A CULTURAL COMPARISON OF OPEN INNOVATION IN ONLINE BRAND COMMUNITIES

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Abstract

Open online brand communities represent a significant potential for innovative ideas. Companies are seeking ways to utilize this source of information and knowledge and to promote knowledge exchange between the company and active members of open online brand communities. In open online brand communities, members voluntarily contribute and control their knowledge. For this research, we collected data from the members of online brand communities from two high technology but culturally different countries: Finland and the USA. Our primary goal was to compare the willingness of members in an online brand community (for a heart rate monitor company) to share information and knowledge and to participate in companies' innovation processes between two different high technology cultures. We used Hofstede's cultural dimensions to help explain differences between information and knowledge sharing and participation in open innovation activities between Finland and the USA. We found that the effect of utility, social identity, and domain-specific skills on information and knowledge sharing differed between the Finnish and American sample. Structural equation modelling results indicate that information and knowledge sharing play an important role.

Keywords: Open innovation, Information and knowledge sharing, Open online brand community, Culture

1 INTRODUCTION

In the 1990s, innovation and research and development replaced efficiency and quality as one of the most important sources of company competitiveness (Bolwijn & Kumpe 1990). The focus has shifted from the producer to the consumer (Vargo & Lusch 2004). Along with this change, companies have started to recognize the opportunities that social media offers for long-term customer relationships and the creation of user-driven innovation in companies' business. As a result, businesses have begun to build their own virtual communities around brands, seeking to attract new customers and to keep in touch with existing customers. The dialogue between the company and customers strengthens the emergence of a confidential relationship between the parties. In addition, members of the community have an enormous amount of expertise related to the brand's products and the use of the product. Therefore, brand community members' potential for innovation is significant (von Hippel 2005).

Vargo and Lusch (2004) suggested that the customer is always a co-producer and argued that the customer continues the marketing, consumption and value creation, and delivery processes. Companies have recognized this as a new possibility and they are seeking to find and create new paths for innovations (Chesbrough 2011). Deciding how to put this into practice depends on the company, regional and national characteristics, and culture. In this paper, we focus on the customers' willingness to participate in information and knowledge sharing based on the use of and experiences with a heart rate monitor device. Companies can achieve a competitive advantage by utilizing customer creativeness and intellectual capital, for example, by establishing online communities around the company's brand and products – so-called brand communities. Muniz and O'Guinn (2001: 412) defined a brand community as a "specialized, non-geographically bound community based on a structured set of social relations among admirers of a brand." Members of brand communities represent particularly valuable sources of innovation as they are usually passionate about the brand and experienced with its products (McAlexander et al. 2002). However, there is no guarantee that users within these communities will actually share information and knowledge with companies (Wasko & Faraj 2005). Because sharing information through social communities is often not work related, companies have difficulty maintaining a policy to enforce information and knowledge sharing; thus, they should encourage this activity in some other way. Constant et al. (1994) suggested that the best way to encourage people to share information voluntarily is to create occasions for them to discuss and exchange knowledge.

Tödtling et al. (2011) suggested that open innovation is dependent on regional policies, culture values, and atmosphere. In the present study, our aim is to compare online brand community members' willingness to participate in information and knowledge sharing and a company's open innovation activities in two countries, Finland and the USA. Both of these countries are famous for their innovative technology; however, their cultural background differs. According to Hofstede's (2010) classification, both Finland and the USA are individualist societies, with the USA scoring higher in this dimension. Individualist cultures emphasize activity and action, valuing individual welfare over that of the group (Adler 2000). They define themselves through the work they do or accomplish, joining groups as an individual. Managers in task-oriented cultures motivate their employees with promises of different rewards – bonuses, promotions, or other public recognition. Highly individualistic people have weak loyalty to groups, teams, and communities; their relationships, especially with coworkers, are less permanent (Adler 2000). However, Finland and the USA differ in the dimensions of masculinity versus femininity and uncertainty avoidance. Finland is a feminine society with high uncertainty avoidance, whereas the USA is a masculine society with low uncertainty avoidance. Uncertainty avoidance refers to the extent to which members of a culture feel threatened by unknown situations and have created beliefs and institutions to avoid them. The difference between masculine and feminine societies is whether people are motivated by wanting to be the best (masculine) or by liking what they do (feminine). Based on these differences, we expect certain variations in the results of our study for the Finnish and the US sample, as we will discuss in Section 2.

The motivation for this research was practical. A manager from an international Finnish heart rate monitor company contacted the authors to ask how they could engage their customers in the company's product development innovation using social media. The company used a social media environment where the customers actively exchanged experiences, ideas, and knowledge about the company's products and services. Our sample was collected from members of the brand community of that company. In an earlier study (Pahnila et al. 2012), we tried to identify the key factors that drive information and knowledge sharing and participation in open innovation activities based on data we collected from this brand community in Finland. The company followed the social media discussions in their main business regions, but did not have a clear view of what drives information and knowledge sharing by the customers who participated in open innovation activities in different regions. To understand information and knowledge sharing, it is critical to pay attention to social and cultural aspects (Wasko & Faraj 2000). Therefore, we collected data from the same company's brand community in the USA. By exploiting the findings of our earlier study and the literature, we studied possible participation differences for open innovation activities in these two high technology but culturally different countries. Prior research regarding information and knowledge sharing in virtual communities has been focused on a) individual differences and motivation (Füller et al. 2008; Chiu et al. 2006; Hsu et al. 2007) and b) organizational issues related to the ownership of knowledge or interaction processes (Gassman & Enkel 2004; Constant et al. 1994; Schröder & Hölzle 2010). We are not aware of any existing studies that examine cultural issues in this context.

We will next discuss the theoretical background and describe the determinants of our model, followed by an outline of the research methodology, models (including results and discussion), conclusion, limitations, and future research.

2 THEORETICAL BACKGROUND

Chesbrough (2003) defined **open innovation** as "a paradigm that 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. Open innovation is controlled by the individual, whereas "closed" innovation is controlled by the company. In closed innovation, companies generate, develop, manufacture, market, distribute, and service their own ideas in-house (Chesbrough 2003: 35). Chesbrough (2011) distinguished between outside-in and inside-out openness. Similarly, Gassman and Enkel (2004) identified three different open innovation processes: the outside-in process, the inside-out process, and the coupled process. In the outside-in process, a company enriches its knowledge integrating suppliers, customers, and external knowledge to promote the organization's innovativeness. In the inside-out process, a company brings its in-house ideas to market. The coupled process unifies the aforementioned processes; it is based on interaction and cooperation with different parties. Choosing the best option among these open innovation processes depends on a company's business area. Companies typically choose one primary process and integrate some elements of other processes (Gassman & Enkel, 2004). Next, we discuss whether differences between the samples were expected based on cultural differences between the two high technology countries that are were examined, Finland and the USA.

