering leaders, and honouring elders. (Kim, 2000, p. 118)

3.2.2 How and why to facilitate collaboration in online innovation communities

Prior literature on collaboration

Collaboration has been studied in various fields, for example on collaborative learning (e.g. Dillenbourg et al., 1996; Roschelle & Teasley, 1995; Stahl, 2006), situated learning and communities of practise (Lave, 1991; Lave & Wenger, 1991), peer production (Bauwens, 2009) and technology brokering that focuses on companies instead of individuals (Hargadon & Sutton, 1997).

One of the most used definitions for collaboration says that collaboration is

> *"a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem" (p. 70, Roschelle & Teasley, 1995)*

Since in an online community context, communication has concentrated on asynchronous applications, for example in a discussion forum, this definition clearly sets a challenge for development of next generation "real" collaboration tools.

The two terms 'collaboration' and 'cooperation' are sometimes used as synonyms but it is useful to draw a distinction between them. In a detailed discussion of this distinction, Dillenbourg (1999) defined the distinction roughly as follows:

> *"In cooperation, partners split the work, solve sub-tasks individually and then assemble the partial results into the final output. In collaboration, partners do the work 'together.' (p. 8)*

Furthermore, creativity is the ability to produce work that is both novel (i.e. original, unexpected) and appropriate (i.e. useful, adaptive concerning task constraints) (Sternberg & Lubart, 1999). However, research on creativity and cognition often focuses on the moments of individual insight and does not address the phenomenon at the collective level (Gentner & Markman, 1997; Sternberg, 1999). According to Kurtzberg & Amabile (2001, p. 285), although researchers have addressed brainstorming in groups with mixed findings, little is known about how creative minds interact in group processes.

Earlier studies have shown that collective cognition in organisations has a significant effect on individual cognitive processes (Hutchins, 1991; Meindl et al., 1996; Thompson et al., 1999). The concept of the collective mind may explain the reasons why collective working, especially in high reliability organisations,

increases efficiency (Weick & Roberts, 1993). The most basic assumption underlying collective cognition is that human thought plays an important role in human behaviour. A second assumption is that a group is an entity with psychological significance (Gibson, 2001).

Online collaboration

To invoke user interest and collaboration, companies utilise certain design tools and toolkits. From the company perspective, interaction systems for customer integration are the primary instrument for reducing costs by shifting certain design tasks from the locus of the manufacturer to the locus of the customer, who can apply their need-related information directly without costly transfers to the producer. (Piller et al., 2004)

Users interested in designing their own products want to do so efficiently. Companies can therefore facilitate them with kits of design tools that ease their product development tasks and with products that can serve as “platforms” upon which to develop and realise user-developed modifications (von Hippel, 2005, p. 128). According to von Hippel (2005), user toolkits can be characterised by five attributes. First, they allow the user to experience learning via trial and error mechanisms. Second, toolkits offer an appropriate solution space regarding the user’s designing activities. Third, they are user-friendly and easy to handle in the sense that no special skills or training are required to operate them. Fourth, user toolkits ensure that user innovation created can be easily transferred to the manufacturer’s production system in order to be produced in larger volumes. Different kinds of configurators, choice boards, design systems, toolkits, or co-design platforms provide customers with sufficient “manufacturing related information” and guide the user through the co-design process of expressing their needs and wishes in a usable format (Piller et al., 2004). Furthermore, chat rooms and e-mail lists with public postings can be provided so that contributors can efficiently exchange ideas and provide mutual assistance (von Hippel, 2005).

Tools to help users develop, evaluate, and integrate their work can also be provided to community members. In fact, such tools are often developed by community members themselves. At the moment more complex online innovation communities devoted to the development of physical products often look similar to open source software development communities in terms of tools and infrastructures (von Hippel, 2005).

A good example of such a case is the Lego Factory community, offering users a Lego Digital Designer (LDD) design tool with which users can design their own 3-D models and share them with others. The product can also be ordered in customised packing. In addition to Digital Designer, Lego offered users an application called Mindstorms, a technic-based kit with a programmable brick, various sensors and actuators and a simple user programming language. This allowed users to create a variety of programmable models which would carry out various movements and developing ideas which the company had first explored in the 1990s. Significantly Lego discovered early in the life of Mindstorms that a growing number of users were 'hacking' the software and developing applications and extensions to the original code that Lego's team had produced. Rather than try and control or restrict this activity Lego adopted an open innovation approach, recognising that 'not all the smart guys work for us'. They also recognised that limiting creativity was contrary to its mission of encouraging exploration and ingenuity. By identifying key developers and then engaging their interest, for example by making available source code, running competitions, even putting a "right to hack" into the Mindstorms software license, Lego was able to gain considerable leverage on the original design. A growing user community began setting up websites, over 40 'recipe' books were produced and all sorts of hardware and software add-ons were developed. (From Tidd & Bessant, 2009)

As the previous example demonstrates, it is also fundamental for these toolkits how well they are able to communicate the knowledge of different stakeholders. There always exists an information gap between company and customer which arises from the asymmetrical distribution of information (Franke & Piller, 2004; Piller et al., 2005). The customer knows his/her use environment and practical needs very well, and the company holds knowledge in the product and production domains. Knowledge representation is important for participants to be able to communicate with other participants with different backgrounds and knowledge levels. Collaborative toolkits should somehow make these differences transparent and help users translate different contributions into a collectively understandable format/language.

Thrift (2006) describes the needs behind those toolkits that companies provide for their customers: Companies may offer various toolkits for collaboration and mass-customisation, which can be seen here as devices supporting collective mind and distributed cognition. The establishment of distributed cognition devices, intended to organise real-life experiments as preferences, tends to blur

habitual distinctions between production, distribution and consumption (Thrift, 2006, p. 279).

However, although collaboration has been present on the internet since the beginning of user-created content services, tools and methods for collaboration are still under development. In online communities users often work more or less individually all the time or at least part of the time. Therefore, tools that increase the sense of collaboration are needed in order to facilitate collaborative online innovation communities. As the definition of collaboration suggests, collaboration is mostly defined as a synchronous activity, and therefore tools enabling users to collaborate in real time are needed.

Furthermore, as earlier mentioned, in order to facilitate users' collaboration, tools are not enough but they need to be supported with appropriate methods and continuous active involvement by maintainers as in other kinds of online communities (e.g. Kim, 2000, p. 3; Szmigin et al., 2005; Warms et al., 2000). Based on the prior studies, users in companies' innovation communities appreciate company feedback even more than other peers' feedback (Jeppesen & Frederiksen, 2006).

Summarising the previous research on online collaboration

The most relevant literature on online collaboration from the perspective of this study is listed in Table 4. Both Piller et al's (2005) and von Hippel (2005) present some tools and methods for enhancing collaboration, yet there is a clear research gap in the studies of collaborative tools and methods in an online community context.

Table 4. Previous research on online collaboration.

Approach Author		Main empirical data	Most interesting results from the study's perspective
Toolkits	von Hippel, 2005	Case studies	Attributes of user toolkits: experience learning via trial and error, an appropriate solution space, user-friendliness, easy transfer of the content to the manufacturer's production system
Mass customisation, collaborative customer co-design	Piller et al., 2005	Case studies, 6 cases	Community applications to overcome the mass confusion phenomenon: generation of customer knowledge to provide a better starting (pre)configuration, the support of collaborative co-design fostering joint creativity and problem solving, and building of trust
Designing virtual customer environments for NPD	Nambisan, 2002	Literature review	Virtual customer environment design elements for customer interaction, knowledge creation, motivation, community-NPD team integration
Active management	Warms et al., 2000; Mäntymäki & Mittilä, 2004	Practical, literature review	Active management processes: active listening, evaluation, development and maintenance

3.2.3 Rewarding users

In this paper the dictionary definition of the term "rewarding" is followed, using it to depict the occasion when: "1) something is given in return for good or evil done or received or that is offered or given for some service or attainment, 2) a stimulus administered to an organism following a correct or desired response that increases the probability of occurrence of the response" (Merriam-Webster's online dictionary, retrieved 3.2.2008). When speaking on rewarding the community members, some authors, as well as practitioners, prefer to use the term "incentives" (Reeve, 2005).

Rewards can be divided into monetary (tangible) incentives and non-monetary (intangible) incentives (also called recognition) that do not have a monetary equivalent value. Monetary rewards can be bonuses, money, paychecks, fees,

trophies and awards. Non-monetary rewarding may be the member's name in honour roll lists or top ten lists, giving privileges and public recognition.

Rewards are also examples of extrinsic motivators. Within psychology, the research by Deci (1975) and Lepper et al. (1973) has presented results in which expected monetary rewards tend to reduce intrinsic motivation, whereas praise and other positive verbal feedback tends to increase it. Studies regarding rewarding and its relationship to intrinsic motivation have suggested that extrinsic rewards for intrinsically interesting activity have a negative effect on future intrinsic motivation (Reeve, 2005). Several studies have implied that the expectancy and tangibility of the reward reduces intrinsic motivation when the person expects a reward for a completed task (e.g. Lindenberg, 2001).

Intrinsic motivation, that is being motivated to perform a task because of the inherent enjoyment derived from doing it, is based in the feeling of self-determination and competence realised by the individual (Bartol & Srivastava, 2002). Bartol and Srivastava (2002) claim that in the case of extrinsic rewards contingent on engaging in or completing target behaviour, the individual would perceive the locus of causality of behaviour as external, and so the feeling of self-determination would be undermined thereby reducing intrinsic motivation. However, they admit that extrinsic rewards can also convey a signal affirming competence of the individual that has a favourable impact on intrinsic motivation. Thus, because of these competing forces, it is not easy to predict the outcome of extrinsic rewards on intrinsic motivation (Bartol & Srivastava, 2002).

This controversy is highlighted in several meta-analyses of past research (Deci et al., 1999; Eisenberger et al., 1999). Deci et al. (1999) found that rewards contingent on the completion of behaviour had an overall negative effect on free choice behaviour, but no effect on the individual's interest in the task.

On the other hand, in a meta-analysis of studies that measured self-determination, Eisenberger et al. (1999) found that extrinsic rewards had a positive effect on feelings of self-determination that is beneficial for intrinsic motivation. Furthermore, Eisenberger & Shanock (2003) suggest that when individuals believe they can obtain rewards by being creative, they become more creative. The expectation that creativity will be rewarded causes individuals to define the task as requiring creativity, to become immersed in it, and to search for novel ways of carrying it out. According to Eisenberger & Shanock (2003) rewards can also enhance creativity through increased intrinsic task interest.

Furthermore, in the organisation theory field it is suggested that rewards based on collective performance are also likely to be effective in creating a feeling of

cooperation, ownership and commitment among employees. Furthermore, Bartol and Srivastava (2002) found team-based rewards and company-wide incentives would be particularly instrumental in enhancing knowledge sharing with teams and across work units respectively.

There are many grounds for giving rewards, for example a reward can be distributed based on the success or activity in process or a quality of the completed task. Bartol and Locke (2000) identified several important aspects of organisational reward systems that are useful for motivating individuals to perform the targeted behaviours. These factors include, but are not limited to, perceived fairness of rewards, employees setting challenging goals in order to achieve attractive rewards, and practices that ensure that employees possess high self-efficacy for performing tasks. In order that reward systems meet these criteria and are effective, two basis prerequisites are that it should be possible for the reward giver to observe or record the target behaviour and to assess its value.

Currently, systematic rewarding is in use only in some online innovation communities. As earlier discussed, in OSS communities paying for the contributors is becoming a more and more usual way to motivate. In contrast to some earlier assumptions, Lakhani and Wolf (2005) found that being paid and feeling creative on F/OSS projects does not have a significant negative impact on project effort. For example, companies may pay for their employees to participate in OSS community actions if they have some interest in its outputs. In Q&A and micro-market crowdsourcing communities, studies suggest that the answer quality is typically higher in fee-based sites than in free sites and paying more money leads to better outcomes (Harper et al., 2008), yet Chen et al. (forthcoming) concludes paying more leads to longer answers but not better quality Instead Chen et al. suggest that the higher reputation of the respondents provides better answers. However, currently most crowdsourcing sites seem to rely on ad hoc design choices or trial and error when determining these rewards (DiPalatino & Vojnovic, 2009).

In innovation, intermediaries offering monetary rewards is common. Usually companies select the winning solution and the owner of that solution may get a significant reward. Wightman (2010) studied users' indirect and direct motivations in different kind of innovation communities, and based on the analysis concluded that in innovation intermediaries such as InnoCentive, it is challenging to attract users because of the task complexity and thus rewards commensurate with the difficulty of the tasks are needed. Wightman (2010) suggests that

dividing complex tasks into a large number of easier tasks could increase the users' motivations and reduce the use of monetary rewards.

Regarding online innovation communities, the idealised picture seems to be that the members' contribution is primarily related to intrinsic motivation, like fun, ideology and challenges. Despite some positive results concerning rewarding and motivation in online innovation communities (Harper et al., 2008; Lakhani & Wolf, 2005), the predominant belief appears still to be that no monetary rewards are needed and only non-monetary rewarding or unexpected rewards would be satisfactory for the members. This belief should be questioned with regard to the extent that this is true and whether it is actually a combination of both intrinsic and extrinsic motivation and the expectancy of being rewarded for work well done within an agreed set of rules.

In light of the rewarding models used in successful innovation intermediaries like InnoCentive, it seems reasonable to assume that multiple and varying types of motivation are present and members may also have multiple simultaneous goals behind their participation. If this is true, again a combination of both monetary and non-monetary rewards would be optimal for the members.

Overall, rewarding users should be a natural part of online communities since users use a lot of their time and effort, and thus it seems quite natural that they get paid for it. Furthermore, if a company crowdsources its key functions, in other words outsources them to an undefined (and generally large) network of people in the form of an open call, rewarding is needed in order to motivate users and to be able create a sustainable business model. Yet currently many online innovation communities still seem to lack a solid rewarding strategy. Because of these reasons, rewarding is a current topic that needs to be studied in a more detailed way in order to understand when and how it should be used as a part of the company's innovation strategy.

Summarising the previous research on rewarding

The most relevant literature on rewarding from the perspective of this study is listed in Table 5. There is a gap of studies concerning rewarding groups in online innovation communities, which gave the reason for focusing on this issue in the study at hand.

Table 5. Previous research on rewarding.

Approach Author		Main empirical data	Main results
Rewarding in psyhology	Deci et al., 1999	Meta-analysis	Expected monetary rewards tend to reduce intrinsic motivation, praise and other positive verbal feedback tends to increase it
	Eisenberger & Shanock, 2003	Case study	Rewarding of creativity causes individuals to define the task more carefully, to become immersed in it, and to search for novel ways of carrying it out. Rewards can enhance creativity through increased intrinsic task interest
Organization based research	Bartol & Locke, 2000	Literature review	Presenting important aspects of organisational reward systems, reward giver should observe or record the target behaviour and to assess its value
	Bartol & Srivastava, 2002	Literature review	Team-based rewards and company-wide incentives are instrumental in enhancing knowledge sharing with teams and across work units respectively
Rewarding in OSS communities	Lakhani & Wolf, 2005	Web survey, 684 answers	Being paid and feeling creative on F/OSS projects does not have a significant negative impact on project effort
User rewarding in micro-market	Harper et al., 2008	Comparative field study	The answer quality is typically higher in fee-based sites than in free sites and paying more money leads to better outcomes
	Chen et al., (forthcoming)	Field experiment	Paying more leads to longer answers but not better quality, the higher reputation of the respondents provides better answers
	DiPalatino & Vojnovic, 2009	Multiple methods	In order to motivate users and to gain quality answers it is important to formulate tasks carefully
Rewarding in crowdsourcing services and online innovation intermediaries	Wightman, 2010	Comparative case study	Dividing complex tasks into a large number of easier tasks could increase the users' motivations and reduce the need for monetary rewards

4. Methodology

4.1 Case study approach

This study represents a qualitative case study with multiple cases (Yin, 2003, pp. 12–14). Although the case study approach is understood a bit differently in different research fields, it should not be seen as a methodological choice but rather a choice of what is to be studied (Stake, 2000). According to Yin (1994, pp. 11–13), the case study is:

> *"an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when boundaries between the phenomenon and the context are not clearly evident. The case study inquiry copes with the technically distinctive situations in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result benefits from the prior development of theoretical propositions to guide data collection and analysis."*

As a research strategy, a case study is used in many situations to contribute to our knowledge of individual, group, organisational, social, political, and related phenomena. In general, using a case study is regarded as a relevant strategy when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context (Yin, 2003, p. 7). Furthermore, according to Burrell and Morgan (1979), case study research is especially well suited when the purpose of the research is a deep understanding of the nature and relevance. Case studies are also mentioned to be well-suited for studying unexplored emerging field and thus aiming for theory-building, such as this study aims (Yin, 2003).

This case study includes three cases, i.e. three online innovation communities which were investigated empirically. Using many cases is common for many reasons. First, they allow cross-case analysis that is used in theory building (Perry, 1998). A two-step theory building position is consistent with the realism paradigm's search for capabilities rather than regularities, for analytic generalisation (Tsoukas, 1989) rather than statistical generalisation (Easton, 1994; Ragin & Becker, 1992; Yin, 2003). In analytic generalisation the investigator is striving to generalise a particular set of results to a broader theory (Yin, 2003, pp. 32–33). In fact, generalisation in qualitative research is not parallel to what the term means in quantitative research. According to Alasuutari (1995, p. 251) in qualitative studies authors always indicate how they assume or claim that their study increases knowledge beyond the specific case analysed. Furthermore, the evidence of a multiple case study is often considered more compelling and the study is altogether more robust than a single case study (Miles & Huberman, 1994, p. 2; Yin, 1994, p. 45). An additional reason in favour of selecting multiple cases is that it also allows the use of replication logic.

In case study approach, a triangulated research strategy is commonly used, which means using different types of materials, theories, methods and investigators in the same study (e.g. Brewer & Hunter, 1989; Denzin, 1978; Koskinen et al., 2005; Patton, 1987). Stake (1995) used the term triangulation about the protocols that are used to ensure accuracy and alternative explanations. The need for triangulation derives from the ethical need to confirm the validity of the processes. The present study utilises the triangulation of data, methods and theories in order to understand the complex phenomenon as well as to increase the quality of this study. The data was collected during the study by theme interviews, a web survey and using other documents as secondary material. Both parties of online innovation communities, maintainers and users, were involved in the data collection. To conclude, the multiple case study approach was chosen in this study because of the explorative nature and aim for deep understanding.

Yin (2003, pp. 46–50) advises that multiple cases should be regarded as multiple experiments and not multiple respondents in a survey. The selection of the number of cases is not done on statistical grounds in multiple case studies; instead the issue should be approached conceptually (Miles & Huberman, 1994, p. 30). The number of cases is related to the number of replications sought. The more replications designed, the more certainty about the results there is (Yin, 2003, pp. 47–51). For these reasons addressed replication logic, not sampling logic, should be used for multiple case studies. Therefore, representativeness is not the

criteria for case selection (Stake, 1995), rather that the selected case predicts similar or contrary results (Yin, 2003). Conversely, the sample is theoretical and purposeful; it can be anything from one case to several, depending on when saturation is reached. This kind of study, when theory generation and theory testing are done concurrently, can be called interactive research (Gummeson, 2001, pp. 38–39). In this study, the cases were selected by judgemental sampling where an expert uses judgement to identity representative samples (Aaker & Day, 1997).

Patton (1990) has listed 15 strategies for purposeful sampling. In some cases he even advises to use maximum variation that may include very extreme cases, but the most important is to use information-rich cases. Naturally, the choice of the cases is also dependant on the conceptual framework developed from the theory.

In this research, three online innovation communities were regarded as sufficient to allow for enough replication. An important step in replication logic is the development of a rich theoretical framework. This, however, required careful selection of sample cases to allow both literal and theoretical replication. The framework needs to state the conditions under which a particular phenomenon is likely to be found, which is called a literal replication. In addition the conditions when it is not likely to be found, in other words when a theoretical replication is needed (Yin 2003, p. 47). In other words, in literal replication similar results are predicted and in theoretical replication contrasting results but for predictable reasons are predicted. Earlier cooperation with the community maintainers enabled researchers to get good access to the communities and collect data with various methods, as well as utilising researchers' existing knowledge. Because of the close connections with the cases, authors also had in-depth knowledge, which was utilised in the analysis.

Yet, since all the chosen cases represent such online innovation communities that can also be referred as online innovation intermediaries, there are limitations of the representativeness of this sample. As a result, some perspectives might be missing from the framework, which sets clearly need for further studies. However, in this explorative study, representativeness of the sample was considered as sufficient in reaching the study objectives.

4.2 Research methods and data collection

The studied cases are online innovation communities representing different kind of online innovation intermediaries called CrowdSpirit, FellowForce and Owela. The cases originate in different countries as the first one is from France, the sec-

ond from the Netherlands and the third one from Finland. All of the cases were recently opened, internet-based services, yet having very different backgrounds and objectives, and therefore offering multiple views on the phenomenon.

As earlier mentioned, the data was gathered with multiple methods by using a triangulated research strategy, which means using different types of materials, theories, methods and investigators in the same study (Brewer & Hunter, 1989; Denzin, 1978). The data collection process and how the data was utilised in each publication is illustrated and time scheduled in Figure 7.

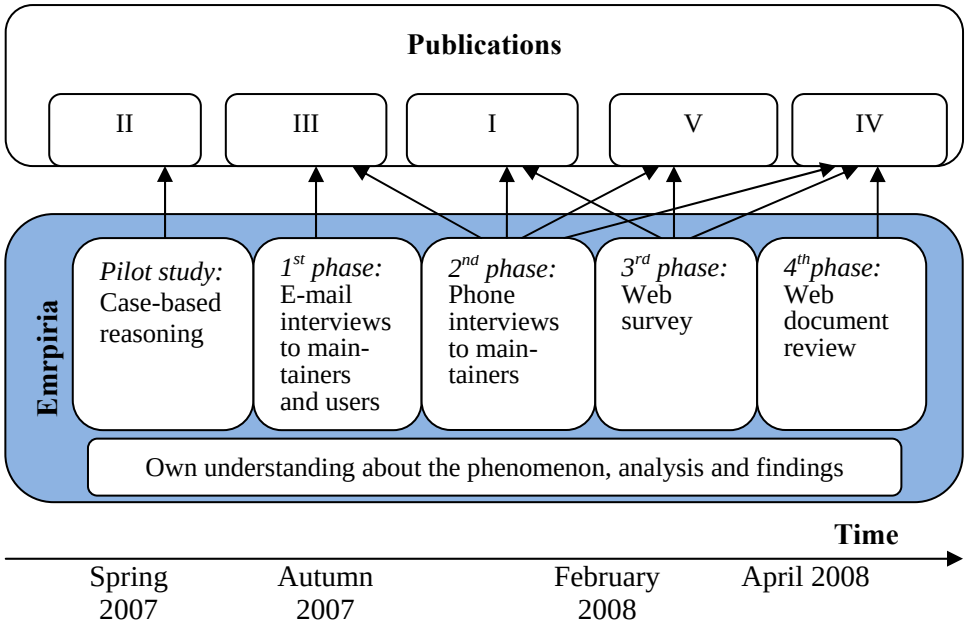


Figure 7. Data collection methods and data usage in publications.

Before using the case study method, a case-based reasoning method was used in paper II[5]. In this study three co-design services (Bookmooch, InnoCentive, InnerTee) were introduced and utilised as case examples of user-based innovation. From our examples and data, we tried to identify regular patterns of collaborative design and problem-solving processes. To offer a dyadic perspective about

[5] The papers are numbered basis on their themes not basis on their chronological age. Composition of papers is depicted in Figure 2, page 14.

the studied phenomenon, both viewpoints, customers as innovators and companies as offering motivation and tools for innovation, were considered.

In the first phase of the case study, open-ended questions were posted to the maintainers and users by e-mail (Appendix B). The questions were sent to people in different positions. Altogether, we got five responses from the maintainers and 12 responses from the users. We asked the maintainers questions on the following topics: What does collaborative creativity mean to them, what motivates users to create collaboratively, how they support collaborative creativity now, and what their future plans are. From the members, we asked what is best in the service, whether they are motivated to innovate collectively, how the service supports that and how it could support more.

Then, three maintainers (one from each community) were interviewed by phone to be able to ask more specific extra questions which arose after the first e-mail question round (Appendix C). The questions included whether they see that the members are working as a group or as individuals for a challenge, and what kind of needs they see for developing collaboration. The semi-structured interviews with the maintainers lasted approximately one hour each and they were recorded and transcribed.

After that, researchers collected data through a web survey with the community members. The web survey questionnaire is provided in Appendix D. The web survey was based on the knowledge acquired from the interviews as well as the literature review and an analysis. The questionnaire was composed in February 2008 and posted on the Webropol online service. The questionnaire was tested with two people at the beginning of March 2008. Some changes were made to the questionnaire based on their comments. After this, community maintainers were contacted to agree about conducting the study. Thirty FellowForce members and fifty CrowdSpirit members were contacted by e-mail by the community maintainers and asked to participate in the survey. In addition, the questionnaire was linked to web pages of the online innovation community Owela and marketed in Owela's newsletter which was sent to its members.

Empirical data was gathered by the web questionnaire from mid-March to mid-April in 2008. From CrowdSpirit members we got 24 responses, from FellowForce members 8, and from Owela 12 responses. Since we only know the number of sent requests in CrowdSpirit’s and FellowForce’s cases but not the number of people who clicked the web survey link and after that decided whether to answer or not, the response rate cannot be estimated in any of the cases. In

addition, in paper IV researchers also analysed the current ways of rewarding in 12 innovation intermediaries by visiting their websites.

4.2.1 Analysis of the interviews

The interviews were based on the interview guide to be sure that theoretically interesting topics were covered. During the interviews some new interesting themes arose that were followed. As a secondary material other sources (websites, presentation material) were used to confirm some facts.

In the analysis, the idea was to give data a possibility to speak. Nevertheless, it should be mentioned that even if the qualitative approach is stressed in all parts of the methodology, the impact of the researchers' pre-understanding and background cannot be eliminated. However, the impact can be diminished by recognising and accepting this fact. For instance, in categorising the results, there is a question about the level of abstraction. In fact, there is not one solution, but it is only a question of taste as to which one to use (Roos, 1999). Yet since the analysis was conducted in cooperation with another researcher (and partly with two other researchers), the impact of one researcher's own opinions is less.

4.2.2 Analysis of the web survey

Data was analysed using SPSS software. Because of the explorative nature of this study, most research questions were rather simple and uncomplicated by nature. Thus, not very advanced methods in analysing the data were needed. On the other hand, the small amount of replies also made it impossible or inappropriate to use certain methods. Methods used were descriptive statistics, like basic frequencies and percentages, and as non-parametric methods T-test and cross tabulations of the selected variables were used when appropriate. In analysing the results between people in various communities and with various lengths of membership, an independent samples T-test was used. For this, a few new variables were created. The question about which online innovation community the participant belongs to was re-categorised into two groups: 1) those belonging to CrowdSpirit and 2) those belonging to some other community. In addition, the question about how long the participant has been a member of the community was re-categorised into two groups: 1) those who have been members for 0–6 months and 2) for 6 or more months.

Groups with at least 20 respondents were formed, which is a prerequisite for using a T-test. Furthermore, we were not interested in the detailed differences between the smaller groups (i.e. between those who have been members for 1–3 months vs. those with 4–6 months etc.). Instead, we were more interested in the common direction of the membership evolution: does longer experience and membership affect the results positively or negatively? However, in the case of the different communities, we would have wanted to obtain more detailed differences between every community we got answers from. The Levene's test for equality [equal variances assumed (Sig > 0.05)] was passed if not explicitly stated otherwise.

4.3 Brief description of the cases

The descriptions are based on the situation in spring 2008.

4.3.1 CrowdSpirit

CrowdSpirit (www.crowdspirit.com), which originates in France, focuses on electronics design. Many users would like to design and to innovate tailor-made gadgets and have them manufactured for themselves. The founders and maintainers of CrowdSpirit have built toolkits for users to submit their designs and ideas. Similarly, CrowdSpirit includes tools for commenting on and voting for different designs. For visualisation, CrowdSpirit provides mind maps which illustrate product ideas with proposed features.

The CrowdSpirit platform proposes a model based on crowdsourcing that enables businesses to directly involve innovators from outside the company in the design of innovative products and services. First, a company sets a challenge and the criteria for selecting the best ideas on the web service, called an "incubator". Innovators submit, vote on and discuss the ideas, and then the best participants are invited to join the project team. The project team summarises up to three concepts based on the discussions of the ideas presented in the "elevator". These concepts are presented to all innovators, who choose whether to validate them or not. The company shares the winnings, if any, equitably among all the members of the project team. In a sense, CrowdSpirit acts a mediator between enthusiastic users and manufacturing companies. In addition to money, CrowdSpirit announces a Top Five List of the most successful users.

The digital wall calendar is a good example of a product designed in CrowdSpirit. After collecting the project team, making the specifications and a

marketing plan, the project team asks for quotations for the development. In CrowdSpirit, members are used to collaborate with others. They discuss and rate others' ideas and work together in the product design process.

4.3.2 FellowForce

FellowForce (http://www.fellowforce.com) is an innovation marketplace and an intermediary that enables companies to submit innovation challenges to solvers. The origin of FellowForce is in the Netherlands and in Poland. Solvers provide suggestions (pitches) to a challenge and the best solvers are rewarded. Unlike other services, such as InnoCentive (www.innocentive.com) and NineSigma (www.ninesigma.net) FellowForce allows solvers to submit their own pitches to companies. Normally, the best pitches that match those challenges are rewarded with money. In addition to monetary rewards, FellowForce announces 'Fellow of the month' and 'Fellow ranking' on the website.

The collective creativity is realised in the "Innovate Us" functionality of FellowForce. This functionality allows any company or organisation to use FellowForce as an open suggestion management system. Any registered participant may submit an innovation but also view the responses of other users, if this feature is turned on. FellowForce also offers services for companies to launch their own co-creation platforms on their websites.

4.3.3 Owela

Owela (http://owela.vtt.fi) is a participatory web laboratory for designing digital media products and services. It aims to be a conversational web community that connects users with developers and researchers and promotes open innovation. Owela offers social media tools for gathering user needs and development ideas as well as collecting feedback for scenarios and prototypes.

Owela is developed at VTT in Finland as part of the project called "Social media in the crossroads of physical, digital and virtual worlds" (SOMED, 2006–2008). At the time of the study, Owela consists of IdeaTube and TestLab, as well as a blog, chat and recommended bookmarks. In IdeaTube, users may participate by commenting on the descriptions and visualisations of different situations, needs, ideas, scenarios and prototypes. In TestLab, the prototypes of future products and services can be tested in the beta phase, and the users are expected to give feedback and development ideas. Owela has been used as an innovation

platform in research projects, as well as studies conducted for companies, such as usability testing of websites.

Owela offers both monetary and non-monetary rewards for users. Monetary rewards have been for example movie tickets, and they have been given based on a lottery, the quality of ideas, or a user's activity level. As a non-monetary reward users have gained recognition on the website. However, according to the maintainers, the rewarding strategy is under development.

5. Contributions and future research paths

5.1 Summaries of the research publications

5.1.1 Publication I: "Innovating is fun" – Motivations to participate in online open innovation communities

Online open innovation communities offer customers an environment where they can participate in companies' product and service development. In order to attract and commit customers to participate in those communities, it is important to understand their motivations for participating.

The aim of this case study is to explore members' motivations in participating in innovation processes in online open innovation communities. The study focuses on three online open innovation communities: CrowdSpirit, FellowForce and Owela. Data was gathered using maintainer interviews and a web survey of members.

The results show that intellectual challenges and fun are the top motivations for participants. Also interest in innovation, the possibility of influencing and creativity were regarded important factors. In contrast to previous studies, community returns as altruism, inspiration from others' ideas, collaboration and common goals were not seen as the most important factors. This might also tell us about the lack of community tools and reward methods in the case communities.

According to the maintainers of the cases, being in touch with interesting companies is one of the members' motivating factors. Yet, the members in these cases did not seem to regard gaining professional benefits and enhancing one's career as central motivators. However, we believe that this factor varies in different kinds of online open innovation communities, and therefore further studies of this issue are needed before drawing conclusions.

This explorative study in the emerging research field is intended as an initial step towards creating an in-depth understanding on user's motivations in partici-

pating in online open innovation communities. From the company viewpoint, this study provides important knowledge of the users' motivations in participating in online open innovation communities which is needed in order to build a successful and active online innovation community.

5.1.2 Publication II: Supporting collective creativity within open innovation

A dynamic and turbulent business environment with constant interventions of new technological, and social and management innovations forces companies to seek new ways of involving existing customers more tightly in the innovation process, and at the same time attracting potential customers. Customising products and services according to customer preferences might do the job for most customers, but some advanced and enthusiastic customers want to have even more influence on the defining process. Open innovation is a newly emerging paradigm that includes close collaboration with customers in the innovation process, not just in defining the product features from a predefined set of alternatives. Recent studies emphasise the need to support collective creativity instead of individual creativity.

The aim of this study is to explore what motivates customers to collaborate in the innovation process, and how this process can be enhanced by offering appropriate tools. After discussing the earlier literature on the open innovation paradigm, collective creativity and users' motivations in participating in the innovation process on the web, three cases (Bookmooch, InnoCentive, InnerTee) illustrate that a service can be both addictive to customers and profitable for companies. These cases are also contrasted with Web 2.0 business models to find out what kinds of information systems and toolkits should be used in different communities with different member motivations.

As a result, we discovered that the earning logic and value creation models are different in each case. Bookmooch receives Amazon exchange fees every time someone buys an Amazon book through the Bookmooch user interface. InnoCentive gets a percentage for every solved case, and InnerTee takes its share of the designs and mixes sold. What is similar to all of these cases is that users act mostly without service provider firm interruption, and even customise and maintain the service by themselves. Those collective creativity factors – help seeking, help giving, reflective reframing and reinforcing – were only partially realized in these three cases.

Furthermore, the design of toolkits for community collaboration seems to require more research on motivational factors and collective creativity reflective reframing and reinforcing were only partially realized in those three cases. For practitioners and researchers this study brings out important and relatively unexplored issues on enhancing collective creativity in online innovation communities. In addition, the analysis of different Web 2.0 toolkits offers practical examples for companies on what kind of online tools have been used and can be used in enhancing collective creativity among users.

5.1.3 Publication III: Motivating and supporting collaboration in open innovation

The individual and group level aspects of OI have remained an unknown, less-researched territory. Similarly, creativity research has inadequately described the collective processes and motivational factors at the group level. There are also many literature examples of toolkits for user innovation for mass customisation. However, toolkits for community collaboration are seldom covered in the literature.

In this case study we explore collaboration in open innovation communities. We focus on the following two research problems: How can users be motivated to collaborate in open innovation communities, and what kind of tools and methods can support collaboration in open innovation communities?

The exploratory case study includes three innovation intermediaries originating in three different countries: France, the Netherlands and Finland. The primary data source consists of the open-ended questions posted to the maintainers and users by e-mail. The data includes five responses from the maintainers and 12 responses from the users. The secondary source is the internet document review. The classification of the factors in the preliminary framework is derived from reading and rereading the answers of the respondents until the themes started emerging from the data. Thereafter, the data are coded according to the chosen themes.

The results suggest that monetary rewards are not always the best way to motivate contributing users. Instead, contributors appreciate many intangible factors, such as community cooperation, learning new ideas and being entertained Contributors also appreciate good support and the right cooperation tools from their service provider.

Based on the results, companies should provide community members with tools that are easy to use, allowing people to express themselves and share their

personal details. It seems to be important that maintainers are involved as visible members of a community, which includes talking about themselves in a more detailed way.

Our study focusing on the utilisation and practical knowledge on enhancing collaboration in OI context is a new and essential opening towards holistic understanding and dissemination of OI. The data was based on only three cases with a limited amount of participants; hence, it may be that in gathering empirical data from a larger group of cases, some new factors will be found. Since the study area is new and in the multidisciplinary field, there are many different paths to the research.

5.1.4 Publication IV: Rewarding in open innovation communities – How to motivate members?

Open innovation communities can act as a source for learning and producing external ideas or even solutions for companies. To integrate customers into companies' innovation and development processes by utilising open innovation communities, companies need tools, platforms and methods, as well as different types of services provided by external companies. In order to attract and enhance users' commitment to participate in online open innovation communities, it is important to know what types of motivators are important for the members. Both monetary and non-monetary rewards can be used for motivating participation.

In this study we focus on studying the role of rewards in online open innovation intermediaries. The first question explores the role of rewards in open innovation communities, while the second concentrates on finding out what type of reward can be used to motivate members to contribute to ideation in online open innovation communities. The data was collected by semi-structured interviews with the community maintainers of three open innovation intermediaries and through a web survey in the communities maintained by them.

In the communities studied, the web survey respondents found monetary rewards important, as well as non-monetary rewards based on the quality of ideas. According to the maintainers' interviews, combinations of monetary and non-monetary reward are important. In addition, we analysed the reward mechanisms in twelve open innovation communities. As a result we found that both reward methods were used in half of them. In fact, all of the intermediaries studied offered monetary rewards.

This study is a path opening in studies considering rewarding in online open innovation communities maintained by intermediaries. In addition to serving academia, the study provides practical implications on the type of reward mechanisms that are relevant to the community members. The implications are useful for the increasing number of open innovation intermediaries on the internet, as well as for the companies who are building or planning to build their own innovation communities.

