LAPPEENRANTA UNIVERSITY OF TECHNOLOGY
School of Business and Management
Knowledge Management

Katri Kemppinen

THE NATURE AND ROLE OF TRUST IN TEMPORARY VIRTUAL PROBLEM-SOLVING TEAMS

Supervisor/Examiner: Professor Kirsimarja Blomqvist
Examiner: Associate Professor Kaisa Henttonen

ABSTRACT

Author:	Katri Kemppinen
Title:	The nature and role of trust in temporary virtual problem-solving teams
Faculty:	LUT School of Business and Management
Major:	Knowledge Management
Year:	2015
Master's thesis:	94 pages, 3 figures, 2 tables, 2 appendices
Examiners:	Professor Kirsimarja Blomqvist, Associate Professor Kaisa Henttonen
Keywords:	Trust, swift trust, virtual teams

The objective of this study is to increase understanding of the nature and role of trust in temporary virtual problem-solving teams engaged in real-life co-creation activities, while much of previous research has been conducted in student settings. The different forms and bases of trust, possible trust barriers and trust building actions, and perceived role of trust in knowledge sharing and collaboration are analyzed. The study is conducted as a qualitative case study in case company. Data includes interviews from 24 people: 13 from 3 different project teams that were going on during the study, 8 from already finalized project teams, and 3 founders of case company. Additional data consists of communication archives from three current teams.

The results indicate that there were both knowledge-based and swift trust present, former being based on work-related personal experiences about leaders or other team members, and latter especially on references, disposition to trust and institution-based factors such as norms and rules, as well as leader and expert action. The findings suggest that possible barriers of trust might be related to lack of adaptation to virtual work, unclear roles and safety issues, and nature of virtual communication. Actions that could be applied to enhance trust are for example active behavior in discussions, work-related introductions communicating competence, managerial actions and face-to-face interaction. Finally, results also suggest that trust has a focal role as an enabler of action and knowledge sharing, and coordinator of effective collaboration and performance in temporary virtual problem-solving teams.

TIIVISTELMÄ

Tekijä:	Katri Kemppinen
Tutkielman nimi:	Luottamuksen luonne ja merkitys tilapäisissä virtuaalisissa ongelmanratkaisutiimeissä
Tiedekunta:	LUT School of Business and Management
Pääaine:	Tietojohtaminen
Vuosi:	2015
Pro gradu -tutkielma:	94 sivua, 3 kuvaa, 2 taulukkoa, 2 liitettä
Tarkastajat:	Professori Kirsimarja Blomqvist, tutkijaopettaja Kaisa Henttonen
Asiasanat:	Luottamus, nopea luottamus, virtuaalitiimit

Tämän tutkimuksen tarkoituksena on lisätä ymmärrystä siitä, millaista luottamus on ja mikä sen merkitys on tilapäisissä virtuaalisissa ongelmanratkaisutiimeissä. Kohteena ovat aidossa ympäristössä toimivat yhteiskehittelytiimit, kun aiemmat tutkimukset ovat tehty pääosin opiskelijoille. Tutkimus on toteutettu kvalitatiivisena tapaustutkimuksena case-yrityksessä. Siihen on haastateltu 24 henkilöä: yhteensä 13 osallistujaa kolmesta meneillään olevasta projektista, 8 jo päättyneistä projekteista, sekä yrityksen perustajia. Täydentävänä aineistona on käytetty kolmen meneillään olleen projektin digitaalisia keskusteluarkistoja.

Tutkimuksen tulokset osoittavat, että tiimeissä esiintyi sekä tietopohjaista että nopeaa luottamusta. Tietopohjainen luottamus perustui aiempiin työperäisiin kokemuksiin tiimin johtajista tai muista osallistujista, ja nopea luottamus erityisesti aiempaan työkokemukseen, taipumukseen luottaa, institutionaalisiin tekijöihin kuten sääntöihin ja normeihin, sekä johtajien ja asiantuntijoiden toimintaan. Virtuaalityöskentelykokemuksen puute, epäselvät roolit ja turvallisuuskysymykset sekä virtuaaliviestinnän luonne voivat puolestaan olla luottamuksen esteinä. Luottamusta lisäävää toimintaa ovat esimerkiksi aktiivinen osallistuminen keskusteluihin, työhön liittyvät esittäytymiset, johtajien toiminta sekä kasvokkainen vuorovaikutus. Lopuksi tulokset viittaavat siihen, että luottamuksella on tärkeä rooli toiminnan ja tiedon jakamisen mahdollistajana sekä projektitiimin tehokkaan yhteistyön ja suorituksen koordinoijana tällaisissa ongelmanratkaisutiimeissä.

ACKNOWLEDGEMENTS

The process of writing this Master's thesis was full of surprises and challenges, yet it has also taught me a lot of valuable things and was a broadening experience. Now when this winding journey is reaching its end, I would like to express my gratitude to all those who have contributed to conducting this study.

First of all, I would like to thank my supervisor professor Kirsimarja Blomqvist for enthusiastic guidance, discussions and encouragement during the study, as well as sharing her vast expertise in trust research, it has been indispensable in this writing process. I would also like to thank case company representatives and all the participants of this study for their time. I really appreciate your contribution.

In addition, I want to thank my fellow Knowledge Management students during these studies, you made studying fun. And finally, I would like to thank my family, especially Teemu for supporting and encouraging me during this intense study. Now it's time for something new.

20.9.2015
Katri Kemppinen

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

LIST OF FIGURES AND TABLES

FIGURES

TABLES

1 INTRODUCTION

This case study is part of the research project INNOSPRING CATCH Capturing opportunities and co-creating value in the digital economy, carried out at Lappeenranta University of Technology. The project is aiming to enhance understanding of new forms of organizing work, cooperation and value co-creation, enabled by digitalization. This study is focused to the analysis of trust in temporary virtual teams engaged in co-creation through problem solving processes: what is trust and how it matters in these surroundings.

1.1 The context of the study

As organizational environments and nature of work have become more dynamic, complex and global, flexible and quickly adaptive organizational systems, structures and processes have evolved in response to changes. These highly flexible and fluid new organizational forms are based on changing templates, quick improvisation and ad hoc responses (Schreyögg & Sydow, 2010). Virtual organizations are examples of this type of adaptive and dynamic way of organizing working life. They are working environments where people work remotely across time and/or place and/or organizational boundaries (Townsend et al., 1998) and comprise a variety of ways of working together (Kasper-Fuehrer & Ashkanasy, 2001). These include virtual teams, also referred to as distributed team (e.g. Saunders & Ahuja, 2006), which have become more prevalent due to advances in information and communication technology, increase in global competition, synergistic cooperation among firms, shift to knowledge work environments, and advantages such as reduced workspace costs and environmental benefits (Germain, 2011; Cascio, 2000).

Another new form of organizing is paid online crowd work, the performance of financially compensated tasks online by distributed crowd workers. It offers opportunities for improving productivity, social mobility, and the global economy by

engaging a geographically distributed workforce to complete complex tasks on demand and at scale. It needs to be noted, that current crowd work typically consists of small, independent, and homogenous tasks. (Kittur et al., 2013.) In this study, the co-creation activities in joint problem solving are supported by more interdependent and complex form of crowd work and conducted in project teams, which can be defined as temporary and virtual.

Common to the definitions of virtual teams are the reliance on technology-mediated communication and crossing several boundaries (Martins, Gilson & Maynard, 2004), but the degree of virtuality varies and includes dimensions such as the proportion of time team works virtually, proportion of the team's members who work virtually and distance virtually (Schweitzer & Duxbury, 2010). Bell and Koslowski (2002) distinguish different types of virtual teams by their temporal distribution (working in different time zones and/or asynchronously), boundary spanning, life cycle (continuing or ad hoc) and dynamics of member roles. Chudoba, Wynn, Lu and Watson-Manheim (2005) state in turn that virtuality describes the degree of the discontinuity of collective work. The discontinuities contributing to virtualness are the use of technology, varying geography, different time zones, crossing organizational boundaries and national cultures, the differences in work practices (ibid). Rather than treating virtual teams as a single phenomenon the differences in virtuality need to be taken into account (Schweitzer & Duxbury, 2010; Bell & Koslowski, 2002).

Although in this study project teams did not rely solely on virtual collaboration, they are called virtual teams as the digital platform was considered an important arena in collaboration process by the case company. The teams within scope of this study were also geographically dispersed (although the degree of dispersion varies from project to project), worked together for a rather short period of time solving their task, and had different organizational and expert backgrounds, thus spanning several boundaries. Solutions to problems were co-created in teams including members from the company orchestrating the problem solving and providing the digital platform, client organization

or community and global network of experts. Some teams contained members with different nationalities where as in some projects all of the participants were Finns.

These new types of organizing work matter, as organizations capable of rapidly creating virtual teams and integrating work and specialized knowledge of experts who might be geographically dispersed, can respond quickly to opportunities and challenges of problem solving (Berry, 2011). Capabilities of this type offer organizations a form of competitive advantage (Bergiel, Bergiel & Balsmeir, 2008). However, there are obstacles that come with organizational flexibility and fluidity, as the very basis of organizing is challenged by downplayed role of organizational identity and boundary in organizational processes (Schreyögg & Sydow, 2010). These obstacles are related i.a. to the communication and trust formation in these type of settings.

1.2 Collaboration and trust building in virtual and temporary teams

Because of the separation in time and space, absence of social control (Cascio, 2000), shared work history, and the limited options of communication channels, working in virtual teams may be problematic (Kanawattanachai & Yoo, 2002). Virtual teams will lose many opportunities for informal collaboration and knowledge sharing (Kimble et al., 2000). Due to these, the challenges of communication, commitment and building trust are more intense in virtual teams (Henttonen & Blomqvist, 2005). According to Cramton (2001), in geographically dispersed collaboration mutual knowledge may not be achieved because of failure to communicate and retain contextual information, unevenly distributed information, difficulty communicating and understanding the salience of information, differences in speed of access to information and difficulties in interpreting the meaning of silence. Problems in maintaining mutual knowledge may inhibit the development and maintenance of trust (ibid.).

Higher degrees of virtuality may also be associated with perceived decreases in the quality of team interactions and performance (Schweitzer and Duxbury, 2010), and virtual ad hoc teams have exhibited lower openness/trust and less information sharing

than face-to-face teams and ongoing virtual teams (Alge, Wiethof & Klein, 2003). Different disciplinary perspectives, different regional or national cultures may further complicate trust development between distant team members (Zolin, Hinds, Fruchter & Levitt, 2004; Newell, David & Chand, 2007).

In these very circumstances where building trust can be particularly challenging, it can also be seen critical for virtual team's functioning and effectiveness. Relationships, shared understanding, and trust are seen as important antecedents of virtual collaboration (e.g. Peters & Manz, 2007). According to Dirks and Ferrin (2001), trust is likely to have the greatest effect in situations or conditions with weak structure, when complexity, risk and uncertainty are more prevalent. Trust is perhaps most critical for team effectiveness under the conditions of geographic dispersion, computer-mediated communication, and national diversity (e.g. Muethel, Siebrat & Hoegl, 2012). Trust is needed because when working interdependently, team members must be willing to accept a certain amount of risk to rely on each other to meet deadlines, contribute to the team task and cooperate without subversive intentions (Salas, Sims & Burke, 2005). Coordination in global ad hoc virtual teams is achieved through trust and shared communication systems (Jarvenpaa, Knoll & Leidner, 1998).

Trust is generally acknowledged as fostering information (Jones & George, 1998) and knowledge sharing (e.g. Chowdhury, 2005; Holste & Fields, 2005; Holste & Fields, 2010). Direct link between trust and knowledge transfer, a process which involves the communication of knowledge from a source to a receiver, but also its use and application by the latter (see Inkpen & Tsang, 2005), is well-documented at the individual, group, and organization level (Alexopoulos & Buckley, 2013). As co-creation activities are a form of collaborative innovation and facilitated social interaction (Roser et al., 2013), and they involve constructing and deconstructing knowledge and experience, leading to a mutual learning process (Payne et al., 2008), trust is presumably important for the success of these processes.

However, results about the effects of trust on performance in short-term virtual teams vary. According to Jarvenpaa, Shaw and Staples (2004) trust effects depend on the situation's structure and they are not necessary direct and linear, and Aubert and Kelsey (2003) claim that effective team performance is independent of trust. But also positive relationship between trust and performance in ad hoc virtual teams have been found (e.g. Crisp & Jarvenpaa, 2013; Kanawattanachai & Yoo, 2002). Virtual teams with higher level of trust have displayed for example the capability to solve problems and resolve conflicts (Jarvenpaa & Leidner, 1999). As Crisp and Jarvenpaa (2013) point out, one of the reasons behind these contradictory results is the confusion with the conceptualization of trust. The aim of this study is to achieve a better understanding of nature of trust and its role in the context of temporary problem-solving virtual teams.

1.3 Key concepts

The theoretical framework of the study is based on the trust literature. Factors such as shared social norms, repeated interactions, and shared experiences have been suggested to facilitate the development of trust, which is updated with experiences about behavior (e.g. Mayer et al. 1995; Lewis & Weigert, 1985). Incremental trust formation models such as Lewicki and Bunker (1995, 1996) and Rousseau et al. (1998) claim that trust relationships start from calculus-based trust, which is grounded in the calculation of benefits to be gained from relationships. If parties gain more knowledge about the other and engage in activities that generate this knowledge, knowledge-based trust may occur (Lewicki & Bunker, 1995, 1996). Identification-based trust (Lewicki and Bunker (ibid.) emerges only when both parties assume a common identity and strong affect develops between the parties. Rousseau et al. (1998, 399) have named the form of subjective and emotional trust relational trust, derived from repeated interactions between trustor and trustee, leading to the formation of attachments. This is similar to affect-based trust by McAllister (1995).

However, in temporary working groups, like ad-hoc virtual teams, there is often no time and possibilities to build trust through longtime interaction and confidence-building activities that contribute to the development and maintenance of trust in more traditional organizational settings (Meyerson, Weick & Kramer, 1996). Yet trust seems to exist even in these conditions. Past research has identified three potentially different types of rapidly evolving trust concepts: *initial trust*, *swift trust*, and *fast trust*. McKnight, Cummings and Chervany (1998) created a theoretical model of *initial trust*, identifying factors that enable high trust when people meet or interact for the first time. Thus, initial trust refers to trust in an unfamiliar trustee (McKnight, Choudhury & Kacmar, 2002). Initial trust is not based personal experience, but in personality factors such as disposition to trust others generally, institution-based structures that assure protection against distrusting actions by the other, and cognitive processes that allow fast information processing and forming initial impressions about other's trustworthiness (McKnight et al. 1998).

Meyerson et al. (1996) in turn used the concept of swift trust to explain trust in face-to-face temporary settings. Swift trust is based on broad categorical social structures and clear roles and later on action. It is thus more a cognitive and depersonalized action form of trust than interpersonal, and there is less emphasis on feeling, commitment, and exchange (ibid, 191). On the other hand, *fast trust* conceptualized by Blomqvist (2002; 2005) evaluates the characteristics but also emphasizes affection and personalized interaction instead of solely fast role-based categorization, suggesting that individual's identity and interpersonal emotions play a role in the development of fast trust. Different tasks may require trust in different ways, which makes understanding the nature and role of trust important.

1.4 Research objectives and research design

Although trust in temporary and dynamic organizations has been studied to some extent, more knowledge is needed about trust formation in complex, problem solving settings. The project teams in case organization provide a fruitful ground for this. Fine-grained conceptualization and empirical analysis of normative actions related to swift trust have also been called for (Crisp & Jarvenpaa, 2013). Jarvenpaa & Leidner (1999) also suggested re-examination on trust conceptualization, as it did not appear as depersonalized as described in Meyerson et al (1996).

In addition, many studies on trust without any previous contact have been carried out laboratory experiments (e.g. Dunning et al., 2014; Yu et al., 2014) and trust in virtual teams has mainly been studied in student contexts (e.g. Jarvenpaa et al. 1998; Jarvenpaa & Leidner, 1999; Kanawattanachai & Yoo, 2002; Aubert & Kelsey, 2003; Jarvenpaa et al., 2004; Zolin et al., 2004, Wilson et al., 2006; Robert et al., 2009; Crisp & Jarvenpaa, 2013), which may limit their applicability to real problem solving teams. Thus, this study will contribute to the body of research on trust in virtual settings by providing important empirical evidence on nature and role of trust in real world knowledge-intensive virtual collaboration environment. It will also have managerial implications on practices that can be set up in order to enhance the functioning of virtual problem-solving teams.

As mentioned, the main research objective of this study is to enhance the understanding about the nature and role of trust in real-life temporary virtual co-creation teams participating in problem solving, aiming to explore what kind of different forms of trust are visible in these teams, what kind of actions build trust and how trust is related to knowledge sharing and collaboration of teams.

The main research question of this study is: What is the nature of trust and what kind of role trust has in knowledge sharing and collaboration in temporary virtual problem-solving teams?

To answer this the following sub-questions are posed:

- What forms of trust can be found?
- What is trust based on?
- Are there any barriers to trust and what kind of actions could build trust?
- How do participants perceive the role of trust in relation to knowledge sharing and collaboration in projects?

These were answered by carrying out a descriptive case study in the case company providing the virtual platform for projects aiming co-create solutions to complex problems. Real-life research setting made it possible to study the role trust plays in the social interaction process among team members from various professional, organizational and cultural backgrounds. The aim in the case studies is the emphasis on the production of detailed and holistic knowledge, based on the analysis of multiple empirical sources that are rich in context (Tellis, 1997).

In this study qualitative analysis was conducted to gather deeper understanding about nature of trust in the case company's co-creation process. Qualitative research has been important in shedding light on the processes of trust building. The inductive approach allows for more open and less structured data collection methods that might enable new concepts to emerge that were not previously found in literature. The qualitative approach also allows respondents to define what they mean by trust. This is important, as the trust is context specific. (Leon, Möllering & Saunders, 2012.)

Data was collected mainly by thematic interviews of a) thirteen members from three projects that were going on at the time of this study was conducted b) eight members of previous, already finalized teams. In addition three informal interviews were conducted with the representatives of case company. Interviews were analyzed using the Gioia methodology. Additional qualitative data included the communication archives of the three current projects and non-participant observation of their communicative action on the platform. Kanawattanachai & Yoo (2002), for example, proposed that better understanding of dynamics of trust can be gained by analyzing team members' communicative actions, instead of perceptual measures.

1.5 Structure of the study

Literature review on trust conceptualizations, components, antecedents and outcomes is made in chapter two. Special attention is on trust development and maintenance in virtual and temporary organizational surroundings. Chapter three presents briefly the theoretical groundings of knowledge flow activities in organization. The basic idea of value co-creation in collaborative innovation and problem solving and its implications on knowledge flows are also presented, especially in virtual and temporary context. Finally, the role of trust in knowledge sharing and use is reviewed. Research methodology is outlined in chapter four, followed by empirical findings in chapter five. The discussion and conclusions, theoretical and managerial implications, limitations of this study and suggestions for future research are highlighted in the last chapter.

2 DIFFERENT FORMS OF TRUST AND THEIR DEVELOPMENT

In this chapter I will present in detail the theoretical background discussed briefly in chapter one: the different conceptualizations of trust, development of trust over time, what is trust based on, and what kind of outcomes have been found in previous literature related to different forms of trust. These are viewed from different contextual standpoints: how they appear in face-to-face or virtual settings and in temporary and non-temporary organizational forms. As the focus of this study is in temporary and virtual surroundings, the rapidly evolving trust forms are reviewed more closely.

2.1 Conceptualizing trust

Many fields of study, such as psychology, sociology and economics, have analyzed trust, each defining trust from their own point of view (Lewicki & Bunker, 1996, 115). As a result, the term trust is used in a variety of distinct, and not always compatible ways within organizational research (Kramer, 1999; McEvily, Perrone & Zaheer 2003). In addition, trust can be analyzed at different levels: individual, interpersonal, organizational, inter-organizational, national or regional (see e.g. Bachmann & Zaheer, 2006).

Two main traditions can be found in interpersonal trust research, namely behavioral and psychological one (Kramer, 1999; Lewicki et al., 2006). Behavioral approach examines trust as an observable rational choice behavior or calculation, and is often studied under laboratory conditions (e.g. Yu, 2014). Psychological approach takes a wider view on trust, aiming to understand the complex intrapersonal states related to trust, including expectations, intentions, affect and dispositions (e.g. Rousseau, Sitkin, Burt & Camerer, 1998; Meyer et al. 1995). Thus it emphasizes not only several interrelated cognitive processes and orientations (Kramer, 1999), but also affective and behavioral intention processes (Kramer et al., 1996; Lewis & Weigert, 1985, McAllister 1995; Williams, 2002). The decision process whether to trust may include actions that are routinized, intuitive, habitual and often not explicitly stated (Kramer, 1996; Möllering

2006.) These distinctive approaches also have implications for how the process of trust development is seen (Lewicki et al., 2006). In this study, I will focus on the psychological tradition in my literature review.

When conceptualized as a psychological state, risk and interdependence have been seen as essential conditions for trust to arise. There is reciprocal relationship between trust and risk: risk creates an opportunity to trust, which leads to trust taking. (Rousseau et al., 1998, 395). According to Luhmann (1988, 103) "A system requires trust as an input condition in order to stimulate supportive activities in situations of uncertainty and risk."

Among many definitions of trust are: *"Psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another"* (Rousseau et al., 1998, 395), *'Actor's expectation on the capability, goodwill and self-reference visible in mutually beneficial behavior enabling cooperation under risk'* (Blomqvist, 2002, 175), and *"Willingness of a party to be vulnerable to the actions of another party based on expectations that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party"* (Mayer, Davis & Schoorman, 1995, 712). Parties in trust relationship are the trustor and trustee: the trustor is the trusting party that holds certain expectations, while the trustee is the party that is assessed by the trustor as trustworthy or not. The term "party" may refer not only to persons but also to collective actors or corporations. Thus, the definition is applicable to both individuals and organizations. (Schilke & Cook, 2013.)

From psychological approach, trust is thus composed of two interrelated cognitive processes. First contains a willingness to accept vulnerability to the actions of another party. Gillespie (2012) has further identified two distinct types of trust related to willingness to be vulnerable: reliance and disclosure. Reliance refers to the willingness of an actor to rely on another's professional skills, knowledge, judgments, and actions including delegating and giving autonomy. Disclosure is defined as the willingness of an actor to disclose work-related and/or personal information, often of a sensitive

nature, to another (Gillespie, 2012). The former can also be called professional trust and the latter personal trust (Alexopoulos & Buckley, 2013). The second process implies that despite uncertainty about actions of others, there are positive expectations regarding other's intentions, motivations, and behavior. (Lewicki et al. 2006, 996.)