2.1 Information and knowledge sharing

Without the rich knowledge produced by community members, virtual communities have a limited value (Chiu et al. 2006); therefore, the success of virtual communities depends on the members' participation and investment in the creation of new knowledge (Tedjamulia et al. 2005). In our previous study (Pahnila et al. 2012), we were able to confirm that information and knowledge sharing have a significant effect on intention to participate in open innovation in the Finnish brand community. According to Muniz and O'Guinn (2001) and Füller et al. (2008), members of brand communities have extensive knowledge of the products and services and are willing to share this knowledge with other members of the community and the company. Hsu et al. (2007) found that knowledge sharing self-efficacy, personal outcome expectations, and identification-based trust have a positive effect on knowledge sharing behavior. We adapted Hsu et al.'s (2007) and Koh and Kim's (2004) questions to

measure information and knowledge sharing. When people consider knowledge as a public good that is embedded in the community, they are motivated to share and provide it only if other members of the community contribute something to its provision (Wasko & Faraj 2000). In individualistic cultures, the importance of knowledge sharing is less automatically recognized than in collective cultures (Hendriks 2004). However, as both Finland and the USA are individualist societies, we hypothesize:

H1: *There are no significant differences in the effect of information and knowledge sharing on participation in open innovation between Finland and the USA.*

2.2 The experienced utility and task involvement

Utility and task involvement represent two separate factors that were found to affect information and knowledge sharing in brand communities (Pahnila et al. 2012). We discuss these factors in this section to show how they are related to cultural differences between Finland and the USA. Previous studies distinguished between two different motivational factors for information and knowledge sharing – intrinsic or hedonic and extrinsic or utilitarian motivation. Intrinsic motivation refers to **task-involvement** driven reasons, in which the person expects to gain pleasure and satisfaction from sharing information and knowledge (Hsu & Lu 2007). Wasko and Faraj (2000) found that people wanted to participate in online communities because they were willing to engage in the exchange of ideas and solutions, they perceived it as fun (Shah 2006), and they felt that helping other members of the community was enjoyable and brought satisfaction. For task-involvement driven members, the brand community represents a channel to express their know-how and creativity in a way that gives them a feeling of satisfaction. Conversely, persons who act out of **utilitarian motivation**, or are need-driven, perform a behavior to achieve specific goals or rewards (Hsu & Lu 2007). This need can be related to product improvements, creating new products, gaining reputation, reciprocity, and the improvement of one's skills (Franke & Shah 2003; Shah 2006). Perceived usefulness, or utility, positively affects attitude towards participation in online communities (Lin 2006). Community members are more likely to share their knowledge when positive personal outcomes can be realized (Hsu et al. 2007). We used adapted questions from Füller et al. (2008) and Hsu and Lu (2007) to measure task involvement. Lin's (2006) perceived usefulness questions were used for the utility construct.

According to Hofstede (2010), Finland is a feminine culture whereas the USA is a masculine culture. In masculine cultures, society is driven by competition, achievement, and success, in both work and leisure pursuits. In feminine cultures, people are motivated by liking what they do, and quality of life is a sign of success. Thus, we hypothesize:

H2: *Utility is a stronger predictor for information and knowledge sharing in the USA than in Finland.*

H3: *Task involvement is a stronger predictor for information and knowledge sharing in Finland than in the USA.*

2.3 Social identity

Social identity theory explores intergroup relations, group processes, and the social self (Hogg et al. 1995). According to Ashforth and Mael (1989: 21), "social identification provides a partial answer to the question, Who am I?" Tajfel (1974: 69) defined the concept of social identity as "that part of an individual's self-concept which derives from his knowledge of his membership of a social group (or groups) together with the emotional significance attached to that membership." Nahapieti and Ghoshal (1998) argued that if people have a common identity, they most likely have similar goals, rules, and interests, which in turn motivates community members to share information with each other. A strong social identity increases the members' responsibility and expresses itself in the members' wish to act in a way that supports the goals and objectives of the community (Bergami & Bagozzi 2000; Hemetsberger 2003; Algesheimer et al. 2005). A person's membership in a particular group brings him respect compared with other groups. Relatively higher-status groups bring a positive identity to group members (Ellemers et al. 1999; Ellemers et al. 1988). Han et al. (2007: 3) described this

identification as a "process whereby individuals see themselves as one with another person or group of people." According to Ellemers et al. (1999), cognitive, evaluative, and emotional components illustrate a person's social identity. We adapted questions from Han et al. (2007) to measure social identity.

In individualist societies, people's self-image is defined in terms of "I," as opposed to collectivist societies, in which self-image is defined in terms of "we." In individualist societies, people look after themselves and immediate family only, whereas in collectivist societies, people belong to groups that take care of members in exchange for loyalty (Hofstede 2010). According to Möller and Svahn (2004), there is a difference between horizontal and vertical individualist countries. In vertical cultures, people consider their 'self' – in terms of social status – to be different from that of others. In horizontal cultures people consider their 'self' to be more or less the same as that of others. Finland is a horizontal individualist country, whereas the USA is a vertical individualist country. Bhagat et al. (2002) argued that this vertical-horizontal difference between cultures influences information processing and sharing. Therefore we hypothesize:

H4: *The effect of social identity on information and knowledge sharing differs significantly between Finland and the USA.*

2.4 Social cohesion

Cohesion is a process reflected in a group's inclination to stick together and be unified when performing a task. Social cohesion theory explains the causally interrelated phenomena of individual- and group-level interactions. Group cohesion describes individuals' attraction to the group (Friedkin 2004; Hsu & Lu 2007). The concept of cohesion still lacks a clear and common definition of the construct (Bollen & Hoyle, 1990). According to Schröder and Hölzle (2010), "cohesion within virtual communities refers to the degree to which community members continuously participate." They (ibid.) suggest that cohesion is rooted in the community purpose. The purpose of a community is to get members to participate in community activities, and cohesion determines the extent to which members are committed to the community, its objectives, and ambitions. Cohesion is the "glue" that makes members of a community stick together. In our case, the "glue" is members' physical training activities and information and knowledge exchange about their training experiences. Cohesion research has presented multitudes of differing explanatory factors to describe the antecedents and consequences of this concept. Bollen and Hoyle (1990) and Friedkin (2004) suggested that an individual's attitude, strong membership attraction and attachments, positive membership attitude, and sense of belonging to a particular group drive social cohesion. According to Hsu and Lu (2007), group cohesion is linked to positive interpersonal relationships, the degree of commitment, communication, interactions, and group performance. The researchers also found that group cohesion is an important element in online game communities. This research used questions adapted from Hsu and Lu's (2007) work. As Finland and the USA are both individualistic societies, we hypothesize:

H5: *The effect of social cohesion on information and knowledge sharing does not differ significantly between Finland and the USA.*

2.5 Domain-specific skills

Domain-specific skills refer to individual's problem solving capabilities. Eccles and Feltovic (2008: 44) suggested that "domain-specific skills are more effective and efficient than domain-general skills when used in the domain to which they are specific, that is, in the domain in which they were practiced and learned." Von Hippel (2001) argued that at least some participants must have the necessary skills to product new innovations. Lettl et al. (2006) argued that brand community members have a broad and comprehensive amount of experience about the brand's products and services. Füller et al. (2008) found that consumer's domain-specific skills have a positive effect on their willingness to participate in open innovation activities. We adapted questions to measure domain-specific skills. In our case, the focus was a user community associated with a heart rate monitor, on the members' information and knowledge exchange within this specific domain. Following Hofstede's (2010) view, countries with low uncertainty avoidance, like the USA, show a fair degree of acceptance for new

ideas, innovative products, and a willingness to try something new or different. Conversely, in societies with high uncertainty avoidance, such as Finland, people have an inner urge to be busy and work hard; innovation may be resisted and security is an important element in individual motivation. Finnish people usually do not say they possess a skill unless they have rather strong skills or expertise in an area, which differs from behavior in the USA. Thus, we hypothesize:

H6: *The effect of domain-specific skills on information and knowledge sharing differs significantly between Finland and the USA.*

2.6 Brand trust

A brand represents a certain image to the consumer, and brands as a symbol reflect the individual's image to themselves (Keller 2003). Brand identity refers to the convergence of an individual's own identity and brand image (Bagozzi & Dholakia 2006). Füller et al. (2008) suggested that members of brand communities are an especially valuable source of innovation because they are passionate about the brand and the experienced products, and they are eager to exchange ideas and experiences about the products and generate new product ideas. Brand community enthusiasts are interested in interacting and developing a relationship with their favorite brand (Füller et al. 2008). Füller et al. (2008) argued that consumers are more willing to participate in open innovation projects and share their knowledge with a producer when they trust the brand and value the relationship, i.e. when brand trust is high. Willingness to participate in the development of a new product is increased through a trust-based relationship with the company (Porter & Donthu 2008). We adapted Füller et al.'s (2008) questions to measure brand trust. Cleveland and Laroche (2007: 250) suggested that, "More than any other factor, culture is the prime determinant of consumers' attitudes, behaviors and lifestyles, and therefore, the needs that consumers satisfy through the acquisition and use of goods and services." This means that although the Internet has shrunk the world, many things are still stable – like local culture. Hofstede (1991: 5) defined culture as, "the collective programming of the mind, which distinguishes the members of one group from another." Culture is a collective phenomenon because it is partly shared among people within the same social environment (Hofstede 1991). If a company's brand is strong in a local market, it is not necessary strong in another market or culture. Aaker (2005: 194–213) suggested that both geographical distance and cultural distance (referring to dissimilar languages, ethnicities, religions, and social norms) create challenges for companies that are doing business globally. The country-of-origin effect may add to a brand's credibility and the perception of high quality, which could have a positive effect on the brand's identity (Aaker 2002: 67–106). The company's products are very well known in Finland, and the company itself is permanent regarding corporate acquisition. Therefore, we hypothesize:

H7: *Brand trust has a stronger moderating effect on the relationship between information and knowledge sharing and participation in open innovation in Finland than in the USA.*

As shown in Figure 1 and Figure 2, we further assessed the roles of the control variables gender and age on participation in open innovation.

3 RESEARCH METHODOLOGY

Our target groups were the members of a heart rate company's online brand community who owned one of the company's hart rate monitors and registered with the community. During the first phase, we collected data from Finnish online brand users and later expanded our research to online users in the USA. The questions were originally in Finnish, the survey was translated into English and pre-tested prior to issuing it in the USA to minimize translation error, as suggested in Brislin (1980: 426–444). The survey was conducted in both countries using the Webropol survey application, which is a solution for gathering data, managing feedback, and reporting results. Community members were asked for their consent prior to receiving the questionnaire. A sample was randomly picked among those members who gave permission. The company that owned the server sent questionnaire to the selected recipients in both countries. The number of potential respondents was 1,500 in Finland and 2,500 in the USA. The number of valid responses was 204 in Finland (13.6% response rate) and 236 in

the USA (9.4% response rate). Table 1 presents descriptive statics for the sample in both countries. As Table 1 shows, the number of male respondents was slightly higher in the USA (85.2%) than in Finland (82.8%). Age distribution was similar in both countries. Most of the respondents in both countries belonged to the age group of 42–51. Among all respondents in the USA, 55% reported their expertise as "very good," as opposed to 38.7% in Finland. Among all Finnish respondents, 42.6% reported their expertise as "moderately good" compared with 29.7% in the USA. Overall, the majority of respondents in both countries perceived their expertise as good.

Measure	Items	Frequency Finland	Percent Finland	Frequency USA	Percent USA
Gender	Male	169	82.8	201	85.2
	Female	33	16,2	33	14.0
	Missing	2	1	2	0.8
Age	<22	3	1.5	-	
	22 - 31	33	16.2	18	7.6
	32 – 41	71	34.8	76	32.2
	42 – 51	72	35.3	85	36.0
	52 – 61	20	9.8	46	19.5
	> 61	5	2.4	11	4.7
	missing	-		-	
Expertise	very good	79	38.7	132	55.9
	moderately good	87	42.6	70	29.7
	medium	34	16.7	31	13.1
	moderate	4	2.0	3	1.3
	very weak	-		-	
	missing	-		-	

Table 1. Profile of the respondents.

3.1 Reliability and validity

While seeking appropriate measures for our constructs, we reviewed literature to find instruments that have been developed, validated, and rigorously tested (Straub 1989; Boudreau & Gefen 2001) in order to improve the reliability of the measure that we applied (see construct/origin in Table 2). Most of the items in the instruments (except gender and age) were measured using a seven-point Likert scale ranging from strongly disagree (1) to strongly agree (7). "HRM" in Table 1 denotes heart rate monitor for one of the Company's products. In the questionnaire, the product was named, but here we use a synonym to keep the company anonymous. The appendix reports the survey questions.

