Economics and Business Review

CONTENTS

How team leaders can improve virtual team collaboration through trust and ICT: A conceptual model proposition[1]

David Kauffmann[2]

Abstract: The purpose of this paper is to present a conceptual model to facilitate the development of collaboration within virtual teams. The model claims that a high level of communication through ICT is an important antecedent for collaboration mediated by the level of trust among the team. Furthermore and according to the model, Team Leaders can have a major impact on the communication effectiveness and on the level of team trust.

Keywords: virtual team, distributed team, collaboration, trust, ICT, team leader.

JEL codes: D83, M12, M15, O32, O33.

Introduction

Collaborative teams are most effective at achieving and enhancing an organization's strategy. Much research has been conducted to identify the antecedents of collaboration in order to increase team effectiveness and the level of its outcomes. The effectiveness of the team and the level of its outcomes will allow assessment as to whether specifying if the team is a successful one or not.

With the Internet revolution of the 1990's the world became a global village. The distance separating people shrank and a new era of organization began. One of the changes that this revolution brought to organizations is the creation of a new kind of team in addition to the conventional face-to-face team: the virtual or distributed team.

In the current highly competitive climate organizations must be dynamic, innovative and able to adapt quickly to new situations. Therefore, 21st century organizations need teams to solve problems and conflicts, to share information and knowledge, to make the right decisions, to be innovative and creative. The quality and level of these attributes will define the nature of team collaboration and then this collaboration will lead to improved team performance [Peters and Manz 2007].

Five key factors have been identified by Bergiel, Bergiel, and Balsmeier [2008] as vital to the formation of a successful virtual team. These five factors are: trust, communication, leadership, goal setting and technology. Boughzala, de Vreede, and Limayem [2012], based on a model of a Collaborative Work Practice designed by de Vreede, Briggs, and Mossey [2009] also observe five critical elements for developing a successful collaboration: these elements are: leadership, people, technology, information and process.

The conceptual model that is proposed in this paper claims that team communication, based on Information and Communication Technology (ICT) channels and the level of trust have an impact on the quality of virtual team collaboration. The effective and proper use of ICT with the mediation of trust will act as an antecedent of the virtual teams' collaboration. Furthermore, the model also claims that the team leader's behavior will have a significant effect on the effective and proper use of ICT and on the team's trust level.

The paper is divided into five sections. The first section is a literature review of papers that deal with the six elements at focus of this paper: Collaboration, Virtual Teams, Communication, Trust, ICT and finally, Team Leader. The second section verbalizes the theoretical background and articulates the hypotheses on which the model is based. The third gives a description of the model itself whose purpose is to help team leaders to improve virtual team collaboration through trust and ICT. The fourth section proposes a method of research to validate the model which includes two stages. Finally, the last section gives a summary of the model and raises its importance for modern organizations.

1. Literature review

Collaboration is an essential ingredient in the success of the organization [Boughzala, de Vreede, and Limayem 2012]. Many of them organize training and seminars for their teams on a periodical basis in order to increase the level of collaboration and cooperation. Collaboration has been recognized as a process that can create outcomes that cannot be achieved by an individual alone [Peters and Manz 2007]. Virtual Teams, because of distance between the teammates, need to develop ways for creating a successful collaboration without face to face training or seminars, but with the help of E-collaboration tools [Hosley 2010]. "Communication and collaboration are the two most important factors

in team success. A virtual environment fundamentally transforms the ways in which teams operate" [Duarte and Snyder 2011]. These E-collaboration tools are built on ICT which allow teammates to communicate with each other on social and task dimensions. At first Virtual Teams were created for limited time projects or task purposes [Jusrud 2008]. Therefore swift trust [Meyerson, Weick, and Kramer 1996], based on cognitive trust only, has been developed in this environment because of the temporary nature of the team. But in the last decades, other Virtual Teams called Distributed Work Groups [Jusrud 2008], have been created for on-going tasks which have a permanent character and therefore swift trust will not be enough to maintain a high level of trust. Affective-based trust, besides cognitive-based trust, will be a necessary ingredient to maintain a high level of trust in such team [De Jong and Elfring 2010]. Communication and trust have been raised several times as components for team collaboration building [Barczak, Lassk, and Mulki 2010]. In order to develop and maintain good communication [Sivunen 2008] and trust [Webber 2002], the team leaders have to play a positive role among their team. Through a review of literature, I will define the main concepts I have raised: Collaboration, Virtual Team (Temporary and On-going), Communication (Task- and relationship-oriented) especially via ICT, Trust (Cognitive- and Affective-based) and finally, Team leaders and their influence among their team to build effective communication, trust and collaboration.