5.1.5 Publication V: Towards collaborative open innovation communities

Open innovation (OI) communities have dramatically changed our conceptions of how innovation can and should be managed, and have prompted calls for new theories of innovation. OI communities with customers can act as a source for learning and producing external ideas or even solutions for companies. As earlier studies indicates that collective problem-solving improves the quality of ideas; motivating and supporting collaboration in online OI communities is important.

This study explores collaboration in online OI communities by answering two questions. The first question considers users' motivations for collaborating in OI communities, while the second explores how rewards can be used to motivate collaboration in OI communities. The study consists of three cases: CrowdSpirit, FellowForce and Owela. The preliminary results are based on the data gathered by interviewing maintainers of the communities and by a questionnaire to the community members.

According to the results, the users were motivated to collaborate by the interesting objectives and the concept of the community, gaining new viewpoints from other users, obtaining better products and receiving rewards. The results also indicate that the lack of proper tools inhibits collaboration in OI communities. Furthermore, an OI community's reward strategy should be transparent and logical. Rewards should be based on the efforts and quality of the work rather than on giving rewards based on the quantity of ideas or lotteries. The system should be flexible so that rewards vary in different situations and phases of the work. The equity and democracy of the reward system are important factors for OI community users. Additionally, customisability of the reward strategy ensures that users can influence on some level the nature of the rewards they receive, and the rewards will, therefore, be more valuable to everyone.

This explorative study is one of the first studies of collaboration in online OI communities. In addition to serving academia, the study provides practical knowledge on how to reward and to motivate groups of members on the web, to companies and the growing number of innovation intermediaries building or planning to build online innovation communities.

5.2 Summary of the main results

The overall aim of this twofold research was to provide a framework for building and managing a collaborative online innovation community based on the knowledge of both sides: the users' motivations to participate and the maintainers' opportunities to facilitate the community especially through rewarding.

To achieve the purpose of the study, the following questions (RQ1–RQ2) were answered.

5.2.1 RQ1. Why do users participate in collaborative online innovation communities?

The results show that collaboration with others was seen as being enriching, fun, productive, efficient, and even the best way to trigger creative innovations. Thus, it can be stated that in the light of earlier research as well as this study, collaborative work in the innovation online communities is something that should be sought in order to get the most out of peoples' creativity.

The results show that *interesting objectives* and *concepts* motivate users to collaborate in online innovation communities. One good example is hobbyist communities in which enthusiastic users can easily be motivated to participate and collaborate. Furthermore, the results show that users are willing to collaborate if they feel that they can *influence the product/service development.* Users also mentioned that they collaborated to *gain new viewpoints*. According to the results, users are motivated to collaborate because they consider it an *efficient way* to operate. On the other hand, from the hedonistic viewpoint, users find collaboration *fun*. Moreover, the *sense of cooperation and community* and *similarity* with other users also motivates users to collaborate. The study also brought out a less discussed motivation factor in prior literature, namely an *open and constructive atmosphere*, which seems to motivate users to collaborate with others. Finally, the right kind of *rewarding* that supports collaboration is an important motivator in the users' eyes.

5.2.2 RQ2. How can maintainers facilitate collaborative online innovation communities by rewarding?

Supporting collaboration is demanding in an online environment, where there is a lack of physical contact with others. It is already challenging to engender collaboration between strangers in face-to-face situations, and the internet environment where there is only a virtual presence makes this even harder. Based on the study, collaboration in online innovation communities faces many challenges, such as scheduling and managing time and creating the sense of cooperation between members. Also, getting people to know each other is needed in order to make communication easier.

According to this research it seems that what is needed are tools that are easy to use, allowing people to express themselves and share their personal details. It seems to be important that maintainers are involved as visible members of a community, communicating actively and also telling about themselves in a more detailed way. All in all, the profile tools in CrowdSpirit, Owela and FellowForce did not allow users to say much about themselves. In addition to this, a greater sense of collective working was suggested, for example, using a web camera and organising brainstorming and real-time discussion sessions. Users should be able to feel like they are sitting around the same virtual table and working together as a group. Also the ability to comment on others' designs and suggestions may be even more efficient in motivating collaboration.

In the literature, it has been suggested that there is a negative impact on intrinsic motivation if extrinsic rewards are used (e.g. Deci et. al., 1999). However, some of the studies have shown opposing results as well (e.g. Lakhani and Wolf, 2005). It seems natural that people want to get paid for their time and effort. The previous research has mainly been conducted in OSS communities or hobbyist communities (e.g. von Hippel, 2005; Lakhani and Wolf, 2005; Jeppesen and Frederiksen, 2006), which are often based on a certain type of enthusiasm, such as a hobby or are even brand-related.

Based on the survey data, rewarding has an essential role for the respondents. However, it seems that current rewarding systems definitely increase participation, but not collaboration. One challenge is related to rewarding groups in a way that motivates collaboration. In the three cases (CrowdSpirit, FellowForce and Owela), only individuals were rewarded. However, to reward a group of people for their mutual collective work in the right way and with the right kind of reward is practically and theoretically challenging.

The survey results indicate that monetary rewarding is important, as well as recognition based on the quality of ideas. The members appreciate the fact that rewarded members are announced on the website, which can also be called social recognition. The survey respondents did not favour activity in the community as a measure for rewarding. This may be due to the fact that activity in the community as such does not necessarily have a relationship to contributing to the challenges with ideas or the quality of the contributions. The respondents' reluctance to rely on the number of presented ideas may also be related to the fact that activity, even in the form of a number of ideas, is not a guarantee of the quality of the contributions.

Furthermore, the study suggests that users' behaviour may not be similar in cases where an online innovation community is run by an intermediary since their business model is based on the participants of the community ideating or innovating and revealing their ideas to challenges given by external companies.

The study considered as well what type of rewarding can be used to motivate users to participate in online innovation communities. The interviewed community maintainers pointed out the importance of combining monetary and non-monetary rewards, as well as stressing the need to understand the motivations of different groups of members. The analysis of the rewarding methods used in 12 online innovation intermediaries indicated that both rewarding methods were used in half of them. In fact, all of the studied intermediaries offered monetary rewards.

Non-monetary rewards are often inexpensive and fairly easy to realise in online innovation communities. They can be realised by including top ten lists or corresponding systems on the websites. Despite the kind of rewarding that is used, monetary or non-monetary, a detailed plan for creating a rewarding model is needed. One of the main questions concerns the kind of behaviour that should be rewarded. In other words, if collaboration is the kind of activity that should be promoted, a rewarding system should concentrate on rewarding groups instead of individuals. Also, an understanding of what the members of the community regard as a fair way to reward them is needed.

In addition, one of the interviewed community maintainers pointed out that a way of answering the challenges in online innovation communities in the future may even be to work without any commitments to one traditional employer, but rather working as a free expert or 'freelancer'. In such cases, the importance of getting reasonable rewards naturally plays a major role. Users do want something in return when they participate and contribute to the innovation processes.

This has been realised in online innovation communities run by intermediaries and many of them have taken various rewarding mechanisms into use. A special characteristic of intermediaries is that the users often do not have an existing relationship with the company they are ideating for.

Based on the data the important elements of the rewarding strategy were suggested. First, the rewarding strategy should be *transparent* (TR) *and logical* (LO). In other words, users should know why, when and how the rewards are given and can then plan their activities based on that information. In addition to motivating users, they should feel that the system is logical so that for more valuable input more reward is also gained.

Second, *democracy (DE) and equity* (EG) of the system is important. In a collaborative online innovation community it is natural that users want the chance to influence the distribution of the rewards, for example by voting. Every user should also feel that the system treats them fairly.

Third, *flexibility* (FL) of the strategy ensures that the nature of the rewards may vary in different situations and phases. In, for example, the commercialisation phase, monetary rewards may be more significant than in the preliminary ideation phase. The power and possibilities of intangible rewards as part of the rewarding strategy should not be underestimated. For example, intangible rewards are usable in supporting the aim of the fun aspect of the community. Furthermore, in the case of collaborative online innovation communities, rewarding group work is a central element in the rewarding strategy.

Fourth, *customisability* (CU) of the rewarding strategy ensures that users can influence, on some level, the nature of the rewards they receive and that the rewards will therefore be valuable to everyone. Some communities for example give points as the reward and users can then choose what reward they will take from the wide selection of the products or services. Many of them include the possibility to donate the points to a charity as well.

Finally, *active participation and feedback by the maintainers* (AP) is essential to the rewarding strategy. The results show that users want to receive feedback from the maintainers about their ideas. They also appreciate rewards such as visiting the maintainers' premises, for example.

5.2.3 The framework of building and managing collaborative online communities

Based on the discussed results, Table 6 (modified from Publication III) illustrates a framework of users' motivations to participate in online innovation communities, maintainers' tools and methods to facilitate them, and the important elements of rewarding. The abbreviations in brackets refer to the above-mentioned elements of the rewarding strategy.

Table 6. Framework of users' motivations for participating, tools and methods for collaboration, and important elements of rewarding in collaborative online innovation communities.

Users' motivations for participating in collaborative online innovation communities	Tools and methods for collaboration	Important elements of the rewarding strategy
Interesting objectives and concept	Active management, clear value statement, usability	Clear and logical rewarding strategy (LO)
Open and constructive atmosphere	Active management, rules, participants' personal information	Transparency (TR), democracy and equity (DE, EQ)
Influencing, making better products / services	Good usability of the service, tools for idea generation and processing	Flexibility (FL): monetary rewards if idea commercially exploited, efficient communication by the maintainers (AP), democracy (DE)
New viewpoints, learning, synergy	Tools for idea generation and processing	Rewarding based on the efforts and quality of the work (EQ), democracy (DE)
Sense of efficacy	Tools for idea generation and processing, time management and face to face meeting tools	Different types of rewards in different phases (FL)
Having fun	Good usability of the service	Use of intangible rewards (CU)
Winning, competition and rewards from participation	Rewarding equitably groups rather than individuals	Rewarding groups (FL), rewards should be valuable for everyone (CU)
Sense of cooperation	Profiles and status information, time management and face to face tools	Rewarding groups (FL)
Sense of community and similarity	Profiles and status information, time management and face-to-face tools	Common meetings and visits (AP)

The tools and methods presented as well as important elements of the rewarding strategy in Table 6 are relative representations, whose value varies depending on what they are compared with. Thus, instead of offering measurable tools, their role is to guide companies to the right direction. Hence, the objective of Table 6 is to provide an example of how knowledge of motivations, tools and methods and rewarding elements can be utilised in managing and building collaborative online innovation communities.

Based on the results the study makes the following propositions, which can be further used as hypotheses in the following studies.

In order to motivate users by offering interesting objectives and concept, the maintainer should participate actively in the community actions by regular content updates and keeping discussions lively, for example. Also the usability of the community and the clear value statement with clear and logical rewarding strategy so that users know when, why and how the rewards are distributed, supports users' motivations.

In innovation communities, where users should feel creative, one of the important motivators is an open and constructive atmosphere. Furthermore, to motivate users by offering an open and constructive atmosphere again highlights the role of the active management by the maintainers. The culture of the community reflects the whole atmosphere and the rules of the discussion should be clearly stated. Providing participants' personal information helps to create a trusting atmosphere. To support these motivation factors, transparency, democracy and equity of the rewarding strategy are needed.

The study showed that influencing and making better products and services motivated users. To support this, the community should be easy to use and include tools for idea generation and processing – refining, commenting and rating. Flexibility of rewarding should be taken into consideration to nurture the concept. For example, the role of the monetary rewards should increase if the idea is commercially exploited. Active feedback of the maintainers in rewarding by giving feedback to the users' on their ideas, and also telling them the stage of the process if the idea is exploited, supports the idea. Furthermore, a democratic rewarding system with which users can influence the reward distribution enforces a feeling that users can make a difference by their actions.

Moreover, to offer new viewpoints and synergy for users, the role of the appropriate tools in encouraging dialogue between users is underlined. To support that, rewarding should be based on the efforts and quality of the work. Also the strategy should be democratic in order to motivate idea sharing.

One of the reasons to collaborate was effectiveness, which can be supported again by offering appropriate tools. Different types of time management and online face to face tools are also needed. It is suggested that flexibility of the rewarding strategy has a positive influence especially on the sense of efficacy.

Based on the results, it seems users also participated because of the entertainment value of the community. If this is a motivator, usability of the services is in important role. Well planned use of intangible rewards can support this motivating factor. Some of the users were motivated because of the possibility of winning and getting rewards. In this case flexibility of the rewarding strategy is needed and rewards should be valuable for everyone. In practice this can be achieved by letting users choose the reward they desire from a variety of different types of rewards.

Users also participated because of the sense of cooperation, sense of community and similarity. To support these motivation factors, the focus is on providing applications that help users and maintainers include and update profile and status information, as well as offering time management and face-to-face tools. In rewarding, it is important to consider how to reward groups not individuals. Also maintainers' active participation and organisation of, for example, meetings and visits to the company premises or online meetings can support these motivation factors, especially the sense of community.

5.3 Theoretical contribution

The overall aim of this twofold research is to provide a framework for building and managing a collaborative online innovation community based on the knowledge of both sides: the users' motivations to participate and the maintainers' opportunities to facilitate the community especially through rewarding.

As a multidisciplinary study the theoretical contribution is dispersed in various fields, especially in new product development studies, open innovation, lead-user and co-creation literature, management and marketing theories, including consumer research, and information systems theory. In the open innovation theory, this study providing a preliminary framework for the management of collaborative online communities may be regarded as a complementary part in the theories of companies' outside-in processes, bringing in external knowledge to the company.

In answering the first research question, the thesis makes a valuable contribution to the studies concerning user motivation to participate in online innovation

communities (e.g. Nov, 2007; Harper et al., 2008 Hars & Ou, 2002; Kittur et al., 2008; Jeppesen and Fredriksen, 2006; Lettl et al., 2006; Kittur et al., 2007; Wasko & Faraj, 2000) by adding a novel approach, a collaborative perspective, to the discussion.

The study also contributes by continuing and deepening the emerging discussion on collaborative online tools and methods (e.g. Piller et al., 2005; von Hippel, 2005). Furthermore, the second research question concerning rewards in collaborative online innovation communities touches on an unexplored research field offering new insights to the existing discussion of rewards in online communities (e.g. DiPalatino & Vojnovic, 2009; Harper et al., 2008; Wightman, 2010).

As a result, by providing a framework on managing a collaborative online innovation community including users' motivations to participate, tools and methods to support participation and collaboration, and presenting important elements in the rewards strategy in collaborative online innovation communities, this study represents an important threshold for further studies. The propositions presented in Chapter 5.23 can be used as a basis forstudies conducted in a more experimental domain.

5.4 Practical implications

The benefits of engaging customers or prospects in the new product development process are already well-established facts among companies and the academic world. Yet, individually customers might not be capable of creating the best possible solutions as their views might be limited to a particular perspective. Another obstacle is an individua1's capability to create products that have market potential. Since collaboration is a way to get most out of people's creativity, collaborative work in innovation online communities may produce valuable results for companies. Therefore, collaboration and collective thinking enables companies to maximise the efficiency of customers' innovation potential and for this reason collaboration should be supported to enhance group or community creativity.

This study clearly shows the untapped possibilities that lie in developing and enhancing collaboration in online innovation communities. There already exist examples of online communities where users' collaboration in fact form the core of the business model, such as Threadless (www.threadless.com) where users ideate and design T-shirts and also decide collectively which design comes into production. Also the accelerated increase of online open innovation intermediaries has given an insight into the power and possibilities of users' online innova-

tion potential. All in all, users' collaboration in online innovation communities can provide interesting possibilities for the large diversity of companies, and therefore more knowledge of the phenomenon is needed.

This study showed that users are motivated to participate in collaborative online innovation communities because it is fun, they feel that they can learn a lot and they have the possibility to gain new viewpoints from others. The interviews indicate that maintainers have recognised these possibilities at some point and are seeking solutions to support collaboration in different ways. To provide some guidelines for companies utilising or planning to utilise collaborative online innovation communities, three critical issues are discussed in a more detailed way.

Firstly, investing in a web-based innovation platform is a waste of money if users' motivation factors to participate are not understood. To make the strategy operational, it needs to stress principles of user motivation. The users' question "Why should I bother?" has to be answered to motivate collaboration. Knowledge of users' motivations is needed to achieve critical mass to community participants. Collaboration needs even more time and effort as working individually and therefore users should immediately notice the value of collaboration.

Secondly, after being familiar with users' motivation factors, collaborative online innovation communities should be facilitated by appropriate methods and tools. Maintainers' active involvement is needed in order to keep a community sustainable in all its life cycle stages. Furthermore, online tools that support the collaborative innovative work are needed. Such tools are for example software that enables better face to face communication, online meetings, and scheduled internet sessions as well as profile tools where users can get to know and find out more about each other. Currently, it seems that mainly only basic tools such as discussion forums and chat rooms are used.

Thirdly, a solid rewarding strategy should be created. The key words of that strategy are transparency, logic, democracy, equity, flexibility, customisability, and again maintainers' active participation. However, as the prior studies have indicated, there are challenges in monetary rewarding concerning the amount of rewarding. Instead of being encouraging, a monetary reward can be unsatisfying if it is considered too small. The problem is what level would satisfy users? That might be an impossible task since the more users get more, the more they probably want in the future. However, if users know the rules of rewarding, they probably either stay with the community or leave if they feel it is unfair. Trying to find the right level to keep enough members happy is the key. Maintainers should also bear in mind that combining both types of rewards, monetary and

non-monetary, is suggested as the best way to reward. Therefore finding the optimal balance between monetary and non-monetary rewards is important.

Creating a rewarding strategy that really encourages collaboration needs a solid plan to be fair for all group members. In this study users also suggested different solutions for rewarding groups. One of them proposed that the group leader can decide the distribution of rewards in a group and after that others can judge if he did well or not. Another suggestion was to decide the distribution of rewards in a group by voting.

Although the framework presented in this study (see Table 6) needs experimental testing and validation, it already gives practical guidelines to companies to make decisions of how to support different motivation factors by appropriate tools and rewards.

5.5 Evaluating the quality of the study

Conducting totally value-free research is not possible since researcher's own ethics, assumptions and values inevitably influence at some level. However, a researcher has to believe that he/she can with objectivity, clarity and precision, report on his/her own observations of the social world including the experiences of others (Denzin & Lincoln, 2003). Especially in qualitative studies such as the present mainly is, the transparency of the research process holds an important position for reflecting the researcher's actions' and giving the reader the possibility to make their own judgments about the results.

In the following, the quality of the study is discussed. Relevant questions in qualitative research are to consider how we can be sure that the findings would be replicated if the study was conducted with the same participants and in the same context. Another relevant question concerns the question of how we can be sure that the findings are reflective of the subjects and the inquiry itself, rather than the product of biases and prejudices on the part of the researcher (Marshall & Rossman, 1999).

Different scientific paradigms use different ways to measure the quality of the study and value different dimensions in interpretation. The positivist paradigm argues that there is nothing specific in the qualitative research and thus it can be evaluated as quantitative research by using four criteria that are internal validity, external validity, reliability and objectivity (e.g. Denzin & Lincoln, 2003, p. 276; Hammersley, 1992, p. 57; Lincoln & Guba, 1985; Silverman, 2000). Yet, the post-positivistic paradigm among other paradigms proposes that a unique set of

criteria in assessing qualitative research is needed (Guba & Lincoln, 2003). Lincoln and Guba (1985) suggest four criteria in assessing the quality of the study. These are *credibility, transferability, dependability* and *conformability*. Wallendorf and Belk (1989) added a fifth criterion for assessing quality that is called *integrity*. This five-pointed criterion is used in the subsequent discussion of the quality of the study.

Credibility (internal validity) refers to the extent to which the results are acceptable representations of the data. The means for achieving credibility in this study are transparency of the research process, triangulation of data and methods, and presenting findings continuously during the study in academic networks as well as to the case companies. Also a considerable amount of quotations were included in the paper to give the reader the possibility to assess the validity of interpretations and estimate the quality of conclusions.

Internal validity of the data is also concerned by a careful data analysis with a SPSS program. However, there were some inaccuracies in preparing the answer categories in the questionnaire, which are discussed next. Length of membership should have been asked about: "How long have you been a member of... community? Give the length in months." There was also a mistake in preparing these categories, since they were overlapping: 1–3 months, 3–6 months, 6–12 months. Also if the participants had been asked to write the number, the answers could have been categorised afterwards in different ways. Answer choices for highest academic degree received would have needed licentiate and vocational level also. Also the list of countries included some mistake, which was given feedback by the respondents. Respondents also gave feedback that some statements were not clear enough, which was also noticed by researchers during the analysis phase.

Transferability (external validity) is the extent to which findings of the study in one context are also applicable in other contexts. In other words it is concerned with the degree to which research findings can be applied to the real world, beyond the controlled setting of the research. Yet, in this setting there is always a dilemma, because attempts to increase internal validity are likely to reduce external validity as the study is conducted in a manner that is increasingly unlike the real world.

In this study multiple methods, purposive sampling and careful documentation of procedures were made to ensure transferability. However, it is admitted that because of the limited amount of the chosen cases and the interviewees, there are some limitations in applying some of the results in other kinds of online innovation communities. In addition in the survey, the sample size was rather small

with 49 respondents. This inevitably has an effect both on the validity and more specifically on the generalisability of the results. However, due to the aim and explorative nature of this study, the data provides an interesting first insight into studying user motivations and rewarding in collaborative online innovation community context and serves as a case study this purpose.

Since all the cases represented innovation intermediaries, this may cause some limitations in the richness of the data. Therefore, in gathering empirical data from a larger group of more diversified cases, in other words from different types of online innovation communities, some new factors may be found. After all, with the resources at hand, this study generated a framework that may and should be developed in further studies.

Dependability (reliability) is the extent to which interpretation was constructed in a way that avoids instability other than the inherent instability of a social phenomenon. In other words, dependability refers to the extent to which findings would be repeated if the study was replicated with similar subjects and context. In the present study, the aim was to achieve dependability by giving a detailed description of how the study was carried out, including the interview guides and questions asked of users in the report. In addition, the interviews were recorded, transcribed and analysed using Nvivo including several rounds of coding. Also interactive study and good relationships with the maintainers gave good possibilities for flexible data collection.

Conformability refers to the extent to which interpretations are the results of the participants and the phenomenon as opposed to the bias caused by the researcher. The conformability of the present study rests on the credibility of the empirical data, analysis and the reporting. During the process the conference papers were presented and discussed publicly and also outside comments were asked for the journal articles.

Integrity refers to the extent to which the interpretation was unimpaired by lies, evasions, misinformation or misrepresentations by informants. Some measures to avoid problems with integrity were taken in this study. The aims of the study were told to all participants and anonymity was assured. All the participants were encouraged to ask any questions concerning the research. The maintainers were also asked for a permission to record the interviews. As Wallendorf and Belk (1989) suggested, the atmosphere of trust was created with a regular contact with the case companies.

5.6 Further research paths

Since the study area is emerging and in the multidisciplinary field, there are many multiple paths to take on research.

In order to further develop the framework of collaborative online innovation communities more research should be done on the motivation factors affecting collaboration and the ways of facilitating collaboration, including the types of recognition and rewarding mechanisms that members appreciate. Utilising multidisciplinary prior literature concerning collaboration could give interesting sights and ideas of developing ways of facilitation in an online innovation community environment.

In this study, Table 4 and Chapter 5.23 summarise the framework of motivations, tools and methods for collaboration, and important elements in the rewarding strategy in collaborative online innovation communities. Going one step further and developing and testing this framework would provide theoretical as well as practical contribution. Customer input in the fuzzy front-end stages of idea generation, screening and concept development is suggested to be more critical than other stages (e.g. Alam, 2006). Testing the framework in different phases of the new product development process or service innovation process would also be interesting path for further studies.

All in all, in this emerging research field, there is a clear need for further studies with multiple methods. Studies conducted on collaborative online innovation communities maintained by different kinds of companies with different business models including also larger and longer established communities would provide interesting insights for both researchers as well as for companies.

References

Aaker, A. and Day, G. 1997. Marketing research. New York: John Wiley.

Ahonen, M., Antikainen, M. and Mäkipää, M. 2007. Supporting collective creativity within open innovation. Conference proceedings of the European Academy of Management (EURAM) Conference. Paris, May 16–19, 2007.

Alam, I. 2006. Process of customer interaction in new service development. In: Edvardsson, B., Gustafsson, A., Kristensson, P., Magnusson, P and Matthing, J. (eds.). Involving customers in new service development. Series of Technology Management, Vol. 11. London: Imperial College Press.

Alasuutari, P. 1995. Laadullinen tutkimus. Tampere: Vastapaino.

Amabile, T. 1993. Motivational synergy. Human Resource Management Review, No. 3, pp. 185–201.

Amabile, T. 1996. Creativity in context: update to the social psychology of creativity. Boulder: Westview Press.

Antikainen, M. 2007. The attraction of company online communities. A multiple case study. Academic dissertation, Department of Management Studies, University of Tampere: Tampere University Press, Finland.

Antikainen, M., Mäkipää, M. and Ahonen, M. 2010. Motivating and supporting collaboration in open innovation. European Journal of Innovation Management, Vol. 13, No. 1, pp. 100–119.

Antikainen, M. and Väätäjä, H. 2008. “Innovating is fun" – Motivations to participate in online open innovation communities. In: Huizingh, K.R.E., Torkkeli, M., Conn, S. and Bitran, I. (eds.). Proc. of the First ISPIM Innovation Symposium Singapore: Managing Innovation in a Connected World. Singapore, 14–17 December 2008.

Antikainen, M. and Väätäjä, H. 2010. Rewarding in open innovation communities – How to motivate members? International Journal of Entrepreneurship and Innovation Management, Vol. 11, No. 4, pp. 440–456.

Anthony, D., Smith, S.W. and Williamson, T. 2005. Explaining quality in internet collective goods: Zealots and good samaritans. The case of Wikipedia. November 2005.

Bagozzi, R. and Dholakia, U. 2002. Intentional social action in consumer behaviour. Journal of Interactive Marketing, Vol. 16, No. 2, pp. 2–21.

Bandura, A. 1995. Self-Efficacy in Changing Societies, Cambridge University Press, Cambridge.

Barcley, I. 1992. The new product process: past evidence and future practical application. Part 1. R&D Management, Vol. 22, No. 34.

Barney, J. 1991. Firm resources and sustained competitive advantage. Journal of Management, Vol. 17, No. 1, pp. 99–120.

Bartol, K.M. and Locke, E.A. 2000. Incentives and motivation. In: Rynes, S. and Gerhardt, B. (eds.). Compensation in organizations: Progress and prospects. San Francisco, CA: Lexington Press. Pp. 104–147.

Bartol, K. and Srivastava, A. 2002. Encouraging knowledge sharing: The role of organizational reward systems. Journal of Leadership & Organizational Studies, Vol. 9, No. 1, pp. 64–76.

Bauwens, M. 2009. Class and capital in peer production, Capital & Class Spring 2009, Vol. 33, No.1, pp. 121–141.

Bilgram, V., Brem, A. and Voigt, K.-I. 2008. User-centric innovations in new product development: Systematic identifications of lead users harnessing interactive and collaborative online tools. International Journal of Innovation Management, Vol. 12, No. 3, pp. 419–458.

Brewer, J. and Hunter, A. 1989. Multimethod research: a synthesis of styles. Thousand Oaks, CA: Sage.

Brown, S.L. and Eisenhardt, K. 1995. Product development: Past research, present findings, and future directions. Academy of Management Review, Vol. 57, No. 4, pp. 61–69.

Bröring, S. and Herzog, P. 2008. Organising new business development: Open Innovation at Degussa. European Journal of Innovation Management, Vol. 11, Issue 3, pp. 330–348.

Burrrell, G. and Morgan, G. 1979. Sociological Paradigms and Organizational Analysis. Aldershot: Gower.

Chen, Yan, Ho, Teck-Hua and Kim Yong-Mi. Forthcoming. Knowledge market design: a field experiment at Google Answers. Journal of Public Economics Theory.

Chesbrough, H. 2003. Open innovation: the new imperative for creating and profiting from technology. Harvard Business School Press, Boston, MA.

Chesbrough, H. 2004. Managing Open Innovation. Research Technology Management, Vol. 47, No. 1, pp. 23–26.

Chesbrough, H. 2006a. Open innovation: a paradigm for understanding industrial innovation. In: Chesbrough, H., Vanhaverbeke, W. and West, J. (eds.). Open innovation: researching a new paradigm, 134, Oxford University Press, Oxford, UK.

Chesbrough, H. 2006b. Open Business Models: How to Thrive in the New Innovation Landscape, Harvard Business School Press, Boston, MA.

Chesbrough, H. 2011. Open services innovation. Rethinking your business to grow and compete in a new era. USA: Jossey-Bass.

Constant, D., Kiesler, S. and Sproull, L. 1994. What's mine is ours, or is it? A study of attitudes about information sharing. Information Systems Research, Vol. 5, No. 4, pp. 400–21.

Da Silveira, G., Borenstein, D. and Fogliatto, F.S. 2001. Mass customization: literature review and research review and research directions. International Journal of Production Economics, Vol. 72, pp. 1–13.

Deci, E. 1971. Effects of externally mediated rewards on intrinsic motivation. Journal of Personality and Social Psychology, Vol. 18, pp. 105–115.

Deci, E. 1975. Intrinsic Motivation, New York: Plenum.

Deci, E. and Ryan, R. 1985. Intrinsic Motivation and Self-Determination in Human Behaviour, New York and London.

Deci, E., Koestner R. and Ryan R. 1999. A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. Psychological Bulletin, Vol. 125, No. 6, pp. 627–688.

Denzin, N.1978. The research act. Chicago: Aldline.

Denzin, N. and Lincoln, Y. 2003. (eds.). Collecting and interpreting qualitative materials. Beverly Hills: Sage.

Dillenbourg, P., Baker, M., Blaye, A. and O'Malley, C. 1996. The evolution of research on collaborative learning. In: Spada, E. and Reiman P. (eds.). Learning in Humans and Machine: Towards an interdisciplinary learning science. Oxford: Elsevier. Pp. 189–211.

Dillenbourg P. 1999. What do you mean by collaborative learning? In: Dillenbourg, P. (ed.). Collaborative-learning: Cognitive and Computational Approaches. Oxford: Elsevier. Pp. 1–19.

DiPalatino, D. and Vojnovic, M. 2009. Proceedings of the 10th ACM conference on Electronic commerce, Stanford, CA, USA, July 6–10, 2009. Pp. 119–128.

Easton, G. 1994. Methodology and industrial network. In: Wilson, D. and Möller, K. (eds.). Relationships and networks: Theory and application. Kent: Conference proceedings.

Edvardsson, B., Gustafsson, A., Kristensson, P., Magnusson, P. and Matthing, J. (eds.). 2006. Involving Customers in New Service Development, Series on Technology Management. Vol. 11. London, Imperial College Press.

Eisenberger, R., Pierce, D.W. and Cameron, J. 1999. Effects of reward on intrinsic motivation-negative, neutral, and positive: Comment on Deci, Koestner, and Ryan. Psychological Bulletin, Vol. 125, No. 6, pp. 677–691.

Eisenberger, R. and Shanock, L. 2003. Rewards, Intrinsic Motivation, and Creativity: A Case Study of Conceptual and Methodological Isolation. Creativity Research Journal, Vol. 15, Nos. 2 & 3, pp. 121–130.

Elmquist, M., Fredberg, T. and Ollila, S. 2009. Exploring the field of open innovation: a review of research publications and expert opinions. European Journal of Innovation Management, Vol. 12, No. 3, pp. 326–345.

Franke, N. and Piller, F. 2003. Key research issues in user interaction with configuration toolkits in a mass customization system. International Journal of Technology Management, Vol. 26, Nos. 5/6, pp. 578–99.

Franke, N. and Piller, F. 2004. Toolkits for user innovation and design: an exploration of user interaction and value creation. Journal of Product Innovation Management, Vol. 21, No. 6, pp. 401–15.

Franke, N. and Shah, S. 2003. How Communities Support Innovative Activities: An Exploration of Assistance and Sharing Among End-Users. Research Policy 32, No. 1, pp. 157–178.

Freeman, C. 1991. Networks of innovators: a synthesis of research issues. Research Policy, Vol. 20, pp. 499–514.

Füller, J., Bartl, M., Ernst, H. and Mühlbacher, H. 2006. Community based innovation: how to integrate members of virtual communities into new product development. Electronic Commerce Research, Vol. 6, No. 2, pp. 57–73.

Gartner 2008. Gartner Says Many Social Software Projects Fail Due to IT Managers Not Having a Well-Defined Purpose to Succeed. STAMFORD, Conn., September 16, 2008. Retrieved January 12, 2011. http://www.gartner.com/it/page.jsp?id=758914.

Gassmann, O. and Enkel, E. 2004.Towards a theory of open innovation: three core process archetypes. Proceedings of the R&D Management Conference, Lisbon, Portugal, July 6–9.

Gentner, D. and Markman, A. 1997. Structure mapping in analogy and similarity. American Psychologist, Vol. 52, No. 1, pp. 45–56.

Gibson, C. 2001. From knowledge accumulation to accommodation: cycles of collective cognition in work groups. Journal of Organizational Behavior, Vol. 22, No. 2, pp. 121–34.

Gruen, T., Osmonbekov, T. and Czaplewski, A. 2005. How e-communities extend the concept of exchange in marketing: An application of the motivation, opportunity, ability (MOA) theory. Marketing Theory, Vol. 5, No. 1, pp. 33–49.

Guba, E. and Lincoln, Y. 2003. Competing paradigms in quantitative research. In: Denzin, N. and Lincoln, Y. (eds.). The landscape of qualitative research. London: Sage.

Gummeson, E. 2001. Are current research approaches in marketing leading us astray? Journal of Marketing Theory, Vol. 1, No. 1, pp. 27–48.

Hagel, J. and Armstrong, A. 1997. Net gain: Expanding markets through virtual communities. Boston: McKingsey & Company.

Hammersley, M. 1992. What wrong with ethnography? Methodological explorations. London: Routledge.

Hargadon, A. and Bechky, B. 2006. When collections of Creatives Become Creative Collective – a Field Study of Problem Solving at Work. Organization Science, Vol. 17, No. 4, pp. 484–500.

Hargadon, A. and Sutton, R. 1997. Technology Brokering and Innovation in a Product Development Firm. Administrative Science Quarterly, Vol. 42, pp. 716–749.

Harper, F.M., Raban, D., Rafaeli, S. and Konstan, J.A. 2008. Predictors of answer quality in online Q&A sites. Proceedings of the Twenty-Sixth Annual SIGCHI Conference on Human Factors in Computing Systems. ACM, New York, USA. Pp. 865–874.

Hars, A. and Ou, S. 2002. Working for free? Motivations for participating in open source projects'. International Journal of Electronic Commerce, Vol. 6, No. 3, pp. 25–39.

Hart, S., Tzokas, N. and Saren, M. 1999. The effectiveness of market information in enhancing new product success rates. European Journal of Innovation Management, Vol. 2, No. 1, pp. 20–35.

Heiskanen, E., Hyvönen, K., Niva, M., Pantzar, M., Timonen, P. and Varjonen, J. 2007. User involvement in radical innovation: are consumers conservative? European Journal of Innovation Management, Vol. 10, No. 4, pp. 489–509.

Hertel, G., Niedner, S. and Herrman, S. 2003. Motivation of software developers in open source projects: an internet based survey of contributors to the Linux Kernel. Research Policy, Vol. 32, pp. 124–138.

Holmes, M. 1999. Product development in the new millennium – a CIPD vision. Keynote address at the Product Development Management Association Conference, Marco Island, FL.

Howard, Rob. 2010. How to: Manage a sustainable online community. Retrieved January 12, 2011. http://mashable.com/2010/07/30/sustainable-online-community/.

Howe, J. 2006. The rise of crowdsourcing. Wired, Vol. 14, No. 6, pp. 176–183.

Huston, L. and Sakkab, N. 2006. Connect and develop: Inside Procter & Gamble's new model for Innovation. Harvard Business Review, Vol. 84, No. 3, pp. 58–66.

Hutchins, E. 1991. Organizing work by adaptation. Organization Science, Vol. 2, No. 1, pp. 14–39.

Jeppesen, L. and Frederiksen, L. 2006. Why do users contribute to firm-hosted user communities? The case of computer-controlled music instruments. Organization Science, Vol. 17, No. 1, pp. 45–63.

Kim, A. 2000. Community building on the web: Secret strategies for successful online communities. Berkeley: Peachpit Press.

Kittur, E. Chi, B., Pendleton, A., Suh, B. and Mytkowicz, T. 2007. Power of the few vs. wisdom of the crowd: Wikipedia and the rise of the bourgeoisie. In: Proceedings of the 25th Annual ACM Conference on Human Factors in Computing Systems (CHI 2007), April–May 2007.

Kittur, A., Chi, E. and Bongwon, S. 2008. Crowdsourcing user studies with mechanical turk'. In: Proceedings of the Twenty-Sixth Annual SIGCHI Conference on Human Factors in Computing Systems, ACM, New York, USA. Pp. 453–456.

Kollock, P. 1999. The economies of online cooperation: gifts and public goods in cyberspace. In: Smith, M. and Kollock, P. (eds.). Communities in Cyberspace, Routledge, London.

Koskinen, I., Alasuutari, P. and Peltonen, T. 2005. Laadulliset menetelmät kauppatieteissä. Tampere: Vastapaino.

Kottler, P. 1989. From mass marketing to mass customization. Planning Review, Vol. 17, No. 5, pp. 10–13

Kurtzberg, T. and Amabile, T. 2001. From Guilford to creative synergy: opening the black box of team-level creativity. Creativity Research Journal, Vol. 13, Nos. 3/4, pp. 285–94.