Construct / Origin	Items	Factor loadings	Composite reliability	Cronbach's alpha	Average variance extracted
Innovation participation • Füller et al. (2008)	Innova1	0.931 0.947	0.970 0.970	0.959 0.959	0.891 0.891
	Innova2	0.945 0.946	•	•	•
	Innova3	0.957 0.947	•	•	•
	Innova4	0.944 0.935	•	•	•
Information and knowledge sharing • Koh and Kim (2004), Hsu et al (2007)	Infsha1	0.832 0.839	0.896 0.887	0.853 0.840	0.634 0.613
	Infsha 2	0.868 0.838	•	•	•
	Infsha3	0.864 0.832	•	•	•

	Infsha4	0.696 0.691	•	•	•
	Infshe5	0.703 0.699	•	•	•
Task involvement • Füller et al. (2008), Hsu and Lu (2007)	Taskinv1	0.918 0.950	0.968 0.983	0.956 0.977	0.885 0.935
	Taskinv2	0.959 0.972	•	•	•
	Taskinv3	0.922 0.968	•	•	•
	Taskinv4	0.963 0.977	•	•	•
Utility • Lin (2006)	Utility1	0.775 0.924	0.812 0.931	0.692 0.901	0.521 0.771
	Utility2	0.766 0.888	•	•	•
	Utility3	0.678 0.831	•	•	•
	Utility4	0.660 0.867	•	•	•
Social identity • Han et al. (2007)	Socident1	0.901 0.923	0.939 0.953	0.914 0.934	0.795 0.836
	Socident2	0.891 0.906	•	•	•
	Socident3	0.886 0.935	•	•	•
	Socident4	0.887 0.892	•	•	•
Social cohesion • Hsu and Lu (2006)	Socohes1	0.889 0.928	0.894 0.925	0.764 0.838	0.809 0.860
	Socohes2	0.899 0.928	•		•
	Socohes3	Dropped	•	•	•
Domain specific skills • Füller et al. (2008)	Domskill1	0.912 0.916	0.908 0.913	0.797 0.809	0.831 0.840
	Domskill2	0.912 0.916	•	•	•
Brand trust • Füller et al. (2008)	Brantrus1	0.942 0.954	0.962 0.966	0.947 0.953	0.863 0.877
	Brantrus2	0.896 0.925	•	•	•
	Brantrus3	0.953 0.956	•	•	•
	Brantrus4	0.923 0.909	•	•	•

Table 2. Convergent validity, internal consistency, and reliability of Finland and USA.

3.2 The measurement model

The descriptive statistics of the study were analyzed using the SPSS 22 software package. There are two widely used analytical techniques in information technology research: SmartPls (Ringle et al. 2005) and WarpPls (Kock 2013). Both techniques are based on linear regression techniques (Brewster 2011) and a two-step evaluation process. The first step evaluates the measurement model, including the reliability and validity of the construct items. The second step evaluates the structural model, including the variance of the endogenous constructs, the significance of path coefficients of the model, and the predictive variance (Brewster 2011; Chin & Newsted 1999; Anderson & Gerbin 1988). SmartPls is a Java-based program and WarpPls (Kock, 2013) is a MATLAB-based program. The regression algorithm is similar in both PLS programs (Brewster 2011). Both programs are variance (or component) based programs, differing from Lisrel or Amos, which are covariance-based programs. The data analysis for this study was conducted using the WarpPls structural equation modeling technique. We selected a variance-based program because it is more predictive (to predict latent

variables in the model and identify relationships between them) than confirmatory by nature and variance-based programs allow the use of both category- and ratio-level indicators in the same model.

3.2.1 Convergent validity

To improve the construct validity, we assessed the convergent and discriminant validity of our measures. As previously discussed, we pilot tested the questionnaire and adapted and used questions that had been tested in prior research. Convergent validity reveals whether the indicators represent the same factor. Convergent validity was ensured by assessing the correlations among the items and the factor loadings and by calculating the variance. Correlations among the items were below the value of 0.90 suggested by Hair et al. (1998) in both the Finland sample and the USA sample (tables are not included in the paper). As Table 2 shows, all items loaded higher than 0.50, as recommended by Hair et al. (2006), except socohes3, which was dropped. All the values of average variance extracted (AVE) were at a satisfactory level, higher than the 0.50 recommended by Hair et al. (2006), with the lowest value for utility (0.521) in the Finland sample and information and knowledge sharing (0.613) in the USA sample. Values of composite reliability exceeded the recommended value of 0.60 suggested by Nunnally (1978), varying from the utility value of 0.812 and above in the Finland sample and the information and knowledge sharing value of 0.887 and above in the USA sample.

3.2.2 Discriminant validity

Discriminant validity tests the extent to which items measure the construct in question and do not measure the constructs that they should not. Discriminant validity was assessed by computing the square root of the average variance extracted for each construct and comparing that value to the correlations between any pair of latent constructs. AVE value of the construct should be greater than the pair-wise correlations of the constructs, indicating that the items of the construct contain more variance than the items of other constructs. As shown in Table 3 and Table 4, the square root of the variance extracted from all of the constructs is larger than all other cross-correlations in both samples.

Construct	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.
1. Innovation participation	4.28	1.45	**0.944**							
2. Information and knowledge sharing	2.82	1.16	0.538	**0.796**						
3. Task involvement	4.84	1.25	0.575	0.538	**0.941**					
4. Utility	3.70	0.98	0.478	0.556	0.318	**0.722**				
5. Social identity	3.68	1.12	0.217	0.298	0.224	0.336	**0.891**			
6. Social cohesion	3.87	0.94	0.267	0.266	0.252	0.301	0.735	**0.899**		
7. Domain specific skills	4.59	1.33	0.575	0.442	0.606	0.314	-0.027	0.140	**0.912**	
8. Brand trust	5.48	1.02	0.250	0.105	0.191	0.185	0.298	0.185	0.142	**0.929**

SD = Standard deviation. Note: The diagonal bolded elements are square roots of the average variance extracted.

Table 3. The mean, standard deviation, and correlations of the constructs for Fin sample.

Construct	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.
1. Innovation participation	4.49	1.64	**0.944**							
2. Information and knowledge sharing	3.62	1.27	0.587	**0.783**						
3. Task involvement	5.49	1.34	0.604	0.355	**0.967**					
4. Utility	3.84	1.34	0.557	0.637	0.377	**0.878**				
5. Social identity	3.71	1.35	0.371	0.465	0.196	0.572	**0.914**			
6. Social cohesion	3.96	1.14	0.406	0.466	0.215	0.589	0.753	**0.928**		
7. Domain specific skills	5.31	1.27	0.510	0.364	0.602	0.338	0.133	0.147	**0.916**	
8. Brand trust	5.72	1.22	0.153	0.098	0.204	0.222	0.319	0.293	0.208	**0.936**

SD = Standard deviation. Note: The diagonal bolded elements are square roots of the average variance extracted.