These expectations are based on people's perceptions of others' trustworthiness, which in work relationships are usually related to ability, benevolence and integrity (Mayer et al., 1995). Ability refers to skills, competencies and characteristics that enable a person to have an influence within some specific domain, and benevolence is the extent to which a trusted person is believed to do good for the trustor. Integrity on the other hand is related to the perception that trusted person adheres to set of principles, that are acceptable from the trustor's point of view. (Ibid.) Considerable body of research from the psychological tradition has focused on identifying these characteristics that underlie beliefs about another's trustworthiness (Lewicki et al. 2006). While the emotional or affective components of trust have traditionally been less studied, expectations are also based on people's affective responses to others (Lewis & Weigert, 1985; Jones & George, 1998). According to Jones and George (1998), emotions and moods are fundamental aspects of the experience of trust, as they are embodied in the experience. One's current affective state may effect one's experience and way a person forms opinions and makes judgments about the trustworthiness of others. The expectations that trust is built on is also in part, emotional. Values and attitudes are also important in experience of trust. (Jones & George, 1998).

2.2 Incremental development of trust

Lewicki et al. (2006) have divided the psychological tradition of trust research into three models, which have distinctive ways of dealing with development of trust: (a) the unidimensional model, which treats trust and distrust as bipolar opposites (e.g., Jones & George, 1998; Mayer et al., 1995; McAllister, 1995); (b) the two-dimensional model, which argues that trust and distrust are two distinctly differentiable dimensions that can

vary independently (Lewicki, McAllister, & Bies, 1998); and (c) the transformational model, which asserts that trust has different forms that develop and emerge over time (Lewicki & Bunker, 1995, 1996).

According to Lewicki et al. (2006), models within what they call the unidimensional approach tend to suggest that expectations are grounded in perceptions of another's trustworthiness, which leads to a willingness to be vulnerable; trust has several component elements (e.g. cognitions, affect, and/or behavioral intentions); and trust can be meaningfully captured by construct, where the high end represents strong, positive trust for another, whereas the low end represents strong distrust. For example McAllister (1995, 25) has distinguished two generally accepted factors of interpersonal trust: *cognition-based trust*, grounded in cognitive reasoning resulting as individual beliefs about peer reliability and dependability, and *affect-based trust*, grounded in emotional ties providing reciprocated interpersonal care and concern.

Antecedents of affect-based trust are the level of citizenship behavior directed toward the trustor and the frequency of informal interaction between the trustor and trustee. (McAllister, 1995). If the trustee exhibits a high level of citizenship behavior toward the trustor and if both of them socially interact frequently, it is highly likely that the trustor would trust the person being evaluated. Affect-based trust allows the trustor to trust the other with sensitive personal information, ideas, and knowledge. The development of strong links of personal values and emotional ties toward the other improves understanding of each other as individuals and creates emotional openness without much concern for vulnerability. (Ibid.)

On the basis of previous research McAllister (1995) suggested that antecedents of cognition-based trust are the extent of reliable role performance, the extent of professional credentials of the trustee, and social similarity between trustor and trustee, although these were not confirmed in the empirical analysis. High level of cognition-based trust allows the trustor to actively engage in collaborative work and seek knowledge from trustee. Thus with cognition-based trust individuals may improve

professional relationships and enhance professional collaborations. (Chowdhury, 2005.) Some level of cognition-based trust may be necessary for affect-based trust to develop. Although these two forms of trust may be connected, each of them functions in a unique manner and has distinct pattern of association to antecedent and consequent variables (McAllister, 1995, 51).

Most developmental approaches to trust assume that trust begins at a zero baseline and develops gradually over time. For example Jones and George (1998) argue that at the beginning of a social encounter, individuals start at a “zero” level of trust, but quickly have to decide whether to trust or not. According to some views, it is also possible for individuals to start relationship with initial distrust due to cultural or psychological factors that bias individuals toward distrust, untrustworthy reputation information about another, suggesting that distrust is appropriate; or context or situational factors that warrant such an early judgment. (Lewicki et al., 2006.) Social categorization processes may lead to initial distrust, for example when in-group individuals presumptively distrust out-group members (Kramer, 1999).

According to Lewicki et al., (2006), the second approach views trust and distrust as having the same components (cognition, affect and intentions) as the unidimensional approach but treats trust and distrust as separate dimensions (e.g., Lewicki et al., 1998). Specifically, trust is regarded as “confident positive expectations regarding another’s conduct,” whereas distrust is “confident negative expectations regarding another’s conduct”. Relationships with limited number of facets and low in richness are likely to result in low trust and low distrust, and this stage is probable at the early phase of the relationship. (Lewicki et al., 1998)

The third psychological approach suggests that there are different types of trust and that the nature of trust itself transforms over time (Lewicki & Bunker, 1996; Rousseau et al. 1998). “Trust takes different forms in different relationship, from a calculated weighting of gains and losses to an emotional response based on interpersonal attachment and identification” (Rousseau et al., 1998, 398).

As mentioned briefly in chapter one, Lewicki and Bunker (1995, 1996) and Rousseau et al. (1998) have described that trust relationships start from *calculus-based trust*, based on the calculation of benefits to be gained from various forms of transactions in relationships. According to Lewicki and Bunker (1996) trust begins at zero, or even above zero, as first impressions of the other may create mildly positive calculus-based trusting stance. However, for example Dietz and Den Hartog (2006) argue that calculus-based trust cannot be considered real trust, as trust is based on a strict cost-benefit analysis, but a suspicion of the other remains.

Lewicki and Bunker (1995, 1996) state that some relationships never develop past this first stage, but ithe second basis, *knowledge-based trust* may arise when one gets more knowledge about the other. It is about knowing the other well enough to predict his or her behavior: what the other person wants and prefers, and how they think and respond (Lewicki et al. 2006). The third basis, *identification-based trust* emerges only in few relationships, when both parties assume a common identity and strong affect develops between the parties. There is mutual understanding which enables acting on other's behalf. (Lewicki, 1995, 1996).

Rousseau et al. (1998, 399) call the form of subjective and emotional trust emerging in addition to calculus-based trust *relational trust*. It is derived from repeated interactions between trustor and trustee, which leads to the formation of attachments based upon reciprocated interpersonal care and concern, thus strengthened over the course of the relationship. Reliability and dependability increase positive expectations about the other.

According Rousseau et al. (1998, 400), institution-based trust supports the formulation of calculus-based and relational trust. Institutional-based trust can be defined as a "form of individual or collective action that is constitutively embedded in the institutional environment in which a relationship is placed, building on favourable assumptions about the trustee's future behaviour vis-à-vis such conditions" (Bachmann & Inkpen,

2011). Institutional factors, such as processes assuring fair treatment of employees, may bolster up the trust sustaining further risk taking and trusting behavior (Rousseau, 1998).

2.3 Rapidly evolving trust

The zero trust baseline assumption and notions of slowly evolving trust related to incremental risk taking and increased interactions have been challenged by theories explaining rapidly evolving trust: initial, swift and fast trust, shortly introduced in the first chapter. Their development process, including antecedents and outcomes, are discussed comprehensively in this subchapter.

2.3.1 Initial trust

If trust is seen to grow gradually through experiental social exchange, it is assumed to start at the low level. However, subjects may exhibit high trust even when they don't have any previous experience with each other. To explain this, McKnight et al. (1998) created a theoretical model of formation of trust at the initial stage of relationship, when parties are unfamiliar to each other. According to McKnight and Chervany (2006), this unfamiliarity means that "they have little solid, verifiable information about each other, and what they do know is not from first-hand, personal experience". This may be related to newness of relationship, but is applicable also to the situations where newness and distance of relationship are combined, such as in virtual teams. Initial phase stops after parties gain verifiable information by first-hand interactional or transactional experience. However, it has further importance because it uncovers a cognitive or affective channel that often has lasting implications for the mental model about relationship. (Ibid.)

By McKnight et al. (1998) definition, trust means that one believes in, and is willing to depend on, another party. Thus the high level trust concept can be broken into two

constructs mentioned earlier: *trusting intention* and *trusting beliefs.* They state that especially personality-, institution- and cognition-based research lines helps to explain initial trust levels. According to personality-based trust researchers, trust is related to a general tendency to trust others (Rotter, 1967). Cognition-based trust research suggests that trust relies on fast, cognitive cues on first impressions, as opposed to personal interactions (see e.g. Meyerson et al., 1996). According to institution-based trust research, trust reflects the security one feels about a situation because of guarantees, safety nets or other structures (Lane & Bachmann, 1996). Based on these, McKnight et al. (1998) model suggests that one's disposition to trust, institution-based trust and cognitive processes affect the formation of trust, which includes trusting beliefs (e.g. benevolence, competence, honesty, predictability) and trusting intentions.

Disposition to trust refers to a tendency to be willing to depend on others, and according McKnight et al. (ibid., 477), includes two different forms: trusting stance and faith in humanity. *Faith in humanity* refers to believing that others are typically well-meaning and reliable, reflecting the extent to which one believes that others are trustworthy. *Trusting stance means* that one believes that regardless of whether people are reliable or not, one will obtain better interpersonal outcomes by dealing with people as though they are well-meaning and reliable. Thus, trusting stance aspect derives from calculative-based research. (Ibid.) According to McKnight et al. model, faith in humanity will lead to trusting beliefs. Trusting stance, on the other hand, makes person willing to depend on another and will lead to trusting intention. (Ibid., 478.)

Institution-based trust means believing in impersonal structures to support one's likelihood for success in a given situation. Two types of institution-based trust are *situational normality*, which means believing success is likely because the situation is normal, and *structural assurances*, believing that success is likely because contextual conditions as promises, contracts, regulations and guarantees are in place. These will lead to trusting intention in initial relationship, and also affect trusting beliefs. First, believing that situation is secured by contracts and regulations, for example, enables one to believe that individuals in the situation are trustworthy. Second, institutions

reflect the actions of the people involved, thus beliefs about the institutions will help to form beliefs about people in those institutions. Third, structural assurance and situational normality beliefs will probably stay consistent with related beliefs, such as trusting beliefs. (McKnight et al.,1998, 478-479.)

Cognitive processes that affect initial trust formation include *categorization* and *illusions of control*. McKnight et al. (1998, 480-481) describe three types of categorization processes: unit grouping, reputation inference, and stereotyping. *Unit grouping* refers to putting other people in the same category as oneself. Because people in the same group tend to share common goals and values, they usually see each other in a positive light (Kramer, Brewer & Hanna, 1996). In-group members are usually considered more trustworthy than outgroup members, and unit grouping quickly leads to high levels of trusting beliefs (McKnight et al., 1998).

Williams (2001) have stated that group membership does not influence perceptions of trustworthiness only via cognition, but also through affect, that is, subjective emotional experiences or states such as anger or joy. The extent to which a trustor feels and perceives a trustee to be a part of his or her social in-group, in other words categorized as within the same social group as the trustor, or out-group, categorized as outside of the social group of the trustor, partly determines the initial trust toward the individual. People’s perceptions of their own interdependence with other groups influence both beliefs about trustworthiness and affect for group members. This can lead to intense category-based affect, which, in turn, may influence people's perceptions of specific category members' trustworthiness, their motivation to trust, and their prosocial behavior toward category members. (Ibid.)

Another categorization mechanism, *reputation inference* refers to linking attributes such as competence, benevolence and integrity to another person based on second-hand information. People with good reputation are categorized as trustworthy, enabling quick development of trusting beliefs without first-hand knowledge. *Stereotyping* means placing other person into a general category either on a broad level (such as gender or

nationality) or on more specific level (like prejudices for or against occupational groups). In the case of positive stereotyping, positive trusting beliefs about the other can be formed swiftly by generalizing from the favorable category into which the other was placed. (McKnight et al., 1998, 481.) Reputation inference, in-group categorization and stereotyping have direct effects on initial trust (McKnight & Chervany, 2006).

The other cognitive process in trust formation is *illusions of control*, unrealistic perceptions of personal control. McKnight et al. (1998, 481) describe token control efforts as actions convincing oneself of personal control. People may use them to evaluate whether or not they can influence other person in some way. By token control efforts, one can become overconfident in one's assessment of the other through social categorization or reputation inference (McKnight & Chervany, 2006).

The theory of initial trust formation by McKnight et al. (1998) has been applied especially to e-commerce research (e.g. McKnight et al., 2002; Koufaris & Hampton-Sosa, 2004). The term initial trust has been used in research related to temporary organizing, but seems that it is sometimes used interchangeably with the concept of swift trust (see e.g. Robert, Dennis & Hung, 2009). It has some similarities with the theory of swift trust, which I will next describe in detail.

2.3.2 Swift trust

A second approach to the rapidly evolving trust baseline is proposed by Meyerson, Weick, and Kramer (1996). These authors attempted to explain how teams of individuals can come together quickly and successfully to work on highly complex, skilled interactions in temporary groups and teams, such as surgical teams, disaster rescue teams, and airline cockpit crews. In these surroundings traditional sources of trust, such as familiarity, shared experiences, reciprocal disclosure, fulfilled promises and experience that vulnerability is not exploited, are not obvious (Meyerson et al. 1996, 167). They argue that in such situations, participants build *swift trust*. Swift judgments about trustworthiness are necessary, because they enable people to act and

initiate interdependent work quickly in uncertain situations. (Ibid., 170.) According to Meyerson et al. swift trust is related to different types of antecedents than trust in non-temporary settings, and therefore it also develops and effects outcomes differently. (Ibid.,181)

Processes enabling trust formation

Vulnerability in temporary teams can be reduced and trust formed and maintained through different social and cognitive processes. First, it is done through weaker dependency on others by forming alternative partnerships, projects and networks, which are a form of “hedge”. The second way to reduce vulnerability is to develop adaptability and the feeling of mastery, which can be a cognitive illusion. Third, other people can be assumed to be trustworthy. (Meyerson et al. 1996, 172.) The perceptions of trustworthiness are enabled by implicit threats at system and the possible future interaction, but even more focally by role clarity. If people in temporary systems deal with one another more in roles than as individuals, the expectations are more standardized, and defined more in terms of tasks and specialties than personalities. Increasing role clarity helps to strengthen positive expectations and reduce negative ones. Due to this, role-based interaction leads to more rapid development of trust than person-based interaction. Inconsistent role behavior and blurring roles increase uncertainty, and will lead to a slower formation of trust. (Meyerson et al., 1996, 173, 181.)

Meyerson et al. state (1996, 174, 182) that expectations about others are usually imported from other settings and placed in categorical forms. Thus they are created using category-driven information processing, which emphasizes speed and confirmation instead of accuracy. This processing is dominated by institutional categories, and categorizations reflect roles, cultural cues, and identity- and occupational-based stereotypes**.** Swift trust is able to develop, because expectations evoking quickly tend to base on task and be general, easy to confirm and stable.

(Meyerson et al., 1996, 178). Crisp and Jarvenpaa (2013) call these collective perceptions cognitive components of swift trust.

Meyerson et al. (1996) also point out that contractor (the organization or agent compiling the temporary groups) has an extremely important role in the process of trust building. The reputation of the contractor and the expectation of his or her good will may be all that is necessary to create the general background expectations of good will, regardless of information about the other participants (ibid., 183-184). Credibility of the contractor is a useful substitute for interpersonal history (ibid., 185). And although members don't often have previous contact with each other, in a way the temporary group itself is not without history. It is collectively assumed that each member's participation is based on some kind history. Either the contractor has experience about other members, or has at least "checked them out". (Ibid., 187.)

Meyerson et al. (1996, 172) propose that perceptions of the nature of the network and labor market available for temporary systems can also have an impact on trust in them. Recruitment of others from a narrowly defined labor pool such that the reputations of pool members are known and people are comparably vulnerable due to the interdependence, lowers expectations for trust-destroying behavior. The stronger the grounds for not expecting harmful behavior, the more rapidly will trust develop among people (ibid.,181).

The role of action in maintaining swift trust

Besides social and cognitive processes, action is important for developing and maintaining swift trust. According to Meyerson et al., 1996, 180) "Swift trust may be a byproduct of a highly active, proactive, enthusiastic, generative style of action". The powerful actions create greater willingness to trust, which results in more rapid development of trust. In temporary groups, people often act as if trust were in place, and because trust behaviors are enacted without hesitation, reciprocally and

collectively, they may provide social proof that acting in trusting manner is reasonable (Meyerson et al., 1996, 186.)

Crisp and Jarvenpaa (2013) shed light on undertheorized normative action components that reinforce swift trust through actions. They found that normative actions, consisting of setting and monitoring group's performance norms, fully mediate the impact of early trusting beliefs on late trusting beliefs. High early trusting beliefs give members the necessary confidence to engage in normative actions, and these normative actions increase late trusting beliefs and consequently performance. Thus, there is positive link between the components of swift trust and team performance. Crisp and Jarvenpaa state that normative actions are particularly important in reinforcing trusting beliefs in geographically dispersed teams where members rely on computer-mediated cues to observe behavior. (Crisp & Jarvenpaa, 2013.)

According to Meyerson et al. (1996), swift trust is more likely at moderate levels of interdependence than at either higher or lower levels. On discussion whether trust is fragile or resilient in temporary systems, Meyerson et al. (1996, 189) propose that swift trust may be more resilient in temporary groups whose members have improvisation attitude. The other things that may contribute to maintaining swift trust in temporary group, is that due to lack of time, there may be less opportunity for the kind of problematic interpersonal and group dynamics that may occur in non-temporary groups. (Ibid.)

To conclude, swift trust is less about relating than doing. There is more emphasis on action, cognition, the nature of the network and labor pool, and avoidance of personal disclosure, contextual cues, modest dependency and heavy absorption in the task. (Meyerson et al., 1996.) Rather than attempts to influence others' feelings and affective attachments to build resilient interpersonal relationships, trust is based on an early presumption that the team is trustworthy but verified through actions around the joint task, scheduling, and monitoring. That is, trust development is founded on normative actions that convey goal-conducive actions. (Crisp & Jarvenpaa, 2013.)

In addition to Crisp and Jarvenpaa (2013), concept of swift trust has been applied to the studies on virtual teams in addition for example by Jarvenpaa et al. (1998), Jarvenpaa and Leidner (1999) and Robert et al. (2009). Robert et al. (ibid.) suggest, following Kramer's (1999) six bases of trust, that individuals import five types of trust from other contexts to influence their formation of swift trust: role-based trust, rule-based trust, third-party -based trust, dispositional-based trust, and category-based trust. Jarvenpaa and Leidner (ibid) argue, that unlike in face to face temporary teams, to which the theory was created, global virtual teams' members remain in different locations and are assembled less on the basis of members' specific roles and more on their knowledge difference, which may have significant implications for swift trust. Contrary to the theory of Meyerson et al. (1996) Jarvenpaa and Leidner (1999) also noted, that in the teams with high trust, there were explicit verbal statements about commitment, support, and excitement.

2.3.3 Personalized fast trust

Whereas the concept of swift trust emphasizes role-based fast categorizations in the development of swift trust, concept of fast trust (Blomqvist 2002; 2005) also stresses affection and personalized interaction. The concept was created to explain the evolution of trust in a context of asymmectric technology partnerships. Blomqvist (2002) divides the concept of trust into four components; capability, goodwill, self-reference and behavior. These are in accordance with her definition of trust as an "actor's expectation on the self-referential actor's capability and goodwill visible in mutual beneficial behavior enabling cooperation under risk" (ibid, 269). In the context of her study, capability includes technological capability, business capability and capability to cooperate (Blomqvist, 2005, 139). Goodwill can be defined as the partner's moral responsibility and positive intentions toward the other, whereas behavioral component is related to actors evaluating each other's behavior through signals and signs. Self-reference, i.e. individual and organizational identity enables the individual

or organization to relate to other actors and cooperate at equal level. (Blomqvist, 2002, 269-270.)

Fast trust seems to be evaluated through inferences rather than profound evidence. Intuition and rationality are combined in evaluating trustworthiness (Blomqvist, 2002, 186). If the task is complex and demands diverse knowledge, Blomqvist (2005, 139) argues that staying in narrowly defined role may not allow close connection necessary for effective information exchange, as full understanding of contextual issues and background information is lacking. If there is a chance for this personal and individual-based trust to emerge, the resulting fast trust is probably more productive, suggesting that "personalized fast trust enables the open tasks and risk-taking inherent in cooperative experimentation" (Blomqvist, 2002, 189).

A conceptual process model on explaining the development of fast trust contains four phases: framebreaking, breaking the existing mental models to be able to appreciate other organizational cultures and contexts; synchronization, understanding and learning of each other and the mutual potential based on intuitive knowledge; improvisation, mutual adaptation and improvising to test the relationship; and finally cooperative experimentation. The process forms through character- and issue-based interest, understanding, learning, adaptation, and commitment, leading to fast trust. Subsequently the actors are willing to make decisions based on intuition and commit themselves to joint experimentation. The improvised action denotes the evolution of fast trust. (Blomqvist, 2005, 133.)

At the beginning the person's likeability may be a prerequisite for further negations, therefore it is proposed that the formation of fast trust also demands affect-based involvement and shared excitement between the committed actors. (Blomqvist, 2005, 133-134.) Shared vision may be the most important and focal issue in the evolution of fast trust. In a dynamic environment the actors have to accept that there is no perfect information, and therefore decisions must be made partly based on tacit knowledge

and intuition. (Blomqvist, 2005, 136.) Blomqvist (ibid) state that face-to-face meetings are needed to facilitate the strategy development of how to deal with specific individual. Images which underpin this strategy are formed from the cues flowing from communication. Strong feelings of trust or distrust are often formed in the first face-to-face interaction.

According to Blomqvist (2005, 137) fast trust may trigger mutual trust if the other party is able to take risk of trusting at the beginning of the relationship building. As it is tested continuously, fast trust is quite thin and fragile. If participants are lacking fast trust, development of the relationship may slow down or even create a situation where the relationship does not develop further. (Ibid.)

2.3.4 Summary of rapidly evolving forms of trust

To sum up previous subchapters, key conceptualizations, antecedents and outcomes of rapidly evolving forms of trust are presented in table 1.