Lakhani, K. and Wolf, B. 2005. Why hackers do what they do: understanding motivation and effort in free/open source software projects. In: Feller, J., Fitzgerald, B., Hissam, S. and Lakhani, K. (eds.). Perspectives on Free and Open Source Software, MIT, Cambridge, MA.

Laursen, K. and Salter, A. 2006. Open for innovation: the role of openness in explaining innovation performance among U.K. manufacturing firms. Strategic Management Journal, Vol. 27, No. 2, pp. 131–150.

Lave, J. 1991. Situated Learning in Communities of Practice. In: Resnick, L., Levine, J. and Teasley, S. (eds.). Perspectives on Socially Shared Cognition, American Psychological Association, Washington DC. Pp. 63–82.

Lave, J. and Wenger, E. 1991. Situated Learning: Legitimate Peripheral Participation. Cambridge: Cambridge University Press. ISBN 0521423740. First published in 1990 as Institute for Research on Learning. Report 90-0013. http://books.google.com/?id=CAVIOrW3vYAC.

Leonard-Barton, D. 1995. Wellsprings of knowledge. Boston: Harvard Business School Press.

Lepper, M., Greene, D. and Nisbett, R. 1973. Undermining children's intrinsic interest with extrinsic rewards: a test of the 'overjustification' hypothesis. Journal of Personality and Social Psychology, Vol. 28, pp. 129–137.

Lerner, J. and Tirole, J. 2002. Some simple economics of open source. Journal of Industrial Economics, Vol. 50, No. 2, pp. 197–23.

Lettl, C., Herstatt, C. and Gemuenden, H. 2006. Learning from users for radical innovation. International Journal of Technology Management, Vol. 33, No. 1, pp. 25–45.

Lewin, K. 1938. The conceptual representation and the measurement of psychological forces. Durham, NC: Duke University Press.

Lichtenthaler, U. 2005. External commercialization of knowledge: review and research agenda. International Journal of Management Reviews, Vol. 7, No. 4, pp. 231–255.

Lilien, G., Morrison, P., Searls, K., Sonnack, M. and von Hippel, E. 2002. Performance assessment of the lead user idea-generation process for new product development. Management Science, Vol. 48, No. 8, pp. 1042–1059.

Lincoln, Y. and Guba, E. 1985. Naturalistic inquiry. Beverly Hills: Sage.

Lindenberg, S. 2001. Intrinsic motivation in a new light. Kyklos, Vol. 54, No. 2–3, pp. 317–342.

Lüthje, C., Herstatt, C. and von Hippel, E. 2005. User-innovators and 'local' information: The case of mountain biking. Research Policy, Vol. 34, No. 6, pp. 951–965.

Mannervik, U. and Ramirez, R. 2006. Customers as Co-Innovators: An Initial Exploration of Its Strategic Importance. In: Edvardsson, B., Gustafsson, A., Kristensson, P., Magnusson, P. and Matthing, J. (eds.). Involving customers in new service development. London: Imperial College Press.

Marshall, C. and Rossman, G. 1999. Designing qualitative research. Thousand Oaks: Sage.

Maslow, A. 1954. Motivation and personality. New York: Harper & Row.

McAlexander, J., Schouten, J. and Koenig, H. 2002. Building brand community. Journal of Marketing, Vol. 66, Issue 1, pp. 38–54.

Meindl, J.R., Stubbart, C. and Porac, J.F. (eds.). 1996. Cognition within and between Organizations. Sage, Thousand Oaks, CA.

Miles, M. and Huberman, A. 1994. Qualitative data analysis – An expanded sourcebook. Newbury Park: Sage.

Motzek, R. 2007. Motivation in Open Innovation. An exploratory study on User Innovators. VDM Verlag, Saarbrücken.

Mäntymäki, M. and Mittilä, T. 2004. Management of an online community. In: Hannula, M., Järvelin, A.-M. and Seppä, M. (eds.). Conference Proceedings, Frontiers of E-Business Research 2003. Tampere: Tampere University of Technology and University of Tampere. Pp. 94–107.

Nambisan, S. 2002. Designing virtual customer environments for new product development: Toward a theory. Academy of Management Review, Vol. 27, No. 3, pp. 392–413.

Nov, O. 2007. What motivates Wikipedians? Communications of the ACM, Vol. 50, No. 11, pp. 60–64.

Oreg, S. and Nov, O. 2008. Exploring motivations for contributing to open source initiatives: The roles of contribution context and personal values. Computers in Human Behavior, Vol. 24, Issue 5, pp. 2055–2073.

Ortega, F. and González-Barahona, J.M. 2007. Quantitative Analysis of the Wikipedia Community of Users. ACM WikiSym 2007: International Symposium on Wikis. New York, ACM Press.

Osterloh, M., Rota, S. and Kuster, B. 2004. Open Source Software Production: Climbing on the Shoulders of Giants, Zurich 2004. Accessed on 14 April 2009. Available at: http://opensource.mit.edu/papers/osterlohrotakuster.pdf.

Patton, M. 1987. How to use qualitative methods in evaluation. Newbury Park: Sage.

Patton, M. 1990. Qualitative evaluation and research methods. Beverly Hills: Sage.

Peddibhotla, N.B. and Subramani, M.R. 2007. Contributing to Public Document Repositories: A Critical Mass Theory Perspective. Organization Studies, Vol. 28, No. 3, pp. 327–346.

Perry, C. 1998. Processes of a case study methodology for post graduate research in marketing. European Journal of Marketing, Vol. 32, Nos. 9/10, pp. 785–802.

Perry, C. Carson, D. and Gilmore, A. 2003. Joining a conversation: writing for EJM's editors, reviewers and readers requires planning, care and persistence. European Journal of Marketing, Vol. 37, Issue 6/7, pp. 652–667.

Peteraf, M.A. 1993. The cornerstones of competitive advantage: A resource-based view. Strategic Management Journal, Vol. 14, No, 3, pp. 179–191.

Piller, F. 2004. Mass customization: reflections on the state of the concept. International Journal of Flexible Manufacturing Systems, Vol. 16, No. 4, pp. 313–334.

Piller, F., Ihl, C., Fuller, J. and Stotko, C. 2004. Toolkits for open innovation – the case of mobile phone games. Proceedings of the 37th Annual Hawaii International Conference on System Sciences, Big Island, HI, 5–8 January. Pp. 1–10.

Piller, F., Schubert, P., Koch, M. and Möslein, K. 2005. Overcoming mass confusion: collaborative customer co-design in online communities. Journal of Computer-Mediated Communication, Vol. 10, No. 4, Article 8.

Pinder, C.C. 2008. Work Motivation in Organizational Behavior (2nd. edn.) The Psychology Press.

Pine, B.J. and Gilmore, J.H. 1999. The Experience Economy: Work Is Theater & Every-Business a Stage. Harvard Business School Press.

Prahalad, C. and Ramaswamy, V. 2000. Co-Opting Customer Competence, Harvard Business Review.

Prahalad, C. and Ramaswamy, V. 2004. The future of competition: co-creating unique value with customers. Boston: Harvard Business School Press.

Ragin, C. and Becker, H. 1992. What is a case? Exploring the foundations of social enquiry. Cambridge: University Press.

Raymond, E.S. 2001. The Cathedral and the Bazaar, O'Reilly, Sebastopol, CA.

Reeve, J. 2005. Understanding Motivation and Emotion. John Wiley & Sons, Inc., USA.

Reichwald, R. and Piller, F. 2005. Open Innovation: Kunden als Partner im Innovationsprozess, München 2005. http://www.impulse.de/downloads/open_innovation.pdf. 17.11.2010.

Reichwald, R. and Piller, F. 2006. Interaktive Wertshöpfung. Wiesbaden, Germany: Gabler.

Reiss, S. 2004. Multifaceted Nature of Intrinsic Motivation: The Theory of 16 Basic Desires. Review of General Psychology Copyright 2004 by the Educational Publishing Foundation, 2004, Vol. 8, No. 3, pp. 179–193.

Rheingold, H. 1993. The Virtual Community: Homesteading on the Electronic Frontier, Addison-Wesley, New York, NY.

Ridings, C. and Gefen, D. 2004. Virtual community attraction: why people hang out online. Journal of Computer-Mediated-Communication, Vol. 10, No. 1, Article 4.

Rivette, K.G. and Kline, D. 2000. Rembrandts in the Attic: Unlocking the Hidden Value of Patents. Boston, MA: Harvard Business School Press.

Rogers, E. 1983. Diffusion of innovations (3rd edn.). New York: Free Press.

Roos, I. 1999. Switching paths in customer relationships. Academic dissertation. Publications of the Swedish School of Economics and Business Administration, No. 78. Helsinki: Swedish School of Economics and Business Administration.

Roschelle, J. and Teasley, S. 1995. The construction of shared knowledge in collaborative problem solving. In: O'Malley, C. (ed.). Computer Supported Collaborative Learning. Springer-Verlag: Berlin. Pp. 69–197.

Rothwell, R., Freeman, C. and Townsend, J. 1974. SAPPHO updated: Project SAPPHO, Phase II. Research Policy, Vol. 3, Issue 3, pp. 258–291.

Ryan, R. and Deci, E. 2000. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. American Psychologist, Vol. 5, No. 1, pp. 68–78.

Sawhney, M. and Prandelli, E. 2000. Communities of creation: Managing distributed innovation in turbulent markets. California Management Review, Vol. 42, No. 4, pp. 24–54.

Schilling, M.A. and Hill, W.L. 1998. Managing the new product development process: Strategic imperatives. Academy of Management Executive, Vol. 12, No. 3, pp. 7–81.

Silverman, D. 2000. Doing qualitative research. A practical handbook. London: Sage.

Stahl, G. 2006. Group cognition: Computer support for building collaborative knowledge. Cambridge, MA: MIT Press. http://www.cis.drexel.edu/faculty/gerry/mit/.

Stake, R. 1995. The art of the case study research. Newbury Park: Sage.

Stake, R. 2000. The case study method in social inquiry. In: Gomm, R., Hammersley, M. and Foster, P. (eds.). Case study method. London: Sage. Pp. 19–26.

Steers, R.M., Mowday, R.T and Shapiro, D. 2004. The future of work motivation theory. Academy of Management Review, Vol. 29, No. 3, pp. 379–387.

Sternberg, R.J. 1999. Handbook of Creativity, Cambridge University Press, Cambridge.

Sternberg, R.J. and Lubart, T. 1999. The concept of creativity: prospects and paradigms. In: Sternberg, R.J. (ed.). Handbook of Creativity, Cambridge University Press, New York, NY. Pp. 3–15.

Stewart, K. and Gosain, S. 2006. The impact of ideology on effectiveness in open source software development teams'. MIS Quarterly, Vol. 30, No. 2. pp. 291–314.

Surowiecki, J. 2004. The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business. Economies, Societies and Nations Little, Brown.

Szmigin, I., Canning, L. and Reppel, A. 2005. Online community: Enhancing the relationship marketing concept through customer bonding. Industrial Journal of Service Industry Management, Vol. 16, No. 5, pp. 480–496.

Thompson, L., Levine, J. and Messick, D. 1999. Shared Cognition in Organizations: The Management of Knowledge, Lawrence Erlbaum Associates. Mahwah, NJ.

Thrift, N. 2006. Re-inventing invention: new tendencies in capitalist commodification. Economy and Society, Vol. 35, No. 2, pp. 279–306.

Tidd, J. and Bessant, J. 2009. Managing Innovation: Integrating technological Market and Organizational Change. 4th edition, John Wiley & Sons, England.

Tolman, E.C. 1959. Principle of purposive behavior. In: Koch, S. (ed.). Psychology: A study of science. New York: McGraw-Hill. Vol. 2. Pp. 239– 261.

Torkkeli, M., Kock C. and Salmi, P. 2009. The "Open Innovation" paradigm: A contingency perspective. Journal of Industrial Engineering and Management, Vol. 2, No. 1, pp. 176–207.

Torvalds, L. and Diamond, D. 2001. Just for Fun: The Story of an Accidental Revolutionary, Harper Business, New York, NY.

Tsoukas, H. 1989. The validity of idiographic research explanations. Academy of Management Review, Vol. 24, No. 4, pp. 551–561.

Ulwick, AW. 2002. Turn customer input into innovation. Harvard Business Review, January, pp. 91–97.

Victor, B. and Boynton, A. 1998. Invented Here: Maximizing Your Organization's Internal Growth and Profitability. A Practical Guide to Transforming Work. Boston, Mass.: Harvard Business School Press.

Viegas, F.B, Wattenberg, M., Kriss, J. and van Ham, F. 2007. Talk before you type: Coordination in Wikipedia. In: Proceedings of the 40th Annual Hawaii International Conference on System Sciences (HICSS '07), Computer Society Press, January 2007. P. 78a.

Vixie, P. 1999. In Open Sources: Voices from the Open Source Revolution. In: Dibona, C., Ockman, S. and Stone M. (eds.). Software Engineering, O'Reilly, Sebastopol, 1999.

von Hippel, E. 1986. Lead users: a source of novel product concepts. Management Science, Vol. 32, No. 7, pp. 791–805.

von Hippel, E. 1988. The sources of innovation. New York: Oxford University Press.

von Hippel, E. 2005. Democratizing innovation, The MIT Press, Cambridge.

von Hippel, E. and G. von Krogh. 2003. Open Source Software and the "Private-Collective" Innovation Model: Issues for Organization Science. Organization Science, Vol. 14, No. 2, pp. 209–223.

von Hippel, E. and von Krogh, G. 2006. Free revealing and the private-collective model of innovation incentives. R&D Management, Vol. 36, No. 3, pp. 295–306.

von Rosenstiel, L. 2003. Grundlagen der Organisationspsychologie, 5. Aufl., Stuttgart: Schäffer-Poeschel 2003.

Voss, J. 2005. Measuring Wikipedia. In: Proceedings of the ISSI 2005, July 2005.

Wallendorf, M. and Belk, R. 1989. Assessing trustworthiness in naturalistic consumer research. In: Hirschman, E. (ed.). Interpretive consumer research. Provo, UT: Association for Consumer Research. Pp. 69–84.

Warms, A., Cothrel, J. and Underberg, T. 2000. Active management: The discipline of successful online communities. White paper. Retrieved April 5, 2002. http://www.participate.com.

Wasko, M. and Faraj, S. 2000. It is what one does: why people participate and help others in electronic communities of practice. Journal of Strategic Information Systems, Vol. 9, Nos. 2–3, pp. 155–173.

Wayland, R. and Cole, P. 1997. Customer connections. Boston: Harvard Business School Press.

Weick, K. and Roberts, K. 1993. Collective mind in organizations: heedful interrelating on flight decks. Administrative Science Quarterly, Vol. 38, No. 3, pp. 357–81.

Wellman, B., Boase, J. and Chen, W. 2002. The Networked Nature of Community On and Off the Internet. Working paper, Centre for Urban and Community Studies, University of Toronto.

West, J. and Gallagher, S. 2006. Open innovation in open source software. In: Chesbrough, H., Vanhaverbeke, W. and West, J. (eds.). Open Innovation: Researching a New Paradigm, Oxford University Press, Oxford. Pp. 82–106.

Wightman, D. 2010. Crowdsourcing human-based computation. Proceedings of NordiCHI 2010, October 16–20, 2010. Pp. 551–560.

Wiertz, C. and de Ruyter, K. 2007. Beyond the call of duty: why customers contribute to firm-hosted commercial online communities. Organization Studies, Vol. 28, No. 3, pp. 347–76.

Yin, R. 1994. Case study research: Design and methods (2nd edn.). Beverly Hills, CA: Sage Publishing.

Yin, R. 2003. Case study research: Design and methods. Beverly Hills: Sage.

Zeityln, D. 2003. Gift economies in the development of open source software: anthropological reflections. Research Policy, Vol. 32, pp. 1287–1291.

Appendices:

Appendix A: Publications I–V

PUBLICATION I

“Innovating is fun”
Motivations to participate in online open innovation communities

In: Huizingh, K.R.E, Torkkeli, M., Conn, S. & Bitran, I. (eds.). Proc. of the First ISPIM Innovation Symposium Singapore: Managing Innovation in a Connected World. Singapore, 14–17 December 2008.

"Innovating Is Fun" - Motivations to Participate in Online Open Innovation Communities

Maria Antikainen*

VTT Technical Research Centre of Finland
P.O.Box 1300, 33101 Tampere, Finland
E-mail: maria.antikainen@vtt.fi

Heli Väätäjä

Tampere University of Technology, Human-Centered Technology
P.O.Box 589, 33101 Tampere, Finland.
E-mail heli.vaataja@tut.fi
* Corresponding author

Abstract

Online open innovation communities offer customers an environment where they can participate in companies' product and service development. In aim to attract and to commit customers to participate in those communities it is important to understand their motivations to participate. In this empirical case study we focus on exploring and understanding users' motivations to participate in online open innovation communities. The study focuses on three online open innovation communities: CrowdSpirit, FellowForce and Owela. Data was gathered using maintainer interviews and a web survey for members. The results show that intellectual challenges and fun are top motivations to participate. Also interest towards innovation, possibility to influence and creativity were regarded important. Maintainers stated that being in touch with interesting companies is one of the members' motivation factors. Yet, the members in cases did not seem to regard gaining professional benefits and enhancing one's career as central motivator.

Keywords: open innovation; online communities; intermediaries; motivation; rewarding; collaboration; case study

1. Introduction

Online communities provide a source for learning from customers and producing external ideas or even solutions to companies [1], [2] Utilising customers' creativity and innovation capability has potential in product and service development as shown in recent studies [3]. In aim to gain ideas and comments from customers, companies are building open innovation communities on web. The aim of the open innovation communities is to offer an environment to provide tools that attract customers to participate in companies' product and service development by giving their ideas and comments.

In addition to having their own open innovation communities, companies can utilise existing open innovation intermediaries. Lately the amount of innovation market places or innovation intermediaries acting between innovators and companies (or 'solvers' and 'seekers') has increased rapidly. The basic idea in intermediaries is that members of the community are brainstorming online together or individually and their ideas are further utilised in creating new solutions for companies. One interesting point to make is that users' behaviour is not similar in an innovation community run directly by a company making products for certain purpose compared to an open innovation community run by an intermediary, whose business model is based on the members of the community revealing their ideas to challenges given by external companies [4].

The competition of user attention on the web is fierce. Hence, to attract and to commit users to participate in online open innovation communities it is important to understand their motivations to participate in them. Motivations to participate have been studied for example in open content communities and open source software communities, [5], [6], [7], [8]. Yet, further research is needed especially in the open innovation community context in aim to broaden the current knowledge to online innovation as well. This information is also important for the companies building and utilizing online open innovation communities.

2. Purpose of the study and structure of the paper

In this empirical case study we focus on exploring and understanding users' motivations to participate in online open innovation communities. Our research problem can be formulated as follows*: "What are the motivations of the members to participate to innovation in online open innovation communities?"*

We first review related work from different disciplines on motivation. Studies on why people visit, join, participate and contribute in different kind of online communities have been made from different perspectives. We focus our review to studies related to e. g. open content communities as lead user communities, firm-owned online communities, volunteer work communities and Q & A communities. After that, we present the results from a case study of three online open innovation communities including the results from a questionnaire conducted with the community members. Finally, we present our conclusions.

3. Methodology

The study focuses on three online open innovation communities, namely CrowdSpirit, FellowForce and Owela. All of these communities can be also described as open innovation intermediaries since they act as connectors between users and companies.

We gathered data by using multiple methods. First, we interviewed the maintainers of the selected communities, one maintainer from each community, by phone. Semi-structured interviews covered questions related to the motivation of members to contribute and collaborate. In addition we asked about their view on rewarding in general and the relationship between rewards and motivation to participate.

Secondly, we conducted a web survey among case community members. In the development of the questionnaire we utilised findings from the interviews as well as the earlier related work on motivations to participate to online communities. One hundred

FellowForce top members and two hundred CrowdSpirit most active members were contacted by email and asked to participate in the survey. In addition, the questionnaire was linked to the online open innovation community Owela and marketed in Owela's newsletter which was sent to its members. The interviews were recorded and transcribed and the web survey was analysed by SPSS. Data was collected during March-April 2008.

4. Earlier studies on motivations in the online community context

5.1 Motivations to participate in online communities

Researchers in the online community research field have considered reasons why people visit, join and participate in online communities in general (summarised in Table 1). Wasko and Faraj [8] explored reasons for why people participate and help each other in online communities. They concentrated on *knowledge exchange* and therefore, they empirically explored three technical communities in their study. They asked participants an open-ended question by email, about why they participate and help others − they got 342 answers. In analysing data they utilised content analysis and divided the results into three general categories *tangible returns*, *intangible returns*, and *community interest*. Firstly, by tangible returns they meant access to useful information and expertise, answers to specific questions, and personal gain. Secondly, intangible returns refer to intrinsic satisfaction and self-actualisation. Thirdly, they said that the majority of comments received (41.9%) reflect a strong desire to have an access to a community of practice. According to them, these comments indicate that people are participating in order to exchange knowledge pertaining to practice, and they value the exchange of practice related knowledge within a community of like minded members.

In addition, Wasko and Faraj [8] stated that these comments indicate that people do not use the forum to socialise, nor to develop personal relationships. According to their study *giving back to the community in return* for the received help was by far the most cited reason for why people participate. They suggested that members are not simply interested in a forum for questions and answers, but appreciate the *online dialogue*, the debate and the discussion around topics of interest. Members help each other thanks to the possibility of *reciprocation* [8], [9]. In other words, they expect that interaction will be available in the future.

People also feel that the community provides access to knowledge rather than just information. Wasko and Faraj [8] argued that communities are especially critical of workers who do not have direct access to others in their practice. Therefore, they pointed out that online communities should use technologies that keep track of the structure of the interaction, archive discussions in a searchable format, and display the identities of group members.

5.2 Motivations to participate in open content communities

von Hippel [3] summarizes that user innovations in general, as well as commercially attractive ones in particular tended to be developed by lead users. He suggests that one central reason why lead users participate in the innovation process is their *willingness to*

customize products for themselves. Furthermore, Jeppessen and Frederiksen [6] suggest that *firm recognition* is even more important than other *peers' recognition* in company-hosted online communities. As an explanation, Jeppesen and Frederiksen [6] (2006) point out that innovative users are advanced and may want to identify themselves more strongly with company developers than with their peers. Another reason, suggested by Jeppessen and Frederiksen [6] is that firm recognition, to a great extent, comprises peer recognition, meaning that achieving firm recognition also leads to recognition by peers. Wiertz and Ruyter [10] studied motivations of collective action also in firm-hosted commercial online communities. They extend the model of social capital by Wasko and Faraj [8] to include the impact of commitment to both the online community and the host firm and reciprocity on quality and quantity of knowledge contribution. Furthermore, Wiertz and Ruyter studied moderating influence of three individual attributes on contributions: perceived informational value, sportsmanship and online interaction propensity. They find that customer's *online interaction propensity, commitment to the community and the informational value* perceived by customer in the community are the strongest drivers of knowledge contribution.

Recently Harper et al. [11] studied the predictors of answer quality on Question and Answer (Q&A) sites, such as Yahoo! Answers, on the Internet. Q&A sites are places, where users ask questions and other users answer them. Some of the sites are free and some are based on requiring a payment and paying a fee to the answerers. In their study they found that the answer quality was typically higher in fee-based sites than in free sites and paying more money led to better outcomes. They also found that site's community of users contribute to its success. In their study sites where anybody can contribute to answering outperformed sites with specific individuals answering the questions. Furthermore, Kittur et al. [12] studied Amazon's community for micro-task markets called Mechanical Turk where small tasks can be assigned to the large community of users. The community offers a potential paradigm for engaging a large number of users for low time and small monetary costs. Since the tasks in Mechanical Turk are often very simple and do not demand creativity, it can be assumed that one of the main motivators to contribute is money. They concluded that in aim to gain quality answers it is important to formulate tasks carefully. Furthermore, Antikainen & Väätäjä [4] suggested that both *monetary and non-monetary rewarding mechanisms* are needed in open innovation intermediaries. In their study non-monetary rewarding based on quality of ideas in form of ranking lists on the website was found important as well as acknowledging the highest quality answers [4].

5.3 Open source software communities

One of the interesting perspectives is provided from the viewpoint of OSS (open source software) communities where people are working in a voluntary basis without receiving direct compensation. Although some of the participants are getting their salaries from the companies, the basic idea of OSS has been traditionally based on free work and still often is. Hars and Ou [13] divided OSS members' motivations into two broad categories: internal factors (e.g., intrinsic motivation, altruism) and external rewards (e.g., expected future returns, personal needs).

Lakhani and Wolf [5] made a survey among participants in F/OSS communities and their study indicated that paid contributors dedicated significantly more time (51%) to projects than volunteers. Lakhani and Wolf [5] found that *enjoyment-based intrinsic*

motivation, namely how creative a person feels when working on the project, is the strongest and most pervasive driver. In addition, they also found that *user need, intellectual stimulation derived from writing code, and improving programming skills* are key motivators for project participation. Furthermore, contrary to experimental findings on the negative impact of extrinsic rewards on intrinsic motivations [14], Lakhani and Wolf [5] find that being paid and feeling creative on F/OSS projects does not have a significant negative impact on project effort.

Oreg & Nov's study [15] showed that software contributors placed a greater emphasis on reputation-gaining and self-development motivations, compared with content contributors, who placed a greater emphasis on altruistic motives. Although reputation-gaining was, as hypothesized, stronger in the software context than in the content context, it was nevertheless unexpectedly the weakest motivation of the three, in both contexts.

Table 1 summarizes factors related to motivations to participate in different kinds of online communities. We also mention some of the authors who have found those factors.

Table 1. Factors related to motivation to participate in online communities

Motivations to participate in online communities	*Authors*
Altruism, values	Nov [7], Zeityln [17]
Care for community, attachment to the group	Kollock [9]
Enjoyment, fun	von Hippel and von Krogh (2003)[17], Nov (2007) [7], Torvalds & Diamond (2001) [18]
Firm recognition	Jeppesen and Frederiksen [5]
Friendships, relationships, social support	Hagel and Armstrong [19]; Ridings and Gefen [21]
Ideology	Nov (2007) [7]
Interesting objectives, intellectual challenges	Amabile 1983; Ridings and Gefen [20]; Wasko and Faraj [8]
Knowledge exchange, personal learning, social capital	Antikainen [21]; von Hippel and von Krogh [17]; Wasko and Faraj [8]); Wiertz and Ruyter [10]
Monetary rewards	Antikainen & Väätäjä [4;]Wasko and Faraj [8]
Need, software improvements, technical reasons	Ridings and Gefen [20]; Jeppesen and Frederiksen [5]; Kollock [9]
Peer recognition	Lerner and Tirole[21], Hargadon & Bechky [22]
Reciprocity	Kollock [9]; Wasko & Faraj [8]; [23]
Recreation	Ridings and Gefen [20]
Reputation, enhancement of professional status	Bagozzi and Dholakia (2002); Bechky (2006); Lakhani & Wolf, 2005; McLure-Wasko & Faraj [23]; Lernel and Tirole [22]
Sense of efficacy, influencing	Bandura [24]; Constand, Kiesler & Sproul (1994)[25]; Kollock [9]
Sense of obligation to contribute	Bryant et al. [26]; Lakhani & Wolf [5]

5. Case study design

5.1 Brief descriptions of the case communities

6.1.1 CrowdSpirit

CrowdSpirit (www .CrowdSpirit.com) is focused on electronics design. Many users would like to design and to innovate tailor-made gadgets and get them manufactured for themselves. The founders and maintainers of CrowdSpirit have built toolkits for users to submit their designs and ideas. Similarly, CrowdSpirit includes tools to comment and vote different designs. For visualisation, CrowdSpirit provides mindmaps which illustrate product ideas with proposed features.

Winning designs are funded by the members of the community - and after prototyping and beta testing; the project group will continue working with the product idea. In a sense, Crowdsourcing acts a mediator between enthusiastic users and manufacturing companies. Lately, CrowdSpirit changed its business model so that instead of also participating in the development and industrialisation process of the products, now CrowdSpirit is involved only in the design process.

6.1.2 FellowForce

FellowForce (http://www.FellowForce.com) is an innovation marketplace and an intermediary that enables companies to submit innovation challenges to solvers. Solvers provide suggestions (pitches) to a challenge and best solvers are rewarded. Unlike other services, like InnoCentive (http://www.InnoCentive.com) and NineSigma (http://www.ninesigma.net) FellowForce allows solvers to submit their own pitches to companies. Normally, the best pitches that match those challenges are rewarded with money.

The collective creativity is realised in the Innovate Us –functionality of FellowForce. This functionality allows any company or organisation to use FellowForce as an open suggestion management system. Any registered participant may submit an idea or innovation but also view the responses of other users, if this feature is turned on. In addition, FellowForce also offers products to companies to launch their own co-creation platforms on their web sites.

6.1.3 Owela

Owela (http://owela.vtt.fi) is a participatory web laboratory for designing digital media products and services. It aims to be a conversational web community that connects users with developers and researchers and promotes open innovation. Owela offers social media tools for gathering user needs and development ideas as well as collecting feedback for scenarios and prototypes.

At the moment Owela consists of so called IdeaTube and TestLab, as well as a blog, chat and recommended bookmarks. In IdeaTube users may participate by commenting the descriptions and visualisations of different situations, needs, ideas, scenarios and prototypes. In TestLab the prototypes of future products and services can be tested in beta phase, and the users are expected to give feedback and development ideas. Owela has

been used in research projects as an innovation platform as well as studies conducted for companies, for example in a usability testing of web sites.

6.2 Research methods, participants, procedure, analysis methods

Our empirical study was divided into two parts. At first we did three interviews lasting approximately one hour. The interviewed maintainers were in a key position in the case communities providing us in-depth insights to the communities. Based on the interviews and earlier literature we were able to formulate web survey questions. We got 49 responses to our web survey. 45 (91%) of the respondents were males. The average age of the respondents was 37 years (avg. 36,76, std. 11,57, min. 19, max. 64). Almost half of the respondents were members in CrowdSpirit (49%, 24 respondents), 16,3% (8 respondents) in FellowForce, 24,5% in Owela (12 respondents) and 10,2% (5 respondents) in other online open innovation communities.

6.3 Results for the maintainers' interviews

FellowForce's maintainer stated that members participate because of their curiosity; they just want to try out. They are also motivated by the possibility to influence to the outcome and share ideas with others. FellowForce's maintainer believes that when you have a good idea, you just want to tell it out. Also a well-known brand attracts members to participate in an open innovation community. FellowForce maintainers added also that rewarding is a solid part of a sustainable open innovation community. FellowForce maintainer stated that they are currently thinking how to enhance collaboration between members with appropriate methods and rewarding system.

In CrowdSpirit members are used to collaborate with others; they discuss and rate others' ideas as well as work together in the product design process. CrowdSpirit's maintainer stressed rewarding, and more specifically, monetary rewards. In his opinion having fun and being touch with others are also top motivators. Furthermore, he believes that being touch with companies and working with them is motivating. Moreover, CrowdSpirit's maintainer stressed the importance of knowing members' motivations in the following statement:

> "Knowing members' motivations is a critical challenge, because we have to first identify all those motivations, and secondly make sure that we can offer something for all."

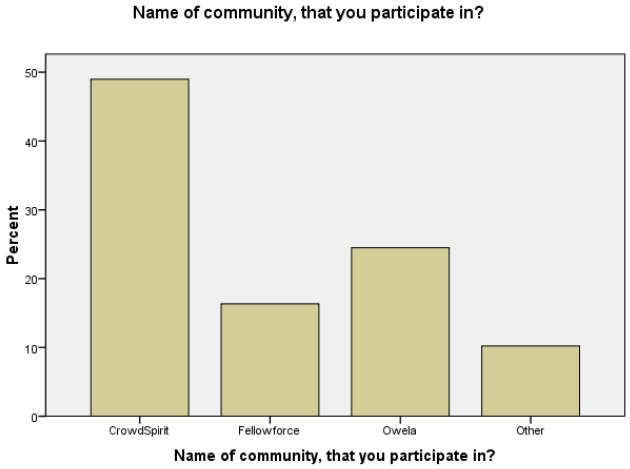
Owela's maintainer believes that interesting objectives and appropriate tools for participation and collaboration are central factors in user motivation. Owela's maintainer stated that collaborating with others is fun, it nourishes creativity and also members learn from each others. Therefore, they are currently developing tools and methods in aim to enhance collaboration between members. To enhance motivation and collaboration, appropriate monetary and non-monetary rewarding models are needed.

6.4 Results from the survey

6.4.1 Survey respondents

There were 49 responses to our survey. 45 (91%) of the respondents were males. The average age of the respondents was 37 years (avg 36,76, std 11,57, min 19, max 64). Almost half of the respondents were members in CrowdSpirit (49%, 24 respondents), 16,3% (8 respondents) in FellowForce, 24,5% in Owela (12 respondents) and 10,2% (5 respondents) in other online open innovation communities (Figure 1).

Figure 1 Percentages of community membership

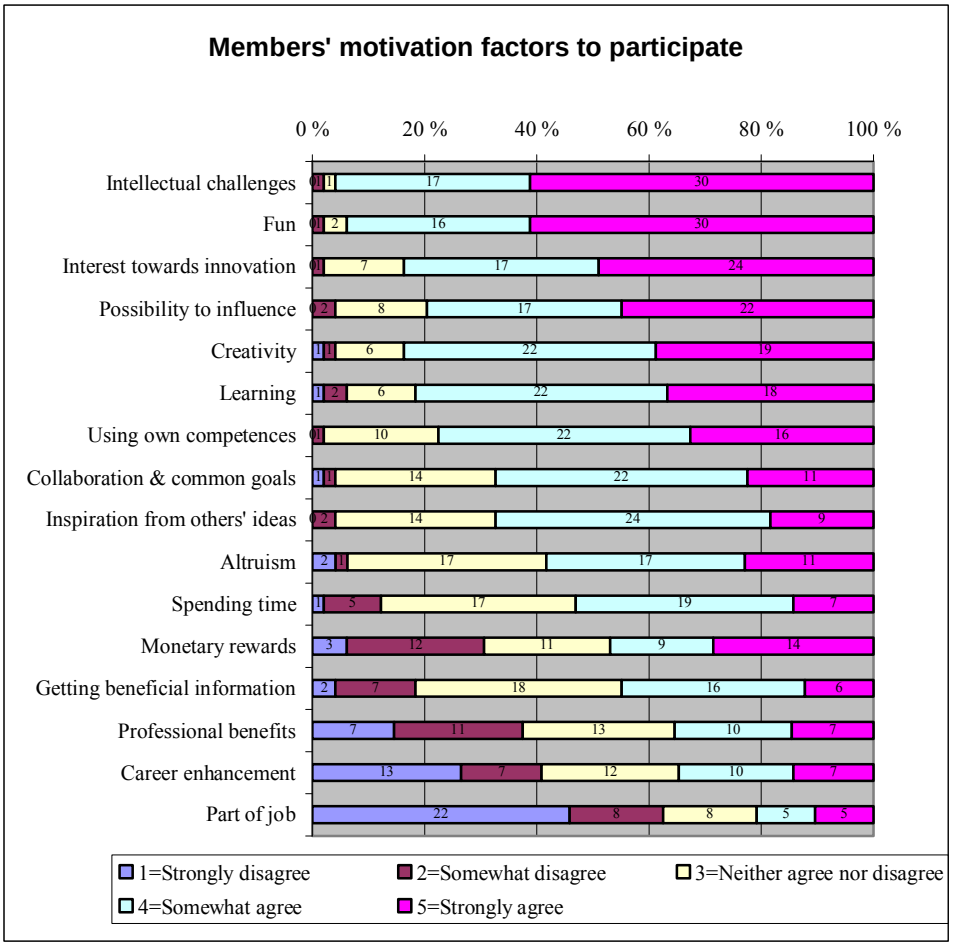


6.4.2 *Members' motivations for participating in online open innovation communities*

The motivations regarding the participation in open innovation communities were asked in question 2 "Why do you participate in an open innovation community?" The respondents rated 15 motivation factors that were mentioned in the previous literature in the scale from 1-5 (1=Strongly disagree, 5 =Strongly agree).

In Figure 2 we can see that based on the average values *intellectual challenges* (avg. 4,6), *fun* (avg. 4,5), *interest towards innovation* (avg. 4,3), *possibility to influence* (avg. 4,2) and *creativity* (avg. 4,2) were top motivation factors. In contrast, part of job (avg. 2,3), career enhancement (avg. 2,8), professional benefits (avg. 3,0), getting beneficial information (avg. 3,3) and monetary rewards (avg. 3,4) were ranked with the lowest scores.

Figure 2 Members' motivation factors to participate



To find out is there difference in motivation factors between different age groups were formed three age groups, namely "below 30" (N 15), "30-39" (N 19) and "40 and older" (N 14). We chose only three groups due to the too low number of responses in cells often year age grouping. The biggest differences were in getting beneficial information factor where the respondents under 30 years and 30-39 years were more interested in them (under 30 years: mean 3,60; 30-39 years mean 3,58) then the respondents in the group "40 and older" (mean 2, 71). Furthermore, the respondents under 30 years were more interested getting monetary rewards (mean 3,87) then respondents in the older groups (30-39 years: mean 3,42; 40 and older: mean 2,71).

We also looked whether the length of the membership influenced on the motivation factors. The biggest differences were in spending time factor, namely the respondents

who have been members less than three months regarded this factor more important (mean 3,69) as the members who have been members a longer time (3-6 months: mean 3,43; over six months: mean 2,86).