Table 4. The mean, standard deviation, and correlations of the constructs for USA sample.

We also tested the loadings and cross-loadings of the items in constructs. Items loaded higher in their own construct than any other constructs in both samples (tables are not included in the paper). Based on this analysis, our measurement satisfies the criteria for convergent validity and discriminant validity suggested by Chin (1998).

4 DATA ANALYSIS AND RESULTS

To test our hypotheses, we present the research models next. The research models and the results are displayed in Figures 1 and 2, which show the estimated path coefficients and the significance of the path p value (indicated also with asterisks). We used a bootstrapping method to resample and to calculate p values and coefficients. The number of resamples was chosen to be 400. PLS was used for the outer model analysis algorithm and Warp3 basic was used as the inner model analysis algorithm. We used identical models in both cases; Finland and the USA. The sample size was N = 204 in Finland and N = 236 in the USA.

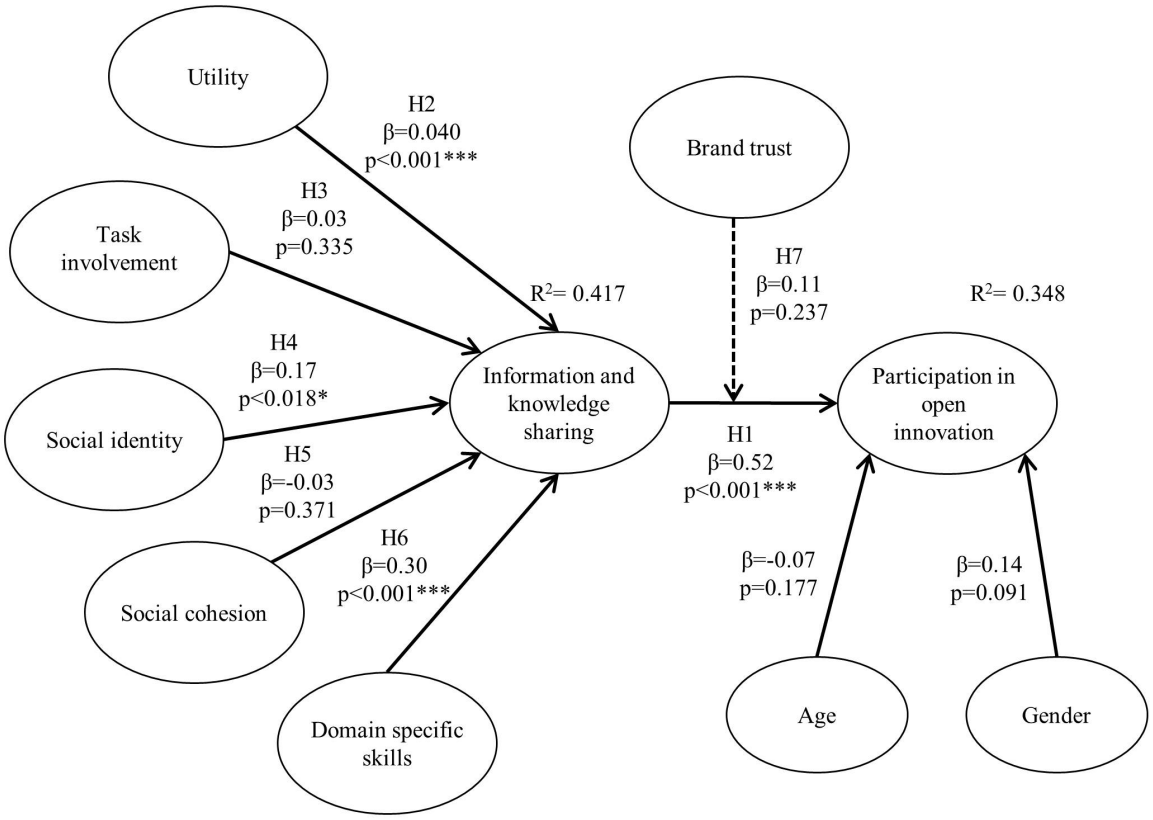

Figure 1. Results and research model. Finland survey.

For the Finnish sample, as indicated in Figure 1, our research model accounts for 41.7% ($R^2 = 0.417$) of the variance in information and knowledge sharing. The whole model accounts for 34.8% ($R^2 = 0.348$) of the variance in participation in open innovation. Beta values of the path coefficients show that utility (ß = 0.40), social identity (ß = 0.17), and domain-specific skills (ß = 0.30) had a significant influence on information and knowledge sharing. In turn, information and knowledge sharing had a significant influence on participation in open innovation (ß = 0.52). Task involvement (ß = 0.03) and social cohesion (ß = -0.03) had an insignificant effect on information and knowledge sharing. The control variables gender (ß = 0.14) and age (ß = -0.07) had an insignificant influence on participation in open innovation. The moderating variable, brand trust, had an insignificant influence on the relationship between information and knowledge sharing and participation in open innovation (ß = 0.11).

The results of the USA survey are displayed in Figure 2, which shows that utility (ß = 0.46) and domain-specific skills (ß = 0.13) had a significant effect on information and knowledge sharing. Information and knowledge sharing had a significant effect on participation in open innovation (ß = 0.56). Task involvement (ß = 0.06), social identity (ß = 0.06), and social cohesion (ß = 0.14) had an insignificant influence on information and knowledge sharing. The control variable, age, had a significant influence on participation in open innovation (ß = -0.20). The moderating variable, brand trust, had an insignificant influence in the relationship between information and knowledge sharing

and participation in open innovation (ß = -0.04). Overall, our research model (Figure 2) accounts for 46.8% (R^2 = 0.468) of the variance in information and knowledge sharing. The whole model accounts for 38.9% (R^2 = 0.389) of the variance in participation in open innovation.