Table 1. The concepts of rapidly evolving trust, their antecedents and outcomes

Form of trust	Author(s) and conceptualization	Antecedents	Consequences	Research context and type of study
Initial trust	McKnight, H.D., Cummings, L.L & Chervany, N.L. (1998): Initial trust between parties will not be based on any kind of experience with, or firsthand knowledge of, the other party.	1. Disposition to trust: 2. Institution-based trust: (a) structural assurance belief and b) situational normality belief, 3 Cognitive processes: (a) categorization processes - unit grouping, reputation categorization and stereotyping and b) illusions of control process	Trusting beliefs & trusting intentions	New organizational relationships, conceptual
	McKnight, H., Choudbury, V. & Kacmar, C. (2002): Trust in an unfamiliar trustee, a relationship in which the actors do not yet have credible, meaningful information about, or affective bonds with, each other.	1. Disposition to trust 2. Institution-based trust	Trusting beliefs & trusting intention -> behaviors e.g. sharing personal knowledge, making a purchase, acting on provided information	E-commerce, quantitative
	Jarvenpaa, S. L., & Shaw, T. R. & Staples (2004): Individual team member's trust in the team before the team interacts.	1. Preexisting dispositions 2. Institutional expectations 3. Cognitive processes such as social categorization and illusions of control	Depend on situation's structure e.g. team cohesiveness, satisfaction, and subjective outcome quality	Global virtual teams, quantitative
Swift trust	Meyerson et al. (1996): A unique form of collective perception and relating that is capable of managing issues of vulnerability, uncertainty, risk and expectations.	Cognitive illusions 2. Roles enabling assumptions of trustworthiness 3. Institutional categorization reflecting cultural cues, stereotypes 4. Contractor reputation 5. Active, generative style of action	Action, communication cooperation	Temporary face-to-face teams, conceptual
	Jarvenpaa, S. L., Knoll, K. & Leidner, D. (1998): form of depersonalized action.	1. Broad categorical social structures 2. Trusting action (Propensity to trust, ability, integrity, benevolence)	Iniative, action, result toward a task goal.	Global temporary virtual teams, quantitative + qualitative
	Jarvenpaa, S.L. & Leidner, D.E., (1999): appears to be somewhat depersonalized, but perhaps not as depersonalized as described in Meyerson et al.	At early phase: 1. Social communication, showing enthusiasm, 2. Coping with technical uncertainty, 3. Individual initiative, Later on: 4. Predictable communication 5. Timely & Substantial responses 6. Transition from social to procedural to task focus 7. Positive leadership 8. Phlegmatic response to crises	-	Global temporary virtual teams, quantitative + qualitative
	Robert Jr., L. P., Dennis, A. R., and Yu-Ting, C. H. (2009): Initial trust observed in temporary and virtual teams, presumptive form of trust that is developed prior to interaction.	1. Role-based trust 2. Rule-based trust 3. Third-party recommendation–based trust 4. Dispositional-based trust 5. Category-based trust	-	Geographically and temporally distributed teams, quantitative
	Crisp, C. B., & Jarvenpaa, S. L. (2013): Unique form of trust in temporary settings. Not so much interpersonal as a cognitive and action form.	1. High early trusting beliefs, 2. Joint task 3. normative action components (setting and monitoring group performance norms)	Late trusting beliefs, team performance	Global virtual ad-hoc teams, quantitative

Fast trust	Blomqvist, K (2002 & 2005): Actor's expectation on the self-referential actor's capability and goodwill visible in mutual beneficial behavior enabling cooperation under risk	Positive affect, shared excitement, proactive behavior, interest, understanding, learning, adaptation, commitment.	Collaboration on open tasks, decision-making based on intuition, experimentation, adaptation, tentative commitment	Asymmetric technology partnerships between small high tech firms and incumbent firms, qualitative case study

Overall, it seems that based on the theories of McKnight et al. (1998) and Meyerson et al. (1996), initial and swift trust would initially be based on similar presumptive expectations and cognitive processing, whereas fast trust emphasizes more personalized approach with positive affect. What makes swift trust different from the concept of initial trust, in addition to the amount of interaction, is the emphasis on the role of action, which may maintain the initially developed trust in conditions where there is already some meaningful firsthand information available, but not attempts to build resilient interpersonal relationships (see Crisp & Jarvenpaa, 2013). In the empirical studies the role of action seems to be further strengthened (see Jarvenpaa et al., 1998; Jarvenpaa & Leidner, 1999; Crisp & Jarvenpaa, 2013). Next, I will sum up previous literature on trust building in virtual and temporary surroundings.

2.4 Trust building in temporary and virtual teams

In studies on trust building in virtual and temporary contexts, both concepts from rapidly evolving trust and more incrementally built trust theories have been applied. The antecedents of trust in the virtual context appear to resemble traditional antecedents in both temporary (Jarvenpaa et al., 1998) and non-temporary (Henttonen & Blomqvist, 2005) virtual teams. Although Meyerson et al. (1996) have suggested that swift trust is initially imported from other contexts and based on broad categorical social structures, according to some previous studies, swift or fast trust in virtual teams seems to emerge at the beginning of the collaboration through first contacts and impressions (e.g. Jarvenpaa & Leidner, 1999; Zolin et al., 2004; Henttonen & Blomqvist, 2005). Thus trust might be created, rather than imported, through communication behavior

(Jarvenpaa & Leidner, 1999). Communication have been seen to positively impact trust in virtual teams (e.g., Jarvenpaa & Leidner, 1999; Henttonen & Blomqvist, 2005), and communication's effect on individual performance is through trust (Sarker et al., 2011). Task-related communication seems to be most important for maintaining trust, but social focus in communication could exist in parallel with it (Jarvenpaa & Leidner, 1999). In addition of being an important antecedent of swift trust, action seems to also be an outcome of it (Jarvenpaa et al., 1998).

According to Kasper-Fuehrer and Ashkanasy (2001) issues that must be dealt with when aiming to foster the development of trust in the virtual context are communication of trustworthiness facilitated by reliable ICT, establishment of common business understanding and strong business ethics. They describe communication of trustworthiness as an "interactive process that affects, monitors and guides members' actions and attitudes in their interactions with one another, and that ultimately determines the level of trust that exists between them" (ibid, 238-239). They argue that their conceptualization goes beyond the idea of swift trust, and imply that communication channels between the collaboration parties are open (ibid.).

Zolin et al. (2004) have noted in their study, that when reliable information about actual follow-through is missing or difficult to interpret, perceived trustworthiness, perceived follow-through and trust are relatively stable over time, based on those first impressions (Zolin et al. 2004). On the other hand, Robert et al. (2009) have noticed that when individuals gathered sufficient information to assess a team member's trustworthiness, the effects of swift trust decline and knowledge-based trust forms using team members' behaviors (perceived ability, integrity, and benevolence). However, the impact of initial swift judgments continue to influence knowledge-based trust judgments (ibid).

Kuo and Yu (2009), exploring trust development and maintenance in temporary, work-oriented virtual teams, have applied Lewicki's and Bunker's (1995) dimensions of trust in their study instead of rapidly evolving forms of trust. Results suggest that members swiftly develop calculus-based trust in order to assess the outcomes and costs of

maintaining team relationships. Participants also rely on prior knowledge to determine other members' competence so that they can make predictions about one another's behaviors. In their study, identification-based trust also developed fast, but was relatively insignificant compared to the other two types of trust. (Kuo & Yu, 2009.) The cognitive and affective dimensions of trust (McAllister, 1995) have also been analyzed in temporary, virtual settings. In a study of Kanawattanachai and Yoo, virtual teams developed a higher-degree of cognition-based trust than affect-based trust over time, and the presence of swift trust in cognitive dimension was related to team performance (Kanawattanachai & Yoo, 2002).

Wilson, Straus & McEvily (2006), in turn have found that the communication medium altered the rate at which trust developed, but didn't produce fundamentally different levels of trust in computer-mediated versus face-to-face teams. There was no evidence that cognitive and affective trust developed differently over time. They state, that as Williams (2001) have argued, affect may influence all stages and types of trust.

Next I will present theoretical underpinnings related to knowledge creation and knowledge work in companies, and previous literature how different types of trust are related to knowledge sharing and transfer processes.

3 KNOWLEDGE FLOWS IN CO-CREATION TEAM CONTEXT – THEORETICAL UNDERPINNINGS

In this chapter I will present the theoretical underpinnings related to knowledge flows in organization, and also briefly present the main ideas of collaboration innovation and problem solving as value co-creation activities, as it forms the context of the study and also have implications for knowledge flows. Finally, I will review literature about the role of trust in knowledge sharing and use to tie the topics of this chapter with trust literature.

3.1 Knowledge flows in organizations

The effective management of knowledge flows is seen necessary for increasing the knowledge stocks that will sustain organizational success. Knowledge flows include the transfer, creation and integration of distributed knowledge. (Cabrera & Cabrera, 2005.) Knowledge transfer can be defined as the process by which a knowledge receiver is affected by the experience of a knowledge source (Argote & Ingram, 2000) or as transmitting knowledge to and absorbing knowledge from each other (Sarker et al., 2005). It thus refers to both sharing knowledge and using it by receiver. Knowledge sharing, an action where knowledge is made available to others within that organization (Ipe, 2003) is one of the key mechanisms by which knowledge transfer can take place in organizations (Cabrera & Cabrera, 2005). Organizational knowledge creation is the process of making available and amplifying knowledge created by individuals, as well as crystallizing and connecting it with an organization's knowledge system (Nonaka, Toyama & Konno, 2000). Knowledge integration, on the other hand, is "synthesis of individuals' specialized knowledge into situation-specific systemic knowledge" (Alavi & Tiwana, 2002, 1030.) As I will only briefly review the research on the topic, I do not concentrate on specific knowledge flow types, but discuss them on general level.

Knowledge is often classified as explicit or tacit, and these different types of knowledge are transferred in different ways. Explicit knowledge is easily articulated or reduced to

writing, is often impersonal and formal in nature, and takes the form of data, documents, reports, catalogues, presentations, manuals, formulas, and so on (Nonaka & Konno, 1998; Nonaka & Takeuchi, 1995; Nonaka et al., 2000). In contrast, tacit knowledge (e.g., abilities, developed skills, undocumented processes, experience, intuitions, hunches, mental models etc.) is highly personal and difficult to communicate and reduce to writing (Nonaka et al., 2000: Nonaka & Konno, 1998). Polanyi (1966) has argued that tacit knowledge cannot be articulated at all, while according to Spender (1996), some tacit knowledge could be articulated but has not been yet, while other tacit knowledge is incapable of being articulated. Sometimes tacit knowledge which is not currently declarative but could be made so is called implicit, and tacit knowledge is used to refer to the "extreme knowledge has never been, and could not likely be, made declarative" (Griffith, Sawyer & Neale, 2003). If expressed at all, tacit knowledge may take the form of analogies, metaphors, stories, or personal strategies (e.g. Choo, 2000; Nonaka and Takeuchi, 1995). Tacit knowledge is rooted in action, procedures, routines, commitment, ideals, an individual's experience, values and emotions (Nonaka & Konno, 1998; Nonaka et al., 2000).

The concept of complex knowledge (Chowdhury, 2005) is similar to tacit knowledge. Complexity of knowledge is a combination of the degree to which the knowledge is tacit and is dependent on a context or a system of knowledge. In other words, highly complex knowledge is hard to express in codes, numbers and so on, and is dependent on specific context in which it was created or on a broad system of knowledge. (Ibid.) On the other hand, Nonaka et al. (2000) claim that knowledge is always context-specific, otherwise it is just information. According to them, information becomes knowledge when it is interpreted by individuals and given a context, anchored in the beliefs and commitments (ibid, 7).

Although individual knowledge is an important organizational resource, it is the collaborative knowledge in an organization that determines its sustainable competitiveness (Hoopes & Postrel, 1999). Thus knowledge transfer and creation is an important part of building knowledge-based competitive advantage (Argote & Ingram,

2000; Kogut & Zander, 1992). According to Nonaka et al. (2000) new knowledge is created through interactions between tacit and explicit knowledge rather than from either of them alone. Most knowledge creation takes place within the context of social systems such as problem-solving groups and project teams (Alawi & Tiwana, 2002). Group-based work can be seen as a knowledge sharing mechanism, which also serves as a tool for organizational learning (Michailova & Sidorova, 2011).

Knowledge creation process in the organization has been explained in the SECI-model (Nonaka & Takeuchi, 1995), a spiral process consisting of four modes of knowledge conversion through which knowledge is converted from one knowledge type to another. The modes of knowledge conversion include socialization, externalization, combination, and internalization (ibid). Socialization involves exchange of knowledge between individuals by observation, imitation, and practice through intimate informal associations. Externalization requires the expression of tacit knowledge and its translation into comprehensible forms that can be understood by others. Combination, in turn, involves conversion of disconnected explicit knowledge into a complex knowledge-base of the organization, and in internalization explicit knowledge has been embodied in action and practice, and converted into organization's tacit knowledge (Nonaka & Konno, 1998).

In accordance with these stages Nonaka and Konno (1998) describe matching shared spaces they called ´ba`, providing platform for advancing individual and/or collective knowledge. These could be physical such as office space, mental like shared ideals, virtual, or any combination of these. For each stages there is type of ´ba` that especially suits them, originating ba for socialization, interacting ba for externalization, cyber ba for combination, and exercising ba for internalization. Cyber ba, is a place of collective interaction in virtual world (Nonaka & Konno, 1998). According to Nonaka and Konno (ibid.), the combination of explicit knowledge is most efficiently supported in collaborative environments utilizing information technology.

To conclude, Mitchell and Nicholas (2006) state that the integration of diverse perspectives and previously unconnected knowledge underpins the generation of new

knowledge. Also psychosocial variables, in particular the norms of members, are critical in determining the success of knowledge sharing efforts. When individual members believe in freedom of expression and value the understanding and utilization of diverse viewpoints, their groups engage in behaviors that are more effective in creating knowledge. (Ibid.)

Alavi and Leidner (2001) have reminded that mere knowledge creation or knowledge codification does not necessarily lead to better performance or value creation. According to Alavi and Tiwana (2002) also knowledge application, the phase in which existing knowledge is brought to solve a problem at hand, is important, as value is created only when distributed knowledge is transferred and applied where it is needed. The key stage in knowledge application is knowledge integration. In the context of this study, these are linked to the co-creation activities including problem solving.

3.1.1 Value co-creation activities and knowledge flows

Co-creation activities are a form of collaborative innovation, seen a means to expand the innovation and value creation capability of the firm (Sawhney et al. 2005, Roser et al., 2013). The co-creation of value occurs whenever stakeholders interact with companies, having an active role in the shaping of their experience and value perception. (Roser et al., 2013.) Co-creation of value can also be conceptualized as joint problem solving, which involves supplier and customer resources integrated in a collaborative interaction process (Aarikka-Stenroos & Jaakkola, 2012). This is the case for example in professional organizations whose primary value creating activities comprise the accumulation, creation, or dissemination of knowledge to provide a customized service or solution that satisfies client needs (Bettencourt et al., 2002) Typical to all co-creation approaches is the expansion of organizational boundaries and the involvement of co-creators. (Roser et al., 2013.)

These creative collaboration processes may take place between an organization and a group or network of co-creators, and are embedded within a value creation context

and co-creation environment (Mitleton-Kelly, 2011). With the possibilities brought by virtual environments such as online communities and web-based engagement platforms, organizations may employ knowledge and inputs of crowds (Roser et al., 2013) through crowdsourcing (e.g. Zheng et al., 2011) or crowd work (e.g. Kittur et al., 2013), for example.

Crowdsourcing is, according to Estellés-Arolas and González-Ladrón-de-Guevara (2012, 197) “a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task”. In the context of this study concept of crowd work is more applicable, as the crowd could be seen to consist of the network of experts, who get compensated for their inputs. Complementing volunteer-based crowdsourcing, paying online crowd work industry engages a geographically distributed workforce to complete complex tasks on demand and at scale (Kittur et al., 2013), although, as mentioned in first chapter, current crowd work typically consists of smaller and less interdependent tasks (ibid.), thus differing from this case. In this case the collaboration processes occur between company providing the service, the selected experts from a network and relatively small number of customers, who are from client company or community. It can be seen thus more selective process than often in crowd-based co-creation approaches.

It has been emphasized that value creation requires sharing critical knowledge and accomplishing effective dialogic communication (Prahalad & Ramaswamy, 2000), thus continuous back and forth dialogue with customers is important, instead of one way interaction from firm to customer (Sawhney et al., 2005). Instead of focus on individual knowledge there is focus on social and experiential knowledge (ibid). Client resources are critical to the process, as they hold much of the knowledge needed for problem solving (Bettencourt et al., 2002). To solve a problem, it is thus important to identify customer’s needs and goals at the beginning of the process (Aarikka-Stenroos & Jaakkola, 2012). Other key resources from the customer include information on

context, industry expertise, production material in addition to effort, time and financial resources, too (ibid., 22).

Because the problems to be solved may contain unknown elements, also professional and applied knowledge from supplier (Aarikka-Stenroos & Jaakkola, 2012) and in this study, also from the experts from the network are focal. More specifically, these resources needed in the problem solving process include expert knowledge, diagnosis skills, experience, objectivity, integrity and ethical codes, and finally relational capital. (Ibid.) Thus, variety of tacit and explicit forms of knowledge are needed. As the co-creating activities aiming to joint problem solving require effective dialogue and various types of expertise from people with diverse backgrounds, I will shortly consider the implications it poses when conducting such collaboration in temporary virtual team context.

3.1.2 Managing knowledge flows in temporary virtual team contexts

People in virtual teams are more likely to have diverse backgrounds than in traditional working environments (Malhotra & Majchrzak, 2004), especially in the case of co-creation teams. It thus critical that individuals in virtual organizations transfer knowledge in order to build a common frame for collaborating effectively (Sarker et al., 2005). Effective knowledge transfer of diverse knowledge forms and sources is a critical activity that ensures the success of knowledge integration and the overall performance in virtual organizations (ibid.).

However, it has been discussed how the nature of virtual teams may limit group's effective knowledge transfer and integration. Barriers to knowledge sharing in virtual contexts include variation in the ability of team members to deal with technology (Rosen, Furst & Blackburn, 2007), ignoring tacit knowledge, knowledge possession as a source of power, geographical and cultural distances, functional boundaries, and relying too much on a few individuals as knowledge providers (Kauppila, Rajama & Jyrämä, 2011). The richness of communication media (see e.g. Daft & Lengel, 1984)

has been seen to either hinder or facilitate knowledge sharing behavior in groups (Griffith & Neale, 2001; Rosen et al., 2007), and computer-mediated communication is seen as less rich format. Effective teamwork is seen to require content- and context-rich exchanges and joint problem solving to integrate and apply knowledge and expertise to conduct their task in coordinated way. Thus, virtual environments pose challenges to knowledge integration, because there are constraints on transactive memory, inadequate mutual understanding, and failure in sharing and retaining contextual knowledge (Alavi & Tiwana, 2002). When shared knowledge is incomplete, individuals interrelate less, and when they are unable to interrelate, knowledge integration is less likely to happen (Pinjani & Palvia, 2013).

Consequently, face-to-face interaction is often seen as the primary method for sharing tacit knowledge (e.g. Nonaka & Takeuchi, 1995; Nonaka & Konno, 1998; Nonaka et al., 2000). Teams who spend less time together on task, are located further apart, and make greater use of technological tools will be more likely to transfer knowledge in explicit rather than tacit forms because the technology supports the declarative nature of explicit knowledge (Griffith et al., 2003). “Sticky” nature of tacit knowledge makes it more difficult to transfer in a usable form (Von Hippel,1994). This poses challenges for transferring tacit and complex knowledge in virtual settings.

Yet, lower level of visible social presence on the virtual team may also have positive effects because it is possible to negate some interpersonal distractions, such as appearance, mannerisms, or even ethnicity, which may interfere with work outcomes in traditional settings (Berry, 2011). Thus virtual work may reduce problems commonly experienced in face-to-face teams, such as stereotyping, personality or power conflicts and cliques (DeRosa et al., 2004), which may hinder knowledge sharing and integration activities. At the same time it needs to be noted, that as technological tools have improved, richer forms of computer-mediated media such as video conferencing and virtual meeting software are more readily available (Maynard, Mathieu, Rapp & Gilson, 2012). Video-supported teams often perform as well as those whose members work

via traditional face-to-face meetings (Anderson et al., 2007). Teams have also become more adept at incorporating technology into their functioning (Maynard et al., 2012).

All in all, some critical issues for knowledge collaboration can be concluded. Effective professional collaboration even with distant and infrequent social interactions is considered important because it enhances shared experiences. With shared experiences individuals can capture the embedded nuanced contexts in which the knowledge was created and share complex knowledge. (Chowdhury, 2005.) A shared understanding is also need for perceiving the goals of the collaboration and how each member can contribute (Peters & Manz, 2007). Things fostering knowledge sharing in virtual teams are i.a. accountability and shared understanding of virtual team's role, early face-to-face meetings and training, technological space that promotes social interaction and visual presence, and trusting and supportive team environment, including understanding of diversity in team (Kauppila et al., 2011). In other words, psychologically safe communication climate may foster knowledge sharing and innovation (Gibson & Gibbs, 2006). According to Gibson and Gibbs, this involves speaking up, raising differences for discussion, participating in spontaneous and informal communication, providing unsolicited information, bridging differences by suspending judgment, remaining open to other ideas and perspectives and engaging in active listening. It also involves a shared belief that a team is safe for interpersonal risk-taking. (Ibid.)

This is important, as perceived risks may reduce the willingness to share and use knowledge in organizations. Sharing tacit knowledge may involve risks to an individual, such as loss of competitive advantage over peers (e.g. Stenmark, 2000). And not just sharing, but also use of tacit knowledge may involve risks to an individual, such as a source providing incomplete or having a questionable track record (Holste & Fields, 2010). However, the processes of using, sharing, integrating, and creating knowledge can be influenced towards preferred directions and levels with knowledge governance mechanisms (Foss, Husted & Michailova, 2010). These governance mechanisms refer to both formal (e.g. goal setting, planning, directives, rules and regulations, residual

rights of control) and informal (e.g. trust, management styles, organizational cultures, communication flows, and channels) mechanisms that are used to impact behaviors related to organization's members engagement in knowledge processes (Michailova & Sidorova, 2011). Thus trust can be seen as informal or relational (see Olander, Hurmelinna-Laukkanen, Blomqvist & Ritala, 2010) governance mechanism, helping to overcome the tension between knowledge sharing and protection (Bogers, 2011). In the next subchapter I will take a closer look on previous research related to role of different dimensions of trust in processes of knowledge sharing and use.

3.2 Role of trust in knowledge sharing and use

As there may be risks involved and the knowledge creation processes require effective collaboration between individuals, mutual trust can be seen to promote interpersonal, complex knowledge sharing (Chowdhury, 2005) and be important for the effective knowledge transfer as well (Holste & Fields, 2005; 2010). In a study of trust formations in innovative collaborations by Hardwick, Anderson & Cruickshank (2013) from a starting point of codified and explicit knowledge, trust seems to foster the exchange and development of more contextualized tacit knowledge employed in the development of the innovation. The type of trust may also have implications for effective knowledge sharing and transfer.

Chowdhury (2005) has studied the role affect- and cognition-based trust has on complex knowledge sharing, suggesting that each of the two forms of trust has a distinct pattern of association to the complex knowledge sharing. The presence of one form of trust does not reinforce the influence of the other, as the two forms of trust did not produce any interaction effect on complex knowledge sharing. Complex knowledge sharing is possible without simultaneous presence of both forms of trust, but cognition-based trust demonstrates a stronger influence on complex knowledge sharing than that of affect-based trust. Hence in teams where knowledge sharing is critical, should be focused more on developing cognition-based trust than on developing affect-based trust. (Ibid.)