1.1. Collaboration

Collaboration is a complex process which as a result of communication and interaction between parties, creates relationships between them, allowing the sharing and synchronizing of information for the purpose of decision making and achieving common matters or goals. Thomson and Perry [2006] define it as a process in which autonomous actors interact through formal and informal negotiation, jointly creating rules and structures governing their relationships and ways to act or decide on the issues that brought them together; it is a process involving shared norms and mutually beneficial interactions.

Gray and Wood [1991] develop a theoretical framework for studying collaboration. This theoretical framework allows understanding of the process of collaboration that yields particular outcomes. They argue that scholars need to investigate three areas: antecedents to collaboration, the process of collaboration itself, and the outcomes of that process. However, during their research on collaboration, scholars often simultaneously associate antecedents with collaboration processes and outcomes. These lead to failure in differentiating the mediating variables from the outcome ones [Thomson, Perry, and Miller 2010].

For the purpose of this paper, I will focus only on one of these areas which is the collaboration antecedents. According to Mattessich, Murray-Close, and Monsey [2001], collaboration depends on twenty factors that influence the

success of collaboration. Trust and Communication have a major role among these factors: "Collaboration depends on the existence of trust, shared vision, communication, and other ingredients". [Mattessich, Murray-Close, and Monsey 2001]. Collaboration requires a dynamic relationship across various members and groups [Hosley 2010], Trust and communication will facilitate this dynamic relationship.

Five of the concepts associated with collaboration which are most frequently mentioned by these scholars are: Knowledge & Information Sharing [Osman 2004; Bell and Kozlowski 2002; Evans 2012; Van Gelder 2011; Ghaznavi et al. 2013], Conflict Management [Osman 2004; Pazos, Ustun, and DelAguila 2011; Atteya 2013; De Dreu and Beersma 2005], Problem Solving [Casalini, Janowski, and Estevez 2007; Ghaznavi et al. 2013; Dillenbourg 1999], Decision Making [Bell and Kozlowski 2002; Michie, Dooley and Fryxell 2006; Turban, Liang, and Wu 2011], and Innovation and Creativity [Osman 2004; Evans 2012; Ghaznavi et al. 2013]. Therefore, these five concepts will be used to define the level of collaboration within the virtual team.

Information sharing is defined as "a process of making one's own stored and updated information accessible for other members of a group. Sharing presupposes consensus of a group about the interaction and is a necessary condition to be effective" [Den Otter 2005]. Knowledge sharing is defined as "the willful application of one's ideas, insights, solutions, experiences [i.e. knowledge] to another individual either via an intermediary, such as a computer-based system, or directly" [Turban et al. 2006].

Relationship conflict is defined as "interpersonal incompatibilities among group members, which typically includes tension, animosity, and annoyance among members within a group" [Jehn 1995]. Conflict management is defined as "behavior oriented toward the intensification, reduction, and resolution of the tension" [De Dreu, Harinck, and Van Vianen 1999] and it will hopefully lead to an opportunity to improve situations and strengthen relationships.

Problem solving is defined as a process used to obtain a best answer to an unknown, or a decision subject to some constraints [Mourtos, De Jong Okamoto, and Rhee 2004]. Collaborative problem solving is problem-solving done by peers, performing the same actions, having a common goal and working together [Dillenbourg 1999].

Decision making is defined as a group's "ability to integrate information, use logical and sound judgment, identify possible alternatives, select the best solution, and evaluate the consequences" [O'Neil 1999]. Collaborative Decision Making typically evolves from either formal or informal deliberations in groups where the group members consider and debate various possible decision options. The decision issues are resolved through discussions, where argumentative logic and persuasive presentation are critical [Raghu et al. 2001].

Innovation is a dynamic process through which problems and challenges are defined, new and creative ideas are developed, and new solutions are selected

and implemented [Sørensen and Torfing 2012]. Collaborative Innovation is defined as "The recursive interaction of co-creativity, knowledge, and mutual learning between two or more people working together toward a common goal of generating new sources of growth or wealth in an organization" [Lynch 2007].