6. Discussion and conclusions

Our purpose in this study was to answer the question "What are the motivations of the members to participate to innovation in online open innovation communities?" To answer the question we conducted three case studies with multiple data collection methods. Our results show that *intellectual challenges* and *fun* seem to be top motivations to participate in online open innovation communities. Also *interest towards innovation*, *possibility to influence and creativity*, were regarded important. In tellectual challenges, fun, interest towards innovation and creativity can be placed into intangible returns category defined by Wasko & Faraj [8]. Possibility to influence can be referred to a tangible return. Other tangible returns as getting beneficial information and monetary rewards were not regarded as top motivation factors. In contrast to Wasko & Faraj's study [8], community returns as altruism, inspiration from others' ideas, collaboration and common goals were not seen as the most important factors. This might also tell about the lack of community tools and reward methods in the case communities.

Although, in this paper monetary rewarding as a motivation factor was not stressed by the side of members, we believe that rewarding in general is an important part of sustainable online open innovation community. This is a case especially in online open innovation intermediaries, where usually users do not have relationships with the organization they are innovating to. In fact, our study indicated that among younger members rewarding was more significant factor. It seems logical that when members are working for some commercial organization at some point, they also want a compensation of their work. In the future answering to the open calls from open innovation communities way of working as a free expert or "free-lancer". In our earlier paper [4] we concluded that both monetary and non-monetary rewarding is needed. As a conclusion of these two papers we suggest that although the main motivation is enjoyment or interest towards innovation, with rewards we can influence on motivation. In contrast, if the main motivator and driver would be only money, these kinds of innovation communities probably are not motivating enough to attract those people to participate.

Interestingly, case communities' maintainers stated that being in touch with interesting companies is one of the members' motivation factors. Yet, the web survey respondents did not seem to regard gaining professional benefits and enhancing one's career as a central motivator. Again, we believe that this factor may vary in different kinds of online open innovation communities. For example, earlier studies state that these factors are relevant in open source communities (Oreg & Nov 2007). Software developers are already building their career by volunteer work in open source software communities and in the future this might be also an important motivation factor to participate in other online open innovating communities.

Since users' motivations are dependent on the characteristics of the online open innovation communities, further studies including different kinds of online open innovation communities in this area are needed in order to gain in-depth understanding on users' motivations. In the future we will also continue studying the connection

between motivation, collaboration and rewarding in on line op en innovation intermediaries in aim to provide practical knowledge for companies interested in open innovation.

Acknowledgments

We want to express our thanks to Professor Sari Kujala at Tampere University of Technology, Human-Centered Technology (IHTE) for her valuable comments on the article an d researcher Hannu Soronen at IHTE for comments on the questionnaire. We are a lso g rateful to Ru ben Robert from FellowForce, David Lionel from CrowdSpirit, Asta Bäck and Pirjo N äkki from Owela/VTT for providing insightful information and comments for the pa per. We a lso want to than k research assistant Tiina Mäkelä at VTT and research assistants Jaana Mäntylä and Roope Kärki at IHTE, who helped in realizing parts of the study. This study has been funded by the SOMED project at VTT and the Ministry of Education, Finland.

References and Notes

1. Chesbrough, H. (2006) *Open innovation: a paradigm for understanding industrial innovation.* In Chesbrough, H., Vanhaverbeke, W., & West, J. (Eds.) Open innovation: researching a new paradigm. 134. Oxford, UK: Oxford University Press.
2. Tapscott, D, and Williams, A. (2006) *Wikinomics.* New York: Penguin.
3. von Hippel, E. (2005) *Democratizing innovation.* The MIT Press.
4. Antikainen, M and Väätäjä, H. (2008). Rewarding in open innovation communities – How to motivate members? In K.R.E. Huizingh, M. Torkkeli, S. Conn and I. Bitran (eds). Proc. of the XIX ISPIM Annual Conference. Open Innovation: Creating Products and Services through Collaboration. Tours, France, 15 - 18 June 2008.
5. Lakhani, K. R. and Wolf, R. (2005). *Why hackers do what they do: understanding motivation and effort in free/open source software projects.* In (Eds.) J. Feller, S. Hissan and K.R. Lakhani, Perspectives on free and open source software. MIT Press.
6. Jeppesen, L. and Frederiksen, L. (2006) *Why do users contribute to firm-hosted user communities? The case of computer-controlled music instruments,* Organization Science, Vol. 17. No. 1, January–February 2006, pp.45–63.
7. Nov, O. (2007) *What motivates Wikipedians?* Communications of the ACM, Vol. 50, No. 11, pp.60-64.
8. Wasko, M. and Faraj, S. (2000) *It is what one does: why people participate and help others in electronic communities of practice,* Journal of Strategic Information Systems, Vol. 9, No. 2-3, pp.155-173.
9. Kollock, P. (1999). 'The economies of online cooperation: Gifts and public goods in cyberspace'. In M. Smith and P. Kollock (Eds), Communities in cyberspace. London: Routledge.
10. Wiertz, C., de Ruyter, K. (2007) *Beyond the call of duty: Why customers contribute to firm-hosted commercial online communities*, Organization Studies, Vol. 28, No. 3, pp.347-376.
11. Harper, F.M., Raban, D., Rafaeli, S. and Konstan, J.A. (2008) *Predictors of answer quality in online Q&A sites*, Proceedings of the twenty-sixth annual SIGCHI conference on Human factors in computing systems, ACM, New York, USA. pp.865-874.

12. Kittur, A., Chi, E. and Bongwon, S. (2008) *Crowdsourcing user studies with mechanical turk.* Proceedings of the twenty-sixth annual SIGCHI conference on Human factors in computing systems, ACM, New York, USA, pp. 453-456.
13. Hars, A and Ou, S. (2002) *Working for free? Motivations for participating in open source Projects*, International Journal of Electronic Commerce, Vol. 6, No. 3, pp. 25–39.
14. Deci, E., Koestner R. and Ryan R. (1999) *A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation.* Psychological Bulletin 125, pp.627-688.
15. Oreg, S., & Nov, O. (2007) Exploring motivations for contributing to open source initiatives: The roles of contribution context and personal values, Computers in Human Behavior.
16. Zeityln, D. (2003). Gift economies in the development of open source software: Anthropological reflections. Research Policy. v32. 1287-1291.
17. von Hippel, E. and von Krogh, G. (2003), 'Open Source Software and the "Private-Collective" Innovation Model: Issues for Organization Science', Organization Science, Vol. 14, No. 2, pp.208−223. Torvcalds diamond
18. Torvalds, L., & Diamond, D. (2001). Just for fun: The story of an accidental revolutionary. New York: Harper Business.
19. Hagel, J. and Armstrong, A. (1997). Net gain: Expanding markets through virtual communities. McKingsey & Company, Boston.Ridings and Gefen (2004). Ridings, C. and Gefen, D. (2004) 'Virtual community attraction: Why people hang out online', ***Journal of Computer-Mediated-Communication***, Vol.10, No. 1, Article 4.
20. Antikainen, M. (2007) *The attraction of company online communities. A multiple case study.* Academic dissertation. Department of Management Studies, University of Tampere, Finland: Tampere University Press.
21. Lerner, J., and Tirole, J. (2002) *Some simple economics of open source*. Journal of Industrial Economics, Vol. 50, No. 2, pp.197-234.
22. Hargadon, A. and Bechky, B. (2006) 'When collections of Creatives Become Creative Collective – a Field Study of Problem Solving at Work', *Organization Science*, Vol. 17, No. 4, pp.484−500.
23. Wasko, M., Faraj, S. (2005). "Why Should I Share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice." MIS Quarterly 29(1): 35-57.
24. Bandura, A. (2005) Self-efficacy in changing societies. New York: Cambridge University Press.
25. Constant, David, Sara Kiesler and Lee Sproull. 1994. 'What's Mine Is Ours, or Is It? A Study of Attitudes about Information Sharing', Information Systems Research, Vol. 5, No. 4, pp.400−421.
26. Bryant, S., Forte, A., & Bruckman, A. (2005). Becoming Wikipedian: Transformation of participation in a collaborative online encyclopedia. In Proceedings of the 2005 international ACM SIGGROUP conference on supporting group work. Sanibel Island, Florida, USA.

PUBLICATION II

Supporting collective creativity within open innovation

In: Conference proceedings of the European Academy of Management (EURAM) Conference.
Paris, May 16–19, 2007.

Published in the Conference proceedings of the European Academy of Management (EURAM) Conference. Paris, May 16-19, 2007.

Mikko Ahonen, University of Tampere
Maria Antikainen, VTT Technical Research Centre of Finland
Marko Mäkipää, University of Tampere

SUPPORTING COLLECTIVE CREATIVITY WITHIN OPEN INNOVATION

Abstract

Dynamic and turbulent business environment with constant interventions of new technological, social and management innovations force the companies to seek new ways to bind the existing customers more tightly in the innovation process and at the same time, to attract new customers. The fierce competition of customer attention forces companies to create new attractive value creation methods to distinct from masses. Customizing products and services according to customer preferences might do the job for most of the customers but some advanced and enthusiastic customers want to have even more influence on defining process. Open innovation is a new emerging paradigm that includes close collaboration with customers in the innovation process, not just in defining the product features from predefined set of alternatives. Recent studies emphasize the need to support of collective creativity instead of individual creativity. Therefore, the aim of this study is to explore what motivates customers to collaborate in the innovation process and how this process can be enhanced by offering appropriate tools. A literature review of motivations to participate in online communities is presented and thereafter certain commercial web-based services supporting community collaboration and brokering are illustrated. These cases are also contrasted with Web 2.0 business models to find out what kinds of information systems and toolkits should be used in different communities with different members' motivations.

Keywords: brokering, creativity, collaboration, community, information system, open innovation, motivation, mass customisation, Web 2.0.

1. INTRODUCTION

Background of the study

Today's average customers are more demanding and harder to attain than ever before. The emergence of information age followed by information overload has driven companies to fight over customers' attention (Davenport and Beck 2001, Thrift 2006). Companies are forced to become more customer-centric and motivate customers to become co-innovators. As competition on customer attention becomes fiercer and fiercer, companies have developed new organizational answers to response to growing customer needs. Companies have started to produce customer experiences in addition to products and services to draw customer attention (Pine and Gilmore, 1999). Mass Customization, customizing products and services according to individual preferences of each customer at the prize of comparable to mass production alternatives, is another innovative approach available thanks to new information and communication technologies. In mass customization approach customers can define much of the features and appearance of the products through different kinds of configuration tools.

Empowerment of customers is common trend in all sectors of businesses. The value proposition of some pacesetter companies is not anymore the products or services that they have to offer, but methods, tools, and opportunities for *Interactive Value Creation* where customers themselves create much of the value they obtain. Interactive Value Creation (Interaktive Wertschöpfung) is a term developed by Reichwald and Piller (2006). This term is closely linked to mass-customisation and customer experiences (see Pine and Gilmore, 1999). Interactive Value Creation means that customers are a strategic resource for manufacturers and closely integrated with them in the value creation network. When customers learn to use different kinds of configuration tools and get accustomed to have power to change product features, they become even more demanding. Some customers are already willing to participate in the innovation process of new products.

> *The new understanding of innovation currently shows up as three associated developments: as the mobilization of forethought, as the deepening of the lure of the commodity through the co-creation of commodities with consumers, and as the construction of different kinds of apparently more innovative space suffused with information technology. (Thrift, 2006)*

This mobilisation of forethought means those activities to motivate customers to participate and to utilise their creativity and problem-solving skills. Recent studies (Hargadon & Bechky 2006, Farooq, Carroll and Ganoe, 2005) emphasize the need to support group creativity instead of individual creativity. Co-creation of commodities is herein inspected through Open Innovation (Chesbrough, 2003) and Interactive Value Creation (Reichwald & Piller, 2006). This construction of innovative space is viewed here through toolkits (von Hippel and von Krogh 2003, von Hippel 2005), brokering (Hargadon and Sutton, 1997) and information system design rules (Farooq *et al*., 2005).

The innovation process is radically changing as customer and user involvement has become central part of the innovation process. Henry Chesbrough (2003, 2006) calls this phenomenon Open Innovation. He emphasises the rise of intermediaries and development of new business models. According to Chesbrough (2006, 14): "As innovation becomes a more open process, intermediate markets have now arisen in which parties can transact at stages which previously were conducted within the firm". However, the view of Chesbrough does not fully consider users and customers innovating between themselves, even outside company's influence. Therefore we will present the Interactive Value Creation (Reichwald and Piller, 2006) view and illustrate brokering activities of intermediaries (Hargadon and Sutton 1997, 2000).

Creativity is the ability to produce work that is both novel (i.e. original, unexpected) and appropriate (i.e. useful, adaptive concerning task constraints) (Sternberg and Lubart, 1999). To invoke user interest and creativity, companies utilize certain design tools and toolkits. Users interested in designing their own products want to do it efficiently. Manufacturers can therefore attract them to kits of design tools that ease their product-development tasks and to products that can serve as "platforms" upon which to develop and operate user-developed modifications. (von Hippel, 128, 2005)

Within this article, we are interested in those toolkits for collective creativity. To be able to maximize the efficiency of individuals' innovation, it has been found that collective thinking is in important role (e.g. Hargadon and Beckhy 2006, Thrift 2006). Therefore, we are especially interested to find out what kind of toolkits are needed for different phases of customer interaction to efficiently and effectively combine private-collective and commercial features of open innovation. The Figure 1 below illustrates some of the different toolkits used for different phases of open innovation.

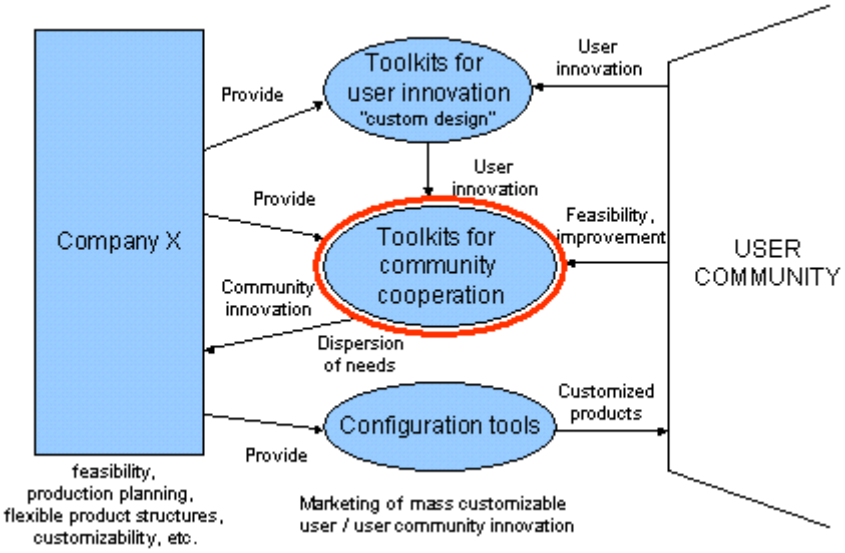


Figure 1. Toolkits for user innovation, community cooperation and mass customization.

When looking at the figure 1, there are many research literature examples of toolkits for user innovation (Hippel 2005) and for mass customization (Franke and Piller, 2003). However, toolkits for community cooperation are seldom covered in the literature (Reichwald and Piller, 2006). Therefore, focusing on toolkits for community cooperation can be seen novel in this research paper.

Purpose and methodology

Therefore, the aim of this study is to explore what motivates customers to collaborate in the innovation process and how this process can be enhanced by offering appropriate tools. The Internet and online communities provide various data collecting methods including questionnaires, interviews, observational techniques as well as using experimental methodology (Hewson, Yule, Laurent and Vogel 2003). However, in this article we will base our findings on case-based reasoning. Three co-design services are introduced and utilised as case examples of user-based innovation. From our examples and data we try to identify regular patterns of collaborative design and problem-solving processes. To offer a dyadic perspective about the studied phenomenon, we consider both viewpoints, customers as innovators and companies as offering motivation and tools for innovation.

The rest of the paper is structured as follows. We start by discussing about the Open Innovation (Chesbrough, 2003) paradigm, Interactive Value Creation (Reichwald and Piller, 2006) and creative communities. After that we review the earlier literature considering what attracts and motivates customers to involve in innovation processes. Then we consider different methods, Web 2.0 business models and toolkits in attracting customers to participate and contribute in companies' development. We also discuss about three existing cases to exemplify how these tools have already being utilized. Finally, in the conclusions chapter we summarize our findings.

2. OPEN INNOVATION, INTERACTIVE VALUE CREATION AND COLLECTIVE CREATIVITY

Open innovation paradigm versus Interactive Value Creation

West and Gallagher (2006) define Open Innovation as systematically encouraging and exploring a wide range of internal and external sources for innovation opportunities, consciously integrating that exploration with firm capabilities and resources, and broadly exploiting those opportunities through multiple channels. Firms practicing open innovation face three inherent management challenges, which are 1) *maximization* (including outbould licencing of IP, patent pooling and even giving away technology to stimulate demand for other products), 2) *incorporation* (firms need to identify relevant knowledge through scanning, recognitions, absorption and political willingness to incorporate external innovation) and 3) *motivation (firms must cultivate ways to assure continued supply of relevant external technologies and IP).* (West and Gallagher, 2006, 82)

Within this article these three challenges by West and Gallagher (2006) are linked to management of communities. User communities utilising toolkits manufactured by firms are able to supply continuously value for firms. However, to enable value creation, the motivation structures of communities need to be understood.

How is Open Innovation then different from Interactive Value Creation? Interactive Value Creation adds a new form to classical organizational forms (hierarchy and market), namely Self-selection and Self-organisation. Tasks are in this form divided between specialized actors whose motivation is based on (own) benefit stemming from collaborative achievements and social motives (Reichwald & Piller, 2006) . These steps, self-selection and self-organization is missing from Open Innovation definitions (e.g. Chesbrough 2003, 2006; West and Gallagher 2006). Self-organisation can be explained by inspecting collective cognition and collective creativity.

From collective cognition to collective creativity

Earlier studies have shown that collective cognition in organizations has a significant effect on individual cognitive processes (Meindl *et al*. 1996, Thompson *et al*. 1999, Hutchins 1991) to explain supraindividual cognitive processes. The concept of collective mind may explain the reasons why collaborative working in especially highreliability organizations increases the efficiency (Weick and Roberts, 1993). Furthermore, the concept of collective mind may also help explain highly creative organizations, where the emphasis on novel solutions also requires mindful exploration (Hargadon and Bechky, 2006).

Toolkits for collaboration and mass-customisation can be seen here as devices supporting collective mind and distributed cognition. The establishment of distributed cognition devices, intended to organize real life experiments as preferences, tends to blur habitual distinctions between production, distribution and consumption (Thrift, 2006, 279). The same users can act as designers and consumers of others' designs. This will be demonstrated in the chapter 5.

Persons are to be trained to conjure up 'unthinkingly' more and better things, both at work and as consumers, by drawing on a certain kind of neuroaesthetic that works on the myriad small periods of time that are relevant to the structure of forethought and the ways that human bodies routinely mobilize them to obtain results, to produce more of the kind of ideas that seem to just turn up, which, in reality, are thoughts that we are forever prevented from becoming directly aware of …. further, it has become clear that affectively binding consumers through their own passions and enthusiasms sells more goods (Thrift, 2006, 286) . But what are those interaction types that enable collective creativity?

Hargadon and Bechky (2006) introduce a model of collective creativity which consists of four types of social interaction: *help seeking, help giving, reflective reframing and reinforcing*. This suggest that *help seeking* can be seen as a set of actions that individuals used to induce others to join in efforts to resolve a particular problematic situation, help-seeking behaviours, and that play a necessary role in enabling moments of collective creativity.

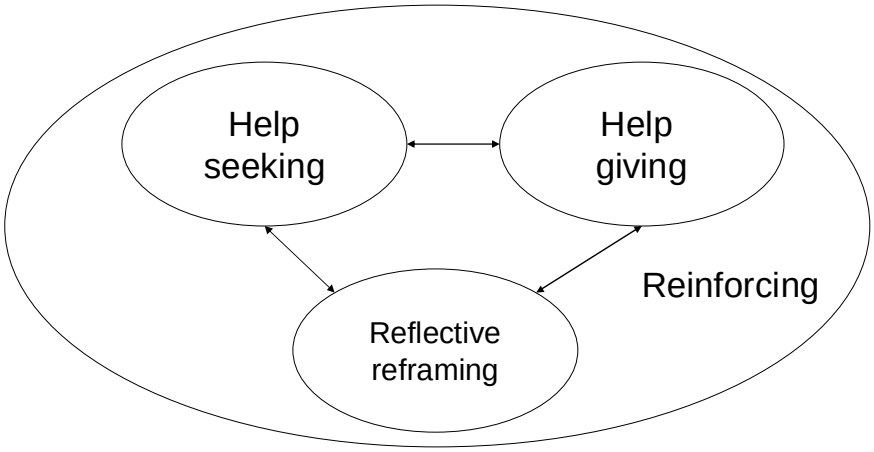


Figure 2. Interaction precipitating moments of collective creativity (Hargadon & Bechky, 2006)

Furthermore, Hargadon and Beckhy (2006) call *reflective reframing* the moment when participants in social interactions make new sense of what they already know comprise a third important aspect of collective creativity. They suggest also the fourth item, reinforcing activities, support individuals as they engage in help seeking, help giving, and reflective reframing and, as a result, they are also critical to enabling those moments when collective creativity emerges. This is analogues to Amabile's (1983) Componential Framework of Creativity. This framework includes three major components: ... "Domain-Relevant Skills" can be considered as the basis of for any performance in a given domain... "Creativity-Relevant Skills " include cognitive style, application of heuristics for the exploration of new cognitive pathways, and working style. ... "Task Motivation" includes motivational variables that determine an individual's approach to a given task. (Amabile, 1983, 67) . " Because collective creativity takes place in moments when any one individual does not hold all of the necessary knowledge to construct a creative solution, the potential for a creative solution requires the domain-relevant skills of multiple participants". . .. The characteristics like curiosity, a habit of reaching out for ideas and help, and a mixture of confidence and humility-help create a highly collaborative culture within knowledge-brokering firms or groups. (Hargadon and Bechky, 2006, 495). Brokering procecces, brokers and their characteristics in Web 2.0 communities will be discussed further in the chapter 4.

3.MOTIVATIONAL DRIVERS – HOW AND WHY CUSTOMERS PARTICIPATE IN THE INNOVATION PROCESS ON THE WEB

3.1. From communities of creation to communities of co-design

Unlike the traditional communities of practice (Wenger, 1998), Open Source Software (OSS) and other user developer communities span *organizational* rather than functional boundaries to create common knowledge and value (Gibbert, Leibold & Probst, 2002). Thus, they are also called *communities of creation* (Sawhney & Prandelli, 2000) or *communities of innovation* (Wikström, 1996). Communities of creation reflect expert knowledge of customer groups which interact not only with one company, but importantly also with each other.

They consist of groups of people who work together over a longer period of time, have interest in a common topic, and want create and share knowledge. Alike communities of creation, *communities of co-design* (Piller et al., 2004) provide common support in the case of goods which can be finally configured (co-designed) by the customer. Special community features are used to support the individual or collaborative configuration (co-design) process. Involving different customers and breaking down the barriers among users opens several possibilities for improving the individual configuration process. While communities of creation address the creation of a new solution space, communities of co-design use an existing one for the purpose of configuration (of a customized product).

3.2 Motivations to participate in online communities

Since online communities enable customers to participate in the innovation process we start by considering the reasons why to participate them. Researchers in the online community research field have considered reasons why people join and visit online communities and what are the attraction factors of online communities. Although, these studies approach the phenomenon from different perspectives than attraction, some of them are close to the one of the present study. Therefore, these studies offer interesting insights into this study. Previous studies about members' reasons to visit to online communities are gathered in Table 1.

Author	Reasons/ motivations to visit or join in	Main emphasis in the study
Antikainen (2007)	16 Attraction factors can be divided between members, member-to-maintainer, member-to-service and member-to-brand	Attraction factors of company online communities
Bagozzi and Dholakia (2002); Dholakia, Bagozzi & Pearo (2004)	Individual motives, social influences and social identity	Motivations to join, psychological perspective
Gruen, Osmonbekov and Czaplewski (2005)	Factors that are divided into motivation, opportunity and ability	C-to-c knowledge exchange
Hagel and Armstrong (1997)	Interest, relationship, fantasy games, transactions, many needs simultaneously	The economical benefits of online communities
Kollock (1999)	Anticipated reciprocity, increased reputation, sense of efficacy	Motivations to contribute
McKenna and Bargh (1999); McKenna and Green (2002)	Self-related: stigmatised and constrained identities Social related: social anxiety, loneliness, hectic lifestyle, safety issues	Motivations to join, psychological perspective
Ridings and Gefen (2004)	Exchange information, social support, friendship, recreation, common interest, technical reasons	Reasons why people visit online communities
Wasko and Faraj (2000)	Tangible returns, intangible returns and community interest	Knowledge exchange
von Hippel and von Krogh (2003)	Personal learning and enjoyment from programming.	Open source communities

Table 1. Summary of the earlier studies about reasons to participate online communities

Individuals may contribute valuable information because the act results in a *sense of efficacy,* that is, a sense that they have had some effect on this environment. There is well-developed research literature that has shown how important a sense of efficacy is (e.g. Bandura 1995), and making regular and quality contributions to the group can help individuals believe that they have an impact on the group and support their own self-image as an efficacious person. Wikipedia (www.wikipedia.org) is a prime example of an online community that gives contributors a sense of efficacy. Wikipedia is an online encyclopaedia which uses online software to enable anyone to create new articles and change any article in the encyclopaedia. The changes the members make are immediate, obvious, and available to the world.

Reputation is important to online contributors such that, in general, individuals want recognition for their contributions. Profiles and reputation are clearly evident in online communities today. Amazon.com is a case in point, as all contributors are allowed to create profiles about themselves and as their contributions are measured by the community, their reputation increases. With eBay (www.ebay.com) that is an online auction site, members have the opportunity to rate their experience with someone they have traded. This has an effect on the sellers or buyers reputation score. The reputation is linked to the role that a member has, and therefore, it is considered to include under roles attraction factor.

Approaching motivation from psychological perspective, McKenna and Bargh (1999) built a conceptual framework about internet social interaction. In their framework they have divided the type of motivation into *self-related* and *social related* types. As self-related motivators they mention stigmatised and constrained identities. According to them, the behaviour deriving from self-related motivators are disclosure of secret aspects of self and becoming the ideal self. As social motivators they mention social anxiety, loneliness, hectic lifestyle and safety issues. Moreover, the behaviour deriving from the social motivators are disclosure to gain intimacy, presenting the ideal self to gain approval and acceptance and forming relationships. (McKenna and Bargh 1999)

Bagozzi and Dholakia (2002) and Dholakia et al. (2004) have as well been interested in participants' motivations visiting online communities. They have built *a social influence model* of consumer participation in online communities, which consists of three parts: *individual motives* for participation in the online community, *social influences* on member participation in the online community and *social identity* in the online community. Furthermore, individual motives are divided into purposive value, self-discovery, maintaining interpersonal interconnectivity, social enhancement and entertainment value.

Wasko and Faraj (2000) explored reasons why people participate and help each others in online communities. They concentrated on *knowledge exchange* and therefore, they empirically explored three technical communities in their study. They asked participants an open-ended question by e- mail, about why they participate and help others and got 342 answers. In analysing data they utilised content analysis and divided the results into three general categories *tangible returns*, *intangible returns*, and *community interest*. Firstly, by tangible returns they meant access to useful information and expertise, answers to specific questions, and personal gain. Secondly, intangible returns refer to intrinsic satisfaction and self-actualisation. Thirdly, they said that the majority of comments received (41.9%) reflect a strong desire to have an access to a community of practice. According them, these comments indicate that people are participating in order to exchange knowledge pertaining to practice, and they value the exchange of practice related knowledge within a community of like minded members. In addition, Wasko and Faraj (2000) stated that these comments indicate that people do not use the forum to socialise, nor to develop personal relationships. According to their study giving back to the community in return for help was by far the most cited reason for why people participate.

4. TOOLKITS SUPPORTING MOTIVATION AND WEB 2.0

> Firms that understand the distributed innovation process and users' roles in it can change factors affecting lead user innovation and so affect its rate and direction in ways they value. Toolkits for user innovation custom design offer one way of doing this. This approach involves partitioning product-development and service-development projects into solution information-intensive subtasks and needed-information-intensive subtasks. (von Hippel, 2005, 16)

Users interested in designing their own products want to do it efficiently. For example, some manufacturers provide users with toolkits and configurations to customize and even design their own products in mass-customization context. Product beta-testing is another example of use of user communities.

How should a web- based service be designed to support collective creativity? Farooq et al. (2005) suggest three design implications to support creativity within information systems (IS): 1) Integrate support for individual, dyadic, and group brainstorming; 2) Leverage cognitive conflict by preserving and reflecting on minority dissent and 3) Support flexibility in granularity of planning. Furthermore, Farooq et al. (2005, 222) explain minority dissent: "the skeptic voices are important and these traces should be kept visible in the IS" and there should discussion about them along the line. Farooq *et al.* (2005) point out that social networks and their management is a crucial part of creativity.

Social networks are currently discussed under a concept called Web 2.0. This concept was originally developed by Tim O'Reilly.

> **Web 2.0** means second generation of Internet-based services such as social networking sites, wikis, communication tools, and folksonomies that emphasize online collaboration and sharing among users. The complex and evolving technology infrastructure of Web 2.0 includes server-software, content-syndication, messaging-protocols, standards-based browsers with plug-ins and extensions, and various client-applications. These differing but complementary approaches provide Web 2.0 with information-storage, creation, and dissemination capabilities that go beyond what the public formerly expected of Web sites. Some Web sites that potentially sit under the Web 2.0 umbrella have built new online social networks amongst the general public. (Wikipedia, 2007)

In the following table some Web 2.0 elements are illustrated.

Web 2.0 element	Description	Typical case
1. Early entry / first mover	A successful Web 2.0 company is characterised by being able to bring together a large number of users / subscribers and facilitating and encouraging interaction between them.	Innertee
2. Constant improvement, innovation and value	A web 2.0 site must constantly provide new and fresh reasons for members of the community to engage.	Innocentive
3. Local and Global Support	While the global economy is at the forefront of everyone's mind, the reality is that the majority of business and social networking is intra-national and often geographically focused .	Bookmooch
4. A platform for others	Sites that allow others to establish and develop businesses on top of it, serving as a platform for communication and commerce have often distanced themselves from their competitors.	Innocentive
5. User co ntent as an attraction	Internet users are finding user-driven content as compelling as, and perhaps even more refreshing than traditional content from magazines, TV networks and film studios.	Innertee

Table 2. Factors driving the success of Web 2.0 businesses (Armapartners, 2006) with case-examples.

Like sh own i n the table 2, Web 2.0 is as m uch a business m odel as i t is a plat form for communication. A b usiness model has two important functions. It must creat e value within the v alue chain: and i t must capt ure a pi ece o f value f or t he f ocal fi rm i n t he chain (Chesbrough, 2006). Thi s piece of v alue is so metimes difficult to recognise as c ustomers expect more and more services to be free of charge. Those cases in the table 2 and the ir value creation mechanism are introduced in the next chapter.

Web 2.0 elements have some similarities with technology brokering (Hargadon and Sutton, 1997) and knowledge brokering (Hargadon and Sutton, 2000). Technology brokering means a strategy for exploiting the networked nature of the innovation process and building new communities around innovative recombinations. The recent Open Innovation paradigm (Chesbrough 2003, 2006) emphasizes those brokers (intermediators) and their role in the innovation process. According to Chesbrough (2006, 14): "As innovation becomes a more open process, intermediate markets have now arisen in which parties can transact at stages which previously were conducted within the firm". Certain Web 2.0 services and organisations maintaining those services in the Internet act as brokers. The technology brokering process model (Hargadon & Sutton, 1997) is based on the structural holes theory by Burt (1992). This theory suggests that innovators can innovate routinely because they occupy a "structural hole", a gap in the flow of information between subgroups in a larger network. For innovators, these gaps exist between industries where there was and was not knowledge about the new emerging technologies. Actors filling these gaps are brokers who benefit by transferring resources from groups where they are plentiful to groups where they are dear (Hargadon & Sutton, 1997, 717). Brokers within this definition are those users or organisations that utilise the information of other users to create innovations.

Knowledge brokering is a similar concept to technology brokering. Knowledge brokering by Hargadon & Sutton (2000) includes four phases: 1) Constantly Capturing ideas, 2) Keeping these alive 3) Exploring new uses for them 4) Building prototypes to test them out. Ideas can be born as individual output but their refinement is always group-based activity. Users with toolkits should be allowed to capture, collect and organise ideas. Exploring new uses means that ideas can be mixed and utilised for different purposes. Building prototypes mean that user can create design and solutions which are evaluated by the community for their novelty and value. In aim to give a practical viewpoint about what kinds of solutions to enhance collaborative innovations among customers already have been made, we look closer at three web-based service case studies.

5. HOW TO ENHANCE CUSTOMERS' COLLABORATION – EXPLORING THREE CASES

Bookmooch (http://www.bookmooch.com)

BookMooch is a book exchange service for used books. Users act as administrators, translators and content producers in the community. Every time a user gives someone a book, that user earns a point and can get any book he or she wants from anyone else at BookMooch. Once the user has read a book, the user can keep it forever or put it back into BookMooch for someone else. There is no cost to join or use this web site: only cost is mailing books to others. Users receive a tenth-of-a-point for every book they type into the system, and one point each time they give a book away. In order to keep receiving books, the user needs to give away at least one book for every five received. Founders of BookMooch earn money every time a user can not find a book in the BookMooch and decides to navigate and purchase a book in Amazon through Bookmooch user interface.

Analysis: In the case of Bookmooch it can be concluded that members' motivations include both self-related reasons, for example information exchange and learning (e.g. Kollock 1999; Wasko and Faraj 2000), and social reasons, ie. creating friendships, sense of community and reciprocation (e.g. Dholakia et el. 2004; Ridings and Gefen 2004). The company behind Bookmooch has built a simple web-interface to allow users to log in and communicate with each other. However, those connections to other services like Amazon (http://www.amazon.com) has been made transparent so that users may stay in the Bookmooch user interface even if they utilise Amazon services. This provides both users and the company additional value.

Innocentive (http://www.innocentive.com)

Pharmaceutical maker Lilly launched InnoCentive in 2001 as a way to connect resources outside the company – people who could help in developing drugs. From this starting point, InnoCentive invited other firms which were also interested in ad hoc experts. Companies like Boeing, DuPont, and Procter & Gamble now post their scientific problems on InnoCentive's Web site; anyone on InnoCentive's network can take participate in solving them.

The companies – or seekers, as InnoCentive calls them – pay solvers from $10,000 to $100,000 per solution. (They also pay InnoCentive a fee to participate.) The non-profit Rockefeller Foundation area on InnoCentive's scientific platform will focus on solving the most pressing and complex humanitarian challenges posed by non-profit entities selected by the Foundation. Under the agreement The Rockefeller Foundation will select non-profit entities and others with charitable intent eligible to use the InnoCentive platform under preferred conditions, and will pay access, posting and service fees on their behalf to InnoCentive, as well as challenge awards to those researchers solving the technology problems the non-profits pose.

The Foundation will launch a new area on its own Web site, www.rockfound.org, to recruit and screen organizations seeking this subsidy to use the InnoCentive platform.

Analysis: Motivation is here merely based on external sources like money, visibility and fame. Like pointed by Wasko and Faraj (2000), tangible returns are probably more important than to socialising or developing personal relationships in such a community. However, the recent integration of Rockefeller Foundation with non-profit projects and related problem-solving makes collaboration more versatile and the Innocentive brand becomes "softer". Similarly, the new user interface and services of InnoCentive will provide more opportunities for discussion and collaboration. Like described earlier by Hargadon and Sutton (1997) InnoCentive act as a broker and allows experts from many different field to combine their forces and expertise to solve problems.

innerTee (http://www.innertee.com)

This last example is a typical Web 2.0 service, currently in a beta phase. innerTee allows originators (artists) to create t-shirt designs and other users (mixers) to make re-designs of these original designs. Mixers can also sell their creations to others. In both cases, the originator (artist) gets a provision and earns respect and attention in the community. Like BookMooch this service is also based on points and these points can be consumed like money when making purchases in the service.

Analysis: innerTee has been purposively designed to support collaboration among designers and innovators.

The elements of Social influence model Bagozzi and Dholakia 2002, Dholakia *et al*. 2004) get realised in Innertee: *individual motives* for participation in the online community, *social influences* on member participation in the online community and *social identity* in the online community. From business perspective Innertee is similar to a service called Threadless.com: all designs are voted and only those designs that get enough votes will be manufactured. Design is outsourced to users and manufacturing of t-shirts is outsourced as well.

5. CONCLUSIONS

In this paper the authors have discussed about different perspectives considering how customers can be motivated to participate in innovation process. Since it has been stated that customers working collaboratively is the most efficient form, we focused on this rather unexplored area. Toolkits for community collaboration and their motivational factors were presented. We approached the phenomenon from both customers and companies' viewpoints using three Internet-based services as exemplars. These three cases (Bookmooch, Innocentive, innerTee) illustrated that a service can be both addictive to customers and profitable for companies. However, the earning logic and value creation models are different in each case, Bookmooch receives Amazon exchange fees everytime someone buys an Amazon book through Bookmooch user interface, Innocentive gets a percentive for every solved case and Innertee takes it's share of sold designs and mixes. What is similar to all of these cases, is that users act mostly without service provider firm interruption and even customise and maintain the service by themselves. Those collective creativity factors: help seeking, help giving, reflective reframing and reinforcing (Hargadon and Bechky, 2006) were only partially realised in those three cases. The role of brokers (Hargadon and Sutton, 1997, 2000) facilitating collective creativity and value creation was illustrated.