Holste and Fields (2005) in turn have studied the relationship of affect- and cognition-based trust with transfer of tacit knowledge. They state that adequate levels of both affect-based and cognition-based trust are required for managers and professionals to be willing to share and use tacit knowledge. Holste and Fields (2010) suggest that both warm personal relationships most likely developed through face-to-face interactions and strong respect for another worker's professional capability is required for the sharing of tacit knowledge. The tacit knowledge these workers have gained may be considered a valuable asset that will be shared mainly with those whom a good personal relationship exists and whose reputation for solid professional performance is established. Willingness to share tacit knowledge also requires some confidence that the knowledge will be appropriately and professionally used. (Ibid, 135.) As also Lee, Gillespien, Mann and Wearing (2010, 485) point out "few people will share work- and task-related confidences with colleagues they consider unreliable or incompetent". Yet, according to Holste and Fields (2010) the quality of the personal relationship with a co-worker has the most significant effect on willingness to share tacit knowledge, proposing that if there is no affect-based trust towards the co-worker, little tacit knowledge sharing may occur regardless of how competent the possible recipient may be. The perceived competence and professionalism of the source of the tacit knowledge is a more critical determinant of willingness to use such knowledge. (Ibid.)

Alexopoulos and Buckley (2013) have used concepts of professional and personal trust, exploring how these two types of trust may be associated differently with effective knowledge transfer in coworker relationships of varying duration. Personal trust is showed in disclosure of work-related and/or personal, often sensitive information to another. Professional trust on the other hand is manifested in reliance on another's skills, knowledge, and judgment, and may be based less on shared interactional history and more on macro-level or presumptive sources of evidence mentioned in chapter two, such as membership in a common social or organizational group, role expectations, reputation, regulations and codes of conduct. Research of Lee, Gillespie, Mann and Wearing (2010) have argued that disclosing sensitive, work-related

information and/or personal feelings and ideas to a knowledge source with whom a knowledge receiver has no or very short history of shared experiences may affect negatively the latter's relational appraisal of the former. (Alexopoulos & Buckley, 2013).

Alexopoulos & Buckley (2013) found that duration of a tie between a knowledge receiver and a knowledge source indeed moderates the positive effect of professional and personal trust on receipt of useful knowledge. According to them, professional trust is particularly important for knowledge transfer in newer relationships, whereas personal trust matters only in well-established relationships. Their results further suggest that reliance and disclosure can be better understood as distinct yet interrelated dimensions of productive knowledge-exchange relationships at work.

To conclude, trust works by creating a platform of confidence that fosters flows of information and the exchange of tacit knowledge (Hardwick et al., 2013), but there are differing results on the effects of different dimensions of trust on knowledge sharing and use. According to Chowdhury (2005) cognition-based trust is more important for complex knowledge sharing, while Holste and Fields (2010) suggest that affective-based trust is most important for sharing tacit knowledge, and cognition-based trust for intentions to use it. For example Ko (2010) has also argued that more personal trust, benevolent trust is more significant for transferring knowledge in long-term consulting projects. In general, As Alexopoulos and Buckley (2013) point out, the duration of relationship may be significant in determining what type of trust matters for most in knowledge transfer.

4 RESEARCH METHODS

In this chapter I will go through the research strategy as well the data collection and applied analysis methods. At first, I will briefly review the idea of case study, and then describe quite thoroughly the research process, including faced challenges, as they have affected the data collection and the chosen methods.

4.1 Case study as a research strategy

The case study research should be considered more as a research strategy than as a research method, as both quantitative and qualitative data can be gathered, and there are various ways to conduct an analysis (Eriksson & Kovalainen, 2008; Koskinen, Alasuutari & Peltonen, 2005). The case study focuses on understanding the dynamics present within single settings (Eisenhardt, 1989). According to Yin (2012, 5) case studies are relevant when one's research addresses either a descriptive question "what is happening or has happened?" or an explanatory question "how or why did something happen". In this study, the former type applies more. Descriptive case studies can offer interesting insights into the world of particular case. (Ibid.) Case studies can also be used to test theory or generate theory. Building theory from case studies involves using one or more cases to create theoretical constructs, propositions or midrange theory from empirical evidence gathered through cases. (Eisenhardt, 1989.)

Insights gained from case may be considered more important, if case is related to a situation which is normally not accessible to researchers (revelatory case), instances of successful ventures (exemplary case), one-of-a-kind situations (unique cases) or extreme conditions (extreme cases) (Yin, 2012, 49.) In the context of trust research, most studies have not been conducted in real-life settings and these type of co-creation teams are not very common, so this particular case has revelatory power and uniqueness in it.

A case is generally bounded entity (a person, organization, behavioral condition, event, or other social phenomena), but the boundary between the case and its contextual conditions may be blurred. When limited to a single organization one has a single case study. The case serves as the main unit of analysis in a case study. At the same time, case studies also can have nested units within the main unit, thus embedded subcases. Single case study can consist of embedded subcases within overall holistic case. (Yin, 2012, 6-7.) In this case study, aim is to form a holistic view on the co-creation project process within the case company, but also subcases (different projects) are taken to a closer analysis.

According to Yin (2012, 11) a good case study benefits from having a multiple sources of evidence. These may include direct observation, interviews, archival records and so on. Using these different sources, one should constantly check the consistency of the findings from different as well as the same sources, thus use triangulation. The most desired convergence occurs when independent sources all point to the same set of events, facts or interpretations. (Ibid., 13.) In this case study interviews form the most important source of data, but data from platform is used to strengthen the overall view of the case.

Researcher also needs to decide whether or not to use theory to help complete key methodological steps, such as developing research questions, selecting cases, refining the case study design, or defining the relevant data to be collected (Yin, 2012, 9). According to Yin (ibid., 28), the role of theory in case study is to provide a “blueprint” for one’s, like developing a story about how and why acts, events, structure exist. Also when building a theory from case study, an essential feature of theory building is comparison of the emergent concepts, theory, or hypotheses with the extant literature, asking what is this similar to, what does it contradict, and why (Eisenhardt, 1989). The theory-building process occurs via recursive cycling among the case data, emerging theory, and later extant literature (Eisenhardt & Graebner, 2007). In this study previous literature and theories about formation of fast trust were in a key role when planning the research design, research questions as well as the questions for interviews and

surveys. However, as later told, those needed to be adjusted to available projects and data. Concepts emerging from data were also compared to the previous theories.

Single or small set of cases cannot be generalized into larger population as in statistical generalizations, but analytic generalizations may apply. Using them depends on using a study's theoretical framework to establish a logic that might be applicable to other situations. The objective for generalizing the findings is two-step process. First involves a conceptual claim where researchers show how their study's findings have described the relationships among a set of concepts, theoretical constructs or sequence of events. The second includes applying these theoretical propositions to implicate other situations where similar concepts and constructs might be relevant. Thus, when one is concerned in generalizing, case studies tend to generalize to other situations on the basis of analytic claims. (Yin, 2012, 19.)

Next, I will describe the research process of this study to give an overview of how the data collection and analysis were formed to its final form.

4.2 Description of the research process and chosen methods

Leon, Möllering and Saunders (2012, 11) have presented the five key challenges that trust research faces; the dynamic process of trust; conceptualizing and describing trust in different contexts; researching tacit elements of trust; the role of researchers in shaping the trust situation they are researching; and research ethics of trust. In addition and related to these general challenges, there are several limitations related to measurement items of trust. These include the fragmented and idiosynchronic use of trust instruments, construct validity and the gap between conceptualization and measurement of trust (McEvily & Tortoriello, 2011, Dietz & den Hartog, 2006).

There is also a need to question the assumptions of universality frequently found in many frameworks of trust (Bachmann, 2012). The nature and forms of interdependence and vulnerability change according to the context and type of relationship (Gillespie,

2012, 180), and people from different countries and languages may develop and apply trust constructs in different ways (Ashleigh & Meyer, 2012; Münscher & Kühlmann 2012). Cultural differences and also swiftly diversifying nature of work and work settings can substantially alter the underlying causal dynamics of organizational relations, emphasizing the importance of contextualization in organizational research (Rousseau & Fried, 2001).

In this study, these were considered when planning a study. To get a better idea of this specific context, besides talking informally with company representatives, 6 pilot interviews for members of previous project were conducted to get a better overview of the projects and the roles participants had, as well as to test the thematic interview questions. These were also used to refine the measurement items to match the virtual and temporary co-creation contexts. According to original plan, the aim was to analyze the type and level of trust and its consequences longitudinally in three virtual project teams. This was to be done at three critical times during the co-creation process to understand how trust evolves in these teams. Interviews were planned to be conducted after the project. Three surveys were carefully planned with Professor Kirsimarja Blomqvist, with whom this research was conducted.

Thus, especially the dynamic nature of trust, as well as its context-dependability and measurement development were originally considered, when forming an original research design and questions. However, the final data collection and analysis were affected by surprises brought by real-time field study setting. As we had rare full data access to the case, the cases were planned to be chosen on the basis of theory. However, ideal cases could not be found, considering the schedule of research and available resources. Due to this, the original research setting as well as research questions needed to be adjusted to available data. Surveys were dropped out, and interviews were conducted during the collaboration in the current projects, and focus shifted fully to the analysis of qualitative data.

4.2.1 Data collection

The pilot interviews were conducted in February-March 2015, and available projects were looked for after first interviews. The data collection in the project A, B and C started during the spring 2015. The main data was collected through thematic interviews conducted via phone or Skype in June 2015. Thematic interviews are done with the help of selected themes and related questions (Tuomi & Sarajärvi, 2009). The themes are usually based on the conceptual framework, as in this research (themes were related to familiarity with team members and case company, experience in projects and virtual communication, communication and knowledge sharing in teams, relationships in the teams, perceived risks, normative actions, commitment, trust, critical success factors of projects and satisfaction on the teamwork, see Appendix 1.

A list of rather precise questions under themes was made, thus it resembles semi-structured interview. But also additional questions were sometimes asked if something interesting came up in the interview, and not all questions were asked in exactly same form and order as in the list of questions, which how it is usually done in semi-structured interviews (e.g. Tuomi & Sarajärvi, 2009). Some alteration had to be made also due to the fact that not all questions seemed to be relevant to the context of the project or the participant's experience. This way, interviews were partly close to open interviews, which allows researcher an intuitive and experience-based approach and possibility for intervention (ibid., 76). Participants were interviewed about their experiences and expectations about collaboration process and trust. As the three projects were going on during the study, they were asked how they perceived the success of collaboration and project in general so far. Interviews also included questions on critical incidents related to trust formations, as critical incidents in relationships can capture the dynamism of trust changing over time (Münscher & Kühlmann, 2012).

The main data included interviews of 26 interviews of 24 people, thus two people were interviewed twice: A) fourteen interviews from team members from three current projects (five people in projects A, four people in projects B and C) and b) eight

members from previous, already finalized projects, including six pilot interviews c) informal interviews from case firm representatives, made in December 2014 and January and May 2015. Sixteen interviews were made by Kirsimarja Blomqvist, four interviews by me, and six together. 23 interviews were conducted in Finnish, and three in English. Sixteen interviewees were male and eight females. There were participants from all five project roles, and of various ages.

The three teams consisted of 36 people altogether, based on the number of project's virtual platform members: eight in project A, 21 in project B and seven in project C, counted at the point when researchers gained access to the teams. Teams A and C had new members after that, but they were excluded from data gathering. Thus not all participants were interviewed. All the teams included one or two of the case company's founders, and they were not interviewed at this point. In project B, despite of large number of participants most of them were inactive. From this case, project manager pointed out possible interviewees, by their activity and newness to this kind of collaboration. Two of them declined and another was not included due to problems in schedule. In project A one person was not reached.

As the original plan in data collection could not be carried out, it was decided that more interview material would be gathered retrospectively from those who had participated in previous projects. Participants were mostly chosen by suggestions of case company and by a snowball method from interviewees. As mentioned, also the pilot interviews were used in analysis, although they were gathered in an exploratory phase. According to Yin (2012, 29) data collected during exploratory phase should not be used as part of the ensuing case study, but conducted as a separate task. However, I did not see this problematic in this case, as testing the interview questions provided rich material which could be used to provide a better overview on this project process.

In addition to interview data, non-participant observation was made about the team members' communication on the virtual platform for those three teams that were taking place during the study. Communication was analyzed from the beginning of the project

to the end of observation period. Thus the period from which there was communication available varied from six to one month. From the already finalized projects there was not such a data available.

Observation were used, as they may help to put studied things into context, and it is also shown, that interviews bring out norms related to some phenomena more strongly, than behavior related to norms. Observation may reveal this kind of contradictions, but also interviews may clear and explain the behavior. It may also offer more versatile knowledge about analyzed subject. (Tuomi & Sarajärvi, 2009, 81).

As this was non-participant, the participants of the project knew the researchers were doing their research, and all team members could see the name and picture (if one had provided one) of a person who was online on the platform, but researchers did not participate to any discussions or post anything to the platform. As the communication shown to all project participant was not highly interactive and consisted mainly on posts to the “wall” of the project, this was actually very close to analyzing communication archives. A description of action at the platform was made in result. I counted all posts and their comments, their contents and participants who had posted or communicated something. In additional I made notes on overall impression about the actions in platform. However, it appeared that perhaps more communication was done in the chat of the platform, which could be seen only to the people involved in that particular chat discussion, this data gives only partial view to the real virtual interaction. In addition, as interviews revealed, all projects applied other means of communication as well, especially e-mail and phone calls. Projects A and B were hybrid teams which also had face-to-face meetings. As the data from platform is used as an additional source providing more knowledge about team context, I did not find this very problematic.

4.2.2 Data analysis

As mentioned, the main focus in this study was in qualitative analysis of the interviews. In this study, prior theories about forms of fast trust and their development and

maintenance was guiding the process of choosing the interview themes and interview questions. Thus interview themes were derived rather deductively. However, in the analysis the inductive insights arising from the data were important, so the analysis follows an inductive approach (see e.g. Tuomi & Sarajärvi, 2009). Interviews were recorded and transcribed, and analysis was conducted following Gioia methodology, which was applied in analysis. Gioia, Corley and Hamilton (2013) describe the Gioia methodology as systematic approach to new concept development, and it is designed to bring what they call ‘‘qualitative rigor’’ to the conduct and presentation of inductive research.

The basic assumptions behind Gioia et al. 2013 approach are that the organizational world is socially constructed (e.g. Berger & Luckmann, 1966) and that people constructing their organizational realities are ‘‘knowledgeable agents,’’ so they know what they are trying to do and can explain their thoughts, intentions, and actions (Gioia et al., 2013, 3). Thus the approach aims to give voice to the informants in the early stages of data gathering and analysis and also to represent their voices in the reporting of the research, which enables discovery of new concepts rather than mere affirmation of existing concepts. (Ibid.)

Clear representation of informant voices is also important for the credibility of study. As Tracy (2010) states, one of the most important means for achieving credibility in qualitative research is thick description, referring to in-depth illustration of complex circumstantiality of data and providing enough detail that readers may come to their own conclusion about the scene. Showing data is critical to be able to estimate whether successful theorizing is plausible (Pratt, 2009). As Pratt (ibid.) suggests, data of this study is presented both in the body of the text and in tables, and power quotes were used to effectively illustrate points of the study.

As suggested in Gioia approach, in the analysis data was first organized into 1st-order concepts and 2nd-order categories. 1st-order analysis tries to adhere faithfully to informant terms, while 2nd-order is more abstract theoretical level of themes and

dimensions. In the 2nd-order analysis it is asked whether the emerging themes suggest concepts that might help to describe and explain the studied phenomena. (Gioia et al. 2013, 6). According to Gioia et al. (ibid.) particular attention is on concepts that don't seem to have adequate theoretical referents in the existing literature or existing concepts that are used in a new context. If possible, 2nd-order themes are further distilled into 2nd-order ''aggregate dimensions'' (ibid). These 1st-order terms, 2nd-order themes and aggregate dimensions formed a basis for building a data structure of the study, which is focal step in Gioia research approach, providing a graphic representation of progression from raw data to terms and themes in analysis. The aim in Gioia methodology is to further transform this rather static data structure into the dynamic inductive model. (Ibid.) The results of analysis are presented in the next chapter.

5 ANALYSIS AND RESULTS

In this chapter I will present the analysis of data and respond to the research questions posed in the introduction chapter. First, to outline the context of the analysis more closely, the case company, studied project teams and their communication on the platform are shortly described on the grounds of interviews, project descriptions, and observation on the platform. After more comprehensive picture of context is drawn, the interview data is analyzed in response to the research questions.

5.1 Description of the case company and projects

The case company is a startup set up by three founders. Company is offering an online advisory service for solving client's cleantech-related environmental challenges. Problems are related to different types of cleantech-related issues, such as smart investments in heating systems or bringing up solutions with positive impact on the seas and marine ecosystems. Clients can be companies, municipalities, nations and investors, for example. Solutions to problems are co-created in multidisciplinary project teams applying a virtual platform. According to the case company's founders, the collaboration is highly knowledge-intensive, and problem solving process is based on experience and intuition, and utilizing tacit knowledge is crucial. Length of the projects varies from one week to approximately six months, but in some cases it can be even longer.

5.1.1 Project process and teams in general

There are two different ways to build up a project, most common are the projects created, sold and orchestrated by case company. These teams include several members from case company, experts from network and representatives from client. There are also projects that are created by a member of expert network. All the experts are able to utilize the network. These projects have usually only one or two

representatives from the case company. There are approximately 5-15 experts and 1-5 client representatives in teams.

Five distinct roles can be found from teams: business lead, project lead, content lead, expert and client. Business lead is responsible for the sales and contacting the client, and project lead is the main point of contact for client and team during the projects. Project lead sets up and manages the project: e.g. arranges meetings, oversees progress, as well as develops the process and tools, manages the content on platform, archives work and manages feedback. Content lead is a leader of the expert team, and has an overall responsibility of the contents, guiding content during the project to ensure the quality. There may be more than one content lead, if project includes various types of content areas to be taken care of. Content lead's and project lead's personal contribution is about the same as that of 3-4 experts together. Leads may be from the case company, but they can also be from the network of experts.

Project process consists of three phases that are related to problem definition, co-creation and implementation of solution. The project starts from define phase, where business lead is the first point of contact for case company. At first, business lead and client are discussing about a problem client is having, trying to find out the core of the problem, as it is not always clear to the client at the beginning of the project. Business lead also finds and converts leads, and appoints a content lead for the project. The content lead finds and assembles the best possible expert team for the project. At the beginning, there is usually at least one expert that helps to formulate the problem and preliminary solution. The number of experts grows gradually and depends on the nature of the problem. Some experts may drop out later on, if it turns out that their expertise is not the most relevant for the project or is relevant just for the certain steps of the problem solving process.

In the co-create phase preliminary solution created at the define phase is refined and crystallized. Usually experts contribute when it most convenient to them and necessary for the project, according to case company, aim is to share ”right knowledge at the right

time”. Content lead draws the final conclusions with the client. The final phase is reached when the concept is ready and its implementation is endorsed. In this stage, business lead has an important role in implementation and closing the project.

The multidisciplinary teams are seen important for problem solving and creativity, as client would not get added value if all the experts were from the same field. Many clients are currently from Finland and about half of the experts are Finnish, but network is global. Some team members have previous contact with each other and some may be located in same city. This has also implications for trust formation process, which is discussed later in the analysis.

According to the case company, project teams apply both synchronous and asynchronous means of virtual communication. If the client is in Finland, first meeting may be hold face-to-face, otherwise they are conducted virtually. According to interviews with the company representative, most important ways of virtual communication are: a) sharing knowledge by posting it to the platform and notifications from the platform (about new members, posts etc.) to the e-mail b) discussion through chat and c) virtual meetings via Google hangout. But the means of communication vary, as mentioned in previous chapter, and some projects rely more on virtual communication while others have regular face-to-face meetings.

To conclude, the degree of virtuality varies from project to project. Although the organizational boundary spanning element is present in all projects, the geographical distance varies from local to global and the extent of using virtual platform and communication technologies in project ranges as well. Overview on three projects that were taking place during the study are presented next.

5.1.2 Studied projects and their communication on the platform

Project A was located in Finland and was in the co-create phase during the study. Its goal was to create a report about the topic of the project. By the end of studied two-month period in 2015, there were 10 participants on digital platform, all Finns. Co-creation was aimed to take place with experts, investor candidates and clients. Project B was also located in Finland and it was in the define phase during the study. The aim of this project was to create new solutions related to the field of the project. Co-creation was to take place among local companies, representatives of the client and experts. At the end of studied period there were over 20 participants in digital platform, but clearly most of them were not active. One member was not a native Finn. Project C was located in European country outside of Finland, and this project was at initial stage of define phase. By the end of studied period there were nine team members of five different nationalities.

Projects A and B had started before researchers entered the platform. All the messages posted on the platform were shown to all participants in the projects, and they could be viewed from the beginning of the project. Thus, also messages sent to the wall of platform prior to the research period were also visible. However, the chat messages were not available for research, as they were shown only to people included in the chat. Additional feature was “liking” the posts, similar to Facebook.

In project A, there were seven participants out ten who provided some posts to the platform during the study. In three months total of 41 messages were sent, of which 23 were sent by project lead. Posts got total of 30 comments and 27 likes. Ten posts were project managerial type including general information about project, such as upcoming events or adding new members to the project, 22 were related to document sharing, six asking or providing commentary, one about giving task to experts, one sharing of topic related knowledge and one message containing pictures for fun. Comments were mostly related to asking and providing additional knowledge related to the post’s topic, some encouraging note was sent as a response “Great!”

There seemed to quite little interaction on the project platform visible to all project members, and most posts were sent by project lead, three experts didn't post anything. Many posts didn't get any comments, and two clients and two experts didn't send any comments. There was perhaps more interaction through chat on the platform. This was a hybrid project applying face-to-face meetings, phone calls and e-mailing in their communication in addition to digital platform. Other means of communication were emphasized in project A, which was probably in part due to the locality of project and familiarity of key participants. In interviews also task was mentioned to effect usability of such virtual platform and collaborative innovation in particular task, suggesting that this project's task was less complex and didn't require as much actual creative collaboration.

In project B, there were four people who provided posts out of 21 listed as participants. 16 posts, 13 comments and 15 likes were sent during six month period, 13 posts were sent by a project lead, as well as all but one comment. Three posts included asking for comments and more information, seven posts information related to the upcoming events, one was information about research, three sharing documents and one about solution available in expert's firm. In comments project lead encouraged to share knowledge about previous solutions to the platform, and also shared articles and knowledge about available solutions, as well as notes about meeting and more information on schedule of the project and upcoming meeting.