All these concepts are closely related to Collaboration where a high level of cooperation between teammates is crucial for the success of the processes.

1.2. Virtual team

Salas et al. [1992] provided a good working definition of a team as "a distinguishable set of two or more people who interact dynamically, interdependently, and adaptively towards a common and valued goal/objective/mission, who each have been assigned specific roles or functions to perform". Salas et al. [1992] also add in the definition that virtual teams "have a limited life-span of membership", however, in the last decades, on-going virtual teams also emerge as I will define later.

Traditional teams are known as face-to-face teams, in which the whole team is mostly working in the same space-time. Virtual teams are different in several ways. Many researchers have tried to characterize the differences between virtual teams and face-to-face teams. According to Chudoba et al. [2005] there are six discontinuities – geography, time, culture, work practices, organization, and technology – that capture distinctive aspects of the virtual team environment. It is widely agreed by scholars that the main elements which define a Virtual Team are groups of people who work together and are often dispersed across space, time, and/or organizational boundaries; furthermore these groups of people collaborate and communicate through electronic technologies commonly called ICT [Ebrahim, Ahmed, and Taha 2009; Hertel, Geister, and Konradt 2005]. Most organizations have teams which are working as Virtual Teams across distance, especially global ones. Martins, Gilson, and Maynard [2004] in a major review of the literature on virtual teams, conclude that "Virtual Teams are increasingly prevalent in organizations and, with rare exceptions, all organizational teams are virtual to some extent".

In his research, Justrud [2008] refers to three kinds of teams working in a virtual environment. The first is known as a virtual task force. This group initially forms as a result of an acute or unexpected situation. The second kind of team defined by Justrud as a virtual team is a group formed for a limited period of time in order to solve certain pre-defined tasks. Both of these kinds of teams are temporary most of the time. Finally, Justrud dubs the third kind of team a distributed work group. This group contains people from different geographical units within the same organization. Such teams are usually of a more permanent nature than virtual teams, they work on an on-going basis.

In the last decade of the 20th century and the first few years of the 21st century, virtual teams were mostly based on temporary teams. Most of these teams

were project teams [Mankin, Cohen, and Bikson 1996; Pulnam 1992], task forces [Hackman 1990], or short-term project teams [Cohen 1993]. Usually temporary teams are working on non-routine, highly skilled technical or administrative projects, such as developing a new product or information system [Saunder and Ahuja 2006].

Over the past few years, the second kind of team – the ongoing or long-term team – has also become more prevalent in the virtual context. This kind of team is dubbed functional team [Hellriegel, Slocum, and Woodman 1998] or work team [Pulnam 1992; Mankin, Cohen, and Bikson 1996]. These teams are typically characterized by cyclically recurring activities, and their members expect to be working together on future tasks [De Jong and Elfring 2010].

Saunder and Ahuja [2006] well define these two kinds of team as follow: "Temporary teams engage in a single task, or, at most, a few tasks, to accomplish their goal. Their tasks are concrete and finite. On the other hand, ongoing teams are long term, often requiring multiple or repeated tasks to accomplish the many or recurring goals that are established at their inception or evolve over time".

Most scholars have based their works on the temporary virtual teams and therefore have developed theories like swift trust [Meyerson, Weick, and Kramer 1996] – based on cognitive trust for quick team trust building. Ongoing teams tend to be more focused on interpersonal relationships, which increase the impact of trust dynamics on team member interactions [Karau and Kelly 2004]. Unlike swift trust, which is highly fragile and temporal, on-going teams must develop trust not only based on the cognitive dimension, but also on the affective dimension. These two dimensions of trust will be developed later in this chapter.

1.3. Communication

Scholarly literature provides evidence that quality of communication has effects on team collaboration and performance [Hassall 2009]. These effects can be positive or negative depending on communication channels and styles. Therefore communication was identified as an important process for any team. However, it is especially important for virtual teams [Saunder and Ahuja 2006; Zofi 2012]. "At the core of any virtual team process is communication" [Powell, Piccoli, and Ives 2004]. Communication is not only an important process; it's a real challenge in a virtual environment [Mumbi 2007] due to different cultures and time zones, and distance. Grabner-Kräuter and Kaluscha [2003] argue that the lack of physical contact makes it more difficult to establish strong relationships and bonds that lead to high levels of trust, making the communication process more challenging.