6. DISCUSSION

West and Gallagher (2006, 85) state that "motivating individuals to generate and contribute their IP in the absence of financial returns is a significant management challenge for an Open Innovation approach". Open source software projects present a novel and successful alternative to conventional innovation models. This alternative presents interesting puzzles for and challenges to prevailing views regarding how innovations "should" be developed, and how organizations "should" form and operate. (von Hippel & von Krogh, 212, 2003). Fitzgerald (2006) discusses about OSS 2.0 and refers to new collaboration and business models between companies and open source communities. More research focus, according to our observations, should companies be put on the open source communities and their motivational factors to understanding. This is the direction where we will head next.

Here we cannot avoid the concept called crowsourcing (Surowiecki, 2004). Open source projects and some Web 2.0 services can be seen as a form of crowdsourcing. Crowdsourcing presumes that a large number of enthusiasts can outperform a small group of experienced professionals. When looking at most skilled people for crowdsourcing, there are generally four conditions that characterise wise crowds: 1) diversity of opinion (each person should have some private information, even if it's just an eccentric interpretation of the known facts) 2) independence (people's opinions are not determined by the opinions of those around them) 3) decentralization (people are able to specialise and draw on local knowledge) 4) aggregation (some mechanism exists for turning private judgements into a collective decision) (Surowiecki, 12, 2004). This definition "independence of opinion" by Suroviecki (2004) does not explain motivation to innovate collaboratively, nor mention the Interactive Value Creation defined by Reichwald & Piller (2006). In that sense the connections of collective creativity and crowdsourcing would be interesting to inspect more in detail.

After being familiar with customers' motivations to participate and collaborate, the most challenging task for companies is to consider what kinds of templates and tools should be offered. This study acts as an opening for further studies considering customer collaboration. Therefore there are several interesting paths to go further. For example, exploring customers' use of toolkits would be an interesting path to proceed. This would require usability analysis and better understanding of customer behaviour. Another question is, whether there are ethical problems, unexpected behaviour or limits in combined crowdsourcing and collective creativity like Thrift (2006) indicates. Crowds or communities may change their behaviour faster than companies expect. The third question is whether brokering phases by Hargadon and Sutton (1997, 2000) could be utilised to explain collective creativity of users in Web 2.0 services. Now brokering explains better the activities of companies providing those Web 2.0 collaboration platforms.

In overall, our case examples and our motivation study indicated that a mechanical bidding process in web communities is not enough to enable exchange of IP (intellectual property) for Open Innovation. The design of toolkits for community collaboration seems to require more research on motivational factors and collective creativity.

REFERENCES

Amabile, T. (1983). **The Social Psychology of Creativity**. Springer-Verlag: New York:

Antikainen, M. (2007). **The attraction of company online communities**. A mul tiple case study. Academic d issertation. Depart ment of Management St udies, U niversity of Tampere, Finland.

Bagozzi, R. P. and Dholakia, U. M. (2002). Intentional social action in consu mer behaviour. ***Journal of Interactive Marketing***, 16(2): 2-21.

Bandura, A. (1995). ***Self-efficacy in changing societies***. Ca mbridge: Cambr idge Univer sity press.

Beckhy, B. and Hargado n, A. (200 6). When co llections o f creatives beco me creat ive collectives: A field study of problem solving at work. ***Organization Science***, 17 (4): 484–500.

Chesbrough, H. W. (2003). ***Open Innovation: The New Imperative for Creating and Profiting from Technology***. Harvard Business School Press: Boston, MA.

Chesbrough, H. (2006). Open Innovation: A Paradi gm f or Un derstanding I ndustrial Innovation. In Chesbrough, H ., V anhaverbeke, W ., & W est, J . (Ed s.) ***Open Innovation: Researching a New Paradigm***. 1-34. Oxford University Press: Oxford, UK.

Gruen, T. , Osm onbekov, T . and C zaplewski, A. (2005). ***How e-communities extend the concept of exchange in marketing: An application of the motivation, opportunity, ability (MOA) theory***. *Marketing Theory*, 5 (1): 33-49.

Davenport, T.H. an d Beck, J.C. (2001). ***The Attention Economy : Understanding the New Currency of Business***. Harvard Business School Press.

Dholakia, U., Bagozzi, R. and Pearo, L. (2004). A social influence model of consumer participation in network- and small-group-based virtual communities. ***International Journal of Research in Marketing***, 21 (3): 241-263.

Farooq, U., Carr oll, J., and Ganoe, C. (2005). Support ing Creativity in Distr ibuted Scientific Communities. **Proceedings of the International GROUP Conference on Supporting Group Work** (Sanibel Is land, Fl orida, No vember 6-9, 2005), 217-226 . New Yo rk, USA : ACM Press.

Fitzgerald, B. (2006). The Trans formation of Open Source So ftware. **MIS Quarterly**, 30(3): 587-598.

Franke, N. and Piller, F. (2003). Key Research Issues in User Interaction with Configuration Toolkits in a Mass Customization System. ***International Journal of Technology Management***, 26(5/6):578-599.

Hagel, J. and Armstrong, A. (1997). ***Net gain: Expanding markets through virtual communities.*** Boston: McKingsey & Company.

Hargadon, A. and Sutton, R. (2000) Building an Innovation Factory. ***Harvard Business Review***. 78(3): 157-166.

Hargadon, A. & Bechky, B. (2006). When collections of Creatives Become Creative Collective – a Field Study of Problem Solving at Work. ***Organization Science***, Vol. 17, No 4, 484-500.

Hargadon, A. & Sutton, R. (1997). Technology Brokering and Innovation in a Product Development Firm, ***Administrative Science Quarterly***, Vol. 42, 716-749.

von Hippel, E. (2005). ***Democratizing Innovation***. The MIT Press.

von Hippel, E. and von Krogh, G. (2003). Open source software and the 'private-collective' innovation model. ***Organization Science*** 14(2): 209-223.

Holmström, H. (2000). Getting to know your customers. Implications of virtual communities in on-line commerce. In L. Svensson, U. Snis et al. (Eds.), ***Proceedings of IRIS 23* (Information Research in Scandinavia): *Doing IT Together***. Uddevalla: University of Trollhättan.

Hutchins, E. (1991). Organizing work by adaptation. ***Organization. Science.*** 2(1): 14–39.

Klang, M. and Olsson, S. (1999). Commercialising online communities: From communities to commerce. In P. Leng and Grant et al. (Eds.), Innovation through electronic commerce. ***Proceedings of the 2nd International Conference IeC'99***. Manchester, UK.

Kollock, P. (1999). The economies of online cooperation: Gifts and public goods in cyberspace. In M. Smith and P. Kollock (Eds), ***Communities in cyberspace***. London: Routledge.

MacInnis, D., Moorman, C. and Jaworski, B. (1991). Enhancing and measuring consumers' motivation, opportunity and ability to process brand information from Ads. ***Journal of Marketing***, 55 (October): 32-53.

McKenna, K. and Bargh, J. (1999). Causes and consequences of social interaction on the Internet: A conceptual framework. ***Media Psychology***, 1, 249-269.

McKenna, K. and Green, A. (2002). Virtual group dynamics. ***Group dynamics: Theory, Research, and Practice***, 6 (1): 116-127.

Meindl, J . R ., Stub bart, C .a nd P orac, J .. (19 96). ***Cognition within and between organizations***. : Thousand Oaks, CA: Sage Publications.

Pine, B.J. a nd G ilmore, J.H. (1999). ***The Experience Economy: Work Is Theater & Every Business a Stage***. Harvard Business School Press.

Reichwald, R., & Piller, F. (2006). ***Interaktive Wertshöpfung***. Wiesbaden, Germany: Gabler.

Rheingold, H. (2003). **Smart Mobs: The Next Social Revolution**. Basic Books.

Ridings, C. and Gefen, D. (2004). Virtual community attraction: Why people hang out online. ***Journal of Computer-Mediated-Communication***, 10 (1), Article 4.

Skiba, B., Tamas, A. & Robinson, K. (2006) Web 2.0: Hype or Reality… and how will it play out? White paper. London.

Sternberg, R. and Lubart, T. (1999). The concept o f creativity: Prospects and paradigms. In R.J. Sternberg (Ed.), **Handbook of creativity**: 3-15. New York: Cambridge University Press.

Surowiecki, J. (2005). **The Wisdom of Crowds**. Anchor.

Thompson, L., Levi ne, J a nd Messic k, D. 1999. ***Shared cognition in organizations: The management of knowledge***. Lawrence Erlbaum Associates: Mahwah, NJ.

Thrift, N. (2006). Re-inv enting invention: new t endencies in capitalist co mmodification. ***Economy and Society***, 35(2). 279-306.

Tseng, M. & Piller, F. (2003) ***The Customer Centric Enterprise: Advances in Mass Customization and Personalization.*** New York: Springer.

Wasko, M. and Faraj, S. (2000). It is what one does: why people participate and help others in electronic co mmunities o f practice. ***Journal of Strategic Information Systems***, 9 (2-3): 155-173.

West, J. & G allagher, S. (2006) Open Innovation in Open Source Software . In Chesbrough, H., Vanhaverbeke, W., & W est, J. (Eds.) ***Open Innovation: Researching a New Paradigm***. 82-106. Oxford University Press: Oxford, UK.

Weick, K. and Roberts, K.. (1993). Collective mind in organizations: Heedful interrelating on flight decks. ***Administrative. Science Quarterly.*** 38(3): 357–381.

Wikipedia.org (2007) Crowsourcing - **wikipedia**, the free encyclopedia. Retrieved: 2nd Jan 2007 from http://en.wikipedia.org/wiki/Web_2.

PUBLICATION III

Motivating and supporting collaboration in open innovation

European Journal of Innovation Management 2010.
Vol. 13, No. 1, pp. 100–119.

Motivating and supporting collaboration in open innovation

Maria Antikainen
Department of Business and Technology Management,
VTT Technical Research Centre of Finland, Tampere, Finland, and

Marko Mäkipää and Mikko Ahonen
Department of Computer Sciences, University of Tampere, Tampere, Finland

Abstract

Purpose – The purpose of this paper is to explore collaboration in open innovation (OI) communities. The paper focuses on the following two research problems: how can users be motivated to collaborate in OI communities and what kind of tools and methods can support collaboration in OI communities?

Design/methodology/approach – The exploratory case study includes three innovation intermediaries originated in three different countries: France, The Netherlands and Finland. The primary data source consists of the open-ended questions posted to the maintainers and users by e-mail. The data include five responses from the maintainers and 12 responses from the users. The secondary source is the internet document review. The classification of the factors in the preliminary framework is derived from reading and rereading the answers of the respondents until the themes started emerging from the data.

Thereafter, the data are coded according to the chosen themes.

Findings – Results suggest that monetary rewards are not always the best way to motivate contributing users. Instead, contributors appreciate many intangible factors, such as community cooperation, learning new ideas and having entertainment. Contributors also appreciate good support and the right cooperation tools from their service provider.

Research limitatio ns/implications – The data was based on three cases and a limited amount of participants. Therefore, it may be that in gathering empirical data from a larger group of cases, some new factors will be found.

Practical implications – Companies should provide community members with tools that are easy to use, allowing people to express themselves and share their personal details. It seems to be important that maintainers are involved as visible members of a community, which includes telling about themselves in a more detailed way.

Originality/value – This study is one of the first papers focusing on the collaboration perspective of OI communities.

Keywords – Innovation, Intermediaries, Online operations, Communities, Motivation (psychology)

Paper type – Case study

INTRODUCTION

Towards understanding of open innovation and customer collaboration

Previously, companies have sought to satisfy the varying needs of different customers and customer groups with product variety or with mass-customisation strategies (Kottler, 1989, Da Silveira et al., 2001). (Kottler, 1989; Da Silveira et al., 2001). Yet, more and more often, the existing solution space (Franke and Piller, 2003; Piller, 2004) is not enough in the tight global competition; instead, companies have to find new solutions and new appealing offerings at an accelerated pace. Customer orientation and customization strategies are sought to better understand and satisfy the customer needs (Tseng and Piller, 2003, p. 4). But this may not be enough to attract customers and users. Market orientation (together with organizational learning) has a positive effect on performance through innovation (Jimez-Jimez et al., 2008) suggesting that most valuable output gained from market orientation is market intelligence. Together with organizational learning, this intelligence can be used for innovations, creating product, process and administrative innovations that increase performance (Jimez-Jimez et al., 2008). New product development is an activity that has previously been a highly closed process and involved only few people in organizations. New level of demand for innovativeness appoints new challenges for this model. Organizations need to be enriched with new external knowledge, which can be brought in by employees from related industries the organisation is aiming at, or by collaborations (Bröring and Herzog, 2008). One way to acquire new knowledge in a cost-efficient way is to involve customers in the innovation development process. Utilising customers' creativity and innovation capability has a lot of potential for new product development, as shown by many recent studies (Wikström, 1996; Piller, 2004; von Hippel, 2005). Heiskanen et al. (2007) suggest that more open-ended approach to concept testing is needed with aim to encourage users to evaluate concepts more critically. Involving customers more into processes may also lover barriers to adopting new innovations. However, individually, customers might not be capable of creating the best possible products as their views of products might be limited to a certain perspective. Also, the market potential for products innovated by a single customer might be low. Earlier studies have shown that collective thinking is important in order to be able to maximise the efficiency of individuals' innovation (Hargadon and Bechky, 2006; Thrift, 2006). Instead of concentrating on an individual customer or a lead user, companies should support group or community creativity (Ahonen et al., 2007). Thrift (2006, p. 279) summarises the current trends in the innovation arena:

> The new understanding of innovation currently shows up as three associated developments: as the mobilization of forethought, as the deepening of the lure of the commodity through the co-creation of commodities with consumers, and as the construction of different kinds of apparently more innovative space suffused with information technology.

As described by Thrift (2006), the innovation process, ideation, and collaboration in new product development are becoming more open. Open innovation (OI) concept (Chesbrough, 2003) is a growing research area and increasing amount of companies is utilizing it. So far, much of the extant literature is concentrated on to describe the phenomenon and its logic, and more recently to define competent business strategies for OI. But an OI business model with sufficient earning logic is not enough to make an OI initiative successful. The old phrase "if we build it, they will come" does not apply here. The investment on a web-based OI-platform is a waste of money if motivation factors are not understood. To make any OI strategy operational, it needs to stress the principles of user motivation – why would users come and use the OI-platform and why would they contribute. Thus, strategy needs to

stress how users are motivated and enabled to contribute to achieve critical mass and to make the OI successful.

The individual and group level aspects of OI have remained an unknown, less-researched territory (West and Gallagher, 2006). Similarly, creativity research has inadequately described the collective processes and motivational factors in the group level (Kurtzberg and Amabile, 2001; Hargadon and Bechky, 2006). There are also many literature examples of toolkits for user innovation (von Hippel, 2005) and for mass customisation (Franke and Piller, 2003). However, toolkits for community collaboration are seldom covered in the literature (Reichwald and Piller, 2006). Therefore, our study focusing on the utilisation and practical knowledge on enhancing collaboration in OI context is a new and essential opening towards holistic understanding and dissemination of OI.

Aims

In this paper we concentrate on the customer-side of OI and focus on collaboration in OI communities to be able to gain a holistic view of the phenomenon. We focus on the following two research problems:

1. *How can users be motivated to collaborate in OI communities?*
2. *What kind of tools and methods can support collaboration in OI communities?*

We see that user motivation is one of the key issues in aim to understand and develop voluntary open innovation communities. Therefore, the RQ1 focuses on the motivation factors for participating in collective-innovation processes in OI communities. The aim to provide a more practical perspective as well, so, the RQ2 concerns the tools and the methods that can support the collaboration. In addition, our purpose is to provide practical information for companies; how to build a more motivating environment for collective-innovation process by supporting collaboration with appropriate tools and practices. As a result, we present a preliminary framework of motivation factors for collaboration in OI communities and provide guidelines and methods for companies aiming to develop tools that support collective-innovation processes in their communities.

Structure of the paper

The rest of the paper is structured as follows: we start with the discussion of companies' transformation through customisation strategies to OI. Thereafter, we take a view on collective creativity, adding the perspective of how to motivate customers to participate. This is followed by a section describing the qualitative research method and the case descriptions, after which we discuss our results. Finally, we draw conclusions and give some suggestions about the tools and the methods that may enhance motivation to participate in online communities for OI.

TRANSFORMATION FROM INDIVIDUAL CUSTOMISATION TO OPEN INNOVATION

Transformation from market orientation to customer-centric strategies

Companies have awakened to the growing heterogeneity of customer needs and preferences and have started to shift their offerings from commodities to customisable products (Hart, 1995). As a solution, companies have utilised mass customisation, where customers are

offered a predefined set of alternative features that they can decide on inside a fixed solution space (Piller, 2004).

With mass customisation, companies are able to get more insights on customers' needs and preferences since customization requires interaction. However, this information only concerns the existing innovation and the fixed solution space to customise that innovation. Thus, mass customisation concentrates on customisation of existing innovations whereas the most rewarding customer involvement could be shown in the ideating process of new products, as OI paradigm suggests (Chesbrough, 2003).

In many OI models, customers are given special attention as a source of new innovations. However, single customer's unique needs might not be very interesting from the company's point of view. Lead users, particularly, may have very distinct needs and preferences when compared to basic users and large masses of customers. Instead of trying to satisfy the needs of one specific customer, it is economically more viable to try to identify large enough customer-product combinations and possibly even different needs inside that segment. One way to achieve this is by supporting and motivating customers to use their collective creativity to innovate together.

Embracing collective creativity is not only beneficial for new innovations, as mentioned above, but also a good customer strategy. First, participation and contribution in the collective-innovation process has been found to provide a "collective customer commitment", a customer's commitment toward a collectively reached solution (Ogawa and Piller, 2006). Earlier studies have already shown that customers appreciate feeling that they have influence and their needs are being listened to. Second, by observing the collective-innovation process and paying attention to the divergence of needs of different contributors, the company can get insight into the variety needed inside the customer group. The company can then assess the heterogeneity of the needs and decide if it chooses to apply the observed need for variety in its product offerings. Instead of being totally customer-driven and doing whatever each individual customer want, company can apply customer-centric strategy to fulfil most of the varying needs of different customers.

Toward an OI process

The focus of companies' innovation operations has traditionally been in closed and protected activities as demonstrated by large research and development (R&D) departments of companies and the increasing number of international patents (WIPO, 2007). Now, in contrast, the pressure is on for corporate innovation processes to open up, as external actors are becoming an increasingly crucial part of companies' innovation capability. This development is one driver for what Chesbrough (2003, 2006) calls OI. This development has proceeded gradually and is gathering more and more interest among companies. Yet, research concerning factors of successful innovations has already, in the 1970s, illustrated the significance of external resources and knowledge to innovations (Freeman, 1991). Knowledge, if considered as a resource, is distinct from many other resources as it does not diminish when shared with others. Actually, most new innovations happen when boundaries of knowledge domains are crossed (Leonard-Barton, 1995; Carlile, 2004).

Even though most of the research has concentrated on networked innovation between companies (Hellström and Malmquist, 2000), the same ideology can be extended to other stakeholders, too. The basic idea behind this is that entrepreneurial teams, which combine different personalities, knowledge, skills and backgrounds, are more likely to accomplish an innovation than homogeneous teams (Vyakarnam et al., 1997). Easy and cost-efficient communication channels through online communities have made it attractive to also bind customers more closely to the innovation process.

Innovation marketplaces have arisen along with the OI phenomenon. These marketplaces, or innovation intermediaries, act as mediators between different actors (companies, customers, users, enthusiasts, etc.). A good example of such marketplaces is InnoCentive which has managed to change the face of R&D for many corporations, government agencies, and not-for-profits by employing their price-based method to engage innovators in many industries from around the world (Tapscott and Williams, 2006). The cases (CrowdSpirit, FellowForce and Owela) presented below can be all be considered as such innovation intermediaries.

VIRTUAL COLLABORATION IN ONLINE COMMUNITIES

Collaboration as a way to increase creativity and efficiency of innovativeness

Earlier studies have shown that collective cognition in organisations has a significant effect on individual cognitive processes (Meindl et al., 1996; Thompson, Levine and Messick., 1999; Hutchins, 1991). The concept of the collective mind may explain the reasons why collective working, especially in high-reliability organisations, increases efficiency (Weick and Roberts, 1993). The most basic assumption underlying collective cognition is that human thought plays an important role in human behaviour. A second assumption is that a group is an entity with psychological significance (Gibson, 2001).

Taatila et al. (2006) suggest that an innovative idea is formed by a social network which "concentrates" the network's knowledge via one or more central persons, "the innovators". Furthermore, Dasgupta (1996) argues that there is a linked network of mature artefacts or artefactual forms leading to the invention. These previous ideas have been invented or found by individual people who share and elaborate them with other individuals (Ståhle et al., 2004).

Thrift (2006) describes the needs behind those toolkits that companies provide for their customers:

> Companies may offer various toolkits for collaboration and mass-customisation, which can be seen here as devices supporting collective mind and distributed cognition. The establishment of distributed cognition devices, intended to organise real life experiments as preferences, tends to blur habitual distinctions between production, distribution and consumption (Thrift, 2006, 279).

Creativity is the ability to produce work that is both novel (i.e. original, unexpected) and appropriate (i.e. useful, adaptive concerning task constraints) (Sternberg and Lubart, 1999). However, research on creativity and cognition often focuses on the moments of individual insight and does not address the phenomenon at the collective level (Sternberg, 1999, Gentner and Markman, 1997). According to Kurtzberg and Amabile (2001, p. 285) although researchers have addressed brainstorming in groups with mixed findings, little is known about how creative minds interact in group processes. In this paper we will focus on how to motivate and support members to collaborate.

Motivations to participate in online communities

One central question is to explore how customers can be motivated to participate and collaborate. Researchers in the online community research field have considered reasons why people visit, join and participate in online communities in general (summarised in Table 1). The nature of the online community affects on the motivation factors. For example, Oreg and Nov (2007) expected that software contributors place a greater emphasis on reputation-gaining and self-development motivations, compared with content

contributors, who placed a greater emphasis on altruistic motives. Although reputation-gaining was, as hypothesized, stronger in the software context than in the content context, it was nevertheless unexpectedly the weakest motivation of the three, in both contexts.

One of the first large-scale motivation studies made in the online community context was made by Wasko and Faraj (2000) who explored reasons why people participate and help each other in online communities. According to their study, giving back to the community in return for help was by far the most cited reason for why people participate. Furthermore, Bandura (1995) proposed that online community members may contribute valuable information because the act results in a sense of efficacy, that is, a sense that they have had some effect on this environment. There is well-developed research literature that has shown how important a sense of efficacy is (e.g. Bandura, 1995), and making regular and qualitative contributions to the group can help individuals believe that they have an impact on the group and support their own self-image as an efficacious person. Wikipedia (www.wikipedia.org) is a prime example of an online community that gives contributors a sense of efficacy.

Since individuals want recognition for their contributions, one considerable motivational factor for online community members is undoubtedly reputation (see for example Hargadon and Beckhy, 2006; Kollock, 1999). Profiles and reputation are clearly evident in online communities today. Amazon.com is a case in point, as all contributors are allowed to create profiles about themselves and as their contributions are measured by the community, their reputation increases. Creating reputation in open source software communities is already a common way to convince employers and to be hired.

Although the above-mentioned motivation factors are more intrinsic motivation factors, there are also extrinsic factors as rewarding and recognition. Jeppessen and Frederiksen (2006) suggest that firm recognition is even more important than other peers' recognition in company-hosted online communities. Antikainen's (2007) study concerning the attraction factors of online communities is in line with this suggestion. As an explanation, Jeppesen and Frederiksen (2006) suggest that innovative users are advanced and may want to identify themselves more strongly with company developers than with their peers. Another reason, suggested by Jeppessen and Frederiksen (2006) is that firm recognition, to a great extent, comprises peer recognition, meaning that achieving firm recognition also leads to recognition by peers.

Part of the online communities, especially innovation intermediaries (for example as Crowdspirit and FellowForce) are utilising monetary rewards for innovators. The main difference between companies' own online communities and innovation intermediaries' communities is that members of the latter are usually not companies' customers, and therefore, strong relationships between members of the community and the companies are lacking. This should be taken into account when considering motivations and rewarding. (Antikainen and Väätäjä, 2008a, b). Majority of the classic social psychology studies suggest that incentives might actually have a negative effect on ideation (e.g. Spence, 1956; Amabile et al., 1986; Toubia, 2006). However, there are also contradictory results (Lakhani and Wolf, 2005; Harper et al., 2008), and especially because of their special nature, monetary rewards might be more useful in innovation intermediaries than in other kinds of online communities (Antikainen and Väätäjä, 2008a, b).

Table 1. Users' motives for participating in online communities (Modified from Antikainen and Väätäjä (2008a)

Motivations to participate in online communities	Authors
Altruism	Zeityln (2003)
Care for community, attachment to the group	Kollock (1999)
Enjoyment, fun	von Hippel and von Krogh (2003); Nov (2007), Torvalds and Diamond (2001)
Firm recognition	Jeppesen and Frederiksen (2007)
Friendships, relationships, social support	Hagel and Armstrong (1997); Rheingold 1993; Ridings and Gefen (2004)
Ideology	Nov (2007)
Interesting objectives, intellectual stimulations	Ridings and Gefen (2004); Wasko and Faraj (2000)
Knowledge exchange, personal learning, social capita	Antikainen (2007); Gruen, Osmonbekov and Czaplewski (2005); von Hippel and von Krogh (2003); Wasko and Faraj (2000); Wiertz and Ruyter (2007)
Monetary rewards	Antikainen and Väätäjä (2008); Wasko and Faraj (2000)
Need, software improvements, technical reasons	Ridings and Gefen (2004); Jeppesen and Frederiksen 2007); Kollock (1999)
Peer recognition	Lerner and Tirole (2002), Hargadon and Bechky (2006)
Reciprocity	Kollock (1999); Wasko, M. and Faraj, S. (2005)
Recreation	Ridings and Gefen (2004)
Reputation, enhancement of professional status	Bagozzi and Dholakia (2002); Hargadon and Bechky (2006), Lakhani and Wolf, (2005); Lernel and Tirole 2000; Wasko and Faraj, (2005)
Sense of efficacy, influencing	Bandura (1995); Constant, Kiesler and Sproul (1994); Kollock (1999)
Sense of obligation to contribute	Bryant et al. (2005); Lakhani and Wolf (2005)

Toolkits for collaboration

To invoke user interest and collaboration, companies utilise certain design tools and toolkits. Users interested in designing their own products want to do so efficiently. Manufacturers can therefore attract them with kits of design tools that ease their product-development tasks and with products that can serve as "platforms" upon which to develop and realize user-developed modifications (von Hippel, 2005, p. 128).

Interaction systems for customer integration are the primary instrument for reducing costs by shifting certain design tasks from the locus of the manufacturer to the locus of the customer, who can apply their need-related information directly, without costly transfers to

the producer. Known as configurators, choice boards, design systems, toolkits, or co-design platforms, these systems provide customers with sufficient "manufacturing-related information" and guide the user through the co-design process of expressing their needs and wishes in a usable format (Piller et al., 2004).

Fundamental for these toolkits is how well they are able to communicate the knowledge of different stakeholders. There always exists an information gap between company and customer which arises from the asymmetrical distribution of information (Franke and Piller, 2004; Piller et al., 2005). The customer knows his/her use environment and practical needs very well, and the company holds knowledge on the product and productions domains. Knowledge representation is important for participants to be able to communicate with other participants with different backgrounds and knowledge levels. Collaborative toolkits should somehow make these differences transparent and help users to translate different contributions into a collectively understandable format/language.

METHODOLOGY

Research Design

Our study is a multiple case study including three cases. We chose our cases based on the available data as well as their appropriateness from the viewpoint of this study. The cases have originated in different countries, e.g. one case is from France, one from the Netherlands and one from Finland.

All of the cases are recently opened, internet-based services and all of them have different backgrounds and objectives, and therefore they offer multiple views on the phenomenon. The data was gathered with multiple methods by using a triangulated research strategy, which means using different types of materials, theories, methods and investigators in the same study (e.g. Brewer and Hunter, 1989; Denzin, 1978).

The primary data source consists of the open-ended questions posted to the maintainers and users by email. The questions were sent to people in different positions. Altogether we got 5 responses from the maintainers and 12 responses from the users. We asked from the maintainers questions considering the following topics: What does collaborative creativity mean to them, what motivates users to create collaboratively, how do they support collaborative creativity now, and what are their future plans. From the members, we asked what is best in the service, whether they are motivated to innovate collectively, how the service supports that and how could it support more.

In addition, three maintainers (one from the each community) were interviewed by phone to be able to ask more specific extra questions which arose after the first email question round. The questions included whether they see that the members are working as a group or as individuals for a challenge, and what kind of needs they see in developing collaboration.

The secondary source was the Internet document review. In addition, the authors have close connections to the cases, and therefore, they have in-depth knowledge of the cases, which were utilised in the analysis. The classification of the factors in the preliminary framework (Table 2) is derived from reading and rereading the answers of the respondents until the themes started emerging from the data. Thereafter, the data was coded according to the chosen themes.

Case descriptions

CrowdSpirit

CrowdSpirit (www.CrowdSpirit.com) focuses on electronics design. CrowdSpirit company originally comes from France. Many users would like to design and to innovate tailor-made gadgets and get them manufactured for themselves. The founders and maintainers of CrowdSpirit have built toolkits for users to submit their designs and ideas. Similarly, CrowdSpirit includes tools for commenting on and voting for different designs.

For visualisation, CrowdSpirit provides mindmaps which illustrate product ideas with proposed features. Winning designs will even be funded by members of the community – and after prototyping and beta testing, the completed products will be delivered to market. In a sense, Crowdsourcing acts a mediator between enthusiastic users and manufacturing companies.

Lately, CrowdSpirit changed its business model. Instead of participating in the development and industrialisation process of the products, now CrowdSpirit involves only in the design process. In other words, after the design and collecting the project team, the team negotiates directly with manufacturers. Digital wall calendar is a good example of the products designed in CrowdSpirit. After collecting the project team, making the specifications and a marketing plan, the project team asks for the quotations of the development.

FellowForce

FellowForce (http://www.FellowForce.com) is an innovation marketplace and an intermediary that enables companies to submit innovation challenges to solvers. The origin of FellowForce is in the Netherlands and in Poland. Solvers provide suggestions (pitches) to a challenge and the best solvers are rewarded. Unlike other services, such as InnoCentive (http://www.InnoCentive.com) and NineSigma (http://www.NineSigma.net) FellowForce allows solvers to submit their own pitches to companies. Normally, the best pitches that match those challenges are rewarded with money.

The collective creativity is realised in the “Innovate Us” functionality of FellowForce. This functionality allows any company or organisation to use FellowForce as an open suggestion management system (Fairbank and Williams, 2001). Any registered participant may submit an innovation but also view the responses of other users, if this feature is turned on. In addition, FellowForce also offer services for companies to launch their own co-creation platforms on their web sites.

Owela – open web laboratory

Owela (http://owela.vtt.fi) is a participatory web laboratory for designing digital media products and services. It aims to be a conversational web community that connects users with developers and researchers and promotes open innovation. Owela offers social media tools for gathering user needs and development ideas as well as collecting feedback for scenarios and prototypes.

Owela is developed at VTT in Finland as part of the project called “Social media in the crossroads of physical, digital and virtual worlds” (SOMED, 2006–2008). At the time of the study, Owela consists of IdeaTube and TestLab, as well as a blog, chat and recommended bookmarks. In IdeaTube, users may participate by commenting on the descriptions and visualisations of different situations, needs, ideas, scenarios and

prototypes. In TestLab, the prototypes of future products and services can be tested in beta phase, and the users are expected to give feedback and development ideas. Owela has been used as an innovation platform in research projects, as well as studies conducted for companies, such as usability testing of web sites.

COLLECTIVE INNOVATION PROCESS – THE RESULTS OF THE STUDY

What motivates users to create collectively?

Case CrowdSpirit

The maintainer commented that "the biggest source of innovation will be based on collective creativity". Yet, at the moment, although users can comment on and rate others' ideas, they are still acting more as individuals than as a group. In CrowdSpirit, users are interested in exchanging ideas and opinions in order to see whether their private interests become real. Interests of people can be totally different, for example issues related to creativity or social networking.

> ..it's absolutely impossible to summarize the interests to one specific subject. The main challenge is exactly here: to ensure that everybody finds their interest even if it's opposing interest. (CrowdSpirit maintainer, 25th September 2007)

CrowdSpirit members stated that they got synergy and fusion of ideas through collaboration as well as also found similar people:

> It supports collaborative work, through Crowdspirit I have been able to find people that lives, breaths and thinks right the same way other inventors do and therefore every idea have been enriched with other ideas..
>
> (CrowdSpirit user, 1st October 2007)

The profiles and professional background of users is versatile. Quite often in services like CrowdSpirit, large amounts of users are students. They probably have different motivational factors than, let's say, professionals:

> Personally I'm very motivated to collaborate with others. I'm a college student so my area of expertise and level of experience is rather limited, no surprise. Anyway, I feel CrowdSpirit is a great way for like-minded people to come together and discuss the risks and benefits of an idea. This way a community of people with the same idea/aspirations can work together to form a business/product without having to bear all the risk themselves. It also allows people to contribute their knowledge/skills where they can do the most good. (CrowdSpirit user, 1st October 2007)

Sharing the risk was mentioned by several respondents. Users also indicated that the clear benefits of the participation should be seen easily. Since the collective participation is in some cases more time-consuming, it is even more important to emphasize the benefits.

Case FellowForce

The reasons why users innovate collectively at FellowForce were seen by a FellowForce maintainer as (1) for fun (exciting, tough, challenging, social interaction, etc), (2) for fame/exposure, and (3) for a reward. Interestingly, both fun (hedonic motivation) and reward (utilitarian motivation) were mentioned. Different users may participate for different reasons and are thus also motivated by different factors. For example, some user might be

very interested the particular challenge at hand and motivated for by the challenge itself where as some might participate to any challenge in hope of getting monetary rewards or fame:

> It is a part of our human nature to work together, to join forces, to share insights, to team up. It is a part of human nature to both destroy and renew. (FellowForce maintainer, 20th September 2007)

FellowForce maintainer believes that the service will probably change innovation practices in companies in Europe. In that sense the maintainer's comment about 'creative destruction' was understandable. One of the top-rewarded users also pointed out personal reasons to innovate:

> This fascination and the competitive element of the challenges motivates me to post an idea once in a while. (FellowForce user, 20th September 2007)

In the previous chapters, we have not given much attention to this competitive element. In addition to collaboration, fostering also competition might attract individual users to contribute. Instead of collaboration, it seems that competition between individuals depicts more the nature of the FellowForce at the moment.

Case Owela

In the time of the study Owela was in its beta phase and users were acting more as individuals than as a group. Yet, the maintainers stated that their objective is to support collaboration in order to get the most of its users' creativity.

In Owela the respondents stated that collectivity enhances innovation and enables people to be more creative. It was mentioned that, especially for some people, it is easier to be innovative in a social context. One of the users stated that 'believing that you are innovative motivates you to participate in collective innovating processes'.

Similar people in the community motivate users to innovate. However, it was also mentioned that innovating with other people can open new viewpoints. One of the users stated as follows:

> ...From others' weird ideas you can combine new ideas. (Owela user, 21st September 2007)

Collective creativity processes may happen either synchronously or asynchronously, yet people have the idea of some kind of collaboration since they know that someone may develop their ideas further. Seeing their own ideas develop further is one motivation factor, according to users. The effectiveness of the collective innovation process was also mentioned among answers. One of the users spoke about the chain reaction of ideas when innovating collectively.

According to maintainers, consumers want to have their ideas heard, and therefore it is a way of influencing for users. To create something visible and also to see that the idea is developed further are important factors for users. On the other hand, this way companies may also get more innovative ideas, and therefore, customers may get better services and products as an output of the collective innovation process.

Moreover, one of the motivation factors mentioned was that innovating together is a good way to commit people to developing the same thing. In general, to be motivated it is important to feel that the issue is important. Getting some rewards, either money or products, was also mentioned. Reputation is another motivation factor for participation. Reputation can, for example, be helpful in creating a career.

The positive and constructive atmosphere help enhance motivation, as does the entertainment factor; creating collectively in a community is considered to be fun.

Summarising the idea of collective creativity, one of the maintainers saw that collective creativity offers:

> ...New possibilities to find better ideas, when there are more brains together. (Owela maintainer, 17th September 2007)

How do you support collective innovation processes in your service: what kind of tools or methods do you offer?

Case CrowdSpirit

From all of our cases, CrowdSpirit provided the most advanced tools for voting and providing feedback. The maintainer describes this tool development phase below:

> Since the beginning, our strategy is clear: let the maximum of freedom to the community to allow them brainstorming. Tools are rules and rules are opposed to freedom and so collective creativity. So we made the choice of a simple tool "Digg-like system" coupled with a forum to allow the exchange of ideas. I'm convinced that we have to adapt our process to the people and not the other way. It means that it's impossible for the moment to know how it will work in terms of process but for sure this will be not thanks to the tools. (CrowdSpirit maintainer, 25th September 2007)

Quite often these Web 2.0 platforms provide APIs (Application Programming Interfaces) for enthusiastic users. These APIs can be utilised by the user community to develop and enhance tools by themselves.