Thus, in project B there were almost no interaction on posts, and there were not responses for quite direct calls. Based on the interviews, there were e-mail type asynchronous communication via chat channel of platform, rather than live chat, about settling schedules for meetings, asking clarifying questions and responding to them and so one. On the basis of interviews, this was also hybrid project utilizing both face-to-face and technology-based communication. Project had face-to-face meetings, and for example e-mails and phone calls were used in communicating with other team members. One participant estimated, that about 50 percent of team's communication

was virtual, and of that 50 percent was on platform, while other estimated even lower percentages for the platform use. Among other things, early phase of collaboration and the locality of the project perhaps affected platform activity. In interviews it was also suggested, that all members were not adapted to using virtual tools.

In project C, there were ten messages posted during the four week period, but no comments were sent. Four posts were sent by project lead, two by content lead, and four members sent one post. Two posts were related to document sharing, six posts included project managerial communication such as welcoming to the project and introducing new members, information about research, event information about meeting, instructions and informing about making notes on document. In three posts members told their availability for meeting. Thus there were only little interaction, but there were probably more interaction through chat also in this project. As this project was at very initial stage during the study, and it might have affected its virtual activities, as there were not too many issues to discuss at that point. Overall, this was the most virtual of these projects, applying other virtual tools such as Google docs, e-mailing and phone conferences in their communication in addition to using digital platform.

To sum up, there seemed to be rather little interaction on the platform that would have been visible to all members, and majority of visible posts seem to be either project management related information or document sharing, thus rather explicit knowledge sharing. Based on the participant interviews, the extent of platform use and use of technology-mediated communication in general seemed to depend in part on the location of the project and the distance between members. In more local projects it perhaps seemed less relevant tool, especially if participants were familiar with each other. Also the type of task and how adapted team members were to the virtual work in general seem to have effect for the extent of communication on the platform. These issues were also related to the nature and role of trust in these teams, which I will further analyze in next subchapter.

5.2 Nature and role of trust in teams

In this subchapter I will answer my subquestions *What forms of trust can be found and what is trust based on*?,*Are there any barriers to trust and what kind of actions could build trust?* And finally*, How do participants perceive the role of trust in relation to knowledge sharing and collaboration in projects?* These are answered on the basis of interviews of team members from projects A, B, C, as well as the members from already finalized projects. Case company's founders' interviews are also used in analysis to reflect leaders' view.

5.2.1 Forms and bases of trust

Contrary to the original research idea, in all projects, including people from already finished projects, there were more members that were familiar with each other than it was originally expected. Either the participants were familiar with leaders of the case company, which were also leading the projects, and/or familiar with one or more other team members, usually experts. This was related to rather narrow pool of actors. In project A there was two participants who told they knew all team members.

> "I knew all the participants in this project, but not in earlier ones. In Finland it's a small circle. But when we go abroad participants may be more unfamiliar".

Thus, in all current and finished projects knowledge-based trust, knowing the other well enough to predict their expertise and behavior, such as preferences, ways of thinking and responding (Lewicki & Bunker, 1995), was found: "Knowing those experts, you know they know". This trust was more a cognitive trust, rational expectations that a trustee will have the necessary attributes to be relied upon (Komiak & Benbasat, 2004). In addition, some participants had even formed trust that could be called affect-based trust (McAllister, 1995) relational trust (Rousseau et al., 1998), or perhaps even identification-based trust (Lewicki & Bunker, 1995; 1996), as there were some signs of

more affective relation. However, this was not very typical for these teams.

> “First of all because I knew the guys, so I like them personally and respect them and of course, it's nice to work with these guys. We have some kind of trust, we have some kind of relation.”

In all projects there were also participants who were not familiar with all members. Thus, also signs of rapidly evolving trust were found, especially in project A and B. Statements such as “I believe we have trusted each other from the beginning” hint that there was rapidly evolving trust present, developed via tentative and assumption-based antecedents. Overall, it appeared that the type of rapidly evolving trust was rather de-personalized in nature, as there were not exchange of personal information or signs of affection among less familiar participants, especially on virtual platform. Disclosing personal information didn’t appear that important for interviewees, “I don't think it would be worthwhile to talk about informal issues”, and one member from finalized projects was suggesting that there were enough material on platform without disclosing personal issues. Few interviewees told there were some personal exchange face-to-face, but only with members they had previously known. Otherwise communication was told to be very professional and task-oriented, as it also appeared while observing the communication on platform. This was perhaps also related to group dynamics, effected by client presence. Some suggested that communication should very professional, as the clients could also see discussions.

> “It can't be chat-type discussion because client is also there, and other stakeholders as well. Communication needs to be very factual. It’s not an ideation wall where you could throw anything.”

In addition of being depersonalized, trust seemed to be assessed via cognitive reasoning based on assumptions. Thus, the nature of rapidly evolving trust forms appeared to be closer to initial (McKnight et al., 1998) and swift trust (Meyerson et al., 1996), rather than fast trust (see Blomqvist et al., 2002; 20059.

Yet, it needs to be noted, that since members had knowledge-based trust to some team members, the group's trust dynamics were different from situation where one doesn't know any participants. One interviewee from one of the finished projects, who knew only client representatives but not case company's representatives nor experts, described that in a way trust didn't really start from zero point: "I didn't know others, but part of the team knew each other well. It helps a lot, when it doesn't start completely from a scratch." Thus the trust between some participants to a certain degree could have "rolled over" the trust to a group level.

To the question about bases of trust, there clearly was **history-based trust** (Kramer, 1999), rooted in personal experiences and shared work history with trustee, forming knowledge-based trust. Also the more affective and relational trust that was found was based on personal experiences. Knowledge-based trust was in this case especially connected to forming trusting beliefs about leaders' or experts' competence. History-based leader competence was connected for example believing that leaders were competent to select most suitable experts for projects on the basis of previous experience. Also one of the company founders brought this up, stating that initially, as business lead often knows client beforehand, that trust to business lead "will carry through the time of insecurity".

It needs to be noted, that I have called this component of trustworthiness reflecting the requirements and abilities needed to perform specific task as competence like McKnight et al. (1998) instead of similar ability (Meyer et al., 1995) or capability (Blomqvist 2002, 2005), as in this case it seemed to be assessed largely through work history, either via personal experiences or references. Yet, I have followed Blomqvist (Ibid.) in naming the belief related to moral responsibility and positive intentions toward the trustee as goodwill, and adhering to set of principles acceptable from the trustor's point of view as integrity similar to Meyer et al. (1995).

But also rapidly evolving trust related antecedents could be found. Partly these were perhaps speculative, reflecting these type of projects in general, due to the presence of knowledge-based trust in these particular projects, which made their assessment more difficult. In project C there had been so little collaboration by the data collection, that assessment was perhaps even more difficult. The bases of trust by projects has been presented in figure 1. Data structure of this analysis has been presented in detail in Appendix 2.

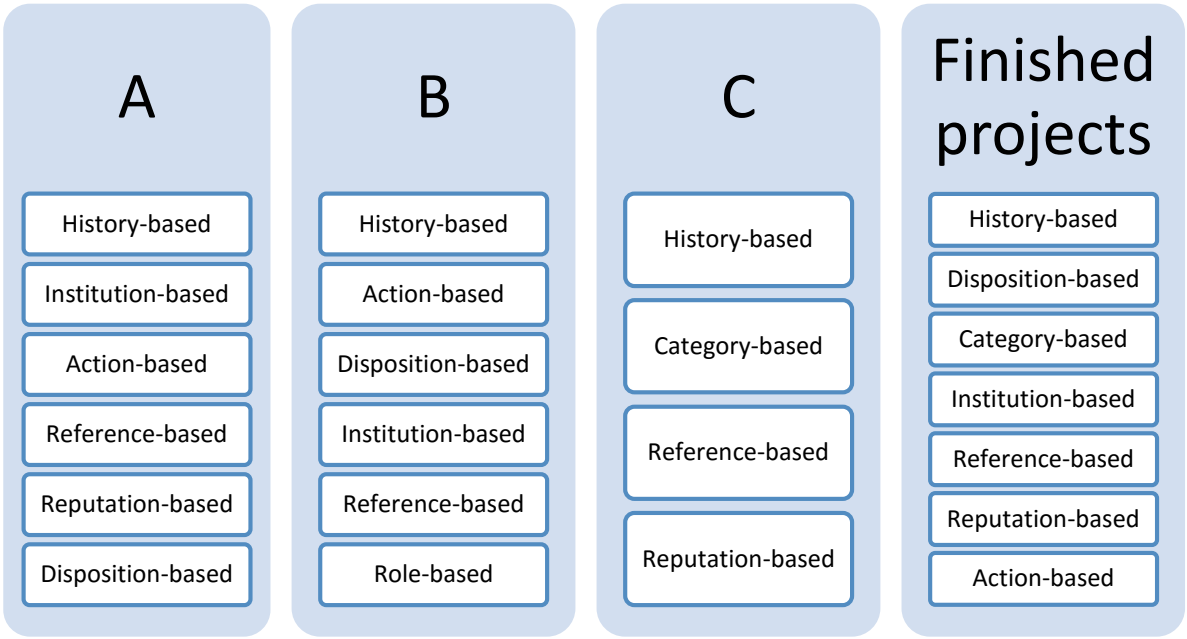

Figure 1. Bases of trust in different projects

In general, the rapidly evolving trust was based on what I have called **reference-based trust**. This type came up in all projects. It was not based on personal experiences but on information about one's relevant working history, such as what kind of cases they had previously done and how successful they had been, presented through descriptions from case company's website or services like social networking websites, or by introduction in first meeting. References were considered important, as they were seen to enable swift assessment of team member's competence. Related to references is what I have called **reputation-based trust**, which is similar to third party -based trust

by Kramer (1999) and cognitive processing of reputation inference by McKnight et al. (1998), derived from second-hand information about reputation communicated by person who has experience with the trustee. Main difference between references and reputation is that latter information is produced by a third party. Reputation was also connected to narrowly defined labor pool, so the reputation of pool members are known and people are comparably vulnerable due to the interdependence, as Meyerson et al. (1996) suggested. Reputation-based trust could be related to competence, but also goodwill and integrity of person. This type was not as prominent as references.

McKnight et al. (1998) described unit grouping and stereotyping belonging to the same cognitive processing by categorizations as reputation inference, but I have labeled the first two belonging to **category-based trust** introduced by Kramer (1999). It refers to trust predicated on information regarding a trustee's membership in a social or organizational category, which often unknowingly influences others' judgments about trustworthiness (ibid., 577). Although this was not a common antecedent, some signs of unit grouping, strengthening the positive beliefs about other by placing them into same category as oneself (see McKnight et al., 1998). They were related for example to similar values.

> "Trust is there when you join the platform, clear that share same values and try to be part of the team."

Other source of category-based trust by unit-grouping were perceived similarity of personality and national identity of as Finns trustworthy actors. "With Finnish experts it doesn't even come to mind, that somebody's ideas would be stolen." This can also be seen as part of positive stereotyping, from which positive trusting beliefs about the other can be formed swiftly (McKnight et al., 1998).

Disposition to trust was mentioned to build rapidly evolving trust in the projects A and B and finalized projects. This **disposition-based trust** varies among different people, reflecting tendency to be willing to depend on others (McKnight et al., 1998). Some

interviewees, including company representative, brought up that disposition to trust would be especially typical in Finland, leading to high initial trust. “In Finland everyone primarily trusts until you lose it, elsewhere you may need to build it.”

This also points to a fragility of initial trust, which, as Gambetta (1988) has put it, is not based so much on evidence, but the lack of contrary evidence. As its antecedents are tentative and assumption-based by nature, this makes trusting intention fragile (McKnight et al. 1998). Interestingly disposition to trust didn’t come clearly up in project C with most non-Finnish participants, but it might just have been due to lack of team’s collaboration at that point, and presence of knowledge-based trust, which made assessment rapidly evolving trust more difficult, as mentioned.

I followed McKnight et al. (1998) theorizing also in naming one source of trust as **institution-based**, which is similar to rule-based trust by Kramer (1999). This category comprised of antecedents that are related to situational normality and structural assurance elements. It included the existence of norms, rules and shared goals, as well as general trustworthiness of a case company, that is to say, contextual conditions supporting successful collaboration (see McKnight et al., 1998) and even community building. Thus these related to company’s structures and procedures enabling trusting beliefs that involved actors are competent, and there are integrity of actions present. As the case company is small start-up, there was actually a rather thin line between impersonal institution-based trust and trust in leaders. These institution-based antecedents came up in projects A and B as well as finished projects, but in project C this was not prominent.

While institution-based trust was connected in part to norms and rules, I called related category **action-based**. It was related to actions of experts and leaders. Expert actions comprised of following those set norms and rules, as well as of active and reliable behavior, “working briskly and fairly”, as one interviewee phrased it. Expert action was thus providing beliefs especially about goodwill and integrity of unfamiliar team members. In leader dimension action-based trust was related to swift assessment of

leader competence through their actions, for example active behavior supporting team functioning.

> "How he introduces people and synthesizes thinking and informs of new things related to the project. His behavior is active and he seems to be a right person for this type of work."

Through action trust can also be assessed "once you act, you will see". As Meyerson et al. (1996) stated, reciprocal enactment of trust behaviors provide social proof that acting in trusting manner is reasonable. The leader dimension of action-based trust was close to what Meyerson et al. (1996) described contractor role to be in temporary teams, yet in this study the competence component was more emphasized than goodwill or integrity elements.

Role-based trust (Kramer, 1999, 578; see also Meyerson et al., 1996) came up only in one response, and as in form of role acceptance rather than role itself providing swift trust. Role-based trust is predicated on knowledge that a person occupies a particular role in the organization rather than specific knowledge about the person's capabilities, dispositions, motives, and intentions (Kramer, 1999, 578). One can argue that in a way reference-based trust is close to this role-based trust, as it also reflects the roles and positions one has occupied previously, yet in wider and also more retrospective scope. In this case knowledge of one's prior work history might have been considered as a stronger cue of one's competence than one's role in project or role in trustee's own organization. People in these project teams were from several different organizations, and the roles in projects were perhaps rather ambiguous (such an expert) to create confidence that the mere role occupancy would signal both an intent to fulfill obligations associated with roles and competence in carrying them out (ibid.), which might in part be reasons why this antecedent of trust didn't stand clearly out. As role-based trust is developed from and sustained by people's knowledge regarding the barriers to entry into roles (ibid.), and this was not in all cases clear to participants, it might have been another reason that this didn't commonly form a basis for swift trust.

To conclude, it seemed that reliance dimension of trust, willingness to rely on another's professional skills, knowledge, judgments, and actions (Alexopoulos & Buckley, 2013; Gillespie, 2012) was more present than disclosure of personal information (see Gillespie, 2012; Lee et al., 2010), perhaps due to temporary nature of the teams. In table 2. main bases of trust and related trusting beliefs are presented.

Table 2. Main bases of trust and related trusting beliefs

Form of trust	Bases of trust	Trusting beliefs	Projects
Knowledge-based trust	History-based	Competence	A, B, C, finalized
Swift trust	Reference-based	Competence	A, B, C, finalized
	Institution-based	Competence, integrity	A, B, finalized
	Action-based	Integrity, goodwill, competence	A, B, finalized
	Disposition to trust	Trust in general	A, B, finalized
	Reputation-based	Competence, integrity	A, C, finalized

Thus, trust in these projects seemed to be history-based in a form of knowledge-based trust and more relational form of trust that was found. Rapidly evolving trust was especially reference-based, institution-based, action-based, disposition-based and reputation-based. History- and reference-based trust seemed to be connected to competence beliefs, institution-based and reputation-based to competence and integrity, action-based in expert dimension especially to the beliefs about integrity and goodwill of participants and in leader dimension to competence beliefs and disposition to trust to trusting beliefs in general. There were also signs of category- and role-based

trust. It could be thus called swift trust. Although role-based trust (see Kramer, 1999; Meyerson et al., 1996) was mentioned only once, when member roles are discussed in relation to trust barriers and role of trust in teams, the importance of role clarity comes up.

5.2.2 Barriers to trust and actions building trust

Trust in projects seemed to be rather stable, in general interviewees could not distinguish critical incidents that would have deteriorated it, and only few had experienced incidents that would have clearly improved it. There didn't currently seem to be major trust-related problems in project teams, perhaps because especially knowledge-based trust to some team members was carrying it so strongly, but interviews suggest that some barriers to trust existed.

In project B it was suggested that low activity on platform was connected to distrust towards virtual working and open knowledge sharing, due to lack of adaptation to new way of working.

> "Maybe it is not trusted. This is still new way to work to some people, that one shares knowledge a bit more openly and discusses more openly."

This was especially seen to be related to generational differences. Younger participants were seen to be more adapt to virtual work, while older participants were having a stronger psychological threshold for using virtual tools. Also some field-related differences in adaptedness of virtual work was suggested. This was also brought up in case company's founders' interviews, where it was stated that when younger team members have entered the platform, they haven't hesitated posting as much as older members, as younger people have been more used to sharing their ideas virtually. Senior experts, on the other hand, have been used to analyzing things thoroughly before presenting solutions, and according to a founder, for them sharing intuitive ideas and participating in the platform have seemed to be more difficult because they have

high psychological threshold “to let anything but godly truth out of their mouth”, which was seen an issue for trust building.

Related to knowledge sharing intentions, it seemed that safety and general instructions of virtual platform use, as well as the access of different users to shared knowledge were not clear to all participants.

> “I think many people are afraid of sharing knowledge there (on the platform), maybe they don’t understand who can see it, even though the platform is simple.”

Thus, one barrier to trust was the lack of structural assurance (McKnight et al., 1998) mechanisms that would make open knowledge sharing on the platform feel safe. Safety of knowledge sharing and consequently knowledge sharing intentions seemed to be affected by the lack of role clarity in relation to non-active members. For example one interviewee mentioned being bothered by non-active team members described as “stalkers”, as you couldn’t know why they were there and if they had access to shared materials. Other mentioned problem related to lack of structural assurance was that general operating model of project was not clear, including involved experts and daily fees.

In project A, as well as in some interviews from finished projects, it was questioned would trust be possible in virtual and temporary teams altogether, mostly due to the lack of face-to-face interaction. Lack of face-to-face interaction was also related to lack of personal cues.

> “I've never got so much virtual trust, that I had never seen the person and there was very high trust.”

Virtuality was seen to hinder swift assessment of whether to trust or not, for example because the assessment of personality was seen more difficult, in line with media richness (Daft & Lengel, 1984) and social presence (Short et al., 1976) theories. This was not seen as big problem in current team, as there were familiar members and face-

to-face meetings, but interviewees were bit skeptical on wholly virtual working model. Additional trust barrier was time constraint in temporary teams, one interviewee stated that “You can’t really build trust within such a short project”.

In addition some history-based barriers, related to experiences of inactivity, were brought up in some interviews. Also low quality of shared knowledge and involuntary participation in platform discussion were mentioned. Category-based barriers such as stereotyping and out-group categorization, and personality-based barriers such as aggressive personality were brought up as hindering trust formation, but more on a general level rather than being experienced in these projects.

One participant from already finalized projects also stated, that although there was trust now, larger pool of experts might change the situation.

> “It's a nice group, I've learned. But if they are growing it, and there will be 100 000 experts, then you won't know what’s going on.”

These indicate that trust building should be considered carefully, when aiming to scale business and use virtual platform more actively in co-creation process among less familiar team members. As there were some lack of adaptation to virtual work, lack of structural assurance making knowledge sharing to feel safe, and doubts about possibilities of virtual collaboration in general, these might have been related to quite low activity of platform discussions.

Trust building mechanisms that could be used in these teams to intentionally build trust reflect these discussed bases and barriers of trust. Main forms of suggested trust building mechanisms are presented in figure 2.

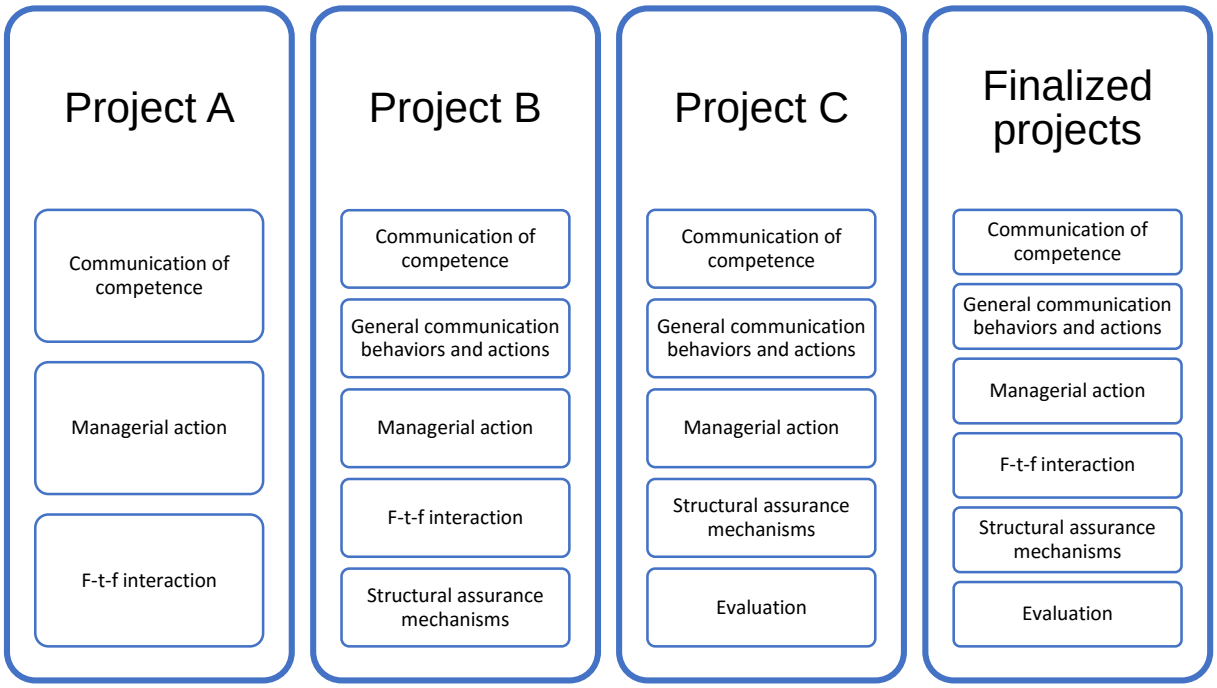

Figure 2. Suggested trust building mechanisms

In all projects came up an activity which I called **communication of competence**. As one important source of trust was reference-based, it is understandable that clear descriptions of experts' expertise on the company website or other web-services, and introductions of new members including relevant work history could be used to build rapidly evolving trusting beliefs, in this case especially on competence. Some members from projects A and B had already experienced that in their project, and one interviewee told that unknown team members' openness about their competence had probably increased trust to them. Communication of competence could perhaps also support building a sense of expert community, as it could strengthen the categorizations of others as competent experts.