Literature often differentiates between two aspects of communication within the team, Task-oriented communication and Social/Relationship-oriented com-

munication [Huang 2010; Lau, Sarker, and Sahay 2000; Jarvenpaa and Leidner 1999]. Task dimension focuses on how well project information, tasks and deliverables are being handled through the communication. In other words, task-oriented communication moves the team forward in the accomplishment of their task and includes such communication as "planning and scheduling work, coordinating subordinate activities, and providing necessary supplies, equipment, and technical assistance" [Yukl 2012]. Social dimension provides the basis and desire for team members to communicate with each other over time. Relationship-oriented communication's aim is to maintain a positive psycho-social dynamic within the team such as "showing trust and confidence, acting friendly and considerate, trying to understand subordinates' problems, helping to develop subordinates and further their careers, keeping subordinates informed, showing appreciation for subordinates' ideas and providing recognition for subordinates' accomplishments" [Yukl 2012].

1.4. Trust

There are different definitions of trust in academic literature. Marguin [2010] refers to two of the most widely accepted definitions. The first is "one party's willingness to be vulnerable to another party based on the belief that the latter party is competent, open, concerned and reliable" [Mishra 1996]. The second widely accepted definition is "the willingness of a party to be vulnerable to the actions of another party based on the expectation 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, and Schoorman 1995]. These represent two definitions of trust in terms of the dyadic relationship.

Cummings and Bromily [1996] observed that trust also exists in collective relationships [groups, teams, and organizational units]. They defined collective trust as: "A common belief among a group of individuals that another individual or group: a] makes good-faith efforts to behave in accordance with any commitments [...] b] is honest in whatever negotiations preceded such commitments and c] does not take excessive advantage of another even when the opportunity is available".

Jarvenpaa, Knoll, and Leidner [1998] developed a model of trust in virtual teams based on the two theories of dyadic and collective relationships, as quoted above. Their model extends the dyadic trust relationship between trustor and trustee based on perceived ability, benevolence and integrity of the trustee [Mayer, Davis, and Schoorman 1995] to all team members. The baseline hypothesis of their work was that, in a global virtual team, team trust is a function of the other team members' perceived ability, integrity and benevolence, as well as of the members' own propensity of trust.

In order to trust and therefore be willing to depend on another party [McKnight, Cummings, and Chervany 1998], to take risks [Jones and

George 1998] and to be vulnerable [Mayer, Davis, and Schoorman 1995], we must create social and interpersonal relationships with the other. One of the main challenges in virtual teams, as opposed to face-to-face teams, is "overcoming the isolation caused by the separation of the telecommuter from the social network in the traditional work space" [Kurland and Bailey 1999]. Similarly, Grabner-Kräuter, and Kaluscha [2003] argue that the lack of physical contact makes it more difficult to establish strong relationships and bonds that lead to high levels of trust.

Over the years, many trust models have been developed. Based on the concept that trust may have rational and emotional roots, a model of cognitive and affective dimensions in trust has been developed by McAllister [1995]. This theory was recently used by Schaubroeck, Lam, and Peng [2011] in their research on the relationship between team performance and cognition-based and affect-based trust.

When trust is based on cognition, individuals employ rational thought in order to trust others. Cognition-based trust refers to trust that is based on performance-relevant cognitions such as competence, responsibility, reliability, and dependability [Schaubroeck, Lam, and Peng 2011]. We hope that other people will fill their roles and that their actions are consistent with their speech [Erdem and Ozen 2003]. But when the interaction between the parties is intense, the emotional and mutual investment in the relationship becomes primordial; this is where the affective side of trust comes into play [Erdem and Ozen 2003]. The emotional attachment created by this intense interaction emphasizes empathy, affiliation and rapport, based on a shared regard for the other person [Schaubroeck, Lam, and Peng 2011].

In family relationships, such as spouse-partner, and even more so in parent-child relationships, the affective side is very strong and forms the basis for most of the trust in the relationship. In contrast, when we need the services of a specialist – such as a technical expert or consultant – the cognitive side is predominant. In a work environment, where colleagues work together toward a common goal, trust is initially cognition-based. However, to maintain this trust in the long run, we must develop the affective aspect of the relationship [McAllister 1995]. Cognitive and affective dimensions are often tightly intertwined in work relationships.