Thereafter, CrowdSpirit maintainer pointed out some challenges in managing the whole innovation-chain, from ideas to commercialization:

> We're going to extend our offer to professionals, I mean resellers and manufacturers. Those communities, who have different interest, will be clearly the communities that will allow making real the ideas. Without those professionals, it will be impossible to industrialize the products. We will announce this new service in the coming months." CrowdSpirit maintainer, 25th September 2007)

Most of the tools and toolkits will be different for regular users (like consumers) and professionals (like manufacturers). The adaptation of tools seems to be an important feature in the future of collaboration platforms. Additionally, the transparency of the status and profile of users need to be considered:

> People need to be able to see in real-time who's on the website doing what and also keep up-to-date on relevant news. So basically I think CrowdSpirit is limited by the current website structure but not by the concept. CrowdSpirit user, 1st October 2007)

Furthermore, the Crowdspirit member suggested that the financing tools as well as project management tools can be helpful in bringing in a more action-oriented collective effort.

Case FellowForce

The activity in FellowForce is focused on challenges and pitches. Originally, the service provided only individual participation and this was seen by some users as disadvantageous:

> I think it could be fun to team up and come up with great new ideas. It would probably cost more time and there would be less reward for your own ideas though. So you should really be in this for the fun of being creative and sharing the experience with others. For me the factor time would probably hold me back. (FellowForce user, 20th September, 2007)

This notion of time is noteworthy. Any functionality or reward structure in these kinds of services that enables scheduling and time management could be beneficial.

The original FellowForce service included a tool called “Innovate Us” which enabled innovation of the actual FellowForce service. This meta-tool proved more valuable than was originally anticipated by staff. One of the users (Fellows) suggested FellowForce staff to create an Innovate Us widget on any website that would allow the users of any web site to innovate the particular website, company and its services. This widget proved successful and currently many websites in several countries have this widget installed and the actual innovation activity is re-directed to the FellowForce service.

Currently, FellowForce is testing a feature called FellowForum. This would allow users to expose their pitches and postings, and thus encourage more collaboration. The current functionalities on FellowForum are: rating, promoting, commenting, suggesting and discussing.

Case Owela

Owela offers a tool called IdeaTube that is a blog-based tool for discussions and idea rating and refining. Chat is also an easy and quick way to send ideas, although it has not attracted many users yet. Owela’s tools and practises are described as follows:

> In Owela collaborative creativity happens not only among users that post ideas, but more importantly among both users and researchers. The users may don’t find themselves being creative when just telling about their problems and needs, but they serve as an important input for researchers to support their creative work. (Owela maintainer, 17th September 2007)

Owela offers also regular competitions with different prizes and also a functionality that indicates the most active innovation under construction. In Owela’s model co-creators, and not only the first innovators, are rewarded. The profiles of the users are currently quite limited, as they are also in the development phase.

According to the users, the positive thing is that the researchers can be met in Owela. The future orientation and attempt to develop something useful in the community were also regarded as good sides of the service.

The results showed that more sense of community was needed. One idea from the users was to include a web camera to be able to see others and to increase the feeling of the collective work. Moreover, users claimed that researchers could somehow be involved more personally in the service. Clarifying the image and the layout were also suggested by users.

Summary of the findings in the context of collective innovation process in open innovation communities

The findings are summarised in Table 2, which presents a preliminary framework of motivation factors for collaboration in OI communities. Our objective is to provide guidelines and methods for companies aiming to develop tools that support collective innovation processes in their communities. The framework included the motivation factors that were based on the data collected in this study. There is also the sample of the gathered data to give a practical example. We also give a short explanation for the chosen factors as well as suggest tools and methods for companies that may help in enhancing these factors.

Table 2. Summary of the motivation factors to collaborate in open innovation community.

Motivation factors to collaborate in OI community	Sample	Explanation	Tools and methods for collaboration
Interesting objectives and clear purpose and concept	*"The ideas and the will to get things better."*	Collaboration is more time consuming, the need for interesting objectives and clear purpose and concept is stressed.	Active participation of maintainers, good usability
Open and constructive atmosphere	*"Positive and constructing atmosphere makes ideating easier."*	Belief in your own skills and an open atmosphere are needed.	Active participation of maintainers, rules, maintainers' personal information
Influencing and making better products / services	*"A way for end-users of consumer products to provide input on the products they will be using."*	Influencing others' opinions and creating better products or services together.	Influencing others' opinions motivates to collaborate
New viewpoints and synergy	*"From others' weird ideas you can combine new ideas."*	It creates synergy when participants come from different backgrounds and interests.	Tools for idea generation, refining, commenting, and rating,
Sense of efficacy	*"Innovating together is pleasant and efficient."*	Collaboration may be more efficient.	Tools for idea generation, time management
Having fun	*"You should really be in this for the fun of being creative and sharing the experience."*	People enjoy doing things together.	Usability of services
Winning, competition and rewards from participation	*"The competitive element of the challenges motivates me to post an idea once in a while."*	Since collaboration is more demanding, rewarding is important.	Rewarding equitably groups not individuals
Sense of cooperation	*"When ideating you wish to get immediate feedback and interaction."*	Feeling of sitting around the same table motivates collaboration.	Profiles and status information, scheduling, time management
Sense of community and similarity	*"I have been able to find people that lives, breaths and thinks right the same way."*	Collaboration is often easier with the people you know and people who are similar	Profiles and status information, scheduling and time management

DISCUSSION

Originally, we were curious to find out *how people can be motivated to innovate collectively?*

The results show that collective work with others was seen as being enriching, fun, productive, efficient, and even the best way to trigger creative innovations. It can even be stated that in the light of earlier research as well as this study, collaborative work in the innovation online communities is something that should be sought for in order to get the most out of peoples' creativeness. However, supporting this kind of collaboration is demanding in an online environment, where there is a lack of physical contact with others. It is already challenging to create collaboration between strangers in face-to-face situations, and the Internet environment can make this even more difficult.

For these reasons, collaboration in online communities faces many challenges, such as scheduling and managing time and creating the sense of cooperation between members. Also, getting people to know each other is needed in order to make communication easier.

One challenge is related to rewarding groups in a way that motivates collaboration. In our three cases (CrowdSpirit, FellowForce and Owela), only individuals were rewarded. However, to reward a group of people for their mutual collective work in the right way and with the right kind of reward is practically and theoretically challenging. The entertaining side of collective creativity does not fully fit with the idea of monetary rewards. In fact, the results show that one motivation factor we perceived is related to having fun. Therefore, this issue would be an interesting area for further research.

Our second question was: What kind of tools and methods can enhance collective innovation processes (i.e. practises, services and rewarding systems)?

According to our results, it seems that current rewarding systems definitely increase participation, but not collaboration. Our cases indicate that other tools, such as the ability to comment on others' designs and suggestions may be more efficient in motivating collaboration.

What is needed are tools that are easy to use, allowing people to express themselves and share their personal details. It seems to be important that maintainers are involved as visible members of a community, which includes telling about themselves in a more detailed way. The profile tools in CrowdSpirit, Owela, FellowForce did not allow people to tell much about themselves. In addition to this, a greater sense of collective working was suggested, for example using a web camera and organising brainstorming and real-time discussion sessions. Users should be able to feel like they are sitting around the same virtual table and working together as a group.

CONCLUSIONS AND FUTURE RESEARCH PATHS

The study increased the knowledge of motivation factors for supporting collaboration in open innovation communities. Various tools and methods for supporting collective innovation were studied. As a result, we presented a preliminary framework of motivation factors for collaboration in open innovation communities. Our objective was to provide guidelines and methods for companies aiming to develop tools that support collective innovation processes in their communities.

The study confirms earlier studies that the collective innovation process is something that is worth for pursuing when aiming to get the most of creativity. However, we also admit the great challenges that are related to characteristics of the online environment as well as group working in general. One of the major challenges is the rewarding of groups, since until lately almost all of the rewarding mechanisms are based on rewarding individuals.

To lay down the barriers and enhance the sense of collaboration, we suggested different tools. Active participation by the maintainers as a part of the community is also needed. In addition to these, simplicity and strong brands are needed in order to attract and commit members to the community. Above all, interesting objectives of innovation are needed in order to motivate participants.

However, the data was based only on three cases with a limited amount of participants, hence, it may be that in gathering empirical data from a larger group of cases, some new factors will be found. Since the study area is new and in the multidisciplinary field, there are many different paths to take on research. Further studies of the collective innovation processes in different communities, using also quantitative methods, are needed. One interesting path would be to further explore collaboration tools and methods based on different kind of technology adopters inside or outside of the organization (Bernstein and Singh, 2008; Rogers, 2003).

ACKNOWLEDGEMENTS

The authors thank Professor Brian Fitzgerald from University of Limerick and Professor Mike Newman from Manchester Business School for their valuable comments and suggestions for the paper. They are also grateful for the valuable information received from Ruben Robert from FellowForce, David Lionel from CrowdSpirit and Asta Bäck, Pirjo Näkki and Tytti Virtanen from VTT. This paper has been funded by the SOMED Project at VTT, Finland.

REFERENCES

Ahonen, M., Antikainen, M. and Mäkipää, M. (2007), "Supporting collective creativity", European Academy of Management (EURAM) *Conference proceedings*, IDEAD, Paris.

Amabile, T.M., Hennessey, B.A. and Grossman, B. (1986), "Social influences on creativity: The effects of contracted-for reward", *Journal of Personality and Social Psychology*, Vol. 50, No. 1, pp. 14−23.

Antikainen, M. (2007), *The attraction of company online communities. A multiple case study*, Academic dissertation. Department of Management Studies, University of Tampere, Finland.

Antikainen, M. and Väätäjä, H. (2008a), "Rewarding in open innovation communities – How to motivate members?" In: Huizingh, K.R.E., Torkkeli, M., Conn S. and Bitran, I. (Ed.), *Proc. of the XIX ISPIM Annual Conference, Open Innovation: Creating Products and Services through Collaboration. Tours, France, 15–18 June 2008.*

Antikainen, M. and Väätäjä, H. (2008b), "Innovating is fun – Motivations to participate in online open innovation communities", In: Huizingh, K.R.E., Torkkeli, M., Conn S. and Bitran, I. (Ed.), *Proc. of the First ISPIM Innovation Symposium Singapore: Managing Innovation in a Connected World. Singapore, 14–17 December 2008.*

Bagozzi, R.P. and Dholakia, U.M. (2002), "Intentional social action in virtual communities", *Journal of Interactive Marketing*, Vol. 16, No. 2, pp. 2–21.

Bandura, A. (1995), *Self-efficacy in changing societies*, Cambridge University Press, Cambridge.

Bernstein, B. and Singh, P. (2008), Innovation generation process. Applying the adopter categorization model and concept of “chasm” to better understand social and behavioural issues, *European Journal of Innovation Management*, Vol. 11, No. 3, pp. 366–388.

Brewer, J. and Hunter, A. (1989), *Multimethod research: A synthesis of styles*, Sage, Thousand Oaks.

Bröring, S. and Herzog, P. (2008), “Organising new business development: open innovation at Degussa”, *European Journal of Innovation Management*, Vol. 11, No. 3, pp. 330–348.

Bryant, S., Forte, A. and Bruckman, A. (2005), *Becoming Wikipedian: Transformation of participation in a collaborative online encyclopedia*. In: Proceedings of the 2005 international ACM SIGGROUP conference on supporting group work. Sanibel Island, Florida, USA.

Carlile, P.R. (2004), Transferring, Translating, and transforming: An Integrative Framework for Managing Knowledge Across Boundaries, *Organization Science*, Vol. 15, No. 5, pp. 555–568

Chesbrough, H.W. (2003), *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Harvard Business School Press, Boston, MA.

Chesbrough, H. (2006), “Open Innovation: A Paradigm for Understanding Industrial Innovation”. In: Chesbrough, H., Vanhaverbeke, W. and West, J. (Ed.), *Open Innovation: Researching a New Paradigm*. pp. 1−34, Oxford University Press, Oxford, UK,

Constant, D., Kiesler S. and Sproull, L. 1994. “What’s Mine Is Ours, or Is It? A Study of Attitudes about Information Sharing”, *Information Systems Research*, Vol. 5, No. 4, pp. 400−421.

Da Silveira, G., Borenstein, D. and Fogliatto, F.S. (2001), Mass Customization: Literature review and research directions, *International Journal of Production Economics*, Vol. 72 pp. 1–13.

Dasgupta, S. (1996), Technology and Creativity, Oxford University Press, New York, NY.

Denzin, N. (1978), *The research act*, Aldline, Chicago.

Fairbank, J.F. and Williams, S.D. (2001), “Motivating Creativity and Enhancing Innovation through Employee Suggestion System Technology”, *Creativity and Innovation Management*, Vol. 10, No. 2, pp. 68−72.

Franke, N. and Piller, F. (2003), “Key Research Issues in User Interaction with Configuration Toolkits in a Mass Customization System”, *International Journal of Technology Management*, Vol. 26, No. 5/6, pp. 578−599.

Franke, N. and Piller, F. (2004), “Toolkits for user innovation and design: an exploration of user interaction and value creation”, *Journal of Product Innovation Management*, Vol. 21, No. 6, pp. 401−415.

Freeman, C. (1991), “Networks of innovators: a synthesis of research issues”, *Research Policy*, Vol. 20, pp. 499−514.

Gentner, D. and Markman, A. (1997), “Structure mapping in analogy and similarity”, *American Psychologist*, Vol. 52, No. 1, pp. 45–56.

Gibson, C. (2001), “From knowledge accumulation to accommodation: cycles of collective cognition in work groups”, *Journal of Organizational Behavior*, Vol. 22, No. 2, pp. 121−134.

Gruen, T.W., Osmonbekov, T., Czaplewski, A.J. (2005), “How e-communities extend the concept of exchange in marketing: an application of the motivation, opportunity, ability (MOA) theory”, *Marketing Theory*, Vol. 5, No. 1, pp. 33–49.

Hagel, J. and Armstrong, A. (1997), *Net gain: Expanding markets through virtual communities*, McKingsey & Company, Boston.

Hargadon, A. and Bechky, B. (2006), “When collections of Creatives Become Creative Collective – a Field Study of Problem Solving at Work”, *Organization Science*, Vol. 17, No. 4, pp. 484−500.

Hart, C.W.L. (1995), “Mass customization: conceptual underpinnings, opportunities and limits”, *International Journal of Service Industry Management*, Vol. 6, No. 2, pp. 36−45.

Heiskanen, E., Hyvönen, K., Niva, M., Pantzar, M., Timonen, P.and Varjonen, J. (2007), User involvement in radical innovation: are consumers conservative? *European Journal of Innovation Management*, Vol. 10 No 4, pp. 489–509

Hellström, T. and Malmquist, U. (2000), “Networked innovation: developing the AXE110 “mini-exchange” at Ericsson”, *European Journal of Innovation Management*, Vol. 3, No. 4, pp. 181−189.

Hutchins, E. (1991), “Organizing work by adaptation”, *Organization Science*, Vol. 2, No. 1, pp. 14–39.

Jeppesen, L. and Frederiksen, L. (2006), “Why do users contribute to firm-hosted user communities? The Case of Computer-Controlled Music Instruments”, *Organization Science*, Vol. 17, No. 1, pp. 45–63.

Jimez-Jimez, D., Valle, R.S. and Hernandez-Espallardo, M. (2008), Fostering Innovation – The role of market orientation and organizational learning, *European Journal of Innovation Management*, Vol. 11, No. 3, pp. 389–412

Kollock, P. (1999), “The economies of online cooperation: Gifts and public goods in cyberspace”. In: Smith, M. and Kollock, P. (Ed.), *Communities in cyberspace*, Routledge, London.

Kottler, P. (1989), “From mass marketing to mass customization”, *Planning Review*, Vol. 17, No. 5, pp. 10–13

Kurtzberg, T. and Amabile, T. (2001), “From Guilford to Creative Synergy: Opening the Black Box of Team-Level Creativity”, *Creativity Research Journal*, Vol. 13, No. 3/4, pp. 285−294.

Lakhani, K. and Wolf, B. (2005), “Why hackers do what they do: understanding motivation and effort in free/open source software projects”. In: Feller, J., Fitzgerald, B., Hissam, S. and Lakhani, K. (Eds.), *Perspectives on Free and Open Source Software*, MIT, Cambridge, MA.

Leonard-Barton, D. (1995), *Well Springs of Knowledge: Building and Sustaining the Sources of Innovation*, Harvard Business School Press, Boston, MA.

Lerner, J. and Tirole, J. (2002), “Some simple economics of open source”, *Journal of Industrial Economics*, Vol. 50, No. 2, pp. 197–234.

Meindl, J.R., Stubbart, C. et al. (1996), *Cognition within and between organizations*, Sage, Thousand Oaks, CA.

Nov, O. (2007), “What motivates Wikipedians?” *Communications of the ACM*, Vol. 50, No. 11, pp. 60–64.

Ogawa, S. and Piller, F.T. (2006), “Collective Customer Commitment: Reducing the risks of new product development”, *MIT Sloan Management Review*, Vol. 47, No. 2, pp. 65–72.

Oreg, S., & Nov, O. (2007), “Exploring motivations for contributing to open source initiatives: The roles of contribution context and personal values”, Computers in Human Behavior, Vol. 24, No. 5, pp. 2055–2073.

Piller, F. (2004), “Mass Customization: Reflections on the State of the Concept”, *International Journal of Flexible Manufacturing Systems*, Vol. 16, No. 4, pp. 313–334.

Piller, F., Ihl, C., Fuller, J. and Stotko, C. (2004). "Toolkits for open innovation – the case of mobile phone games". In: *Proceedings of the 37th Annual Hawaii International Conference on System Sciences*, pp. 1–10.

Piller, F., Schubert, P., Koch, M. and Möslein, K. (2005), "Overcoming mass confusion: Collaborative customer co-design in online communities", *Journal of Computer-Mediated Communication*, Vol. 10, No. 4. Article 8.

Reichwald, R. and Piller, F. (2006), *Interaktive Wertshöpfung*, Gabler, Wiesbaden, Germany.

Rheingold, H. (1993), *The virtual community: Homesteading on the electronic frontier*, Addison-Wesley, New York.

Ridings, C. and Gefen, D. (2004), "Virtual community attraction: Why people hang out online", *Journal of Computer-Mediated-Communication*, Vol. 10, No. 1, Article 4.

Rogers, E.M. (2003), *Diffusion of Innovations*, 5th ed., Free Press, New York, NY.

Spence, K.W. (1956), *Behavior Theory and Conditioning*, Yale University Press, New Haven, CT.

Ståhle, P., Sotarauta, M. and Pöyhönen, A. (2004), "Innovatiivisten ympäristöjen ja organisaatioiden johtaminen", Tulevaisuusvaliokunta, *Teknologian arviointeja 19, Eduskunnan kanslian julkaisu 6/2004, Helsinki, Finland.*

Sternberg, R.J. (1999), *Handbook of Creativity*, Cambridge University Press, Cambridge, UK.

Sternberg, R. and Lubart, T. (1999), "The concept of creativity: Prospects and paradigms", In Sternberg, R.J. (Ed.), *Handbook of creativity*: 3–15. Cambridge University Press, New York.

Taatila, V., Suomala, J., Siltala, R. and Keskinen, S. (2006), Framework to study the social innovation networks, *European Journal of Innovation Management*, Vol. 9, No. 3, pp. 312–326.

Tapscott, D, and Williams, A. (2006), *Wikinomics*, Penguin, New York.

Thompson, L., Levine, J. and Messick, D. (1999), *Shared cognition in organizations: The management of knowledge*, Lawrence Erlbaum Associates, Mahwah, NJ.

Thrift, N. (2006), "Re-inventing invention: new tendencies in capitalist commodification", *Economy and Society*, Vol. 35, No. 2, pp. 279–306.

Torvalds, L. and Diamond, D. (2001), *Just for fun: The story of an accidental revolutionary*, Harper Business, New York.

Toubia, O. (2006), "Idea Generation, Creativity, and Incentives", *Marketing Science*, Vol. 25, No. 5, pp. 411–425.

Tseng, M.M. and Piller, F.T. (2003), "*The Customer Centric Enterprise*. *Advances in Mass Customization and Personalization*", Springer.

von Hippel, E. (2005), *Democratizing Innovation*, The MIT Press, Cambridge, Massachusetts.

von Hippel, E. and von Krogh, G. (2003), "Open Source Software and the "Private-Collective" Innovation Model: Issues for Organization Science", *Organization Science*, Vol. 14, No. 2, pp. 208−223.

Vyakarnam, S., Jacobs, R.C. and Handelberg, J. (1997), "Formation and development of entrepreneurial teams in rapid growth business". In: Reynolds et al., (Ed.), *Frontiers of Entrepreneurship Research 1997*, College Babson, Wellesley, MA.

Wasko, M. and Faraj, S. (2000), "It is what one does: why people participate and help others in electronic communities of practice", *Journal of Strategic Information Systems*, Vol. 9, No. 2–3, pp. 155–173.

West, J. and Gallagher, S. (2006), "Open Innovation in Open Source Software". In: Chesbrough, H., Vanhaverbeke, W. and West, J. (Ed.), *Open Innovation: Researching a New Paradigm*, Oxford, UK, Oxford University Press. Pp. 82–106,

Weick, K. and Roberts, K. (1993), "Collective mind in organizations: Heedful interrelating on flight decks", *Administrative. Science Quarterly*, Vol. 38, No. 3, pp. 357–381.

Wiertz, C. and de Ruyter, K. (2007), "Beyond the call of duty: Why customers contribute to firm-hosted commercial online communities", *Organization Studies*, Vol. 28, No. 3, pp. 347–376.

Wikström, S. (1996), "The customer as co-producer", *European Journal of Marketing*, Vol. 30, No. 4, pp. 6–19.

WIPO (2007), WIPO Patent Report: Statistics on Worldwide Patent Activity (2007 Edition). World Intellectual property Organization, 2007 Edition, Online at: http://www.wipo.int/export/sites/www/freepublications/en/patents/931/wipo_pub_931.pdf.

Zeityln, D. (2003), "Gift economies in the development of open source software: Anthropological reflections", *Research Policy*, Vol. 32, pp. 1287–1291.

PUBLICATION IV

Rewarding in open innovation communities

How to motivate members?

In: International Journal of Entrepreneurship and Innovation Management 2010.
Vol. 11, No. 4, pp. 440–456.

Rewarding in open innovation communities – how to motivate members

Maria J. Antikainen*

VTT Technical Research Centre of Finland,
Business and Technology Management,
P.O. Box 1300, FI 33101 Tampere, Finland
E-mail: maria.antikainen@vtt.fi
*Corresponding author

Heli K. Väätäjä

Tampere University of Technology,
Human-Centered Technology,
P.O. Box 589, 33101 Tampere, Finland
E-mail: heli.vaataja@tut.fi

Abstract: In order to attract and enhance users' commitment to participate in online open innovation communities, it is important to know what types of motivators are important for the members. Both monetary and non-monetary rewards can be used for motivating participation. In this study we focus on studying the role of rewarding in online open innovation intermediaries. The data was collected by interviews with the community maintainers of three open innovation intermediaries and by a web survey in the communities maintained by them. In the studied communities, the web survey respondents found monetary rewarding important, as well as non-monetary rewarding based on the quality of ideas. According to the maintainers' interviews, combinations of monetary and non-monetary rewarding are important. In addition, we analysed the rewarding mechanisms in 12 open innovation communities. We found that both monetary and non-monetary rewarding methods are used in the studied open innovation intermediaries.

Keywords: online communities; open innovation; intermediaries; rewarding; monetary; non-monetary; tangible; intangible; recognition; motivation.

Reference to this paper should be made as follows: Antikainen, M.J. and Väätäjä, H.K. (2010) 'Rewarding in open innovation communities – how to motivate members', *Int. J. Entrepreneurship and Innovation Management*, Vol. 11, No. 4, pp.440–456.

Biographical notes: Maria Antikainen is a Research Scientist in the Business and Technology Knowledge Centre at VTT. She leads an open innovation virtual team and is currently involved in various projects related to open innovation and social media. She also works as a part-time Lecturer at Tampere Polytechnic teaching digital marketing and relationship marketing. She finished her PhD studies at the University of Tampere in March 2007. Her doctoral thesis concerned the attraction of company online communities from the relationship marketing perspective. She has several publications on open innovation, company online communities and social media.

Heli Väätäjä, MSc is a Researcher in the Unit of Human-Centered Technology at Tampere University of Technology. She is currently involved in projects related to user experience of mobile systems and services and open innovation. She graduated from Tampere University of Technology, Department of Electrical Engineering in 1993 majoring in measurement technology and minoring in signal processing. She has several publications in the areas of user experience, open innovation communities and signal processing as well as one granted patent. Before starting her work at Tampere University of Technology in 2007, she worked at Nokia Research Center as a Research Engineer from 1995 until 2007.

1 Introduction

The Web 2.0 phenomenon has changed customers' roles from passive objects to active participants (Tapscott and Williams, 2006). Open innovation communities can act as a source for learning and producing external ideas or even solutions for companies (Chesbrough, 2006; Jeppesen and Frederiksen, 2006). In aiming to integrate customers into companies' innovation and development processes, companies need tools, platforms and methods, as well as different types of services provided by external companies.

Utilising customers' creativity and innovation capability has potential in new product development, as shown in many recent studies (Piller, 2004; von Hippel, 2005). In order to do this, companies can, for example,

1 build their own open innovation communities

2 use existing online communities related to their products and services, like brand communities

3 look for hobbyist communities

4 they can utilise existing communities on the web that act as intermediaries in this field (Chesbrough, 2003; von Hippel, 2005; Chesbrough, 2006a)

Lately, the number of online innovation market places or innovation intermediaries acting between innovators and companies (or 'solvers' and 'seekers') has increased rapidly. The basic idea with intermediaries is that they maintain an online open innovation community for members who are ideating online collectively or individually. In many of these communities, third-party companies seek ideas for their challenges and announce these for the community members to solve. The ideas or innovative solutions provided by the members can be further utilised by the company. An example of this type of online innovation intermediary is InnoCentive.

Since the competition for customers on the web is extremely tight, attracting members to online communities is challenging; therefore, an online community has to attract members by offering them value on every visit (Antikainen, 2007). In order to do this, knowing members' motivations to visit (Wasko and Faraj, 2000; Dholakia et al., 2004), as well as to participate in and contribute to, online communities (Jeppesen and Frederiksen, 2006; Nov, 2007) is important.

In building the community it is important to create a trusting relationship with the members and increase their commitment. One way to strengthen the members' commitment, as well as to increase customers' motivation to participate in and contribute to an innovation process, is to reward them (Antikainen and Väätäjä, 2008b). A reward can be given direct to an individual or a group and it can be either monetary or non-monetary, such as recognition. A common way to use non-monetary rewarding is to have a list of top innovators on the website. Some online open innovation communities, especially innovation intermediaries like CrowdSpirit and FellowForce or companies behind innovation challenges, are also giving monetary rewards to developers of the best ideas or innovations (Antikainen and Väätäjä, 2008b).

However, there are some conflicting results concerning motivation and monetary rewards. In fact, classic research in social psychology suggests that incentives might actually even have a negative effect on ideation (Toubia, 2006). Amabile et al. (1986) concluded that explicitly contracting to do an activity in order to receive a reward will have negative effects on creativity, but receiving no reward or only a non-contracted-for reward will have no such negative effects. Therefore, in this study we explore the role of monetary and non-monetary rewarding in motivating members in open innovation communities and what type of rewarding is appreciated by the members.

2 Purpose of the study and methodology

This empirical study explores rewarding in the online open innovation community context. We are especially interested in finding out how rewarding can be used to motivate participants to contribute in online open innovation communities. The research questions are formulated as follows:

1 What is the role of rewarding in open innovation communities?

2 What type of rewarding can be used to motivate members to contribute to ideation in online open innovation communities?

The paper is structured as follows. We first review related work on participants' motivation to participate in online communities and continue with a discussion on rewarding and motivation. We continue with a summary of the rewarding mechanisms of existing online open innovation communities. Then we present the results from our empirical study of three online open innovation communities, including the results from a questionnaire conducted with the community members. Finally, we propose our conclusions.

The studied innovation communities are FellowForce, CrowdSpirit and Owela, which are run by innovation intermediaries. We gathered data from the maintainers through semi-structured interviews and from members of the communities with a web survey. This study is a path opening in studies considering rewarding in online open innovation communities maintained by intermediaries. In addition to serving academia, the study provides practical implications on the type of rewarding mechanisms that are relevant to the community members. The implications are useful for the increasing number of open innovation intermediaries on the internet, as well as for the companies who are building or planning to build their own innovation communities.

3 Related work on motivation in online communities

The first step in understanding rewarding in open innovation communities is to explore the reasons why customers participate in and contribute to online communities. Studies on why people visit, join, participate in and contribute to different kinds of online communities have been made from varying perspectives. We focus our review on studies related to open source software (OSS) communities, peer-to-peer problem-solving communities and volunteer work in Wikipedia. In the literature, human motivation has been divided into intrinsic and extrinsic reasons (Deci and Ryan, 1985; Amabile, 1996; Ryan and Deci, 2000). In addition, Motzek (2007) stresses the impact of social motives in a person's code of conduct, and, therefore, divides social motives into a third category. We follow the model by Motzek (2007) in categorising the motivators in this paper.

3.1 Intrinsic motives to participate in online communities

Intrinsic motivation refers to the situations in which a person does something because it is inherently interesting or pleasant (Deci and Ryan, 1985). A person experiences feelings of competence, fun and self-determination when pursuing intrinsic motives (Deci, 1975). Lindenberg (2001) divides intrinsic factors into *enjoyment-based* and *obligation/community-based*. In this paper, the latter are categorised as social motives in Section 3.3.

One of the interesting perspectives is provided from the viewpoint of OSS communities where a considerable number of people are working on a voluntary basis without receiving direct compensation for their efforts. In OSS communities, *ideology* has been considered one of the motivational factors that explain why developers contribute (Lakhani and Wolf, 2005; Stewart and Gosain, 2006). In open content communities such as Wikipedia, ideology also seems to be an important motivation factor. However, in Nov's (2007) study, a high ranking of the ideology as a motivation factor was not coupled with a strong correlation to the contribution level. (Nov, 2007)

Furthermore, *enjoyment*, *fun* and *recreation* seems to be important motivation factor in many kinds of online communities (Raymond, 2001; Torvalds and Diamond, 2001; von Hippel and von Krogh, 2003; Osterloh et al., 2004; Ridings and Gefen, 2004; Lakhani and Wolf, 2005; Nov, 2007; Antikainen and Väätäjä, 2008a) In addition, *intellectual challenges and stimulation*, *interesting objectives* and *learning and improving skills* are essential motives for contributing to many kinds of communities, such as OSS communities, firm-hosted problem-solving communities, communities of practice and newsgroups (Wasko and Faraj, 2000; Hars and Ou, 2002; Ridings and Gefen, 2004; Lakhani and Wolf, 2005; Wiertz and de Ruyter, 2007).

Hars and Ou (2002) suggested that while internal factors such as intrinsic motivation, the joy of programming and the identification with a community play a role, external factors have greater weight in OSS communities. Also, Oreg and Nov's (2007) study suggested that software contributors place a greater emphasis on reputation-gaining and self-development motivations, compared with content contributors, who placed a greater emphasis on altruistic motives. Yet, in contrast, Lakhani and Wolf (2005) and Hertel et al. (2003) argue that although academic theorising on individual motivations for

participating in OSS projects has posited that external motivational factors in the form of extrinsic benefits (e.g.; better jobs, career advancement) are the main drivers of effort, enjoyment-based intrinsic motivation, namely how creative a person feels when working on the project, is the strongest and most pervasive driver.

3.2 Extrinsic motives to participate in online communities

Extrinsic motives refer to the consequences of a certain activity, perceiving the task itself as a means to an end (Amabile, 1993). A person may contribute valuable information because she feels she has some effect on the environment, which is called *a sense of efficacy* (e.g., Constant et al., 1994; Bandura, 1995).

User needs and *influencing on product/service development* have been identified as motivation factors in different kinds of online communities (Hars and Ou, 2002; Lakhani and Wolf, 2005). von Hippel (2005) summarises that user innovations in general, as well as commercially attractive ones in particular, tend to be developed by lead users. He suggests that one central reason for lead users participating in the innovation process is their *willingness to customise products* for themselves.

Furthermore, *reputation* and *enhancement of professional status* (Lerner and Tirole, 2002; Lakhani and Wolf, 2005) have been stressed in OSS communities, where developers may prove their skills to potential employers as well. In addition, members might participate in open innovation communities because of the possibility to show their skills.

Jeppesen and Frederiksen (2006) suggest that *firm recognition* is even more important than *peers' recognition* in company-hosted online communities. As an explanation, Jeppesen and Frederiksen (2006) point out, that innovative users are advanced users and may want to identify themselves more strongly with company developers than with their peers. Another reason, suggested by Jeppesen and Frederiksen (2006), is that firm recognition comprises peer recognition to a great extent, meaning that achieving firm recognition also leads to recognition by peers.

In contrast to experimental findings on the negative impact of extrinsic *rewards* on intrinsic motivations, (Deci, 1971; Deci et al., 1999), Lakhani and Wolf (2005) claim that being paid and feeling creative on OSS projects does not have a significant negative impact on project effort. Harper et al. (2008) report the predictors of answer quality on Question and Answer (Q&A) sites such as Yahoo! Answers on the internet. Q&A sites are places where users ask questions and other users answer them. Some of the sites are free and some are based on requiring a payment and paying a fee to the answerers. According to Harper et al. (2008), the answer quality was typically higher on fee-based sites than on free sites and paying more money led to better outcomes. They also report that sites where anybody can contribute to answering outperform sites with specific individuals answering the questions.

Furthermore, Kittur et al. (2008) studied Amazon's community for micro-task markets, called Mechanical Turk, where small tasks can be assigned to the large community of users. Since the tasks in Mechanical Turk are often very simple and do not demand creativity, it can be assumed that one of the main motivators to contribute is money. Kittur et al. (2008) conclude that in order to gain quality answers, it is important to formulate tasks carefully.

3.3 Social motives for participating in online communities

Wasko and Faraj (2000) stated that people do not use the forum to socialise, nor to develop personal relationships. According to their study, *giving back to the community in return* for the received help was by far the most cited reason for why people participate. They suggested that members are not simply interested in a forum for questions and answers but appreciate *online dialogue*, the debate and the discussion around topics of interest. Members help each other thanks to the possibility of *reciprocation.* In other words, they expect interaction to be available in the future. Furthermore, *altruism, attachment and/or commitment to the community and community interest* have been explored as a motivator, especially in open content and firm-hosted communities (Kollock, 1999; Wasko and Faraj, 2000; Nov, 2007; Wiertz and de Ruyter, 2007). In other words, the good of the group enters one's utility equation (Kollock, 1999).

Seeking friendships and 'hanging out together' was recognised as one motivator for participation in online communities at the beginning of the rise of online communities. (Hagel and Armstrong, 1997; Wasko and Faraj, 2000; Ridings and Gefen, 2004). In addition, achieving *peer recognition* also motivates users to participate in OSS communities as well as in other online communities (Lerner and Tirole, 2002; Jeppesen and Frederiksen, 2006).

Since online communities are based on the idea that members share some common interest and purpose, it can be assumed that social motives for participating in online communities are important in order to create a sustainable online community. Social motives can be seen as essential when enhancing collaboration between members.

3.4 Summarising the motives for participating in online communities

In Table 1 we summarise the motives for participating in online communities, dividing them into the above-mentioned categories.

Table 1 Users' motives for participating in online communities

	Users' motives for participating in online communities	*Authors*
Intrinsic motives	Ideology	Lakhani and Wolf, 2005; Stewart and Gosain, 2006; Nov, 2007
	Enjoyment, fun, recreation	Raymond, 2001; Torvalds and Diamond, 2001; von Hippel and von Krogh, 2003; Osterloh et al., 2004; Ridings and Gefen, 2004; Lakhani and Wolf, 2005; Nov, 2007
	Intellectual challenges, stimulation, interesting objectives	Ridings and Gefen, 2004; Lakhani and Wolf, 2005
	Learning, improving skills and knowledge exchange	Wasko and Faraj, 2000; Hars and Ou, 2002; Wiertz and de Ruyter, 2007; Antikainen, 2007; Gruen et al., 2005
Extrinsic motives	Firm recognition	Jeppesen and Frederiksen, 2006
	Reputation, enhancement of professional status	Bagozzi and Dholakia, 2002; Lerner and Tirole, 2002; Lakhani and Wolf, 2005

Table 1 Users' motives for participating in online communities (continued)

	Users' motives for participating in online communities	*Authors*
Extrinsic motives	Sense of efficacy	Constant et al., 1994; Bandura, 1995
	User need, influencing the development process	Hars and Ou, 2002; von Hippel, 2005; Lakhani and Wolf, 2005
	Rewards	Antikainen and Väätäjä, 2008b; Wasko and Faraj, 2000; Lakhani and Wolf, 2005; Harper et al., 2008; Kittur et al., 2008
Social motives	Altruism, reciprocity, care for community	Kollock, 1999; Wasko and Faraj, 2000; Zeityln, 2003; Nov, 2007; Wiertz and de Ruyter, 2007
	Friendships, 'hanging out together'	Hagel and Armstrong, 1997; Ridings and Gefen, 2004
	Peer recognition	Jeppesen and Frederiksen, 2006; Lerner and Tirole, 2002

In Table 1 the closely related motivations are categorised under the three main categories: intrinsic, extrinsic and social motives. Most categories include motivation factors that are identified in different kinds of communities, such as OSS, firm-hosted communities and open innovation communities.