Other **communication behaviors and actions** (see Jarvenpaa & Leidner, 1999) than just communication of competence, in forms of for example general introductions, could

also been seen as supporting trust building and perhaps also grouping process. Communication of competence could naturally be seen as specified sub-group of this category, yet presented separately, as it was brought up more commonly and was so competence-focused. I labeled here more general introductions than those focused on expertise, and active behavior in discussions, which was mentioned as a trust building mechanism on project B.

> "Being actively present in the meetings, and participating in throwing ideas around and not freeriding, like others are trying and others are just cherry-picking."

Active behavior in discussions could thus support especially beliefs about member goodwill. Also **performance**, assessed for example through success of collaboration, was seen to build trust, enhancing the competence belief.

Evaluation was suggested to build trust to strangers, this was mentioned in project C and in one of the interviews from previous projects. This could include evaluation of team members by their leader, but especially expert rating provided by fellow team members after collaboration, serving as a reputation regulating mechanism. Again, it was suggested that this would perhaps increase trust on other's competence, but more importantly expert rating as evaluation and reputation mechanism could help to assess and communicate the goodwill and integrity of actor, showing that "This guy follows rules and good ethics, and this stole my information and used it". This was seen important especially in a situation where network is expanding and there will be more unfamiliar participants, and swift assessment of trustworthiness comes more crucial.

In projects A and B, and already finalized projects **face-to-face interaction** was mentioned as an important trust building mechanism. One interviewee stated that not even interaction via video could replace the face-to-face contact, as "even face characteristics can tell of trust". Some interviewees also suggested relatedly the need for personal contact to be able to build trust. "With plain CV one cannot build deep trusting relationship". Thus, interestingly, although more personal communication was

not seen focal when asked about disclosure, face-to-face interaction and more personal touch were seen to enable “deeper” trust. It could be used to strengthen both rapidly evolving trust and knowledge-based trust, perhaps also relational trust, although it was not explicitly stated. With more personal contact perhaps fast trust could also be created. Some interviewees suggested though, that trust creation requires long term collaboration and for example teaming same people again, thus “real” trust was seen to emerge via incremental trust formation.

Interestingly, in the most virtual project C face-to-face interaction didn’t come up as suggested trust building mechanism. Yet one member stated, that occasional face-to-face meetings would be important in communicating with clients, as they were not adapted to virtual work, but in expert work physical presence was not necessary. Perhaps due the distance between members virtual means of communication were accepted, and members might have been more used to virtual work, as one member put it, “Let's say I have experience to share documents or information with others, while they're not sitting next to me”.

As there were some feeling of lack of structural assurance, securing safe knowledge sharing by clearing up safety issues and providing clear visualization of different roles on platform, for example by presenting why inactive participants were attached to the project, could be seen to build trust. Related important trust building mechanism was what I called as **managerial action**. It included normative actions as well as the general idea of salience of leader role, communications and actions in building trust. I categorized normative actions here, as these teams were not self-organized (see e.g. Crisp & Jarvenpaa, 2013, Jarvenpaa et al., 1998), and setting and monitoring performance norms were seen as a managerial tasks. For example clear rules how to act, or how and where to share were called for. So far, rules and norms in teams seemed to mainly emerge in the course of collaboration rather than be explicitly stated. Interestingly, one of the founders also brought up this issue, stating that on virtual platform need for clear management seems bigger.

> “When I have previously lead top experts in my teams you really can't control them, it's more like they are controlling management. But here on the virtual platform, the need for control is rather big, and the control is accepted. (--) The experts are always asking for it, please tell more precisely what is expected of me.”

Thus, in virtual co-creation context, maybe especially with those participants who are less adapt to virtual work, the previous experiences about leading experts may be challenged. This differs from example from Piccoli and Ives (2003), who have argued that behavioral control mechanisms, for example the definition of explicit work assignments and specification of rules and procedures, have significant negative effect on trust in virtual teams. It needs to be noted that among interviewees there were also opposite suggestions, that more precise rules were not necessary “I don't long for them, nobody would follow them”. One can conclude, that careful consideration of each team’s premises and needs are required to find most appropriate ways to manage and build trust in them.

Finally, I will analyze participants’ perceptions about role of trust in team’s knowledge sharing and collaboration.

5.2.3 Role of trust in knowledge sharing and collaboration

In accordance with previous literature, and as the presented trust barriers have already suggested, trust seemed to have pivotal role in knowledge sharing and overall collaboration of problem-solving teams. As separating the roles of knowledge-based and swift trust forms was rather difficult, I have discussed trust in general, unless other stated. Due the very early phase of collaboration in project C, role of trust was not discussed as much in those interviews. Among members of other current and finalized projects, trust was most often brought up as a knowledge sharing enabler.

> “Trust is a necessary condition, I wouldn't say anything if I had some kind of idea that it would be misused.”

Trust was mentioned to be important for sharing work-related confidential knowledge such as trade secrets. Thus, trust can be considered helping to overcome the tension whether to share or protect knowledge, as for example Bogers (2011) suggested. Trust was seen crucial for not only sharing knowledge, but get engaged in collaboration in the first place.

> “On the whole it starts from trusting that what’s put here is this group's matters and you don't tell others about it. It requires pretty much 100 % of trust to come here (to the platform) and discuss.”

Thus trust was seen promoting action, and being the basis for collaboration, “the Alpha and Omega” of project work. It might well be, as Jarvenpaa et al. (1998) stated that action is both antecedent and outcome of trust in virtual teams.

> “Absolutely important. It probably is in any case the basis of many things. Otherwise it will be like "is this working" or "can I do this". Then comes the insecurity and hesitation that are things working. Through trust are so many things done, and if you lose it once, we know that gaining it back is very difficult.”

Swift trust probably has enabled thus overcoming the threshold for participation and by managing uncertainty, as Meyerson et al. (1996) suggested, yet remaining rather fragile. As the role of trust in promotion of knowledge sharing and action was focal, consequently trust seemed to also have a role as an overall coordinator of effective collaboration and performance in teams.

> “Project goes further, information is shared, knowledge and competences are shared, it has an impact on everything. If you can’t trust another person it slows down the activities in the project”.

Trust in team and trustworthiness of platform were also mentioned as belonging to the most important success factors of the projects by some interviewees. The role of trust in promoting effective collaboration and being a critical success factor came up especially in client views, perhaps because project outcomes were understandably in their focus and important in forming the value perception. The perceived roles of trust are presented in figure 3.

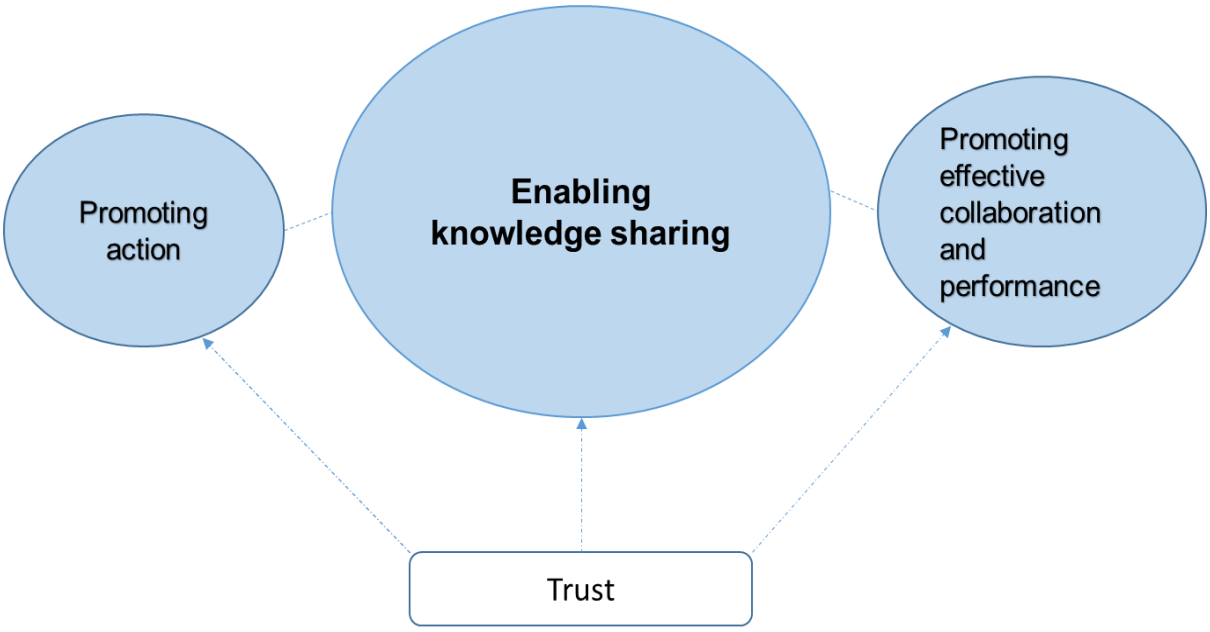

Figure 3. Role of trust in problem-solving teams

In addition, trust was mentioned to have role in network building as well as in positive team climate creation. Trust could also substitute contracting in general, one interviewee told that trust towards the founders made contracts unnecessary. But swift trust may not be enough to work as that kind of substitute. Other interviewee mentioned need for contracts instead of just trusting “It probably effected that I had not worked with project manager before”.

Contrary to other views, one interviewee stated that trust actually enabled knowledge protection, because if others are trusting your expertise, you don't have to share everything, “You can say it's number five but you don't have to tell how you got the result.” Thus, also some knowledge protection seem to be present, in part related to the nature of expert work, in which retaining the value of your expertise can be seen important and thus knowledge protection strategies applied. And as mentioned in previous sub-chapter, some barriers to trust were connected to knowledge sharing, such as not trusting the new way to work and some lack of structural assurance mechanisms that would support open knowledge sharing on the platform. For example unclear roles of those members that were attached to the platform but were not active, were suggested to have affected knowledge sharing intentions and thus perhaps hindered open knowledge sharing for some participants “Then comes self-censorship, what can I put there, if they have access but don't share**”.**

According to the interviews, and in line with Aarikka-Stenroos and Jaakkola (2012), the most valuable knowledge for problem solving seemed to be expert knowledge, experiece and contextual knowledge, thus rather complex knowledge. In general, the platform seemed to support mostly explicit knowledge sharing as previous theorizing (e.g. Nonaka & Konno, 1998), have suggested. Sharing of that knowledge seemed to happen outside the platform, or being converted into explicit form on platform. Perhaps this was also related to how the platform is used, if following Nonaka and Takeuchi (1995) model, tacit types of knowledge could probably emerge more from active discussions, which could be supported by trust building. Again, one needs to take into account that researchers didn’t have access to chat discussion archives, and in projects B and C there had been rather little of sharing either tacit or explicit knowledge, due to the phase of the project, so you could not draw too far reaching conclusions on shared knowledge types in these projects. Yet, in already finalized projects platform had supported mostly explicit knowledge sharing. As mentioned, activating discussions on platform might have changed that.

> “There could be more discussions, there have been good suggestions and experiences have been shared, but perhaps I'm longing for more commenting. Are things working after all, because there are always counterarguments, so there would be more perspectives. Because some things may not work in specific contexts.”

Via discussions perhaps even more of complex knowledge could be shared. This would be also important on the whole in the co-creation process, as the value creation requires sharing critical knowledge and dialogic communication (e.g. Prahalad & Ramaswamy, 2000). Few participants suggested, that open ideation and knowledge sharing would require perhaps more personalized and history-based trust. “Trust, where people feel they can really throw any idea around, requires that people know each other at some level, which takes time.” More mature, incrementally developed trust could be seen to promote more open knowledge sharing. This was related to the importance of being able to know how one reacts before communication can be very open. This might also be related to experienced affect, as Holste and Fields (2010) state without affect-based trust towards the co-worker, little tacit knowledge sharing may take place.

It needs to be noted, that the knowledge process which was used to solve a problem appeared to be more like knowledge integration than creating completely novel knowledge. The process could be described for example as puzzle solving: “Everyone brings their own part, and we will compile the big picture from them, and get the puzzle solved.” Thus synthesis of the knowledge was achieved by collecting participants’ piece of experience, which were compiled together to a solution. This was not a flaw considering the tasks, which varied from concept design to creating a report, and in general co-creation activities can comprise of different types of knowledge processing including integration of knowledge to provide a customized solution that satisfies client needs (Bettencourt et al., 2002). When the project tasks didn’t require exactly novel knowledge creation, swift trust might have been enough to support the project’s task, and of course, these teams in general did not rely on just swift trust but also knowledge-

based trust. The nature of the task also seemed to be related to the perceived need for open discussion. One interviewee stated that “Open discussion could have just slowed down this fact-based project phase.”

While in general trust was considered important for project team functioning, there were some differentiating views, reflecting personal dispositions and personal preferences, and effect of varying task and role clarity, when assessing the role of trust.

> “I wouldn't emphasize it too much. I think it’s perfectly normal that you can’t trust all people, and some don’t carry tasks fast and so on, but it shouldn’t have an impact on your work. We have clear tasks. Each has his/her own task and if you have taken care of it, then you've done your share well. It has been very rare that you have to patch someone's expertise up.”

It seemed that among interviewees there were differences how clear the roles in projects were perceived, some told they knew that it was very clear, while some others saw them as more emergent. This might have been again related to task of the projects. Clear roles and task division, as well as the less complex nature of task may lower the required interdependence of actors, decreasing the risk in collaboration and thus diminishing the role of trust (see e.g. Meyerson et al., 1996). On the other hand, if co-creation activities are very interrelated and need sharing more intuitive insights, perhaps, it can be questioned whether de-personalized swift trust is enough to enable that, and more personalized fast trust (Blomqvist 2002; 2005), or history-based trust forms such as knowledge-based or relational trust would support that.

I will conclude and discuss the results of this analysis in next and final chapter, and also present theoretical and managerial implications, as well as limitations of this study and suggestions for future research.

6 CONCLUSIONS

The objective of this case study was to empirically investigate the nature and role of trust in temporary virtual problem-solving teams. As previous research on trust in temporary and virtual teams has mainly been conducted in student settings, the aim of this study was to fill this gap and provide knowledge on trust in real-life complex environment. Main findings are discussed next.

6.1 Discussion and conclusions

As there were more previously familiar members in studied projects than originally expected, it can be concluded that there was knowledge-based trust present. Also rapidly evolving trust towards the unfamiliar team members was found, and as it was rather de-personalized and cognitive in nature, it was categorized as swift trust (Meyerson et al., 1996). In addition of being cognitive in nature in both knowledge-based and swift forms of trust, the reliance dimension of trusting intentions seemed to be more present than that of disclosure, as hardly any personal disclosure (see Gillespie, 2012; Lee et al., 2010) could be found.

My results show, that knowledge-based trust was rooted especially in shared work history, and seemed to be connected to the beliefs of leader's and experts' competence. In general, swift trust was especially mentioned to be based on references about previous work history, disposition to trust, leader- and member-based action, as well as institution-based factors such as shared norms and rules securing collaboration, and information on reputation provided by third party. Some category-based trust was also found. Reference-based trust appeared to be related to competence beliefs, institution-based and reputation-based to competence and integrity, disposition to trust to trusting beliefs in general, and action-based in expert dimension especially to the beliefs about integrity and goodwill of participants and in leader-dimension to competence beliefs. Prevalence of competence beliefs was perhaps related to nature and task of teams: when aiming to efficiently co-create solutions to problems other team

members' and leader's competence becomes crucial. It might be also easier to swiftly assess than integrity or especially goodwill elements, which were more evaluated by action. This assessment may be even more difficult in all virtual environment, and Malhotra, Majchrzak and Rosen (2007) have suggested that because goodwill is hard to observe virtually, expectations about actions and the actions themselves need to be made as explicit as possible for all others to see.

While a role occupied by the person is often seen as an important antecedent for presumptive form of trust (Kramer, 1999; Meyerson et al., 1996), here the roles did not stand out when asked about antecedents. I discussed that this might have been effected by the fact that in these temporary virtual problem-solving teams participants came from several different organizations and the roles in projects were perhaps not providing enough information to assess one's competence swiftly. In these projects reference-based trust may have substituted role-based assessment by enabling the swift assessment of previous working history strengthening the competence beliefs. This type of assessment could be done in first meeting, but importantly even prior any interaction via presentations on company website or business oriented social networking services, which can provide an overview on one's working history without personal experience.

It needs to be noted that some interviewees also felt that boundaries for expert selection and especially the role of inactive members on the platform were not clear. In addition to some experienced inclarity in platform safety issues, and lack of adaptadness to virtual work, these were forming a slight trust barrier related to feeling a lack of structural assurance mechanisms providing secure grounds for open knowledge sharing. Lack of adaptation may have affected the knowledge sharing behavior, and previously it has been found that individual virtual competence, knowledge, skills and abilities that individuals develop to cope with virtual environments, can serve as a key contributor to effective knowledge transfer (Wang & Haggerty, 2009). This lack of structural assurance might have also hindered knowledge sharing to some extent. Another possible trust barrier might be the nature of virtual work. Some participants questioned

the possibility of open knowledge sharing and trust formation in virtual surroundings, thus these views were supporting theories of richness of communication media (Daft & Lengel, 1984) and social presence theory (Short et al. 1976) which question the possibility of relationship and trust development in virtual teams. It needs to be noted, that this was not problem in current projects, as the projects mostly applied face-to-face meetings, and in most virtual of teams participants seemed to be more adapted to virtual work, and perhaps have rather high individual virtual competence (see Wang & Haggerty, 2009).

Actions that could be applied to build trust were communication behaviors and actions in form of general introduction and active behavior in discussion (see Jarvenpaa & Leidner, 1999), which could strengthen the goodwill beliefs, and related action that I called communication of competence. It could be done for example via work-related introductions in meetings or on the website or at the virtual platform. As this was related to formation of reference-based competence beliefs, it could be seen as pivotal in building swift trust in these problem-solving teams.

It was suggested that also evaluation of experts could build trust to unknown team members. Expert rating was mentioned as an action that could regulate the reputation of participants and provide information and help to assess especially the goodwill and integrity of actor. This was seen most important in situation when network is expanding and there will be more unfamiliar participants, and swift assessment of trustworthiness comes more crucial. Structural assurance (McKnight et al.,1998) could be strengthened by providing clear information on safety issues on platform as well as about the role of inactive members. Related managerial actions were also seen important in trust building. For example setting clear rules on action and knowledge sharing on platform were part of this, as well as facilitating discussions to activate members. Leadership practices establishing and maintaining trust through the use of communication technology has also been brought up by Malhotra et al. (2007). This could be done by focusing the norms on how information is communicated, revisiting and adjusting the communication norms as the team evolves, and making progress explicit through use

of team virtual workspace (ibid.). Also face-to-face interaction was suggested as an important trust building mechanism in more local projects. It could be used to strengthen both rapidly evolving forms trust and incrementally developing trust.

As an answer to the last research question about role of trust in knowledge sharing and collaboration in problem-solving teams trust was seen focal in engaging in action, sharing knowledge and further promoting performance and effective collaboration, being in accordance for example with Meyerson et al., (1996); Chowdhury (2005), Holste and Fields (2005; 2010) and Crisp and Jarvenpaa (2013). It was also brought up as a critical success factor by some participants.

Although trust could be serving as an informal or relational governance mechanism in these teams (Olander et al., 2010), it seemed that were also some knowledge protection possibly present, due to the nature of expert work. Also the structural assurance questions such as unclear roles discussed earlier might have effected knowledge sharing behavior, as there was some hesitation to share knowledge while there were members that didn't produce anything themselves. Some interviewees also suggested that trust which enables truly open and tacit knowledge sharing requires more mature trust than swift trust, perhaps even more affective trust (Holste & Fields, 2010). One can ponder, if evolution of more personalized fast trust (see Blomqvist 2002; 2005) could also support open knowledge sharing. As the complex knowledge required in the problem-solving process seemed often to be converted into explicit form and process seemed to lead to knowledge integration, one can argue that also swift trust might be enough to carry such tasks out. Also one can argue, that in short-term relationships more cognition-based trust and reliance dimension may matter most for effective knowledge sharing and use (Chowdhury, 2005; Alexopoulos & Buckley, 2013), while in more personal trust may matter in long-term engagements (Ko, 2010; Alexopoulos & Buckley, 2013).

Although the importance of trust in teams was generally acknowledged, some interviewees suggested that perhaps it was not that crucial, when there was clear role

and task division, and the task was less complex by its nature. Clear task division and the less complex nature of task may lower the required interdependence of actors, decreasing the risks in collaboration and thus diminishing the role of trust (see e.g. Meyerson et al. 1996; Dirks & Ferrin, 2001).

All in all, in more complex and interdependent tasks trust seem to be focal. As the relational side of trust was not strongly present, one could conclude that rather than being a "glue" as often referred (e.g. Brown, Pole & Rodgers, 2004) it could be described as the cornerstone in functioning of problem-solving teams, describing its focal role in engaging in action and sharing knowledge .

6.2 Theoretical implications

This study has enhanced the understanding about the nature and role of trust in real-life temporary virtual problem-solving teams. The main contributions to the previous literature on trust in temporary and virtual surroundings (e.g. Meyerson et al., 1996; Jarvenpaa et al. 1998; Jarvenpaa & Leidner, 1999; Crisp & Jarvenpaa, 2013) are related to analyzing trust in virtual teams in real-life context instead of rather extensively used student settings.

The results support the previous literature in many ways. In line with Meyerson et al., (1996) the swift trust that was found in these projects seemed to be less about relating than doing. Action and cognition elements were more visible than affective components, in addition action provided one base for swift trust, thus supporting Meyerson et al. (ibid) theory and the work of Jarvenpaa et al. (1998). Also antecedents similar to those provided by initial trust theory (McKnight et al., 1998) and Kramer (1999) were found, especially institution-based and dispositional-based assumptions. As an addition to the previous theory, I described that references were forming an important presumptive base for rapidly evolving trust, as they enable rapid assessment on other person’s competence in surroundings where roles are not so visible. Although

roles did not stand out as focal trust antecedents, the unclear roles of inactive members were creating possible trust barrier, thus being line with Meyerson et al. (1996) theorization.

This study suggested, as assessing competence via references is important in forming swift trust in this expert-work context that trust could be built through communication of competence. Also expert's active behavior was supporting trust formation, in these results are in line with the work of Jarvenpaa and Leidner (1999) that trust might be created through communication behavior. In addition, evaluation mechanisms such as expert rating were suggested to build swift trust to strangers, supporting assessment of expert competence as well as goodwill and integrity beliefs. These support Wildman et al. (2012) theory that professional trust development can be fostered by invoking presumptive trust cues that communicate the added value of relying on the expertise and knowledge of personally unfamiliar colleagues.