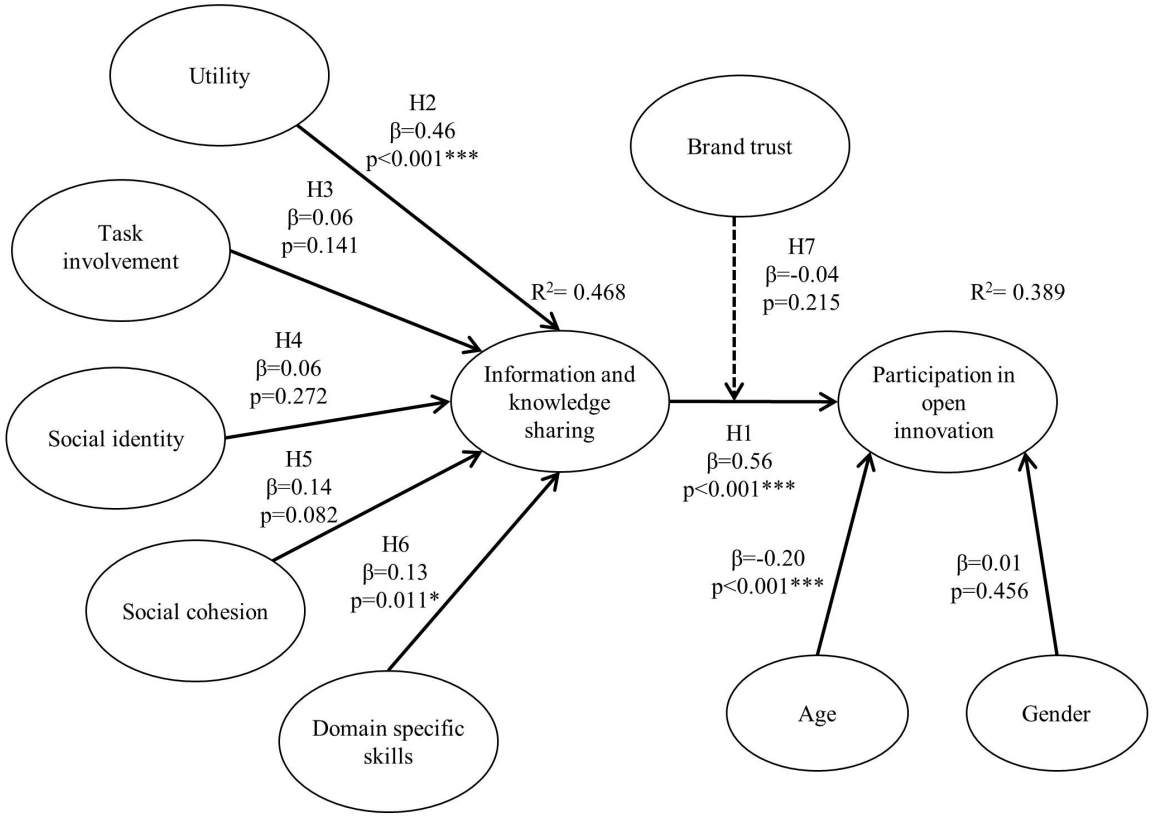

Figure 2. Results and research model. USA survey.

5 DISCUSSION

In this paper, we examined whether participation in open innovation differs between two countries, Finland and the USA. We applied the same independent variables to explain participation. Next, we will discuss the most important findings of the study, specifically in terms of cultural differences.

Our findings indicate that utility has a significant effect on information and knowledge sharing. Utility describes to what extent online community participation promotes getting information from other community members. It also indicates individuals' perception regarding the extent to which participation enables knowledge sharing with other community members. More specifically, it appears that reciprocity is valued in both countries and the finding is consistent with Hemetsberger's (2003) and Füller et al.'s (2008) beliefs that individuals participate in online co-production and innovation for utilitarian reasons. However, in the American survey, utility was a slightly better predictor of information and knowledge sharing (ß = 0.46) than in the Finnish survey (ß = 0.40), which confirms Hypothesis 2.

However, contradicting our expectation and previous findings (Hemetsberger 2003; Füller et al. 2008; Pahnila et al. 2012), task involvement did not have a significant effect on information and knowledge sharing in either sample – Hypothesis 3 was not supported. Task involvement indicates the individuals' perception that working with innovations in the online community is inspiring, pleasant, exciting, and fun. It was somewhat surprising that community members did not find it inspiring, exciting, or enjoyable to deal with the heart rate monitor. Perhaps the heart rate monitor did not provide as much pleasure because the members had become used to the device and they were more interested in the functionalities of the monitor than the monitor itself.

Social identity had a significant effect on information and knowledge sharing in the Finnish survey but an insignificant effect in the USA survey, which supports Hypothesis 4. As discussed earlier, according to Möller and Svahn (2004), there is a difference between horizontal and vertical individualist countries. Finland represents a horizontal individualist country, whereas the USA is a vertical individualist country.

Social cohesion had an insignificant effect on information and knowledge sharing in both the Finnish and American survey, thus Hypothesis 5 was supported. This finding indicates that social community itself is not a primary "glue" that sticks community members together. It seems that cultural differences do not have much effect on the relationship between social cohesion and information and knowledge sharing.

Domain-specific skills had a strong and significant effect on information and knowledge sharing in both surveys. Thus, Hypothesis 6 was supported. Perhaps Finnish people view their own domain-specific expertise as playing a larger role in sharing ideas and knowledge with other members of the community, while American members are more open to new ideas and innovations, due to the uncertainty avoidance dimension.

Information and knowledge sharing had a strong and significant effect on participation in open innovation in both surveys. This indicates that online brand community members are willing to participate in a company's open innovation activities. We carried out our survey using a self-reporting questionnaire; therefore, we should be careful with respect to the conclusion. As Gassman and Enkel (2004) depicted, there are different innovation processes with different controls, requirements, and ways to implement them. The next step could be to examine this willingness on a practical level.

Brand trust did not have a moderating effect in either survey; thus, Hypothesis 7 was not supported. This surprising finding might indicate that the company's brand was actually stronger in the USA than we expected, or that in the context of open innovation in brand communities, the cultural origin of the brand does not play a prominent role in brand trust.

With respect to control variables in the Finnish survey, both age and gender had an insignificant effect on participation in open innovation. In the American survey, gender had an insignificant effect but age had a significant effect on participation in open innovation. It is notable that age had a negative correlation with intention to participate in open innovation, the interpretation of which is not necessary unambiguous. One explanation could be that younger community members are more likely to intend to participate than older ones.

As with any study, there are potential limitations. First, this research was focused on the online brand community members' sporting activities. Therefore, the generalizability of the research is limited. Second, the response rate of the survey, though acceptable, was not particularly high (13.6% in Finland and 9.4% in the USA). Perhaps only the most active members responded to the survey. It is possible that these individuals have differing views than the less active members of the brand community. Third, the same questions were used in both countries. We translated the Finnish version to English and tried to follow the guidelines suggested by Brislin (1980: 426–444). It is possible that there were some language and cultural nuances, which may have affected the research and its findings. Fourth, the percentage of females was 16.2% in the Finnish survey and 14.0% in the USA survey. This may skew the data because cultural differences may have a different effect on males and females.