4 Rewarding as a way to motivate online community members

4.1 Defining rewarding

In this paper we follow the dictionary definition of the term 'rewarding', using it to depict the occasion when

1 "something is given in return for good or evil done or received or that is offered or given for some service or attainment

2 a stimulus administered to an organism following a correct or desired response that increases the probability of occurrence of the response" (Rewarding, 2008).

When speaking about rewarding the community members, some authors, as well as practitioners, prefer to use the term 'incentives' (Reeve, 2005). Examples of different rewards are approval, paychecks, trophies, money, praise, attention, grades, scholarships, prizes, food, awards, honour-roll lists, public recognition and privileges. These are also examples of extrinsic motivators.

4.2 Motivation and its relationship to rewarding

Rewarding can be divided into monetary (tangible) rewarding and non-monetary (intangible) rewarding (also called recognition). Monetary rewards can be money, paychecks, fees, trophies and awards. Non-monetary rewarding may be the member's name in honour-roll lists or top ten lists, giving privileges and public recognition. Within

psychology, the research by Deci (1971, 1975) and Lepper et al. (1973) has presented results in which expected monetary rewards tend to reduce intrinsic motivation, whereas praise and other positive verbal feedback tends to increase it. Studies regarding rewarding and its relationship to intrinsic motivation have suggested that extrinsic rewards for intrinsically interesting activity have a negative effect on future intrinsic motivation (Reeve, 2005). Several studies have implied that the expectancy and tangibility of the reward reduces intrinsic motivation when person expects a reward for a completed task. However, no widely accepted theories on the relationship between motivation and rewarding currently exist (Lindenberg, 2001).

Regarding online open innovation communities, the idealised picture seems to be that the members' contribution is primarily related to intrinsic motivation, like fun, ideology and challenges. Despite some positive results concerning rewarding and motivation (Lakhani and Wolf, 2005; Harper et al., 2008), the predominant belief appears to be that no monetary rewards are needed and only non-monetary rewarding or unexpected rewards would be satisfactory for the members. We think this belief should be questioned with regard to the extent this is true and whether it is actually a combination of both intrinsic and extrinsic motivation and the expectancy to be rewarded for work well done for an agreed set of rules.

In light of the rewarding models used in successful open innovation intermediaries like InnoCentive, it seems reasonable to assume that multiple and varying types of motivation are present and members may also have multiple simultaneous goals behind their participation. If this is true, a combination of both monetary and non-monetary rewards would be optimal for the members.

4.3 Comparisons of different rewarding mechanisms

We analysed the current ways of rewarding in 12 open innovation intermediaries by visiting their websites. Our results are summarised in Table 2. The non-monetary rewards used consist of different types of ranking lists and announcement of the competition winners. Monetary rewards include money and products. In some of the communities money is given to the challenge winners, and in some of them money and products were given for achieving a certain number of points or even by raffling. Some intermediaries have their own currency, which can be exchanged for the real world's currency.

Table 2 Rewarding mechanism in reviewed innovation intermediaries

Community	*Non-monetary rewards*	*Monetary rewards*
FellowForce – www.FellowForce.com	Fellow of the month, fellow ranking	Money
CrowdSpirit – www.CrowdSpirit.com	Top five list	Money
Owela – owela.vtt.fi	-	Products
NineSigma – www.ninesigma.com	-	Money
InnoCentive – www.InnoCentive.com	-	Money

Table 2 Rewarding mechanism in reviewed innovation intermediaries (continued)

Community	*Non-monetary rewards*	*Monetary rewards*
IdeaWicket – www.ideawicket.com	Top rating list for ideas	Money, products
Kluster – http://kluster.com	-	Watts (own currency)
Ideacrossing – www.ideacrossing.com	Last year's winners, ranking of competitors. Judges get their profiles published, access to network of judges	Money, products
Yet to come – www.yet2.com	-	Money
Cambrian House – www.cambrianhouse.com	Weekly winners, champions	Money
Vator Tv – www.vator.tv	Last competition's winners, recent winners	Money
Tynax – www.tynax.com	-	Money

We can see that all of the studied open innovation communities used monetary rewarding and most of them also used non-monetary rewarding. At the time of the analysis, Kluster had recently been launched, which may explain the lack of non-monetary rewards. In the case of other communities lacking non-monetary rewards (InnoCentive, NineSigma, Yet to come and Tynax), some explanation may be the nature of the community. In other words, if the community is for top experts and includes a high confidentiality level, it might be a reason why non-monetary rewards are not publically used.

5 Case study design

5.1 Methodology, participants and settings

This study is an empirical study of three online open innovation communities: CrowdSpirit, FellowForce and Owela. The chosen online open innovation communities are run by innovation intermediaries. Although all of them are owned by innovation intermediaries, these three communities are based on different kinds of operational models and logics behind the service, which gave us a possibility to get different perspectives on rewarding. Our earlier cooperation with the community maintainers enabled us to get good access to the communities and collect data with various methods, as well as utilising our existing knowledge.

We gathered the data by interviewing the maintainers of the communities and by a web survey with the community members. The semi-structured interviews with the maintainers were done by phone and they were recorded and transcribed. The interviews lasted approximately one hour and covered questions related to the current rewarding mechanisms and future plans for rewarding and motivating members. In addition, we asked their views on the relationship between rewards and motivation to participate.

Our web survey was based on the knowledge acquired from the interviews as well as the literature review and an analysis of the rewarding mechanisms used in online open

innovation communities. One hundred of the top innovators of FellowForce and 200 of the most active members of CrowdSpirit were contacted by e-mail and asked to participate in the survey. The response rate among CrowdSpirit members was 12% (24 responses) and among FellowForce members 8% (8 responses). In addition, the questionnaire was linked to the Owela online open innovation community and mentioned in Owela's newsletter, which was sent to its members. Since we cannot know how many saw the survey, we cannot estimate Owela's response rate.

To study what kind of recognition and rewarding is important to the members of the communities, we based our questionnaire on the findings of the earlier studies and the analysis of the rewarding mechanisms currently used, and also ideated some new ways of rewarding.

5.2 Descriptions of the case communities

5.2.1 CrowdSpirit

CrowdSpirit (www.CrowdSpirit.com) focuses on electronics design. Many users would like to design and innovate tailor-made gadgets and get them manufactured for themselves. The founders and maintainers of CrowdSpirit have built toolkits for users to submit their designs and ideas. Similarly, CrowdSpirit includes tools for commenting on and voting for different designs. For visualisation, CrowdSpirit provides mindmaps that illustrate the product ideas with the proposed features.

The CrowdSpirit platform proposes a model based on crowdsourcing that enables businesses to directly involve innovators from outside the company in the design of innovative products and services. First, a company sets a challenge and the criteria for selecting the best ideas in the web service, called an 'incubator'. Innovators submit, vote on and discuss the ideas, and then the best participants are invited to join the project team. The project team summarises up to three concepts based on the discussions of the ideas presented in the 'elevator'. These concepts are presented to all innovators, who choose whether to validate them or not. The company shares the winnings, if any, equitably among all the members of the project team. In a sense, CrowdSpirit acts a mediator between enthusiastic users and manufacturing companies.

5.2.2 FellowForce

FellowForce (www.FellowForce.com) is an innovation marketplace and an intermediary that enables companies to submit innovation challenges to solvers. The solvers provide suggestions (pitches) to a challenge and the best solvers are rewarded. Unlike other services, such as InnoCentive (http://www.InnoCentive.com) and NineSigma (http://www.ninesigma.net), FellowForce allows solvers to submit their own pitches to companies. Normally, the pitches that best match those challenges are rewarded with money.

The collective creativity is realised in the 'Innovate Us' functionality of FellowForce. This functionality allows any company or organisation to use FellowForce as an open suggestion management system. Any registered participant may submit an idea or innovation, and view the responses of other users, if this feature is turned on. In addition, FellowForce also offers products to companies to launch their own co-creation platforms on their websites.

5.2.3 Owela

Owela (http://owela.vtt.fi) is a participatory web laboratory for designing digital media products and services. It aims to be a conversational web community that connects users with developers and researchers and promotes open innovation. Owela offers social media tools for gathering user needs and development ideas, as well as collecting feedback for scenarios and prototypes.

At the time of the study, Owela offered a so-called IdeaTube and TestLab, as well as a blog, chat and recommended bookmarks. In IdeaTube, users may participate by commenting on the descriptions and visualisations of different situations, needs, ideas, scenarios and prototypes. In TestLab, the prototypes of future products and services can be tested in beta phase, and the users are expected to give feedback and development ideas. Owela has been used as an innovation platform in research projects, as well as studies conducted for companies, such as usability testing of websites.

5.3 Results of the maintainers' interviews

When asked about the motivation to participate, the FellowForce maintainer stated that professionals and experts do not want to compete; they only participate when it is fun to participate or when they want to show how good they are. According to him:

> "Experts only participate in such contests where the contest itself is the driver…"

According to the FellowForce maintainer, in niche areas, where the number of experts is really limited, it is remarkably easier to attract professionals than in broader areas where competition is extremely tight. The evidence of this is seen in such open innovation communities as InnoCentive and NineSigma, which have both been successful in forming a committed user community.

For the same reasons, FellowForce planned to shift its business model from a community perspective to a portal perspective, enabling connection with companies who are running challenges on their own websites. CrowdSpirit has also widened its business model by differentiating consumer and company business models. In the new model, businesses can also test their ideas and preliminary concepts in CrowdSpirit. In Owela, the maintainer stated that learning and a feeling of influencing are important motivational factors to participate in the ideation process.

When asked how important monetary rewarding is, the CrowdSpirit maintainer replied:

> "The first motivator is not money; it is a mistake to participate if it is. The idea is that you will not become rich from your ideas, but you basically just get some reward in return."

Yet the FellowForce maintainer said that the bigger the sum of money is, the more there are participants, which is quite a natural reaction. In CrowdSpirit and FellowForce, financial rewards are given to the best ideas. In Owela, product prizes are raffled among people filling in a questionnaire. All the interviewees agreed that rewarding mechanisms are not currently in a key role in their communities, but they are continuously working on them and aim to develop them further. It was also stated by one of the maintainers that knowing different member groups' motivations for participating is needed in order to plan a rewarding strategy.

Furthermore, we asked which rewarding type the maintainers considered more important at this moment – monetary or non-monetary rewarding. They could not answer directly, but the FellowForce maintainer stated as follows:

> "I prefer to use the words 'satisfier and dissatisfier', if the money is not enough, it is a dissatisfier, you will lose motivation – ranking is only a satisfier (it can only be positive)."

Yet all the maintainers felt that a combination of monetary and non-monetary rewarding seems to be the best way to reward and motivate members to contribute to the ideation and innovation process. It was also stated that the bigger and more demanding the task is, the bigger the reward should be.

6.3 Results of the web survey

6.3.1 Respondents

There were 49 responses to our survey. The majority of the respondents were males (45 respondents, 91%). The average age of the respondents was 37 years (avg 36.76, std 11.57, min 19, max 64). Almost half of the respondents were members of CrowdSpirit (49%, 24 respondents), 16.3% (8 respondents) of FellowForce, 24.5% of Owela (12 respondents) and 10.2% (5 respondents) of other online open innovation communities.

6.3.2 Importance of recognition and rewarding

An overview of the respondents' opinions on the maintainers' recognition and rewarding is shown in Table 3. Over half of the respondents state that some form of recognition, like top ten lists, encourages them to participate in the community. 62.6% state that monetary rewarding encourages them to contribute to the ideation. 24.5% of the respondents agree with the statement that they are not interested in any kind of reward, whereas 63.3% disagree with this statement, which supports the previous claim on the importance of extrinsic, monetary rewarding.

Table 3 Members' opinions on the importance of recognition and rewarding

	Agree	*Neutral*	*Disagree*
Maintainers' recognition (non-monetary rewarding) encourages participation.	57.2%	28.6%	14.2%
Monetary rewarding encourages contributing.	62.6%	22.9%	14.6%
Not interested in getting any kind of reward for contribution.	24.5%	12.2%	63.3%

6.3.3 Ranking lists

Table 4 presents the respondents' opinions on ranking lists, which are one form of non-monetary rewarding. A ranking list by the quality of the ideas is favoured by the respondents (31.3% very important, 35.4% important way of rewarding). Ranking lists by activity or by number of presented ideas are not seen as important ways of rewarding by the respondents.

Table 4 Members' opinions on importance of ranking lists

	Not imp.	*Of some imp.*	*Important*	*Very imp.*
Ranking list by activity.	24.5%	44.9%	24.5%	6.1%
Ranking list by the quality of ideas.	10.4%	22.9%	35.4%	31.3%
Ranking list by the number of presented ideas.	38.8%	40.8%	14.3%	6.1%

6.3.4 Public acknowledgement

The respondents were also asked to give their opinion on the importance of various forms of public acknowledgement. Table 5 summarises the respondents' opinions on the importance of making active contributors visible to others. Announcing the rewarded members on the website is seen as very important (28.6%) or important (30.6%). Acknowledging the most active member of the month is not seen as important (36.7%) or to be of some importance (38.8%). Introducing active community members on the website is mainly seen as not important (20.4%) or of some importance (42.9%).

Table 5 Members' opinions on the importance of public acknowledgment on the website

	Not imp.	*Of some imp.*	*Important*	*Very imp.*
Announcing rewarded members on the website.	12.2%	28.6%	30.6%	28.6%
Acknowledging the most active member of the month.	36.7%	38.8%	12.2%	12.2%
Introducing active community members on the website.	20.4%	42.9%	24.5%	12.2%

6.3.5 Monetary reward

Table 6 presents the respondents' opinions on the importance of giving a monetary reward for the best idea or innovation and on prizes raffled between the participants. 44.9% of the respondents see a monetary reward for the best idea or innovation as a very important way of rewarding and 24.5% of the respondents see it as important. Prizes raffled between the participants are not seen as an important way of rewarding. 24.5% of the respondents see it as not important and according to 46.9% of the respondents it is only of some importance. The respondents favour monetary reward for the best idea or innovation over all other types of rewarding or recognition mechanisms.

Table 6 Members' opinions on the importance of monetary rewarding

	Not imp.	*Of some imp.*	*Important*	*Very imp.*
Monetary reward for best idea or innovation.	10.2%	20.4%	24.5%	44.9%
Prize raffled between participants.	24.5%	46.9%	16.3%	12.2%

7 Discussion and conclusions

First, we tried to determine the role of rewarding in open innovation communities. We interviewed the maintainers of three online open innovation communities and conducted a web survey with the members of the same communities. Based on the survey data, rewarding has an essential role for the respondents. The survey results indicate that monetary rewarding is important, as well as recognition based on the quality of ideas. The members also appreciate the fact that rewarded members are announced on the website.

The survey respondents did not favour activity in the community as a measure for rewarding. This may be due to the fact that activity in the community as such does not necessarily have a relationship to contributing to the challenges with ideas or the quality of the contributions. The respondents' reluctance to rely on the number of presented ideas may also be related to the fact that activity, even in the form of number of ideas, is not a guarantee of the quality of the contributions.

In the literature, it has been suggested that there is a negative impact on intrinsic motivation if extrinsic rewards are used (e.g., Deci et. al., 1999). However, some of the studies have shown opposing results as well (e.g., Lakhani and Wolf, 2005). It seems natural that people want to get paid for their time and effort. However, the previous research has mainly been done on user innovation and software development (e.g., von Hippel, 2005; Lakhani and Wolf, 2005; Jeppesen and Frederiksen, 2006) in open content communities, firm-hosted communities and OSS communities. These communities are often based on a certain type of enthusiasm, such as a hobby or are even brand-related. We believe that the users' behaviour may not be similar in cases where an open innovation community is run by an intermediary since their business model is based on the members of the community ideating or innovating and revealing their ideas to challenges given by external companies.

Secondly, we considered what type of rewarding can be used to motivate members to participate in open innovation communities. The interviewed community maintainers pointed out the importance of combining monetary and non-monetary rewards, as well as stressing the need to understand the motivations of different groups of members. The analysis of the rewarding methods used in 12 online open innovation communities indicated that both rewarding methods were used in half of the studied open innovation intermediaries. In fact, all of the studied intermediaries offered monetary rewards.

Non-monetary rewards are often inexpensive and fairly easy to realise in open innovation communities. They can be realised by including top ten lists or corresponding systems on the websites. Despite the kind of rewarding, monetary or non-monetary, that is used, a detailed plan for creating a rewarding model is needed. One of the main questions concerns the kind of behaviour that should be rewarded. In other words, if cooperation is the kind of activity that should be promoted, a rewarding system should concentrate on rewarding groups instead of individuals. Also, an understanding of what the members of the community regard as a fair way to reward them is needed.

In addition, one of the interviewed community maintainers pointed out that answering the challenges in open innovation communities in the future may even be to work without any commitments to one traditional employer but rather working as a free expert or 'freelancer'. In such cases, the importance of getting reasonable rewards naturally plays a major role.

Users do want something in return when they participate and contribute to the innovation processes. This has been realised in online open innovation communities run by intermediaries and many of them have taken various rewarding mechanisms into use. A special characteristic of intermediaries is that the users often do not have an existing relationship with the company they are ideating for. More research should be done in this area of open innovation to understand the members' motivation to participate and rewarding them.

This research is a path into the field of studying open innovation communities maintained by innovation intermediaries. In the future, motivation to participate and rewarding should be studied in different types of open innovation communities, including larger and longer established communities run by intermediaries with various types of business models. More research should be done to gain a deeper understanding of the factors affecting participation and the types of recognition and rewarding mechanisms the members appreciate. It also has to be taken into account that people's motivations and goals when participating and contributing are not straightforward. It would also be interesting to analyse the relationship between people's real action in their participation to online open innovation and what they say.

Acknowledgements

We want to express our gratitude to Prof. Sari Kujala at Tampere University of Technology, Human-Centred Technology (IHTE) for her valuable comments on the article and researcher Hannu Soronen at IHTE for comments on the questionnaire. We are also grateful to Ruben Niewenhuis from FellowForce, David Lionel from CrowdSpirit, and Asta Bäck and Pirjo Näkki from Owela/VTT for providing insightful information and comments for the paper. We also want to thank research assistant Tiina Mäkelä at VTT and research assistants Jaana Mäntylä and Roope Kärki at IHTE, who helped in realising parts of the study. This study has been funded by the SOMED project at VTT and the Ministry of Education, Finland.

References

Amabile, T. (1993) 'Motivational synergy', *Human Resource Management Review*, No. 3, pp.185–201.

Amabile, T. (1996) *Creativity in Context*, Boulder.

Amabile, T.M., Hennessey, B. and Grossman, B. (1986) 'Social influences on creativity: the effects of contracted-for reward', *Journal of Personality and Social Psychology*, Vol. 50, No. 1, pp.14–23.

Antikainen, M. (2007) 'The attraction of company online communities: a multiple case study', Academic dissertation, Department of Management Studies, University of Tampere, Tampere University Press, Finland.

Antikainen, M and Väätäjä, H. (2008a) 'Innovating is fun – motivations to participate in online open innovation communities', in K.R.E. Huizingh, M. Torkkeli, S. Conn and I. Bitran (Eds.): *Proc. of the First ISPIM Innovation Symposium Singapore: Managing Innovation in a Connected World*, Singapore, 14–17 December 2008.

Antikainen, M. and Väätäjä, H. (2008b) 'Rewarding in open innovation communities – how to motivate members?', in K.R.E. Huizingh, M. Torkkeli, S. Conn and I. Bitran (Eds.): *Proc. of the XIX ISPIM Annual Conference, Open Innovation: Creating Products and Services through Collaboration*, Tours, France, 15–18 June 2008.

Bagozzi, R. and Dholakia, U. (2002) 'Intentional social action in consumer behaviour', *Journal of Interactive Marketing*, Vol. 16, No. 2, pp.2–21.

Bandura, A. (1995) *Self-Efficacy in Changing Societies*, Cambridge University Press, New York.

Chesbrough, H. (2003) *Open Innovation: the New Imperative for Creating and Profiting from Technology*, Harvard Business School Press, Boston, MA.

Chesbrough, H. (2006a) *Open Business Models: How to Thrive in the New Innovation Landscape*, Harvard Business School Press, Boston, MA.

Chesbrough, H. (2006) 'Open innovation: a paradigm for understanding industrial innovation', in Chesbrough, H., Vanhaverbeke, W. and West, J. (Eds.): *Open Innovation: Researching a New Paradigm*, Vol. 134, Oxford University Press, Oxford, UK.

Constant, D., Kiesler, S. and Sproull, L. (1994) 'What's mine is ours, or is Iit? A study of attitudes about information sharing', *Information Systems Research*, Vol. 5, No. 4, pp.400–421.

Deci, E. (1971) 'Effects of externally mediated rewards on intrinsic motivation', *Journal of Personality and Social Psychology*, Vol. 18, pp.105–115.

Deci, E. (1975) *Intrinsic Motivation*, New York.

Deci, E. and Ryan, R. (1985) Intrinsic Motivation and Self-Determination in Human Behaviour, New York and London.

Deci, E., Koestner, R. and Ryan, R. (1999) 'A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation', *Psychological Bulletin*, Vol. 125, pp.627–688.

Dholakia, U., Bagozzi, R. and Pearo, L. (2004) 'A social influence model of consumer participation in network-and small-group-based virtual communities', *International Journal of Research in Marketing*, Vol. 21, No. 3, pp.241–263.

Gruen, T., Osmonbekov, T. and Czaplewski, A. (2005) 'How e-communities extend the concept of exchange in marketing: an application of the motivation, opportunity, ability (MOA) theory', *Marketing Theory*, Vol. 5, No. 1, pp.33–49.

Hagel, J. and Armstrong, A. (1997) *Net Gain: Expanding Markets through Virtual Communities*, McKingsey & Company, Boston.

Harper, F.M., Raban, D., Rafaeli, S. and Konstan, J.A. (2008) 'Predictors of answer quality in online Q&A sites', *Proceedings of the Twenty-Sixth Annual SIGCHI Conference on Human Factors in Computing Systems*, ACM, New York, USA, pp.865–874.

Hars, A. and Ou, S. (2002) 'Working for free? Motivations for participating in open source projects', *International Journal of Electronic Commerce*, Vol. 6, No. 3, pp.25–39.

Hertel, G., Niedner, S, Herrman, S. (2003) 'Motivation of software developers in open source projects: an internet based survey of contributors to the Linux Kernel', *Research Policy*, Vol. 32, pp.124–138.

Jeppesen, L. and Frederiksen, L. (2006) 'Why do users contribute to firm-hosted user communities? The case of computer-controlled music instruments', *Organization Science*, Vol. 17. No. 1, pp.45–63.

Kittur, A., Chi, E. and Bongwon, S. (2008) 'Crowdsourcing user studies with mechanical turk', *Proceedings of the Twenty-Sixth Annual SIGCHI Conference on Human Factors in Computing Systems*, ACM, New York, USA, pp.453–456.

Kollock, P. (1999) 'The economies of online cooperation: gifts and public goods in cyberspace', in M. Smith and P. Kollock (Eds.): *Communities in Cyberspace*, Routledge, London.

Lakhani, K.R. and Wolf, R. (2005) 'Why hackers do what they do: understanding motivation and effort in free/open source software projects', in J. Feller, S. Hissan and K.R. Lakhani (Eds.): *Perspectives on Free and Open Source Software*, MIT Press, Cambridge.

Lepper, M., Greene, D. and Nisbett, R. (1973) 'Undermining children's intrinsic interest with extrinsic rewards: a test of the 'overjustification' hypothesis', *Journal of Personality and Social Psychology*, Vol. 28, pp.129–137.

Lerner, J. and Tirole, J. (2002) 'Some simple economics of open source', *Journal of Industrial Economics*, Vol. 50, No. 2, pp.197–234.

Lindenberg, S. (2001) 'Intrinsic motivation in a new light', *Kyklos*, Vol. 54, No. 2–3, pp.317–342.

Motzek, R. (2007) *Motivation in Open Innovation. An Exploratory Study on User Innovators*, VDM Verlag, Saarbrücken.

Nov, O. (2007) 'What motivates Wikipedians?', *Communications of the ACM*, Vol. 50, No. 11, pp.60–64.

Oreg, S. and Nov, O. (2007) 'Exploring motivations for contributing to open source initiatives: the roles of contribution context and personal values', *Computers in Human Behavior*, Vol. 24, No. 5, pp.2055–2073.

Osterloh, M., Rota, S. and Kuster, B. (2004) *Open Source Software Production: Climbing on the Shoulders of Giants*, Zurich 2004, accessed on 14 April 2009, available at http://opensource.mit.edu/papers/osterlohrotakuster.pdf.

Piller, F. (2004) 'Mass customization: reflections on the state of the concept', *International Journal of Flexible Manufacturing Systems*, Vol. 16, No. 4, pp.313–334.

Raymond, E.S. (2001) *The Cathedral and the Bazaar*, O'Reilly, Sebastopol, CA.

Reeve, J. (2005) *Understanding Motivation and Emotion*, John Wiley & Sons, Inc., USA.

Rewarding (2008) *In Encyclopædia Britannica*, available at Encyclopædia Britannica Online: http://www.britannica.com/EBchecked/topic/500714/rewarding (accessed on 2 February 2008).

Ridings, C. and Gefen, D. (2004) 'Virtual community attraction: why people hang out online', *Journal of Computer-Mediated-Communication*, Vol. 10, No. 1, Article 4.

Ryan, R. and Deci, E. (2000) 'Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being', *American Psychologist*, Vol. 5, No. 1, pp.68–78.

Stewart, K. and Gosain, S. (2006) 'The impact of ideology on effectiveness in open source software development teams', *MIS Quarterly*, Vol. 30, No. 2. pp.291–314.

Tapscott, D. and Williams, A. (2006) *Wikinomics*, Penguin, New York.

Torvalds, L. and Diamond, D. (2001) *Just for Fun: The Story of an Accidental Revolutionary*, Harper Business, New York.

Toubia, O. (2006) 'Idea generation, creativity, and incentives', *Marketing Science*, Vol. 25, No. 5, pp .411–425.

von Hippel, E. (2005) *Democratizing Innovation*, The MIT Press, Cambridge.

von Hippel, E. and von Krogh, G. (2003) 'Open source software and the 'private-collective' innovation model: issues for organization science', *Organization Science*, Vol. 14, No. 2, pp.208–223.

Wasko, M. and Faraj, S. (2000) 'It is what one does: why people participate and help others in electronic communities of practice', *Journal of Strategic Information Systems*, Vol. 9, No. 2–3, pp.155–173.

Wiertz, C. and de Ruyter, K. (2007) 'Beyond the call of duty: why customers contribute to firm-hosted commercial online communities', *Organization Studies*, Vol. 28, No. 3, pp.347–376.

Zeityln, D. (2003) 'Gift economies in the development of open source software: anthropological reflections', *Research Policy*, Vol. 32, pp.1287–1291.

PUBLICATION V

Towards collaborative open innovation communities

In: Kakouris, A. (ed.). University of Athens, Proceedings of the 5th European Conference on Innovation and Entrepreneurship (ECIE 2010). Academic Publishing Limited, Reading, UK. Pp. 52–60.

Towards Collaborative Open Innovation Communities

Maria Antikainen
VTT Technical Research Centre of Finland, Business and Technology Management, Tampere, Finland / Tampere University of Technology (TUT)
maria.antikainen@vtt.fi

Abstract

Open innovation (OI) communities have dramatically changed our conceptions of how innovation can and should be managed and have prompted calls for new theories of innovation (von Hippel and von Krogh 2003). OI communities with customers can act as a source for learning and producing external ideas or even solutions to companies. As earlier studies indicate that collective problem solving improves the quality of ideas, motivating and supporting collaboration in online OI communities is important.

This explorative study explores collaboration in online OI communities by answering two questions. The first question considers users' motivations to collaborate in OI communities, while the second one explores how rewarding can be used to motivate collaboration in OI communities. The study consists of three cases: CrowdSpirit, FellowForce and Owela. The preliminary results are based on the data gathered by interviewing maintainers of the communities and by a questionnaire to the community members.

According to the results, the users were motivated to collaborate by interesting objectives and the concept of the community, gaining new viewpoints from other users, obtaining better products and receiving rewards. The results also indicate that the lack of proper tools inhibits collaboration in OI communities. Furthermore, an OI community's rewarding strategy should be transparent and logical. Rewarding should be based on the efforts and quality of the work rather than on giving rewards based on the quantity of ideas or lotteries. The system should be flexible so that rewards vary in different situations and phases of the work. The equity and democracy of the rewarding system are important factors for OI community users. Additionally, customisability of the rewarding strategy ensures that users can influence, on some level, the nature of the rewards they receive, and the rewards will therefore be more valuable to everyone

This explorative study is one of the first studies of collaboration in online OI communities. In addition to serving academia, the study provides practical knowledge on how to reward and motivate groups of members on the web to companies and the growing number of OI intermediaries building or planning to build innovation communities.

Keywords: online communities, open innovation, intermediaries, rewarding, collaboration, monetary, non-monetary, tangible, intangible, recognition, motivation, case study

1 Introduction

1.1 Background of the study

OI paradigm assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology (Chesbrough, 2003, p xxiv).OI specifically with customers, provides interesting possibilities for companies to improve their innovation processes. Online OI communities with customers can serve as a source for learning and producing external ideas or even solutions for companies (Jeppesen et al. 2006; Chesbrough 2006).

To integrate customers into innovation processes in online OI communities, companies need methods, tools, platforms and resources as well as different types of services provided by external companies. In order to do this, companies can: 1) build their own OI communities, 2) use existing

online communities related to their products and services, such as brand communities, 3) look for hobbyist communities, or 4) use existing communities on the web that act as intermediaries in this field (Chesbrough 2003; von Hippel 2005; Chesbrough 2006a). The number of online innovation market places and innovation intermediaries acting between innovators and companies (or 'solvers' and 'seekers') has recently grown rapidly.

As earlier studies indicate that collective problem solving improves the quality of ideas (e. g., Hargadon and Beckhy 2006; Thrift 2006), it is important to motivate and support collaboration in online OI communities. It is therefore relevant to study these issues in order to serve companies managing their own communities, innovation intermediaries offering online OI communities as a service, and academia.

1.2 Purpose and methodology

This explorative research studies collaboration in online OI communities by addressing two questions. The first question considers users' motivations to collaborate in OI communities. The second question concentrates on how rewarding can be used to motivate collaboration in OI communities.

The study consists of three cases: CrowdSpirit, FellowForce and Owela. Our research team gathered the data by interviewing maintainers of the communities and by a questionnaire to the community members. Semi-structured interviews with the maintainers were conducted by phone and recorded. The recordings were transcribed as notes afterwards. The data were collected March-April 2008.

The interviews each lasted approximately one hour and covered questions related to the members' motivation factors, existing collaboration tools and methods, and future plans to support collaboration. Also the communities' rewarding models were discussed. In addition to the interviews, a web survey was conducted covering themes related to collaboration and aspects related to rewarding and motivation. One hundred of FellowForce's top members and two hundred of CrowdSpirit's most active members were contacted by email and asked to participate in the survey. This plan of action was chosen due to the wish of the maintainers instead of using a link on the web site. However, in the Owela's case we used the link on the web site and in aim to get more responses and the survey was also marketed in Owela's newsletter, which was sent to its members.

2 Literature review

2.1 Users' motivations to collaborate in online OI communities

In this study the focus is on online OI communities where users participate in organisations' innovation processes at some level. To encourage collaboration online OI communities offer set of tools as well as utilise different methods, such as rewarding. The first step to knowing why users collaborate in online communities is to understand their motivations to participate in and contribute to online communities. Studies into why people visit, join, participate in and contribute to different kinds of online communities have been carried out from varying perspectives. Prior literature has divided human motivation into intrinsic and extrinsic reasons (Deci and Ryan 1985; Amabile 1996; Ryan and Deci 2000). Motzek (2007) also stressed the impact of social motives in a person's code of conduct and therefore added a third category for social motives.

According to Deci and Ryan (1985), intrinsic motivation refers to situations in which a person does something because it is inherently interesting or pleasant to do so. In contrast, extrinsic motives refer to the consequences of a certain activity, perceiving the task itself as a means to an end (Amabile 1993). As online communities are based on the idea that members share some common interest and purpose, social motives play an important role in sustainable online communities.

Social motives can also be seen as essential when enhancing collaboration between members. Wasko and Faraj (2000) stated that people do not use the forum to socialise or develop personal relationships. According to their study, giving back to the community in return for help received was by far the most cited reason for people's participation.

Table 1 divides the closely related motivations into three main categories: intrinsic, extrinsic and social motives. Most categories include motivation factors identified in different kinds of communities, such as OSS, firm-hosted communities and OI communities (Antikainen & Väätäjä 2010).

Table 1: Users' motives for participating in online communities (Antikainen & Väätäjä 2010)

.

	Users' motives for participating in online communities	Authors
Intrinsic motives	Ideology	Lakhani and Wolf 2005; Stewart and Gosain 2006; Nov 2007
	Enjoyment, fun, recreation	Raymond 2001; Torvalds & Diamond 2001; von Hippel and von Krogh 2003; Osterloh et al. 2004; Ridings and Gefen 2004; Lakhani and Wolf 2005; Nov 2007
	Intellectual challenges, stimulation, interesting objectives	Ridings and Gefen 2004; Lakhani and Wolf 2005
	Learning, improving skills and knowledge exchange	Wasko and Faraj 2000; Hars and Ou 2002; Wiertz and Ruyter 2007; Antikainen 2007; Gruen et al., 2005
Extrinsic motives	Firm recognition	Jeppesen and Frederiksen 2006
	Reputation, enhancement of professional status	Bagozzi and Dholakia 2002; Lernel and Tirole 2002; Lakhani and Wolf 2005
	Sense of efficacy	Constant et al. 1994; Bandura 2005
	User need, influencing the development process	Hars and Ou 2002; von Hippel 2005; Lakhani and Wolf 2005;
	Rewards	Antikainen and Väätäjä 2008; Wasko and Faraj 2000; Lakhani and Wolf 2005; Harper et al. 2007; Kittur et al. 2008
Social motives	Altruism, reciprocity, care for the community	Kollock 1999; Wasko and Faraj 2000; Zeityln 2003; Nov 2007; Wiertz and Ruyter 2007
	Friendships, "hanging out together"	Rheingold 1993; Hagel and Armstrong 1997; Ridings and Gefen 2004
	Peer recognition	Jeppesen and Frederiksen 2006; Lerner and Tirole 2002

Prior research into users' motivations to collaborate proposes that collective work with others is seen as enriching, fun, productive, efficient and even the best way to trigger creative innovation. Furthermore, it suggests that collaboration should be sought in order to get the most out of

people's creativeness. The research admits, however, that it is demanding to support collaboration in an online environment as it is already challenging to create collaboration between strangers in face-to-face situations (Antikainen et al. 2010).

2.2 Motivation and its relationship to rewarding

Rewarding can be divided into monetary (tangible) rewarding and non-monetary (intangible) rewarding (also called recognition). Monetary rewards include money, pay checks, fees, trophies and awards. Non-monetary rewarding may be the member's name in honour-roll lists or top ten lists, granting privileges and public recognition. (Antikainen & Väätäjä 2010)

Studies in the field of psychology suggest that expected monetary rewards tend to reduce intrinsic motivation, whereas praise and other positive verbal feedback tend to increase it (Deci 1975, and Lepper et al. (1973). According to Reeve's (2005) studies into rewarding and its relationship to intrinsic motivation, extrinsic rewards for intrinsically interesting activity have a negative effect on future intrinsic motivation. Several studies have implied that the expectancy and tangibility of the reward reduce the intrinsic motivation when a person expects a reward for a completed task. No widely accepted theories on the relationship between motivation and rewarding currently exist however (Lindenberg, 2001). The simplicity of the theories on motivations and study setups presumably cause some misinterpretations, as in real-life several motivations may exist concurrently.

The idealised picture of online communities seems to be that the members' contribution is primarily related to intrinsic motivation such as fun, ideology and challenges. Despite some positive results concerning rewarding and motivation (Lakhani and Wolf 2005; Harper et al. 2008), the predominant belief appears to be that no monetary rewards are needed and only non-monetary rewarding or unexpected rewards would be satisfactory to members. More studies are needed in an online community context to explore whether it is in fact a combination of intrinsic and extrinsic motivation and the expectancy to be rewarded for work that is well done for an agreed set of rules. Even fewer studies are available aimed at increasing users' motivations to collaborate by rewarding.

3 Results

3.1 Case communities – brief descriptions and maintainers' interviews

3.1.1 CrowdSpirit

CrowdSpirit (www.CrowdSpirit.com), which originated in France, focuses on electronics design. The founders and maintainers of CrowdSpirit have built toolkits for users to submit their designs and ideas. Similarly, CrowdSpirit includes tools for commenting on and voting for different designs.

CrowdSpirit recently changed its business model. Instead of participating in the development and industrialisation process of the products, CrowdSpirit is now only involved in the design process. In other words, after the design and collection of the project team, the team negotiates directly with the manufacturers. After collecting the project team and drawing up the specifications and a marketing plan, the project team asks for quotations for the development.

In CrowdSpirit, members are used to collaborate with others. They discuss and rate others' ideas and work together in the product design process. To be willing to collaborate, people have to be open, have their own competitive core (more value in this field). According to CrowdSpirit's maintainer, it is a mistake to think that users would collaborate voluntarily.