Also managerial action via for example normative actions and communication were seen to build trust, especially on virtual platform. In this results differ for example from Piccoli and Ives (2003), who have argued that behavioral control mechanisms had significant negative effect on trust in virtual teams. Crisp and Jarvenpaa (2013) have suggested that teamleaders or external coaches can be effective as long as they enable rather than disrupt internal processes that give rise to normative action. This study suggested that leaders had important role in initiating such actions. To the previous research on the role of normative actions or behavioral control in swift trust (Crisp & Jarvenpaa, 2013; Piccoli & Ives, 2003) this study adds knowledge on the role of managerial action in real-life expert-work context, in which the dynamics of actions can be seen differ from those experimental studies conducted among self-organized student teams. These results are in line with Malhotra et al. (2007) findings that leader practices build trust in virtual teams.

These results are also supporting for example Henttonen and Blomqvist (2004) in that building trust through actions and communicating individual roles and shared goals

seem to be important in the success of virtual teams. These results also suggest, that trust may perhaps be linked to performance as in Crisp and Jarvenpaa (2013), and support that psychologically safe communication climate may foster knowledge sharing in general (Gibson & Gibbs, 2006). Finally, it is also in line with Meyerson et al. (1996) idea that swift trust is more likely at moderate levels of interdependence than at either higher or lower levels, and Parker and Lee (2014) in that project complexity is related to level of dependence.

6.3 Managerial implications

Some implications for management can also be drawn from results. As the case company saw the platform as an important collaboration arena for the co-creation of solutions, but the actual interaction on the platform had not yet reached very active level in the studied project teams, the facilitation of projects becomes crucial. Managerial actions support also trust building, as mentioned. Leader role, perhaps both project and content lead role, can be emphasized in organizing the project and activating the participants, as the active discussion may not appear from scratch. This seems to be especially important for those team members that are less adept to virtual work. Activation can be done for example via ice-breaking methods and asking actively questions.

Relatedly, it needs to be discussed what is the role of inactive members in projects, to be able to unravel the trust barrier that role-related uncertainty may create. Another important notion is to discuss the norms of platform use and virtual participation together with the team, how to use it and what to share, as the role clarity and safety issues that may hamper some knowledge sharing intentions and behaviors. Shared norms of use could help the participants to orientate into more active virtual interaction. As mentioned in previous chapter, the differences between teams and participants need to be taken into account in this. In addition, face-to-face meetings supporting virtual work are suggested to be held in those more local projects where distance is not

an issue, as participants themselves considered face-to-face interaction to be important part of collaboration and trust formation.

Another suggestion is connected the previously mentioned implications that nature of trust in these teams has for scaling business. As the founders were trusted, and they had participated in majority of projects, in addition that there were lot of previously familiar experts in these projects, trust seemed be rather stable and knowledge-based by its nature, relying on personal experiences. But in situation where expert network is enlarging and projects are more often led by other people than founders, it seems important to support mechanisms that transparently show expert selection criteria and enable swift assessment of previously unknown experts, such as previously mentioned clear communication of competence and expert rating. These would support rapidly evolving trust even among unfamiliar team members, and consequently support effective co-creation process, including knowledge sharing.

Alexopoulos and Buckley (2013) have suggested that organizations seeking knowledge sharing and use beyond explicit knowledge, may need to consider how they facilitate the transformative movement from initial transactional to the optimal stage of mature trust where both reliance and disclosure matter. This implies that trust building could support more personal approach for example by using mentioned activating methods as ice-breaking, and if possible, still use at least in part previously known participants or those experts most adept to virtual work in those tasks that require most intensive and creative collaboration.

6.4 Limitations and suggestions for future research

Key limitation of this study is that the adjusted research design was far from ideal and studied teams consisted of both previously known and unknown members, and the degree of virtuality was rather low in all but one team. Thus, the presence of knowledge-based trust and lower degree of virtuality considerably altered the trust dynamics of

team, which made the original task of tracking and separating rapidly evolving forms of trust and their role more difficult and in part impossible. There had also been varying amount of collaboration in different teams, which might have affected the assessment of trust. As this study was conducted as my Master's thesis, ideal cases could unfortunately not be waited for. As the original longitudinal research setting was dropped out, the measurement of trust levels could not be carried out and outcomes of different forms of trust could not be detected either, and thus the role of trust was discussed in rather general level. As this study was conducted as qualitative analysis, the results are not generalizable as such, but reflect this specific context.

Although qualitative methods enable respondents to define what they mean by trust (Lyon et al., 2012), due to the tacit nature of trust the assessment and explication of trust and its role might have also been somewhat difficult to some participants. These caused that rapidly evolving trust was perhaps sometimes discussed at more general level than in these particular teams.

Thus, future research should continue exploring the dynamics of rapidly evolving forms of trust and their role in real-life contexts, as there still remains gap to fill, but among previously unknown team members in teams with higher degree of virtuality. This could be done via longitudinal research setting. The measurement of rapidly evolving trust levels and forms in several points during the team's collaboration could shed light on how and when different types of rapidly evolving trust come out, and how different types of trust play out in different phases of work. Operationalizing and measuring the different types of rapidly evolving trust at various points of time would also help to overcome the limitations of cross-sectional designs (see Schwab, 2004) and to analyze the dynamics of trust over time, as the dynamic, temporal element is rarely captured in trust research, but longitudinal data methods enable that (Lyon, 2012). Also the role of diversity in cultural and expertise backgrounds for rapid trust development could be further analyzed.

REFERENCES

Aarikka-Stenroos, L. & Jaakkola, E. (2012). Value co-creation in knowledge intensive business services: A dyadic perspective on the joint problem solving process. Industrial Marketing Management, 41,1, 15-26.

Alavi, M. & Tiwana, A. (2002). Knowledge integration in virtual teams: The potential role of KMS. Journal of the American Society for Information Science and Technology, 53, 12, 1029-1037.

Alge, B.J., Wiethoff, C. & Klein, H.J. (2003). When does the medium matter? Knowledge-building experiences and opportunities in decision-making teams. Organizational Behavior and Human Decision Processes 91, 26–37.

Alexopoulos, A.N. & Buckley, F. (2013). What trust matters when: the temporal value of professional and personal trust for effective knowledge transfer. Group & Organization Management, 1-31.

Anderson, A.H, McEwan, R, Bal, J. & Carletta, J. (2007). Virtual team meetings: an analysis of communication and context. Computers in Human Behaviour 23, 5, 2558–2580.

Ashleigh, M.J. & Meyer, E. (2012). Deepening the Understanding of Trust: Combining Repertory Grid and Narrative to Explore the Uniqueness of Trust. In Lyon, F., Möllering, G., & Saunders, M. (Eds.) Handbook of research methods on trust. Edward Elgar Publishing.

Argote, L., & Ingram, P. (2000). Knowledge transfer: A basis for competitive advantage in firms. Organizational behavior and human decision processes, 82, 1, 150-169.

Aubert, B. A., & Kelsey, B. L. (2003). Further understanding of trust and performance in virtual teams. Small Group Research, 34, 575–618.

Bell, S. B., & Kozlowski, S. W. (2002). A typology of virtual teams: Implications for effective leadership. Group & Organization Management, 27, 14–49

Berger, P. & Luckmann, T. (1966). The social construction of knowledge: A treatise in the sociology of knowledge. Open Road Media: Soho, NY, USA.

Bergiel B. J., Bergiel E.B. & Balsmeier, P. (2008). Nature of virtual teams: a summary of their advantages and disadvantages, Management Research News, 31, 2, 99-110.

Berry, G. (2011). A cross-disciplinary literature review: Examining trust on virtual teams, Performance Improvement Quarterly, 2011, 24, 3.

Bettencourt, L.A., Ostrom, A.M., Brown, S. & Roundtree, R.I. (2002). Client co-production in knowledge-intensive business services. California Management review 4, 4, 100-128.

Blomqvist K. (2002). Partnering in the dynamic environment: the role of trust in asymmetric technology partnership formation. Acta Universitatis Lappeenrantaensis 122, Lappeenranta.

Blomqvist, K. (2005). Trust in a dynamic environment - fast trust as a threshold condition for asymmetric technology partnership formation in the ICT Sector. In K. Bijlsma-Frankema and R. Klein Woolthuis (eds.).Trust under pressure: Investigations of trust and trust building in uncertain circumstances. Cheltenham : Edward Elgar, 127-147.

Bogers, M. (2011). The open innovation paradox: knowledge sharing and protection in R&D collaborations. European Journal of Innovation Management, 14,1, 93-117.

Brown, H. G., Poole, M. S. & Rodgers, T. L. (2004). Interpersonal traits, complementarity, and trust in virtual collaboration. Journal of Management Information Systems, 20, 115–137.

Cabrera, E. F. & Cabrera, A. (2005). Fostering knowledge sharing through people management practices. The International Journal of Human Resource Management, 16, 5, 720-735.

Cascio, W.F. (2000). Managing a virtual workplace. The Academy of Management Executive, 14, 3, 81–90.

Choo, C.W. (2000). Working with knowledge: how information professionals manage what they know. Library Management, 21, 8, 395-403.

Chowdhury, S. (2005). The role of affect-and cognition-based trust in complex knowledge sharing. Journal of Managerial issues, 17, 3, 310-326.

Chudoba, K. M., Wynn, E., Lu, M. & Watson-Manheim, M. B. (2005). How virtual are we? Measuring virtuality and understanding its impact in a global organization. Information systems journal, 15, 4, 279-306.

Cramton, C. D. (2001). The Mutual Knowledge Problem and its Consequences for Dispersed Collaboration. Organization Science, 12, 3, 346-371.

Crisp, C. B. & Jarvenpaa, S. L. (2013). Swift trust in global virtual teams: Trusting beliefs and normative actions in Journal of Personnel Psychology, 12, 1, 45 -

Daft, R.L & Lengel, R.H. (1984). Information richness: a new approach to managerial behavior and organization design. Research in Organizational Behaviour, 6, 191–233.

Dietz, G. & Hartog, D. N. D. (2006). Measuring trust inside organisations. Personnel Review, 35, 5, 557-588

Dirks, K. T. & Ferrin, D. L. (2001). The role of trust in organizational settings. Organizational Science, 12, 450–467.

Dunning, D., Anderson, J.E., Schlösser, T., Ehlebracht, D. & Fechenhauer, D. (2014). Trust at zero acquaintance: More a matter of respect than expectation of reward. Journal of Personality and Social Psychology 107, 1, 122-141.

Eisenhardt, K. (1989). Building theories from case study research. Academy of Management review, 14, 4, 532-550.

Eisenhardt, K. M. & Graebner, M. E. (2007). Theory building from cases: opportunities and challenges. Academy of management journal, 50, 1, 25-32.

Eriksson, P. & Kovalainen, A. (2008). Qualitative methods in business research. Sage.

Estellés-Arolas, E. & González-Ladrón-de-Guevara, F. (2012). Towards an integrated crowdsourcing definition. Journal of Information science, 38, 2, 189-200.

Foss, N. J., Husted, K. & Michailova, S. (2010). Governing knowledge sharing in organizations: Levels of analysis, governance mechanisms, and research directions. Journal of Management studies, 47, 3, 455-482.

Germain, M-L. (2011). Developing trust in virtual teams. Performance Improvement Quarterly, 24, 3.

Gibson, C. & Gibbs, J. (2006) Unpacking the concept of virtuality: the effects of geographic dispersion, electronic dependence, dynamic structure, and national diversity on team innovation. Administrative Science Quarterly, 51, 451–495.

Gillespie, N. (2012). Measuring trust in organizational contexts: an overview of survey-based measures. In Lyon, F., Möllering, G., & Saunders, M. (Eds.) Handbook of research methods on trust. Edward Elgar Publishing.

Gioia, D. A., Corley, K. G. & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research notes on the Gioia methodology. Organizational Research Methods, 16, 1, 15-31.

Griffith, T. L. & Neale, M. A. (2001). Information processing in traditional, hybrid, and virtual teams: From nascent knowledge to transactive memory. Research in organizational behavior, *23*, 379-421.

Griffith, T. L., Sawyer, J. E. & Neale, M. A. (2003). Virtualness and knowledge in teams: Managing the love triangle of organizations, individuals, and information technology. MIS quarterly, 265-287.

Hardwick, J., Anderson, A. R. & Cruickshank, D. (2013). Trust formation processes in innovative collaborations: networking as knowledge building practices. European Journal of Innovation Management, 16, 1, 4-21.

Henttonen, K. & Blomqvist, K. (2005). Managing distance in a global virtual team: The evolution of trust through technology-mediated relational communication. Strategic Change, 14, 107–119.

Holste, J. S. & Fields, D. (2005). The relationship of affect and cognition based trust with sharing and use of tacit knowledge. In Academy of Management Proceedings, 1, B1-B6. Academy of Management.

Holste, J. S. & Fields, D. (2010). Trust and tacit knowledge sharing and use. Journal of knowledge management, 14, 1, 128-140.

Hoopes, D. G. & Postrel, S. (1999). Shared knowledge,“glitches,” and product development performance. Strategic management journal, 20, 9, 837-865.

Inkpen, A. C., & Tsang, E. W. K. (2005). Social capital, networks and knowledge transfer. Academy of Management Review, 30, 146-165.

Ipe, M. (2003). Knowledge sharing in organizations: A conceptual framework. Human Resource Development Review, 2, 4, 337-359.

Jarvenpää, S.L., Knoll, K. & Leidner, D.E. (1998). Is Anybody Out There? Antecedents of Trust in Global Virtual Teams. Journal of Management Information Systems, 14, 4, 29-64.

Jarvenpaa, S. L. & Leidner, D. E. (1999). Communication and trust in global virtual teams. Organizational Science, 10, 6, 791–815.

Jarvenpaa, S. L., Shaw, T.R. & Staples, D.S. (2004). Toward Contextualized Theories of Trust: The Role of Trust in Global Virtual Teams. Information Systems Research, 15, 3, 250-267.

Jones, G. R., & George, J. M. (1998). The experience and evolution of trust: Implications for cooperation and teamwork. Academy of Management Review, 23, 531–546.

Kanawattanachai, P. & Yoo, Y. (2002). Dynamic nature of trust in virtual teams. Journal of strategic Information Systems 11, 186-213.

Kasper-Fuehrer, E. C. & Ashkanasy, N. M. (2001). Communicating trustworthiness and building trust in interorganizational virtual organizations. Journal of Management, 27, 3, 235-254.

Kauppila, O. P., Rajala, R. & Jyrämä, A. (2011). Knowledge sharing through virtual teams across borders and boundaries. Management Learning.

Kimble, C., Li, F. & Barlow, A. (2000). Effective virtual teams through communities of practice. (Department of Management Science Research Paper Series No. 00/9). Strathclyde, UK: University of Strathclyde.

Ko, D. G. (2010). Consultant competence trust doesn't pay off, but benevolence trust does! Managing knowledge with care. Journal of Knowledge Management, 14, 202-213.

Kogut, B. & Zander, U. (1996). What firms do? Coordination, identity, and learning. Organization science, 7, 5, 502-518.

Komiak, S. X. & Benbasat, I. (2004). Understanding customer trust in agent-mediated electronic commerce, web-mediated electronic commerce, and traditional commerce. Information Technology and Management, 5, 1-2, 181-207.

Koskinen, I., Alasuutari, P. & Peltonen, T. (2005). Laadulliset menetelmät kauppatieteissä.

Koufaris, M. & Hampton-Sosa, W. (2004). The development of initial trust in an online company by new customers. Information & Management, 41, 3, 377-397

Kuo, F. & Yu, C (2009). An exploratory study of trust dynamics in work-oriented virtual teams. Journal of Computer-mediated communication. 14, 4, 823-854.

Kramer, R. M. (1999). Trust and distrust in organizations: Emerging perspectives, enduring questions. Annual Review of Psychology, 50, 569-598.

Lane, C. & Bachmann, R. (1996). The social constitution of trust: supplier relations in Britain and Germany. Organization Studies, 17, 3, 365-395.

Lee, P., Gillespie, N., Mann, L. & Wearing, A. (2010). Leadership and trust: Their effect on knowledge sharing and team performance. Management Learning.

Lewicki, R. J., Tomlinson, E. C. & Gillespie, N. (2006). Models of interpersonal trust development: Theoretical approaches, empirical evidence, and future directions. Journal of management, 32, 6, 991-1022.

Lewis, J. D. & Weigert, A. (1985). Trust as a social reality. Social forces, 63, 4, 967-985.

Luhmann, N. (1988). Familiarity, confidence, trust: problems and alternatives. In Gambetta, D. Trust: making and breaking cooperative relations. Basil Blackwell Inc.

Lyon, F., Möllering, G. & Saunders, M.N.K. (2012). Introduction: The Variety of Methods for the Multi-faceted Phenomenon of Trust. In Lyon, F., Möllering, G., & Saunders, M. (Eds.) Handbook of research methods on trust. Edward Elgar Publishing.

Malhotra, A. & Majchrzak, A. (2004). Enabling knowledge creation in global virtual teams: Best practices for IT support and knowledge sharing. Journal of Knowledge Management, 8, 4, 75.

Malhotra, A., Majchrzak, A. & Rosen, B. (2007). Leading virtual teams. The Academy of Management Perspectives, 21, 1, 60-70.

Martins, L.L., Gilson, L.L. & Maynard, M.T. (2004) Virtual teams: what do we know and where do we go from here? Journal of Management, 30, 805–835

Mayer, R. C., Davis, J. H. & Schoorman, F. D. (1995). An integrative model of organizational trust. Academy of management review, 20, 3, 709-734.

McKnight, D.H., Cummings, L., L., & Chervany, N.L. (1998). Initial trust formation in new organizational relationships. The Academy of Management Review, 23, 3, 473-490.

McKnight, D. H., & Chervany, N. L. (2006). Reflections on an initial trust-building model. Handbook of trust research, 29-51.

McAllister, D. J. (1995). Affect-and cognition-based trust as foundations for interpersonal cooperation in organizations. Academy of Management Journal, 38, 1, 24-59.

McKnight, D. H., Choudhury, V. & Kacmar, C. (2002). Developing and validating trust measures for e-commerce: An integrative typology. Information systems research, 13, 3, 334-359.

Meyerson D., Weick K.E. & Kramer R.M. (1996). Swift trust and temporary groups. In Trust in Organisations: Frontiers of Theory and Research, Kramer M.R., Tyler T.R. (eds.) Sage: Thousand Oaks, CA. 167–195.

Michailova S. and Foss N. (2009) Knowledge governance: themes and questions. In Knowledge Governance: Processes and Perspectives. Foss, N.J. & Michailova, S., Eds. Oxford University Press, Oxford.

Michailova, S., & Sidorova, E. (2011). From group-based work to organisational learning: the role of communication forms and knowledge sharing. Knowledge Management Research & Practice, 9, 1, 73-83.

Mitleton-Kelly, E. (2011). Identifying the Multi-dimensional Problem-space and Co-creating an Enabling Environment. Emergence: Complexity and Organization, 13, 1/2, 1.

Muethel, M., Siebdrat, F. & Hoegl, M. (2012). When do we really need interpersonal trust in globally dispersed new product development teams? R&D Management Volume 42, 1, 31–46.

Münscher, R. & Kühlmann, T. (2012). Using Critical Incident Technique in Trust Research. In Lyon, F., Möllering, G., & Saunders, M. (Eds.) Handbook of research methods on trust. Edward Elgar Publishing.

Möllering, G. (2006). Trust: Reason, routine, reflexivity. Emerald Group Publishing.

Newell, S., David, G. & Chand, D. (2007). An analysis of trust among globally distributed work teams in an organizational setting. Knowledge and Process Management, 14, 3.

Nonaka, I., & Takeuchi, H. (1995). The knowledge-creating company: How Japanese companies create the dynamics of innovation. Oxford university press.

Nonaka, I. & Konno, N. (1998). The Concept of 'Ba': building a Foundation for Knowledge Creation. California Management Review 40, 3, 40-54

Nonaka, I., Toyama, R., & Konno, N. (2000). SECI, Ba and leadership: a unified model of dynamic knowledge creation. Long range planning, 33, 1, 5-34.

Olander, H., Hurmelinna-Laukkanen, P., Blomqvist, K., & Ritala, P. (2010). The dynamics of relational and contractual governance mechanisms in knowledge sharing of collaborative R&D projects. Knowledge and Process Management, 17,4, 188-204.

Park, J. G., & Lee, J. (2014). Knowledge sharing in information systems development projects: Explicating the role of dependence and trust. International Journal of Project Management, 32, 1, 153-165.

Payne, A., Storbacka, K. & Frow, P. (2008). Managing the co-creation of value, Journal of the Academy of Marketing Science, 36, 1, 83-96.

Piccoli, G., & Ives, B. (2003). Trust and the unintended effects of behavior control in virtual teams. MIS quarterly, 365-395.

Pinjani, P., & Palvia, P. (2013). Trust and knowledge sharing in diverse global virtual teams. Information & Management, 50, 4, 144-153.

Polanyi, M. (1966). The logic of tacit inference. Philosophy, 41, 155, 1-18.

Prahalad, C.K. & Ramaswamy, V. (2000). Co-opting customer competence. Harvard Business Review, 78, 1, 79-87.

Pratt, M.G. (2009). For the lack of a boilerplate: tips on writing up (and reviewing) qualitative research. Academy of Management Journal 52, 5, 856–862.

Robert, L. P., Dennis, A. R., & Hung, Y.-T. C. (2009). Individual swift trust and knowledge-based trust in face-to-face and virtual team members. Journal of Management Information Systems, 26, 241–279.

Rosen, B., Furst, S., & Blackburn, R. (2007) Overcoming barriers to knowledge sharing in virtual teams. Organisational Dynamics 36, 3, 259–273.

Roser, T., DeFillippi, R., Samson, A. (2013). Managing your co-creation mix: co-creation ventures in distinctive contexts European Business Review, 25, 1, 20-41

Rotter, J. (1967). A new scale for the measurement of interpersonal trust. Journal of personality.

Rousseau, D.M., Sitkin, S.B., Burt, S.R., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. Academy of Management Review, 23, 3, 393-404.

Salas, E., Sims, D. E., & Burke, C. S. (2005). Is there a ‘‘big five’’ in teamwork? Small Group Research, 36, 5, 555–599.

Saunders, C. & Ahuja, M.K. (2006) Are all distributed teams the same? Differentiating between temporary and ongoing distributed teams. Small Group Research, 37, 662–700.

Sarker, S., Sarker, S., Nicholson, D.B. & Joshi, K.D. (2005) Knowledge transfer in virtual systems development teams: an exploratory study of four key enablers. IEEE Transactions on Professional Communication, 48, 201–218.

Sarker, S., Ahuja, M., Sarker, M., & Kirkeby, S. (2011). The role of communication and trust in global virtual teams: A social network perspective. Journal of Management Information Systems, 28, 273–309.

Sawhney, M., Verona, G. & Prandelli, E. (2005). Collaborating to create: the internet as aplatform for customer engagement in product innovation. Journal of Interactive Marketing, 19, 4, 4-17

Schilke, O. & Cook, K.S. (2013). A cross-level process theory of trust development in interorganizational relationships. Strategic Organization, 11, 83, 281-303.