One question our study raises is why cultural differences were not as prominent as we expected. Perhaps the national-level differences do not translate to individuals in such a straight-forward manner. Also, brand communities may have their own "culture" that is shared by participants, diminishing the effects that societal cultural differences would have. Not all of the assumptions from our hypotheses were confirmed, but this is valuable information – it leads us to investigate the reasons why our expectations were not fulfilled, opening up several directions for future research.

6 CONCLUSIONS

Brand communities differ from other communities because participants have a common interest toward a certain brand or product, which connects community members to one another. Brand communities can be categorized depending on whom has control over the information and knowledge. In this research, community membership was voluntary and the members had control over the information and knowledge. As a result of the study, it appears that brand communities are effective tools for the dissemination of knowledge and for new knowledge creation. We believe that this research will help organizations better understand cultural issues and the community members' engagement and motivation to participate in open innovation activities. In this study, we examined the role of culture on a national level, attempting to understand the role of culture and how to operate in an expanding global environment. Further research could examine different levels of innovative brand communities and the effect of culture on these different levels – the society level, the organizational level, and the individual level. It would also be interesting to study the role of value that members experience or expect to gain when participating in open innovation activities.

Appendix

Items	**Question asked in the questionnaire**
Innova1	Would you like to participate in the social community to develop new technology?
Innova2	Would you like to participate in the social community to develop new web-applications?
Innova3	In my opinion, it is important that I can participate in the social community to develop new technology.
Innova4	In my opinion, it is important that I can participate in the social community to develop new web-applications.
Infsha1	I frequently participate in knowledge sharing activities in the Company online community.
Infsha 2	I usually spend a lot of time conducting knowledge sharing activities in the Company online community.
Infsha3	When participating in the Company online community, I usually actively share my knowledge with others.
Infsha4	When discussing a complicated issue, I am usually involved in the subsequent interactions.
Infshe5	I usually involve myself in discussion.
Taskinv1	Dealing with innovations (about my HRM*) on the Internet would be inspiring.
Taskinv2	Dealing with innovations (about my HRM) on the Internet would be pleasurable.
Taskinv3	Dealing with innovations (about my HRM) on the Internet would be exciting.
Taskinv4	Dealing with innovations (about my HRM) on the Internet would be enjoyable.
Utility1	Participation in the Company online community enhances my ability to get information from community members.
Utility2	Participation in the Company online community enables me to share knowledge with community members.
Utility3	Participation in the Company online community helps to satisfy my social needs.
Utility4	Overall, participation in the Company online community meets my needs.
Socident1	I feel great to be a member in the Company online community.
Socident2	I find it easy to identify myself with the Company online community.
Socident3	I am proud to be a member of the Company online community.
Socident4	I would feel good if I were described as a member of the Company online community.
Socohes1	I fit in well with the Company online community.
Socohes2	I like the members of the Company online community.
Socohes3	In general, social communities act as a cohesive unit.
Domskill1	I consider myself very knowledgeable and can contribute to product developments.
Domskill2	I possess profound know-how (e.g., concerning technology, applications, market understanding, product design) relevant for virtual HRM product development.
Brantrus1	If I buy a training computer I have trust in the Company brand.
Brantrus2	If I buy a training computer I rely on the Company brand.
Brantrus3	Company is a trusted brand.
Brantrus4	Company is a secure brand.

*HRM = heart rate monitor

References

Aaker, D. A. (2002). Building Strong Brands, Simon & Schuster.

Aaker, D. A. (2005). Strategic Market Management, John Wiley & Sons.

Algesheimer, R., Dholakia, U-M. and Herrmann, A. (2005). The Social Influence of Brand Community: Evidence from European Car Clubs. Journal of Marketing, 69, 10-34.

Adler, N. J. (2000). International dimensions of organizational behavior. Ohio, USA.

Anderson, J. C. and Gerbin, D. W. (1988). Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. Psychological Bulletin, 103, 411-423.

Ashforth, B. and Mael, F. (1989). Social identity theory and the organization. Academy of Management*,* 14 (1), 20-39.

Bagozzi, R.P. and Dholakia, U.M. (2006). Antecedents and purchase consequences of customer participation in small group brand communities. International Journal of Research in Marketing, 23, 45-61.

Bergami, M. and Bagozzi, P.R. (2000). Self-Categorization, Affective Commitment, and Group Self-Esteem as Distinct Aspects of Social Identity in the Organization. British Journal of Social Psychology, 39, 555-577.

Bhagat, R.S., Harveston, P.D. and Triandis, H.C. (2002). Cultural variations in the cross-border transfer of organizational knowledge: an integrative framework. Academy of Management Review, 27 (2), 204-221.

Boudreau, M.-C. and D. Gefen, E. A. (2001) Validation in information systems research: A state-of-the-art assessment. MIS Quarterly*,* 25**,** 1-16.

Bollen, K.A. and Hoyle, R.H. (1990). Perceived Cohesion: A Conceptual and Empirical Examination. Social Forces, 69 (2), 479-504.

Bolwijn, P. T. and Kumpe, T. (1990). Manufacturing in the 1990s - Productivity, Flexibility and Innovation. Long Range Planning, 23 (4): 44-57.

Brewster, J. (2011). Studying Technology Adoption Behaviors with Linear or Non-Linear PLS: Does It Make a Difference? Proceedings of the First International Conference on Engaged Management Scholarship, Cleveland, Ohio June 2nd – 5th 2011.

Brislin, R.W. (1980). Translation and Content Analysis of Oral and Written Materials. Hanbook of cross-cultural psychology: Methodology. H. C. Triandis and J. W. Berry. Boston, MA, Allyn and Bacon. Volume 2: 426-444.

Chesbrough, H. (2011). Open services innovation. Rethinking your business to grow and compete in a new era, John Wiley & Sons.

Chesbrough, H.W. (2003). Open Innovation: The new imperative for creating and profiting from technology. Boston: Harvard Business School Press, p. 24.

Chiu, C-M., Hsu, M-H. and Wang, E.T.G. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. Decision Support Systems, 42, 1872-1888.

Chin, W.W. (1998). The Partial Least Squares Approach for Structural Equation Modeling. Modern Methods for Business Research. G. A. Marcoulides, Lawrence Erlbaum Associates**:** 295-336.

Chin, W.W. and Newsted, P.R. (1999). Structural Equation Modeling Analysis with Small Samples Usig Partial Least Squares. In Hoyle, R. (Ed.) Statistical Strategies for Small Sample Research. Thousand Oaks, CA, Sage Publications.

Cleveland, M. and Laroche, M. (2007). Acculturaton to the global consumer culture: Scale development and research paradigm. Journal of Business Research, 60, 249-259.

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, 5 (4), 400-421.