Trust is assumed to develop gradually over time based on direct personal interaction and communication [Mayer, Davis, and Schoorman 1995; Lewicki and Bunker 1995]. Individuals need time in order to trust another person. We need to develop both cognitive and affective trust. Other research has gone so far as to add other dimensions, such as the "early trust" suggested by Webber [2002] as an antecedent to both cognitive and affective trust, or the "intended behavior" defended by Cummings and Bromily [1996] as a third dimension.

However, high levels of trust at an early stage are possible and may be driven by cognitive cues from group membership and reputation. Affective trust

has been thought to develop later in the life of an interpersonal relationship [Williams 2001].

1.5. Information and communication technologies

As I outline above, ICTs are almost the only means to collaborate and communicate in a virtual environment since face to face meeting is nearly non-existent. The impact of technology on collaboration has been a topic for several items of research including empirical findings [Dennis, Wixom, and Vandenberg 2001; Fjermestad and Hiltz 1998]. Thomas and Bostrom [2008] declare that they "found evidence that Virtual Team leaders do manage information and communication tools (ICTs) in order to affect changes in team cooperation, through trust and relationship improvements". Technology is evolving at an exponential pace leading to new collaboration tools like Web2.0 tools and social media. Former research [Dennis, Wixom, and Vandenberg 2001] suggested that use of different collaboration technology could influence outcomes differently. The different technology characteristics may influence differently the level of collaboration of the team and therefore have various impacts on the performance of the team and his outcome [Ustun and Pazos 2012].

ICTs provide support for both synchronous and asynchronous communication [Warkentin, Sayeed, and Hightower 1997; Ashley 2003]. Synchronous systems enable interpersonal contact that simulates face-to-face contact. It has been argued that "asynchronous Computer-Mediated Communication (CMC) is closer to writing due to the fact that it allows for more syntactic complexity than synchronous CMC" and that "synchronous CMC is closer to speaking than asynchronous CMC because numerous communication strategies and a wide range of discourse patterns are found in the synchronous environment" [Hirotani 2009]. This difference will impact upon the optimal use of these channels. There are three different levels of channels as defined by Bos et al. [2002]; the first is based on text-like writing or online presentation, the second on vocal contact and the third includes vocal and visual contact. The advantage of asynchronous systems is that they allow people to think before answering and to establish the reason behind a particular decision. Asynchronous systems also have the three levels of contact (Text, Vocal and Visual).

ICTs can facilitate both task-based and relationship-based communication. Of the large range of ICT channels, some are more suitable for task-oriented communication and some for relationship-oriented communication [Kauffmann and Carmi 2014]. Kauffmann and Carmi [2014] also argue that depending on the type of trust the Team Leaders wants to develop (Cognitive or Affective) and depending on the kind of Virtual Team (Temporary or Ongoing), the appropriate ICT channel has to be used in order to develop trust in a more effective way.

1.6. Team leader

The definition of team leader that I will use in the model is based on the functional leadership theory [McGrath 1962]. According to Morgeson, DeRue, and Karam [2010], this theory is the most prominent and well-known team leadership model. Bell and Kozlowsky [2002] and Zaccaro, Rittman, and Marks [2001] have also supported this observation. This theory suggests that the leadership role is "to do, or get done, whatever is not being adequately handled for group needs" [McGrath 1962]. Morgeson, DeRue, and Karam [2010] defined team leadership as "[…] oriented around team need satisfaction [with the ultimate aim of fostering team effectiveness]". Several studies have focused on understanding the principal functions of the team leader. Zaccaro, Rittman, and Marks [2001] define this leadership as social problem solving, where leaders are responsible for (a) diagnosing any problems that could potentially impede group and organizational goal attainment, (b) generating and planning appropriate solutions, and (c) implementing solutions within typically complex social domains. Bell and Kozlowsky [2002] split the team leader function into two primary categories: (a) the development and shaping of team processes, and (b) the monitoring and management of ongoing team performance. On the one hand, team leaders must act as managers and be task-oriented [Gray 2004] and on the other they must act as leaders and be people-oriented [Abbas and Asghar 2010] in order to extract better performance and effectiveness from their teams.

2. Theoretical background and research propositions

The key factors to a successful team in general and in a virtual team in particular, are High levels of trust, Clear communication, Strong leadership and Appropriate levels of technology [Bergiel, Bergiel, and Balsmeier 2008]. The model is based on these four key factors to develop the level of team collaboration to achieve success. I will use two elements of leadership which are the abilities of team leaders to encourage and develop communication skills of the team and to facilitate team trust building.