Schreyögg, G. & Sydow, J. (2010). Organizing for Fluidity? Dilemmas of New Organizational Forms. Organization Science, 21, 6, 1251–1262.

Schwab, D. (2004). Research Methods for Organizational Studies. Psychology Press.

Schweitzer, L. & Duxbury, L. (2010). Conceptualizing and measuring the virtuality of teams. Info Systems Journal, 20, 267–295.

Short, J., Williams, E. & Christie, B. (1976). The social psychology of telecommunications.

Stenmark, D. (2000). Leveraging tacit organisational knowledge. Journal of Management Information Systems, 17, 3, 9-24.

Tellis, W. (1997). Introduction to Case Study. The Qualitative Report, Volume 3, Number 2, http://www.nova.edu/ssss/QR/QR3-2/tellis1.html

Townsend, A. M., DeMarie, S. M., & Hendrickson, A. R. (1998). Virtual teams: Technology and the workplace of the future. The Academy of Management Executive, 12, 3, 17–29

Tracy, S. (2010). Qualitative Quality: Eight “Big-Tent” Criteria for Excellent Qualitative Research. Qualitative Inquiry, 16,10, 837-851.

Tuomi, J., & Sarajärvi, A. (2009). Laadullinen tutkimus ja sisällönanalyysi. Tammi.

Von Hippel, E. (1994). “Sticky information” and the locus of problem solving: implications for innovation. Management science, 40, 4, 429-439.

Wang & Haggerty (2009). Knowledge transfer in virtual settings: the role of individual virtual competency. Information Systems Journal 19, 571–593.

Williams, M. (2001). In whom we trust: Group membership as an affective context for trust development. Academy of management review, 26, 3, 377-396.

Wilson, J. M., Straus, S. G., & McEvily, B. (2006). All in due time: The development of trust in computer-mediated and face-to-face teams. Organizational Behavior and Human Decision Processes, 99, 16-33.

Yu, M., Saleem, M., & Gonzalez, C. (2014). Developing trust: First impressions and experience. Journal of Economic Psychology, 43, 16-29.

Yin, R. K. (2012). Case study research: Design and methods (3rd ed.). Thousand Oaks, CA: Sage.

Zolin, R., Hinds, P.J., Fruchter, R. & Levitt, R.E. (2004). Interpersonal trust in cross-functional, geographically distributed work: A longitudinal study. Information and Organization, 14, 1–26.

Zellmer-Bruhn, M. & Gibson, C. (2006). Multinational organization context: Implications for team learning and performance. Academy of Management Journal, 49(3), 501–518.

APPENDICES

APPENDIX 1 INTERVIEW QUESTIONS

The role in the team, familiarity with team members and virtual communication

- Have you been working with case company before? If you have, how did you become engaged into cooperation with case company?
- At which point did you enter this project and how did you became engaged in it?
- Do you have any previous experience with your team members? What did you know about the other participants in this project?
- Did you look for information about your team members or case company when entering the project? If you did, what kind of information and where did you look for it?
- How much experience do you have about working in virtual environments? Do you use virtual tools and platforms to communicate your personal issues, ideas and feelings (i.e. through social media, Facebook, Twitter etc.)?

Communication, interaction, knowledge sharing, relationships in the team

- What kind of knowledge participants have brought into project? In your opinion, what kind of knowledge is most valuable to the problem solving? Can you provide an example?
- How much have you shared tacit knowledge, i.e. knowledge related to your experience, insights etc. Can you provide an example, what has it been and how it has been communicated?
- Do you think you are able to use other team members' tacit knowledge in the problem-solving process and how? Has some novel knowledge been created as a result?
- In your opinion, is it easy to share your ideas and knowledge freely to others in this project and why? What supports sharing them, and what kind of things

prevent you from sharing your ideas?

- How does the digital platform of case company support the communication between members? Does it support tacit knowledge sharing?

- In your opinion, does it feel safe to express your ideas and insights lightly on the platform, even if there is a risk that those ideas fail/don't work/are not agreed?

- In your opinion, has there been any critical incidents related to communication? Can you provide an example of communicational behavior that has supported your collaboration, or one that has hindered it?

- Have you or any of your team members communicated some negative thoughts/feelings during the project?

- Have you discussed any personal issues in your team?

- How would you describe the atmosphere between team members? In your opinion, what is this atmosphere based on?

- In your opinion, were there any competition between team members? How did this affect collaboration?

- Can an expert communicate too openly? In your opinion, what kind of openness is good in communication? How can expert regulate the openness of their communication?

Perceived risk, goals, normative actions, commitment

- In your opinion, how risky the project is and what kind of risks exist to you, other team members, and for the project in general?

- How much have you discussed the goals of the project?

- How would you describe, what are your personal goals in this project? When you think of the goals of the other team members, to what extent your goals converge with theirs and how do they differ?

- How were you advised to use the platform? Is there some kind of rules of conduct? Have they existed from the outset, or have you created them during the collaboration?

- How is the problem solving facilitated? Is it monitored and controlled is some ways, how?

- Has it been clear to you what is expected from you in this project? Do you think that is important to know?

- In your opinion, are there things in the project that should be contracted clearly, but so far there are not contracts?

- How committed are you to the project? In your opinion, how committed are the other members of the project? Can you describe some concrete signs of commitment, or lack of it?

Trust/Critical success factors

- How would you characterize trust in this kind short-term problem solving groups?

- In your opinion, what is trust based on in this project team? What kind of things have enabled you to trust your team members? How have you evaluated their trustworthiness, what kind of things have you paid attention to?

- Were there things that prevented you from trusting your team members?

- Would you say that there were changes in trust over the course of the project? How would you describe it?

- Could you provide an example of a situation or behavior, in which trust has been strengthened during this project? (critical incident)

- Has there been any situations or behaviors, in which trust decreased or was broken? Could you provide an example? (critical incident)

- Has it been easy for team members to understand each other? If not, can you give some examples of misunderstanding or lack of understanding?

- Has it been easy or difficult for you to be understood by other team members? Have you made an extra effort to be understood?

- In your opinion, have the differences in cultural, national and expertise background affected trust in your team? If they have, how?

- In your experience of this project team, has there been any attempts to build trust?

- In your opinion, how satisfied have you been on the collaboration and the things you have accomplished so far? What kind of things have created satisfaction/dissatisfaction?

- In your opinion, what are the three most critical issues for the success project?

- In your opinion, how important has trust and trusting atmosphere been for the success of the project?

- Based on your experience in this project, do you have any suggestions how to build trust in this kind of project teams? Do you have any suggestions how to enhance the overall collaboration in this kind of project?

APPENDIX 2 DATA STRUCTURE

Bases of trust in problem-solving project teams

First order	Second order	Aggregate dimension
That the affairs really remain confidential within group that they are not spread around	Reliability of team communication	Action-based trust
Working briskly and fairly	Proactive and fair action	
So he is very assertive and that project is advancing	Active leader behavior	
His behavior is active and he seems to be a right person for this type of work	Active leader behavior	
Trust leaders that they are able to pick good experts, build trust and proper team	Trust in competence of leader actions	
Trust is there when you join the platform, clear that share same values and try to be part of the team	Unit grouping	Category-based trust
If Finns say they have an education they have the diploma, there are no fake experts	Unit grouping	
You can trust on expertise if you know the person	Knowledge-based trust on competence	History-based trust
Trust has been good, because I have known a lot of these, if not all, at least some.	Knowledge-based trust in team members	
I'm good friends with one, it's not just business relationship	Affect-based trust	
I think I probably know all at some level	Knowledge-based trust in team members	
I knew all the participants in this project	Knowledge-based trust teams members	
I know the competence level of the experts	Knowledge-based expert competence	
I know him very well, so there is trust	Knowledge-based trust in leader	
I knew the guys, like them personally and respect them, it's nice to work with them, we have some kind of trust	Affect-based trust	
Because know each other and respect no need for f-t-f meeting	Knowledge-based trust	
From working with these people before	Knowledge-based trust	
I have started to believe in case company, because I personally know other experts	Knowledge-based trust in experts	
Has been here before, he had the idea, saw the potential and had lots of contacts	Knowledge-based leader competence	
If they claim they are experts, trust that	Knowledge-based trust in leader competence	
Trust founders have carefully selected, not lousy or non-cooperative	Knowledge-based trust in leader competence	
Business lead has created some kind of trust, for client to participate in the first place	Knowledge-based trust in leaders	

Knowing those experts, you know they know	Knowledge-based expert competence	
Setting up shared rules, Discussing and defining together the case and common goal	Setting shared rules and goals	Institution-based trust
(Important to know) about (case company) that if we have a confidential case it will remain as such	Reliability of company	
Trust is based on confidentiality, so that no one is invited to the team without our consent and there isn't too open communication about this work	Norms monitoring selection and communication	
I trust in (case company) as an actor and I trust experts chosen by them.	Trustworthiness of company	
It is the whole thing. If it is the firm image starting from the web pages, their size and how long it has operated, certification and profitability	Reliability of company	
Trust comes from writing down from whom the ideas came from so that's clear	Norms of knowledge ownership	
There needs to be shared goals and business understanding one way or another.	Shared goals, business understanding	
Other participants and earning logic	Participants and compensation model	
If we have famous name and references, it is easier to trust what comes from here	References	Reference-based trust
Well competence is quite good, and references	Competence and references	
Check background, e.g. what is their relevant expertise	Competence by reference	
If expert from a firm that is well known brand, that brand builds certain trustworthiness	Competence by references	
I check facts from elsewhere.	Background information	
Learning in the first meeting about previous experience weighs on how much person knows about this field and how much s/he can help me	Competence by references	
Background check via Google, case company profile for expertise, so they did something in this specific country or region that they're selected to do	Competence by references	
References that has one done similar work before	References	
How good cases they have got, and you get to work with people who are capable of producing atleast as good quality as yourself.	Competence by references	
Things done previously	References	
Accepting different roles	Role acceptance	Role-based trust
My colleague knew the founder, and then I knew his background. That's why I was trusting.	Reputation	Reputation-based trust
Background and projects, reputation and references. References and cases when unfamiliar sub-sector.	Reputation	
What others have said and commented	Reputation	
There is trust that one wouldn't operate long in Finnish markets if directly stealing someone's idea	Small pool reputation-mechanism	
Some basic assumption that you can trust people, especially in Finland	Disposition to trust	Disposition-based trust

I think that things are talked straightly, once you say something you mean it	Disposition to trust	
In Finland everyone primarily trusts until you lose it, elsewhere you may need to build it	Disposition to trust	
You just have to trust, because you can't do other's job	Disposition to trust	
In Finland all trust automatically each other	Disposition to trust	
I trust others a lot	Disposition to trust	
I trust until I've been proved wrong	Disposition to trust	
Working rather openmindedly with people I don't know	Disposition to trust	
I have trusted all blindly	Disposition to trust	

Trust barriers

First order	Second order	Aggregate dimension
New way to work, sharing knowledge a bit more openly and discussing more openly maybe not trusted	Possibly lack of trust and adaptation	Adaptation to new way of working
Type of working is not common	Novelty of virtual work	
I have some stereotypes and antipathies	Stereotyping	Category-based barriers
Automatically less trust if expert from a field I don't know anything	Outgrouping	
It takes longer to trust to a person that is very different from me	Outgrouping	
Few experts that don't want to work with due to experiences	Experiences	History-based barriers
One expert didn't do anything related to task, made a mental note not take him/her to my own project	Experience of lack of activity	
I shunned them as experts, they are not ideators, more like listeners	Experience of lack of activity	
Even via LinkedIn trust is better than here where you're forced to respond	Involuntary involvement	Involuntary participation
I've never got so much virtual trust, that I've never seen the person and there was a very high trust	Virtuality lowering trust	Lack of face-to-face interaction
If there show's up someone I don't know, even if s/he comments, trust doesn't evolve just like that	Virtually swift trust building more difficult	
Difficult to build deep trust based on platform	Virtual communication	
People make quite fast their evaluation of whether like and trust or not, difficult via virtual forum	Fast evaluation difficult virtually	
Personality not so visible in virtual environment	Difficulty of personality assessment in virtual	
Bringing in some people outside of your trusted network makes it troublesome, people may get quite cautious	Cautiousness if not trusted network	Lack of knowledge-based trust
Learned it's a nice group, if it is growing then you don't know what is going on	Lack of knowledge-based trust	

I'm a little bit bothered because of stalker members; if they have access to these materials	Lack of activity and role clarity	Lack of structural assurance
People are afraid of sharing knowledge in there, not sure who can see	Unclear roles and safety issues	
I would really not want all that information there, I don't know how they are protected	Safety issues	
Used experts and daily fee are not clear now	Unclear expert selection and compensation model	
Often notice that the given knowledge is not right or it is such that is lowers trust	Untrue knowledge	Quality of shared knowledge
You can't really build trust within such a short project	Not possible in temporary	Time constraints

Trust building

First order	**Second order**	**Aggregate dimension**
Active presence and sharing ideas	Active behavior	General communication behaviors and actions
Trust is increased when all the participants are active	Active behavior	
Trust will come once the experts get introduced and say something	Initiating communication	
Introduction will create what is possible in such a short time	Introducing each other	
New members are introduced, goals are talked through, so it's made known for everyone where we are aiming.	Introduction and discussion on goals	
Telling areas of interest in informal meeting	Informal interaction sharing interests	
Telling references in informal meeting	Informal interaction sharing references	Communication of competence
Their openness about their competence has increased trust for them.	Sharing knowledge on competence	
Maybe short introduction, when new members come, CV of three lines, for example	Introduction of work experience	
It should be done in a way that you don't put a name in there and no one knows why, but adding a description	Introduction of work experience	
Telling what they have done previously and seeing their results	Communication about previous work and performance	
The descriptions of experts at platform build trust, you can check the background	Sharing background information	
Expert competence clearly and transparently communicated	Communication of expert competence	
Interesting expert group available should be visible to client	Communicating competence of network	

Rating and expert selection critical if this grows, that there's basic trust that this guy is okay by his expertise	Rating mechanism to secure basic trust	Evaluation
Trustworthiness by rating, this person follows rules and good ethics, and this stole my information and used it	Goodwill and integrity by rating	
Suggestion for project manager to evaluate experts for learning	Evaluating experts	
Rating would create trust to strangers	Rating mechanism	
I have to learn to know another person face-to-face before I can really say anything	Face-to-face interaction	Face-to-face Interaction
Face-to-face meeting enables faster analysis if this person is useful to me and if I can trust	Faster trust face-to-face	
Even video would not substitute the possibility to talk face-to-face with someone	Face-to-face building	
Seeing face-to-to face would create 10x more trust. Maybe I would be also more open in that situation	Stronger trust via face-to-face interaction	
In these meetings there was discussion created from various issues, and trust	Face-to-face interaction	
Maybe you will get to know people better in f2f meetings and maybe it helps in trust building	Face-to-face interaction	
Face-to-face will increase trust more	Face-to-face interaction	
Face-to-face meeting created clearer picture	Face-to-face interaction	
Strength of face-to-face communication is creating atmosphere and trust	Face-to-face interaction	
Face-to-face meetings with client important in trust building	Face-to-face interaction	
It is that openness, and all that all invited are welcome to the group	Group membership	Group membership
You will see the people picture and visual content you feel part of the group	Identification	
If we wanted to build trust we should do another project with same people	Teaming the same people	Incremental trust building
Trust creation requires long term collaboration	Long term collaboration	
Trust will come over time, if you have shared projects you weld together	Long term collaboration	
Sharing relevant knowledge may build trust somewhat	Relevant knowledge sharing increasing trust	Knowledge sharing
Project management can create trust or distance	Project management	Managerial action
If you have a specific theme and then a moderator asking tough questions	Facilitation	
The one who is selling and trying to get money from the project, it is his role to build trust	Leader responsibility	
(Founder's) practices build trust, how he has been communicating and advancing the project	Communication and management	
Everyone should know the rules of the game, they must be quite selective	Normative actions	
Clear rules how to act or how to share and where	Normative actions	
More precise rules and describing IPR needed when getting bigger	Normative actions	

When you see how the collaboration works, it builds trust	Success of collaboration	Performance
That you get the system running together with the group	Success of collaboration	
Telling what they have done previously and seeing their results	Results	
(Would build trust) if everyone did a good job there	Competence of group	
With plain CV one cannot build deep trusting relationship	Personal contact for more resilient trust	Personal contact
Need for personal contact	Personal contact	
Active presence and sharing ideas	Social presence	Social presence
It's important it's credible enough, and Finnish	Platform crebility and reliability	Structural assurance mechanisms
It has to be clear it is safe there	Platform safety clear	
You should build trust on the clear business model	Clear business model	
Visually defining roles	Visualization of roles on the platform	
Best (virtual) trust may emerge if you belong to the same organization, same tribe.	Unit-grouping	Categorizations
Human behave so that they first looks what the other one is wearing, if s/he is skinny or heavy, what s/he wears and how old s/he is	Categorizations by first impressions	

Role of trust

First order	Second order	Aggregate dimension
Prerequisite for participation and discussion	Enabling participation and conversation	Action promotion
Through trust are so many things done	Enabling action	
Should be based on trust, If the expert doesn't trust, he leaves the network	Trust as a basis of collaboration	Basis for collaboration
I trust these guys and did not ask for a signed contract	Trust makes contracts unncessary	Governance mechanism
Others trusting you are an expert enables that you don't have to share everything	Trust enables knowledge protection	Enabler of knowledge protection
Prerequisite for participation and discussion		Enabler of knowledge sharing
In a way there forms a trusting climate, will there be discussions or do people just want to proceed.	Trusting climate enabling active discussion	
Because we are talking here about trade secrets and assets, so there needs to be trust within the team	Trust enabling confidential knowledge sharing	
You can discuss openly with people you surely trust	Enabling open discussion	

Trust is a necessary condition, I wouldn't say anything if I had some kind of idea that it would be misused	Enabling knowledge sharing	
If you have to share confidential knowledge it is really important	Enabling confidential knowledge sharing	
Trustworthiness is a key on how much knowledge we can share	Enabling knowledge sharing	
Trust, where people feel they can really throw any idea around, requires that people know each other at some level, which takes time	Knowledge-based trust enabling free idea sharing	
If you notice people will act like that, you will share the knowledge with them more easily	Trustworthiness enables knowledge sharing	
It's confidential that things can be discussed	Disclosure of confidential knowledge	
Basic trust from knowing each other beforehand helped (in knowledge sharing)	Knowledge-based trust making knowledge sharing easier	
No friction and accomplishing a lot in a short time	Good performance	Promotion of performance and effective collaboration
Without socializing and trust difficult to get good outcomes	Necessary for the performance	
It (trust) has to exist to be able to create anything smart	Necessary for the performance	
Project proceeds, knowledge is exchanged, understanding and competences are shared, it has an impact on everything,	Coordination of effective collaboration	
Trust is absolutely one of the most important, or most important (success factor)	Success factor	Trust as a success factor
Trust, trusting mutually that everything works out	Success factor	
Trustworthiness of tool critical success factor	Success factor	
It is even more important for the one who is selling something	Enabling business	Business promotion
I think that best networks build from trust	Network creation	Networking promotion
Warm and compassionate climate from knowing and trusting	Creation warm and compassionate climate	Climate promotion

Personal and work-oriented communication

First order	Second order	**Aggregate dimension**
We have known each other for years and do not separate work hours	Personal sharing when familiar members	Personal communication
With these people you have got to know elsewhere, with them there'll be inevitably more levels than just professional		
There is a lot of material, so nothing extra is needed	Personal communication not needed	Task-oriented communication
I don't think it would be worthwhile to talk about informal issues		
Not sharing any personal things via platform	Task-based communication on the platform	
Not on the platform (personal knowledge), some are acquaintances, so f-t-f discussions		
No small talk, it is all factual	Task-based communication	
When didn't know any others, action was outcome and project oriented		
No, communication is purely on project		
On people's holidays, who's gone and when, but not more closely		
Not really, may be have a good weekend and such, it is 99 percent focused on task.		

Knowledge sharing and integration

First order	Second order	Aggregate dimension
This platform works as a source for open data for participants	Explicit knowledge on platform	Explicit knowledge sharing
Very little knowledge shared on platform, some questions and mostly project management related	Mostly project management knowledge on platform	
You put ideas, links, preferences, prepare documents	Explicit knowledge on platform	
References, links and documents on the platform	Explicit knowledge on platform	
Knowledge from networks and various types of meetings, and that may not be found directly from the Internet	Explicit knowledge on platform	
You load certain reports and plans, maybe not the tool to discuss	Explicit knowledge on platform	
Not much conversation on platform, there are documents and reports	Explicit knowledge on platform	
It has actually been mostly what (project lead) has posted there, background information and memos for meetings and so on	Explicit knowledge on platform	
Reports and comments from planner	Explicit knowledge on platform	

So far there has mostly been notifications on seminar or about interesting articles or research	Explicit knowledge sharing	
Private message on schedules and links to articles	Knowledge sharing in chat	
Some tacit knowledge, if we had worked more together, maybe there had been more of it.	Some tacit knowledge	Tacit and complex knowledge sharing
This was based on experiental knowledge and vision and touch to practice	Experiental, practical knowledge and vision	
To write it, there is really no other way than talk	Sharing tacit knowledge via conversation	
All you share you share from your experiences, what has worked in somewhere else	Experiental, complex knowledge	
All expertise based on that you have done some expert work before, then bring it to the group	Experiental knowledge	
There may be new tacit knowledge for case company	Tacit knowledge	
Knowledge about materials could provide	Experiental knowledge	
Experts have brought their own expertise from this industry, actors and future potential	Knowledge about industry, networks, potential	
There could be more discussions, so there would be more perspectives, things may not work in specific contexts	Complex knowledge sharing via discussions	
Not through that platfrom	Experiental knowledge not on platform	
Background of people and things one has done and experiences (in meetings)	Tacit knowledge sharing face-to-face	
I would say that most fruitful have been the face-to-face meetings, because these participants are not really used to working virtually.	Fruitful knowledge sharing face-to-face interaction	
And it might be that this leads to different solution because there are people who think about same issue from different perspectives.	Sharing experiental and complex knowledge in project	
Quite little actual co-creation, but it is an insight to get the knowledge compressed	Compressed knowledge instead of creation	Knowledge integration
Synthesis of existing knowledge rather than genuinely creating new	Synthesis of knowledge instead of creation	
Expert's deep knowledge and experience could be brought to customers repeatedly, the idea is to use repetition and factory line	Using experts deep knowledge and experience again	
Different expertise background brought together offers better outcome	Different expertise brought together	
Each person has a little bit of different expertise that is put together to a project	Integration of various expertise	
You are able to get it from there like that one knows something and other something else.	Complementary knowledge	