The maintainer emphasised the importance of rewarding and, more specifically, monetary rewards as compensation for users' work. In the maintainer's opinion, having fun and acquiring new viewpoints from others are the top motivators. Furthermore, the maintainer believes that being in touch and working with companies is motivating for the participants. Collaboration in groups is already a way of working at CrowdSpirit. More collaborative tools such as chat are needed however. The main difficulty is to have people in the community at the same time, as there are members all over the world. To support collaboration, people also need information, profiles and to get to know each other, other than just professionally.

3.1.2 FellowForce

FellowForce (http://www.FellowForce.com) is an innovation marketplace and intermediary that allows companies to submit innovation challenges to solvers. FellowForce originated in the Netherlands and Poland. Solvers provided suggestions (pitches) to a challenge, and the best solvers were rewarded. FellowForce allows solvers to submit their own pitches to companies. Normally, the best pitches matching the challenges are rewarded with money.

Collective creativity is realised in FellowForce's "Innovate Us" functionality. Any registered participant may submit an innovation and view the responses from other users, if this feature is turned on. FellowForce also offers services for companies to launch their own co-creation platforms on their websites.

FellowForce's maintainer stated that members participate because of their curiosity: they just want to try it out. They are also motivated by the possibility of influencing an outcome and sharing ideas with others. FellowForce's maintainer also added that rewarding is a solid part of a sustainable OI community and that it is currently considering ways to enhance collaboration between members with appropriate methods and a rewarding system.

3.1.3 Owela – open web laboratory

Owela (http://owela.vtt.fi) is a participatory web laboratory for designing digital media products and services. Owela was developed at VTT in Finland and aims to connect users to developers and researchers, and to promote OI. Owela offers social media tools for gathering user needs and development ideas and collecting feedback for scenarios and prototypes.

In IdeaTube, users may participate by commenting on the descriptions and visualisations of different situations, needs, ideas, scenarios and prototypes. In TestLab, the prototypes of future products and services can be tested at the beta phase, and the users are expected to give feedback and development ideas. Owela has been used as an innovation platform in research projects and studies conducted for companies, such as usability testing of websites.

Owela's maintainer believes that interesting objectives and appropriate tools for participation and collaboration are central factors of user motivation. The maintainer stated that collaboration with others is fun, nourishes creativity and that members learn from each other. It is therefore currently developing tools and methods aimed at enhancing collaboration between members. Appropriate monetary and non-monetary rewarding models are needed to enhance motivation and collaboration.

3.2 Survey

3.2.1 Survey respondents

There were 49 responses to our survey. Of the respondents, 45 (91%) were male. The average age of the respondents was 37 years (avg 36.76, std 11.57, min 19, max 64). Almost half of the respondents were members of CrowdSpirit (49%, 24 respondents), 16.3% (8 respondents) of FellowForce, 24.5% of Owela (12 respondents) and 10.2% (5 respondents) of other online OI communities.

3.2.2 Survey responses

Figure 1 shows that 75% of the respondents agreed or strongly agreed that members' mind collaboration was an efficient way to work. Hedonistic factors such as enjoyment and utilitarian factors such as efficiency therefore rationalise why collaboration is the preferred way of acting in open innovation communities.

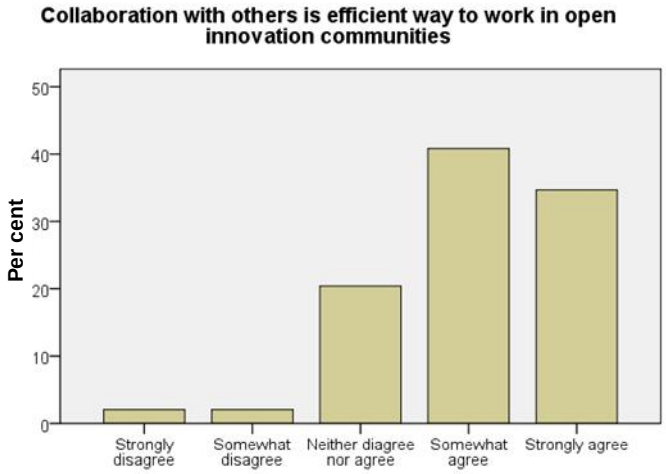


Figure 1: "What is important to you in an open innovation community?" N: 49, Mean: 4.04, Median: 4.00, Std. Dev.: 0.912.

We also asked whether users would like to collaborate more. The result was clearly positive, as shown in Figure 2.

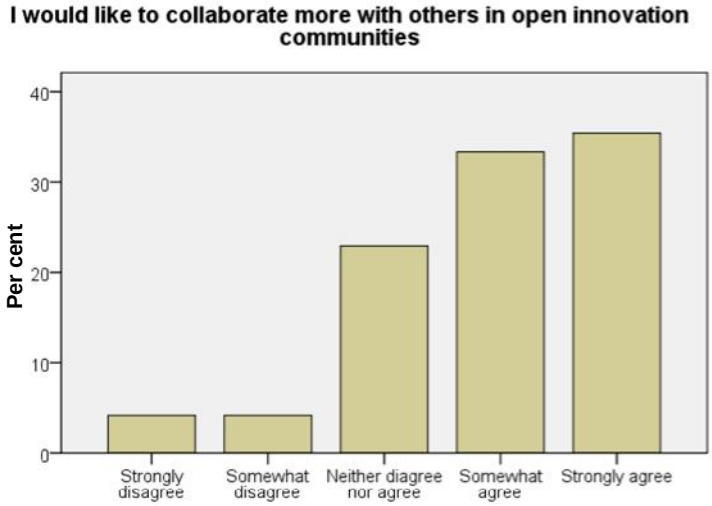


Figure 2: "What is important to you in an open innovation community?" N: 48, Mean: 3.92, Median: 4.00, Std. Dev.: 1.069.

All of the communities emphasised the importance of collaboration in the community and were searching for and developing new ways to collaborate.

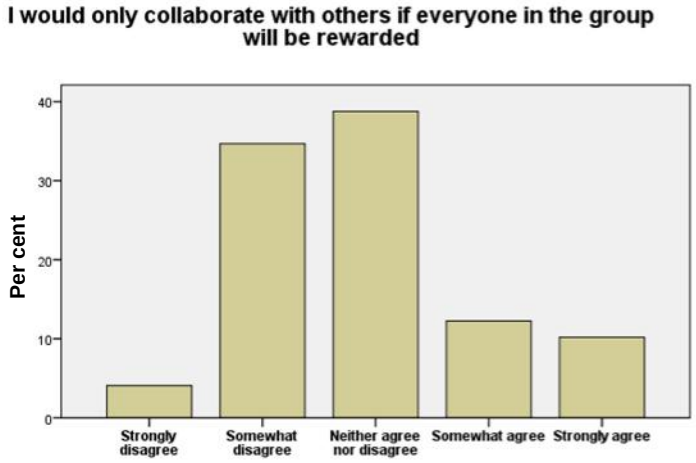


Figure 3: "What is your opinion on rewarding in an open innovation community?" N: 48, Mean: 2.9 Median: 3.00, Std. Dev.: 1.026.

The results in Figure 3 show that rewarding everyone in the group was not seen as important. Naturally, there are also other ways to reward collaboration. We tackled this issue in our final question. The open question was formulated as follows: "*Would you like to collaborate more with other members of OI communities*? *How should groups be rewarded*?"

Once again, the answers indicate that collaboration was appreciated. Both online meetings and face-to-face meetings were suggested. Scheduled Internet sessions were seen as the preferable way to cooperate. Acquiring different perspectives from other people was seen as the most important benefit. For example, one of the respondents stated that he was an innovative person but not technically skilled. He therefore appreciated cooperation with technical people.

Members also saw a challenge in rewarding every member in the project equitably. The importance of finding the originator of the process was emphasised. One of the respondents suggested a point system that acknowledged the input of members at different stages of development, from problem identification to product launch.

> *"After launching the product, the same system would work as a royalty system that continued to reward the original contributors while allowing a traditional retail system to be imposed when marketing the product."*

A system in which the project leader distributes the rewards to his/her group was also suggested. The system would be transparent so that every member's scores were shown. This way, if the group leader is not equitable, he may not be voted leader again. Moreover, one idea was to choose a leader who would gain the biggest reward and all the members would then vote for the rewards.

Both kinds of rewards, monetary and recognition, were in fact seen as important. One of the respondents suggested that companies could invite members to visit their premises.

Furthermore, obtaining some kind of response to the ideas immediately and seeing how the ideas were further developed were emphasised in the members' answers, as the following statement indicates:

> *"If the quality of innovation produced by a group is high, that is its own reward, especially if the innovation is tangibly put into practice*."

One of the respondents indicated that monetary recognition should be assigned if the idea were to become commercially exploited. Moreover, well-timed rewarding was emphasized, as the following statement suggests:

> *"As the primary purpose of an innovation community is to develop new products that can then be released into the market, it is extremely important to reward the early contributors who develop the product to ensure the success and longevity of an innovation community."*

3.3 Summary of findings in the context of the collective innovation process in OI communities

3.3.1 Motivation factors to collaborate

The results show that *interesting objectives* and *concepts* motivate users to collaborate in OI communities. One good example is hobbyist communities in which enthusiastic users can easily be motivated to participate and collaborate. An *open and constructive atmosphere* also motivates users to collaborate with others. The results show that users are willing to collaborate if they feel that they can *influence the product/service development.* Users also mentioned that they collaborated to *gain new viewpoints*. According to the results, users are motivated to collaborate because they consider it an *efficient way* to operate. On the other hand, from the hedonistic viewpoint, users find collaboration *fun*. Moreover, the *sense of cooperation and community* and *similarity* with other users also motivate users to collaborate. Finally, the right kind of *rewarding* that supports collaboration is an important motivator in the users' eyes.

3.3.2 Important elements of the rewarding strategy

First, the rewarding strategy should be *transparent and logical*. In other words, users should know why the rewards are given. Second, *democracy and equity* of the system are needed. Users also want the chance to influence the distribution of the rewards, for example, by voting. Every user should also feel that the system is fair. Third, *flexibility* of the strategy ensures that the nature of the rewards can vary in different situations. In, for example, the commercialisation phase, monetary rewards may be more significant. Intangible rewards, however, may support the aim of the fun aspect of the community. Fourth, *customisability* of the rewarding strategy ensures that users can influence, on some level, the nature of the rewards they receive and that the rewards will therefore be valuable to everyone. Finally, *active* participation by the *maintainers* is essential to the rewarding strategy. The results show that users want to receive feedback from the maintainers on their ideas. They also appreciate rewards such as visiting the maintainers' premises.

4 Discussion and conclusions

This explorative study is one of the first studies of collaboration in online OI communities presenting some preliminary results based on the interviews and the survey. In addition to serving academia, the study provides practical knowledge on how to reward and motivate groups of members on the web to companies and the growing number of OI intermediaries building or planning to build innovation communities. The study tackles two specific themes: users' motivations to collaborate and how rewarding can be used to motivate members to collaborate in OI communities.

Prior studies have shown that collaboration improves the quality of ideas by increasing the level of efficiency and creativity (e.g., Hargadon and Beckhy 2006; Thrift 2006). The study brought out all three kinds of motivation factors: intrinsic, extrinsic (Deci and Ryan 1985) and social (Motzek 2007).

Maintainers stated that the development of collaboration tools and methods is still more or less in its infancy. They admitted that users are currently working more as individuals than as groups. As one of the maintainers proposed, the next step would be for users to work genuinely as a group and not as individuals. This poses further challenges for tools and methods to be used for collaborative online innovation.

The second research question considered rewarding as a motivation factor. The importance of a well-designed reward system to the aim of receiving benefits can be logically justified based on prior literature. Within psychology, for example, the research by Deci (1975), Lerner and Tirole (2002) has presented results showing that expected monetary rewards tend to reduce intrinsic motivation whereas praise and other positive verbal feedback tend to increase it. In contrast, although intrinsic motivations seem to be important in the OI communities studied, the study emphasized both types of reward, monetary and non-monetary. The respondents to the study also gave concrete suggestions for the different kinds of rewarding models within groups. The results show that users are willing to collaborate for hedonistic and utilitarian reasons, and the collaboration possibilities in themselves can therefore be regarded as a reward. Furthermore, motivation factors to collaborate can and should be used when developing the rewarding strategy of the collaborative OI community. If, for example, users are motivated to collaborate because of the sense of community, a reward could be a visit to the company's premises, as suggested in this study. Furthermore, if fun is the motivator, rewards should somehow support this idea.

According to the results, a rewarding strategy should be transparent and logical. Rewarding should be based on the efforts and quality of the work rather than on the quantity of ideas or lotteries. Although users did not support the idea that everyone in the group be rewarded, they wanted to know the reasoning behind rewarding decisions. The system should also be flexible so that rewards vary in different situations and phases of the work. Equity and democracy of the rewarding system are important factors for OI community users. The customisability of the rewarding strategy ensures that users can influence, on some level, the nature of the rewards they receive, and that the rewards will therefore valuable to everyone.

This study clearly shows the untapped possibilities that lie in developing and enhancing collaboration in OI communities. Our interviews indicate that maintainers have recognized these possibilities at some point and are seeking solutions to support collaboration in different ways. This study brought out users' motivation factors to collaborate and important elements of the rewarding strategy that can be used together in the development of rewarding schemes in collaborative OI communities. There are opportunities for future studies to elaborate on the similarities and differences between the factors that determine generally appropriate rewarding strategies.

Acknowledgments

I would like to express my gratitude to Professor Saku Mäkinen at Tampere University of Technology for his valuable comments on this article. I am also grateful to my partner in the data collection and analysis, Heli Väätäjä, at Tampere University of Technology. I would further like to thank Ruben Robert from FellowForce, David Lionel from CrowdSpirit, and Asta Bäck and Pirjo Näkki from Owela/VTT for providing insightful information.

References

Ahonen, M., Antikainen, M., & Mäkipää, M. (2007) "Supporting collective creativity", European Academy of Management (EURAM) Conference proceedings, IDEAD, Paris.

Antikainen, M. and Väätäjä, H. (2010) "Rewarding in open innovation communities – How to motivate members?" *International Journal of Entrepreneurship and Innovation Management*, Vol 11, No. 4, pp 440-456.

Amabile, T. (1993) "Motivational synergy" *Human Resource Management Review,* No. 3, pp 185-201.

Amabile, T. (1996) *Creativity in Context*, Boulder.

Bagozzi, R. and Dholakia, U. (2002) ”Intentional social action in consumer behaviour”, *Journal of Interactive Marketing*, Vol 16, No. 2, pp 2-21.

Bandura, A. (2005) *Self-efficacy in changing societies,* Cambridge University Press, New York.

Chesbrough, H.W. (2003) *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Harvard Business School Press, Boston, MA.

Chesbrough, H. (2006) “Open Innovation: A Paradigm for Understanding Industrial Innovation”, In Chesbrough, H., Vanhaverbeke, W., & West, J. (Eds.) *Open Innovation: Researching a NewParadigm* 134, Oxford University Press, Oxford, UK.

Chesbrough, H. (2006a) *Open Business Models: How to Thrive in the New Innovation Landscape*, Harvard Business School Press, Boston, MA.

Constant, D., Kiesler, S and Sproull, L. (1994) “What's mine is ours, or is it? A study of attitudes about information sharing”, *Information Systems Research*, Vol 5, No. 4, pp 400−421.

Deci, E. (1975) *Intrinsic Motivation*, New York.

Deci, E. and Ryan, R. (1985) *Intrinsic Motivation and Self-Determination in Human Behaviour*, New York and London.

Gruen, T., Osmonbekov, T. and Czaplewski, A. (2005) “How e-communities extend the concept of exchange in marketing: An application of the motivation, opportunity, ability (MOA) theory”, *Marketing Theory*, Vol 5, No. 1, pp 33-49.

Hagel, J. and Armstrong, A. (1997) *Net gain: Expanding markets through virtual communities*, McKingsey & Company, Boston.

Hargadon, A. and Bechky, B. (2006) “When collections of Creatives Become Creative Collective – a Field Study of Problem Solving at Work”, *Organisation Science*, Vol 17, No. 4, pp 484-500.

Harper, F.M., Raban, D., Rafaeli, S. and Konstan, J.A. (2008) “Predictors of answer quality in online Q&A sites”, *Proceedings of the twenty-sixth annual SIGCHI conference on Human factors in computing systems*, ACM, New York, USA, pp 865-874.

Hars, A and Ou, S. (2002) “Working for free? Motivations for participating in open source Projects”, *International Journal of Electronic Commerce*, Vol 6, No. 3, pp 25–39.

Jeppesen, L., Frederiksen, L. (2006) “Why do users contribute to firm-hosted user communities? The Case of Computer-Controlled Music Instruments”, *Organisation Science*, Vol 17, No. 1, January–February 2006, pp 45–63.

Kittur, A., Chi, E. and Bongwon, S. (2008) “Crowdsourcing user studies with mechanical turk”, *Proceedings of the twenty-sixth annual SIGCHI conference on Human factors in computing systems*, ACM, New York, USA, pp 453-456.

Kollock, P. (1999) “The economies of online cooperation: Gifts and public goods in cyberspace”, in M. Smith and P. Kollock (eds), *Communities in cyberspace*, Routledge, London.

Lakhani, K. R. and Wolf, R. (2005) “Why hackers do what they do: understanding motivation and effort in free/open source software projects”, in (Eds.) J. Feller, S. Hissan and K.R. Lakhani, *Perspectives on free and open source software*, MIT Press.

Lepper, M., Greene, D. and Nisbett R. (1973) “Undermining children’s intrinsic interest with extrinsic rewards: A test of the ‘overjustification’ hypothesis”, *Journal of Personality and Social Psychology*, 28, pp 129-137.

Lerner, J., and Tirole, J. (2002) “Some simple economics of open source”, *Journal of Industrial Economics*, Vol 50, No. 2, pp 197-234.

Lindenberg, S. (2001) *“Intrinsic motivation in a new light”, Kyklos*, Vol 54, No. 2-3, pp 317–342.

Motzek, R. (2007) *Motivation in Open Innovation. An exploratory study on User Innovators*, VDM Verlag, Saarbrücken.

Nov, O. (2007) “What motivates Wikipedians?”, *Communications of the ACM*, Vol 50, No. 11, pp 60-64.

Osterloh, M., Rota, S, Kuster, B. (2004) “Open Source Software Production: Climbing on the Shoulders of Giants”, Zurich 2004, [online], Retrieved April 14, 2009 from http://opensource.mit.edu/papers/osterlohrotakuster.pdf

Raymond, E. S. (2001) *The cathedral and the bazaar*, O'Reilly, Sebastopol, CA.

Rheingold, H. (1993) *The virtual community: Homesteading on the electronic frontier*, Addison-Wesley, New York.

Ridings, C. and Gefen, D. (2004) “Virtual community attraction: Why people hang out online”, *Journal of Computer-Mediated-Communication*, Vol 10, No. 1, Article 4.

Reeve, J. (2005) *Understanding motivation and emotion,* John Wiley & Sons, Inc, USA, 556 p.

Ryan, R., and Deci, E. (2000) “Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being”, *American Psychologist*, Vol. 5, No. 1, pp 68-78.

Stewart, K. and Gosain, S. (2006) “The impact of ideology on effectiveness in open source software development teams” *MIS Quarterly,* Vol 30, No. 2. pp 291–314.

Thrift, N. (2006) Re-inventing invention: new tendencies in capitalist commodification. Economy and Society, Vol 35, No. 2, pp 279-306.

Torvalds, L., & Diamond, D. (2001) *Just for fun: The story of an accidental revolutionary*, Harper Business, New York.

von Hippel, E. (2005) *Democratizing innovation,* The MIT Press.

von Hippel, E. and von Krogh, G. (2003) “Open source software and the ‘private-collective’ innovation model: Issues for organization science”, *Organization Science*, Vol 14, No. 2, pp 208−223.

Wasko, M. and Faraj, S. (2000) “It is what one does: why people participate and help others in electronic communities of practice”, *Journal of Strategic Information Systems*, Vol 9, No. 2-3, pp 155-173.

Wiertz, C. and de Ruyter, K. (2007) “Beyond the call of duty: Why customers contribute to firm-hosted commercial online communities”, *Organization Studies*, Vol 28, No. 3, pp 347-376.

ZeityIn, D. (2003) “Gift economies in the development of open source software: Anthropological reflections”, *Research Policy*, Vol 32, pp 1287-1291.

Appendix B: E-mail interview to the users of the case online communities, autumn 2007

1. What does collective creativity mean to you?
2. In your opinion what motivates users to innovate collaboratively?
3. How do you support collective creativity in your service: what kind of tools or methods you offer?
4. In your mind how well have you succeeded in this?
5. What are your future plans to support collective creativity in the service?

E-mail interview to the case maintainers, autumn 2007

1. What do you like best in the service?
2. Are you motivated to innovate collectively with other users of the service?
3. Does the service support collaborative work and how it could support more?

Appendix C: Phone interviews to the case maintainers, February 2008

1. What is your role in X?
2. Could you describe X and how it functions?
3. What kind of people participate in the community?
    1. (Based on knowledge or guess – demographics: gender, age, education, country...)
    2. Other characteristics...?
4. What do you see as the reasons or motivation factors for the members to participate in your community?
    1. Could you give concrete examples? (intellectual challenge, professional interest, fun, passing time...)
    2. What are the most important reasons?
5. When a challenge is given for the community, do you participate in the innovation process?
    1. In what ways?
    2. Why?
6. Do you see that the members are working as a group or as individuals for a challenge?
    1. In service Y?
    2. In service Z?
7. What kind of factors affect the functioning of the community for a given challenge?
8. Do you use rewarding (money...) or some other kind of recognition (e.g. top 10 lists...) for contributions?

    8.1 What do you use (list of tangible/intangible rewards...)

    Tangible

    - money

- paychecks
- trophies
- awards
- goods

Intangible

- praise
- approval
- honour roll lists
- public recognition (top 10 lists tmv?)
- privileges
- grades
- points

8.2 Why do you use rewarding (monetary or whatever...)

9. How important is recognition or rewarding for the individual community members?
    1. Which is more important, recognition or rewarding?
    2. Why?
    3. What about for the community's functioning towards a goal?
10. What is the role of other members in recognition of contributions?
11. Do members appreciate more company recognition or peer recognition?
12. Do you see collaboration between members important? Does it generate better or more creative results?
13. How do you support collaboration in your service: what kind of tools or methods you offer?
    1. Do you use rewarding/recognition for groups working for a challenge?
14. What kind of needs do you see in developing the recognition and rewarding?

What kind of needs do you see in developing the collaboration?

Appendix D: Survey for case community members – March–April 2008

1. Which of the following open innovation communities do you participate in?

1.1. CrowdSpirit
1.2. Fellowforce
1.3. Owela
1.4. Other, what?

2. **Why do you participate in an open innovation community?**

2.1 Innovating is fun.
2.2 I enjoy intellectual challenges.
2.3 It is engaging to participate in ideation.
2.4 I like using my creativity in the open innovation community.
2.5 I learn new things by participating in the community.
2.6 I want to get a monetary reward for my ideas.
2.7 I get inspired by other users' ideas.
2.8 I want to see that new services/products are developed based on my ideas.
2.9 It is a nice way to spend some time.
2.10 I can utilise the information and ideas from the community elsewhere.
2.11 I like to use my competences for innovating.
2.12 I benefit professionally from taking part into an innovation community.
2.13 It is a part of my job to participate.
2.14 I like to work with others towards a common goal.
2.15 I enhance my career prospects by participating.
2.16 Being able to help others motivates me to participate.

3. What is your opinion on rewarding in an open innovation community?

3.1 Getting positive feedback from members on my ideas is important to me in the community.
3.2 Getting positive feedback from maintainers on my ideas is important to me in the community.
3.3 Getting positive feedback from peers is more important than getting it from the maintainers.
3.4 Maintainers'recognition (e.g. name on top ten list) encourages me to contribute.
3.5 Monetary rewarding encourages me to contribute.
3.6 I am not interested in to get any kind of reward for my contribution.
3.7 I would only collaborate with others if everyone in the group is rewarded.

4. How important to you are the following ways of rewarding in open innovation communities?

4.1 A member ranking list by activity.
4.2 A member ranking list by quality of ideas.
4.3 A member ranking list by the number of presented ideas.
4.4 A ranking list based on peers' opinions on ideas.
4.5 Announcing the awarded members on the website.
4.6 Acknowledging the most active member of the month or equivalent.
4.7 Introducing active community members on the website.
4.8 Giving prizes in a lottery for participants.
4.9 Giving a monetary reward for the best idea or innovation.
4.10 Getting to be part of an insider group of innovative members.
4.11 Giving a special honorary title for the most innovative members.
4.12 When members are working as a group, all the group members are rewarded.

5. Please give your suggestions on how to improve rewarding in open innovation communities.

6. What is important to you in an open innovation community?

6.1 I want to know the online identity of writers of the best ideas.
6.2 The writer affects the credibility of the message.
6.3 I feel it is important to help others in the community.
6.4 It is important that my ideas are taken into account.
6.5 It is important that the conversation activity is high.
6.6 Spontaneous ideas are shared with others.
6.7 I prefer innovating in a group than individually.
6.8 Collaboration with others is an efficient way to work in open innovation communities.
6.9 I would like to collaborate more with others in open innovation communities

7. Would you like to collaborate more with other members in open innovation communities? How should groups be rewarded?

8. What is your experience of the open innovation community you participate most often to?

8.1 Layout of the site is intuitive.
8.2 Navigation in the site is logical.
8.3 Community has a clear purpose.
8.4 Community has a clearly stated way of rewarding.

8.5 It is clear for me what the policy of the rights to ideas or innovations is.
8.6 The rewarding system is fair.
8.7 The functionalities of the community support sending feedback to other users' ideas.
8.8 Tools for collaboration are good.

9. What is your experience of the following issues in the community you participate most often in?

9.1 I would like to know who else is online.
9.2 The amount of information provided in other members' profiles seems adequate to me.
9.3 The community enables easy interaction with others.
9.4 User profiles should contain specific information about the members.
9.5 I find face to face innovation to be more spontaneous than online innovation.
9.6 It is important that I can use a nickname in the community.
9.7 Active discussions make me come back.
9.8 I'm able to express my ideas clearly online.
9.9 I carefully choose the ideas I present online.
9.10 The technology implemented enhances the innovation process.
9.11 It would be important for me to form groups with other members.
9.12 I enjoy collaborating with others in the community.

10. How long have you been a member of the open innovation community you participate most often in?

10.1 Less than 1 month
10.2 1–3 months
10.3 3–6 months
10.4 6–12 months
10.5 More than 1 year

11. How often do you visit the community?

11.1 Several times a day
11.2 Daily
11.3 Couple of times a week
11.4 Weekly
11.5 Couple of times a month
11.6 Monthly
11.7 Less than once a month

12. How much time do you use per visit on an average in the community?

12.1 Less than 5 minutes
12.2 5–15 minutes
12.3 15–30 minutes
12.4 More than 30 minutes

13. How often do you contribute to innovating in the community?

13.1 Number of question respondents:
13.2 Daily
13.3 Couple of times a week
13.4 Weekly
13.5 Couple of times a month
13.6 Monthly
13.7 Less than once a month

14. What other online voluntary work do you do?

14.1 Open source development.
14.2 Contributing to other open online developer communities (e.g. hosted by a company).
14.3 Sharing innovations in peer-to-peer communities or websites.
14.4 Contributing to Wikipedia or equivalent open services.
14.5 Contributing to other online open innovation communities.
14.6 I do not do other online voluntary work.
14.7 Other, what?

Question [14.7] (What other online voluntary work do you do? Other, what?)

15. What is your gender?

15.1 Male
15.2 Female

Series title, number and report code of publication

VTT Publications 760
VTT-PUBS-760

Author(s)
Maria Antikainen

Title

Facilitating customer involvement in collaborative online innovation communities

Abstract

To intensify the new product and service development process, companies have to admit that they need to be enriched by new external knowledge outside the company. Utilising customers' or potential customers' creativity and innovation capability has a lot of potential in new product development and service design. The open innovation (OI) concept, lead-user literature as well as value co-creation literature provide interesting possibilities to companies to improve their innovation processes by utilising the customer community creativity. Collaborative online innovation communities can maximise users' innovation potential by enabling collective thinking, which is superior to the ideas of individual users.

Therefore, this study focuses on customer involvement in new product development especially in collaborative online innovation communities. The overall aim of this twofold research is to provide a framework for building and managing a collaborative online innovation community based on the knowledge of both sides: the users' motivations to participate and the maintainers' opportunities to facilitate the community especially through rewarding. To achieve the purpose of the study two research questions are answered: 1) Why users participate in collaborative online innovation communities and 2) How can maintainers facilitate collaborative online innovation communities by rewarding? The first question takes the user's perspective, which is then completed with the maintainer perspective in the second research question focusing on maintainers' ways of facilitating, especially by rewarding users in collaborative online innovation communities. The research questions are examined in five publications.

This multiple case study includes three online innovation communities: FellowForce, CrowdSpirit and Owela. The main empirical data was collected from the maintainers by e-mail survey and semi-structured interviews and from the members of the communities through a web survey during the years 2007-2008.

The respondents brought out various factors that motivate them to participate in collaborative online innovation communities. The factors they mentioned were: new viewpoints, a sense of efficacy, a sense of community and fun. Furthermore, interesting objectives, an open and constructive atmosphere, making and acquiring better products, winning and rewards, also motivated the respondents to collaborate.

The results indicate that the lack of proper tools inhibits collaboration in online innovation communities. Moreover, 92% of the respondents suggested that all group members should be rewarded in some way. In addition, the study suggests that the rewarding strategy should be clear and transparent. Rewarding should be based on the efforts and quality of the work, instead of giving rewards based on quantity of the ideas or lotteries. The system should be flexible and rewards should be valuable for everyone. In addition to tangible rewards (e.g. money and products), intangible rewards (e.g. recognition) are also relevant. All in all, the equity and the democracy of the rewarding system are important factors for online innovation community users.

This exploratory and multidisciplinary research represents a path opening in studies concerning customer involvement in companies' new product development processes in collaborative online innovation communities. From the managerial viewpoint the study contributes to providing valuable information for companies on building and managing collaborative online innovation communities.

ISBN
978-951-38-7730-9 (soft back ed.)
978-951-38-7731-6 (URL: http://www.vtt.fi/publications/index.jsp)

Series title and ISSN
VTT Publications
1235-0621 (soft back ed.)
1455-0849 (URL: http://www.vtt.fi/publications/index.jsp)

Project number

Date
April 2011

Language
English, Finnish abstr.

Pages
94 p. + app. 97 p.

Name of project

Commissioned by

Keywords
Online communities, open innovation, collaboration, intermediaries, motivation, rewarding, monetary, non-monetary, tangible, intangible, recognition, case study

Publisher
VTT Technical Research Centre of Finland
P.O. Box 1000, FI-02044 VTT, Finland
Phone internat. +358 20 722 4520
Fax +358 20 722 4374

Julkaisun sarja, numero ja raporttikoodi

VTT Publications 760
VTT-PUBS-760

Tekijä(t)
Maria Antikainen

Nimeke

Asiakkaiden fasilitointi yhteistyöhön perustuvissa online-innovaatioyhteisöissä

Tiivistelmä

Menestyäkseen markkinoilla yritykset hyödyntävät yhä enemmän ulkopuolista tietoa tuotteiden ja palveluiden kehittämisessä. Asiakkaiden ja potentiaalisten asiakkaiden luovuus ja innovatiivisuus voivat edistää monin tavoin tuotteiden ja palveluiden kehittämistä. Tutkimukset avoimesta innovaatiosta, edelläkävijäkäyttäjistä sekä arvon yhdessä tuottamisesta avaavat mielenkiintoisia mahdollisuuksia yrityksille tehostaa innovaatioprosesseja asiakasyhteisöjä hyödyntämällä. Yhteistyöhön perustuvat ja verkossa kollektiivista ajattelua hyödyntävät innovaatioyhteisöt voivat maksimoida käyttäjien innovaatiopotentiaalin, jonka on todettu olevan ylivertaista yksilön tuottamiin ideoihin verrattuna.

Tässä tutkimuksessa tarkastellaan asiakkaiden osallistumista tuotekehitykseen erityisesti yhteistyöhön perustuvissa online-innovaatioyhteisöissä. Tutkimuksen tavoitteena on luoda viitekehys yhteistoiminnallisen online-innovaatioyhteisön rakentamisesta ja johtamisesta. Tavoitteeseen päästäkseen tutkimus lähestyy ilmiötä kahdesta suunnasta: käyttäjien motivaatiosta osallistua yhteistoiminnalliseen online-innovaatioyhteisöön sekä ylläpitäjien mahdollisuuksista fasilitoida yhteisöä erityisesti palkitsemalla. Tutkimuksessa vastataan kahteen tutkimusongelmaan: 1) miksi käyttäjät osallistuvat yhteistoiminnallisiin online-innovaatioyhteisöihin ja 2) kuinka ylläpitäjät voivat fasilitoida näitä yhteisöjä palkitsemalla? Tutkimusongelmia on käsitelty tarkemmin viidessä julkaisussa.

Tapaustutkimukseen valittiin kolme verkossa toimivaa innovaatioyhteisöä nimeltään FellowForce, CrowsdSpirit ja Owela. Pääosa empiirisestä aineistoista kerättiin vuosina 2007−2008 ylläpitäjiltä sähköpostihaastatteluin ja puolistrukturoiduin haastatteluin sekä käyttäjille tehdyllä nettikyselyllä.

Vastaajat toivat esille erilaisia tekijöitä, jotka motivoivat heitä osallistumaan yhteistoiminnallisiin online-innovaatioyhteisöihin. Näitä tekijöitä olivat uusien näkökulmien saaminen, tehokkuuden tunne, yhteisöllisyyden tunne sekä viihdyttävyys. Näiden lisäksi käyttäjät mainitsivat osallistumissyiksi myös mielenkiintoiset ideoinnin kohteet, yhteisön avoimen ja rakentavan ilmapiirin, parempien tuotteiden kehittämiseen osallistumisen, voittamisen ja palkkioiden saamisen.

Tulokset osoittivat, että tällä hetkellä kunnollisten työkalujen puute vähentää yhteistyömahdollisuuksia online-innovaatioyhteisöissä. Vastaajista 92 % oli sitä mieltä, että kaikki ryhmän jäsenet pitäisi palkita jollakin tavoin. Tutkimuksen perusteella palkitsemisstrategian tulee olla selkeä ja läpinäkyvä. Palkitsemisen olisi pohjauduttava ennen kaikkea työpanokseen ja työn laatuun, eikä käyttäjiä tulisi palkita aktiivisuuden tai arvonnan perusteella. Palkitsemisstrategian pitäisi olla myös joustava ja palkintojen arvokkaita kaikille. Aineellisten palkintojen, kuten rahan ja tavaroiden, lisäksi myös aineettomat palkinnot, kuten tunnustukset, ovat tärkeitä. Kaiken kaikkiaan tasapuolisuus ja palkitsemisjärjestelmän demokraattisuus ovat tärkeitä asioita online-innovaatioyhteisöön osallistuville.

Tämä eksploratiivinen ja monitieteellinen tutkimus edustaa polunavausta tutkimusalueessa, joka käsittelee asiakkaiden osallistumista yritysten tuotekehitysprosesseihin yhteistoiminnallisissa verkkoyhteisöissä. Manageriaalisesta näkökulmasta tutkimus kontribuoi tarjoamalla arvokasta tietoa yrityksille tällaisten yhteisöiden rakentamisesta ja johtamisesta.

ISBN
978-951-38-7730-9 (nid.)
978-951-38-7731-6 (URL: http://www.vtt.fi/publications/index.jsp)

Avainnimeke ja ISSN	Projektinumero
VTT Publications 1235-0621 (nid.) 1455-0849 (URL: http://www.vtt.fi/publications/index.jsp)	

Julkaisuaika	Kieli	Sivuja
Huhtikuu 2011	Englanti, suom. tiiv.	94 s. + liitt. 97 s.

Projektin nimi	Toimeksiantaja(t)

Avainsanat	Julkaisija
online communities, open innovation, collaboration, intermediaries, motivation, rewarding, monetary, non-monetary, tangible, intangible, recognition, case study	VTT PL 1000, 02044 VTT Puh. 020 722 4520 Faksi 020 722 4374

To intensify new product and service development processes, companies have to admit that they need to be enriched by new external knowledge outside the company. Collaborative online innovation communities can maximise users' innovation potential by enabling collective thinking, which is superior to the ideas of individual users.

This study focuses on customer involvement in new product development, especially in collaborative online innovation communities. The aim of this twofold research is to provide a framework for building and managing a collaborative online innovation community based on the knowledge of both sides: the users' motivations to participate and the maintainers' opportunities to facilitate the community, especially through rewarding. The multiple-case study includes three online innovation communities.

As a result, the following motivation factors for participating in collaborative online innovation communities were found: gaining new viewpoints, a sense of efficacy, a sense of community, fun, interesting objectives, an open and constructive atmosphere, making and acquiring better products, and winning and rewards. The results also indicate that the current lack of proper tools inhibits collaboration. To provide more concrete methods for rewarding users in collaborative online innovation communities, the study presents key elements of the rewarding strategy, which are transparency and logic, democracy and equity, flexibility, customisability, active participation and feedback by the maintainers.

This exploratory and multidisciplinary research represents a path opening in the emerging study field. From the managerial viewpoint, the study contributes to providing valuable information to companies on building and managing collaborative online innovation communities.

ISBN 978-951-38-7730-9 (soft back ed.)
ISSN 1235-0621 (soft back ed.)

ISBN 978-951-38-7731-6 (URL: http://www.vtt.fi/publications/index.jsp)
ISSN 1455-0849 (URL: http://www.vtt.fi/publications/index.jsp)