Eccles, D. W. and Feltovich, P. J. (2008). Implications of Domain-General ‘‘Psychological Support Skills’’ for Transfer of Skill and Acquisition of Expertise. Performance Improvement Quarterly, 21 (1), 43-60.

Ellemers, N., Kortekaas, P. and Ouwerkerk, J. (1999). Self-categorisation, commitment to the group and group self-esteem as related but distinct aspects of social identity. European Journal of Social Psychology*,* 29, 371-389.

Ellemers, N., Van Knippenberg, A., De Vries, N. and Wilke, H. (1988). Social identification and permeability of group boundaries. European Journal of Social Psychology, 18, 497-513.
Franke, N. and Shah, S. (2003). How communities support innovative activities: an exploration of assistance and sharing among end-users. Research Policy, 32, 157-178.
Friedkin, N.E. (2004). Social cohesion. Annual Review of Sociology, 30, 409-425.
Füller, J., Matzler, K. and Hoppe, M. (2008). Brand Community Members as a Source of Innovation. Journal of Product Innovation Management, 25, 608-619.
Gassman, O. and Enkel, E. (2004). Towards a theory of open innovation: Three core process archetypes. Proceedings of the R&D Management Conference (RADMA).
Hair, J.F.J., Anderson, R.E., Tatham, R.L. and Black, W.C. (1998). Multivariate data analysis, Upper Saddle River, New Jersey, Prentice Hall Inc.
Hair, J.F.J., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R.L. (2006). Multivariate data analysis, Pearson Prentice Hall.
Han, J., Zheng, R. and Xu, Y. (2007). The effect of individual needs, trust and identification in explaining participation intentions in virtual communities. Proceedings of the 40th Hawaii International Conference on System Sciences - *HICSS'07*, Hawaii: IEEE.
Hemetsberger A. (2003). When consumers produce on the Internet: the relationship between cognitive-affective, socially-based, and behavioral involvement of prosumers. The Journal of Social Psychology, http://flosshub.org/system/files/hemetsberger1.pdf. Accessed: 01.11.2011
Hendriks, P.H.J. (2004). Assessing the role of culture in knowledge sharing. Proceedings of Fifth European Conference in Organization, Knowledge, Learning and Capabilities (OKLC) Innsbruck.
Hofstede, G., Neuijen, B., Ohayv, D.D., and Sanders, G. (1990). Measuring organizational cultures: A qualitative and quantitative study across twenty cases. Administrative Science Quarterly, 35, 286-316.
Hofstede, G.H. (1991). Software of the mind. United States of America, McGraw-Hill.
Hofstede, G.H. (2010). Cultural tools, country comparison. Retrieved 05-03-2015, 2015, from http://geert-hofstede.com/finland.html.
Hogg, M., Terry, D. and White, K. (1995). A tale of two theories: A critical comparison of identity theory with social identity theory. Social Psychology Quarterly, 58 (4), 255-269.
Hsu, M-H., Ju, T.L., Yen, C-H. and Chang, C-M. (2007). Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectations. International Journal of Human-Computer Studies, 65, 153-169.
Hsu, C-L. and Lu, H-P. (2007). Consumer behavior in online game communities: A motivational factor perspective. Computers in Human Behavior, 23, 1642-1659.
Keller, K.L. (2003). Brand Synthesis: The Multidimensionality of Brand Knowledge. Journal of Consumer Research, 29, 595-600.
Kock, N. (2013). WarpPLS 4.0 User Manual. from http://www.scriptwarp.com/warppls/.
Koh, J., and Kim, Y.-G. (2004). Knowledge sharing in virtual communities: an e-business perspective. Expert Systems with Applications, 26, 155-166.
Lettl, C., Herstatt, C. and Gemuenden, H. (2006). Users' Contributions to Radical Innovation: Evidence from Four Cases in the Field of Medical Equipment Technology. R&D Management, 36 (3), 251-272.
Lin, H.-F. (2006). "Understanding behavioral intention to participate in virtual communities." CyberPsychology and Behavior, 9, 540-547.
McAlexander, J.H., Shouten, J.W. and Koenig, H. (2002). Building Brand Community. Journal of Marketing, 66 (1), 38-54.
Muniz, A.M. and O'Guinn, T.C. (2001). Brand Community. Journal of Consumer Research, 27, 412-432.
Möller, K. and Svahn, S. (2004). Crossing East-West boundaries: Knowledge sharing in intercultural business networks. Industrial Marketing Management, 33, 219-228.
Nahapiet, J. and Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage Academy of Management. The Academy of Management Review, 23 (2), 242-266.
Nunnally, J.C. (1978) *Psychometric theory*, New York, McGraw Hill.
Pahnila, S., Väyrynen, K., and Pokka, T. (2012). Open Innovation In Online Brand Communities. In PACIS 2012 Proceedings. Paper 176.

Porter, C.E. and Donthu, N. (2008). Cultivating Trust and Harvesting Value in Virtual Communities. Management Science, 54 (1), 113-128.
Ringle, C.M., Wende, S. and Will, A. (2005). SmartPLS 2.0 (M3) Beta. University of Hamburg, Haburg, Germany.
Schröder, A. and Hölzle, K. (2010). Virtual communities for innovation: Influence factors and impact on company innovation. Creativity and innovation management ,19 (3), 257-268.
Shah, S.K. (2006). Motivation, Governance and the Viability of Hybrid Forms in Open Source Software Development. Management Science, 52 (7), 1000-1014.
Tajfel, H. (1974). Social identity and intergroup behaviour. Social Science Information, 13 (2), 65 93.
Straub, D. W. (1989). Validating instruments in MIS research. MIS Quarterly, 13**,** 147-169.
Tedjamulia, S.J.J., Dean, D.L., Olsen, R.O. and Albrecht, C.C. (2005). Motivating Content Contributions to Online Communities: Toward a More Comprehensive Theory. In Proceedings of the 38th Hawaii International Conference on System Sciences.
Tödtling, F., Prud'homme van Reine, P. and Dörhöfer, S. (2011). Open Innovation and Regional Culture—Findings from Different Industrial and Regional Settings. European Planning Studies, 19 (11), 1885-1907.
Vargo, S.L. and Lusch, R.F. (2004). Evolving to a New Dominant Logic for Marketing. Journal of Marketing, 68, 1-17.
von Hippel, E. (2001). Innovation by User Communities: Learning from Open-Source Software. MIT Sloan Management Review, 42 (2), 82-86.
Wasko, M.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, 9, 155-173.
Wasko, M.M. and Faraj, S. (2005). Why should I share? Examining social capital and knowledge contribution in electronic networks of practice. MIS Quarterly, 29 (1), 35-57.