2.1. Team leaders as mentors and facilitators

Quinn et al. [2010] argue that there are eight managerial roles for team leaders on their way to becoming a master manager (Figure 1). Two of these managerial roles are of them acting as a mentor and a facilitator based on their Human Relation Model. As a mentor, team leaders need to develop subordinates and to communicate effectively. Team leaders need to teach how and encourage teammates to communicate effectively. As a facilitator, they need to build the
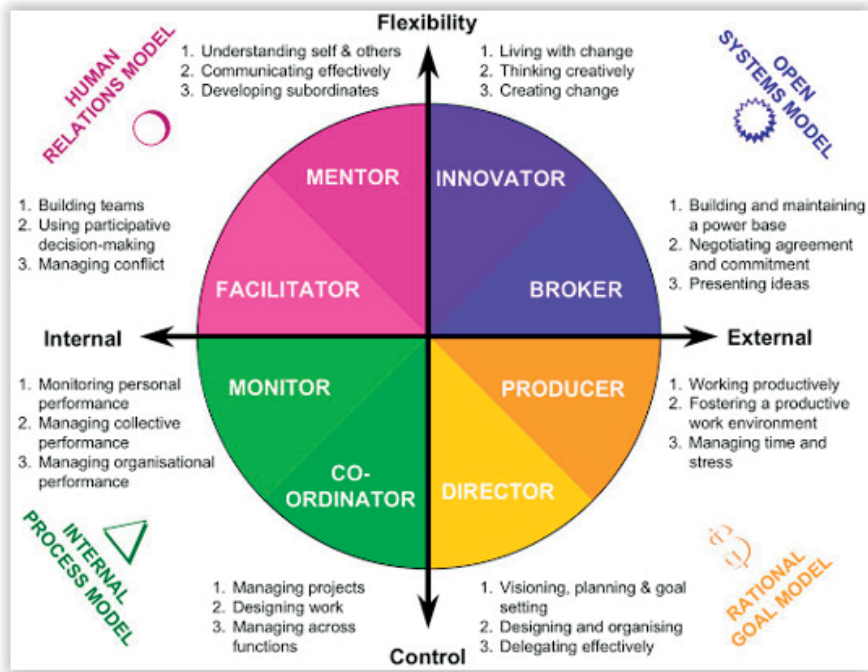
Figure 1. Quinn et al. [2010] Model

team, to encourage decision making and resolve team conflict. Trust is an element of the team building, and decision making and team conflict management are part of team collaboration.

Sivunen A. [2008] conducted research on the communication of leaders in virtual teams. The fourth finding of her research was that virtual team members expect their team leaders to give instructions for the use of communication technology and about computer-mediated communication practices in general. DeRosa and Lepsinger [2010: 44] and Duarte and Snyder [2011: 18] also defend this argument and claim that team leaders have impacts on the team's communication skills. My first hypothesis of the model is:

H1a: *The greater the knowledge of the Team Leader of ICT, the greater Communication skills of the virtual team will be.*

Webber [2002] in a paper examined the challenges faced by Cross-Functional Teams and why these challenges facilitate the need for development of a team climate of trust. On one hand Cross-Functional Teams differ from Virtual Teams, Virtual Teams have common goals while Cross-Functional Teams can have different goals but, on the other hand, they have much in common such as not working in the same space and time. Webber [2002] concludes that team leaders are major agents for building quick trust within the team. Hsu [2006] supported the hypothesis that the relationship between team transformational

leadership and team trust has a significant correlation in software development teams which also supports Webber's argumentation of a positive correlation between team leaders' behavior and team trust. The importance of team leaders as mentors and contributors to the virtual team trust level has also been outlined by DeRosa and Lepsinger [2010: 92], Duarte and Snyder [2011: 83], and Zofi [2012: 102]. They argue that the virtual environment makes their roles in trust building more crucial than a regular team. The next hypothesis of the model is: H1b: *Team Leader behavior has an impact on Trust among the virtual team.*

2.2. Communication, Trust, Collaboration and the relation between them

In 2010, Roth conducted research to analyze Virtual Teams Effectiveness as a Function of using Computer-Mediated Communication (Figure 2). His model was formed of three main parts: Inputs, Processes and Outputs.
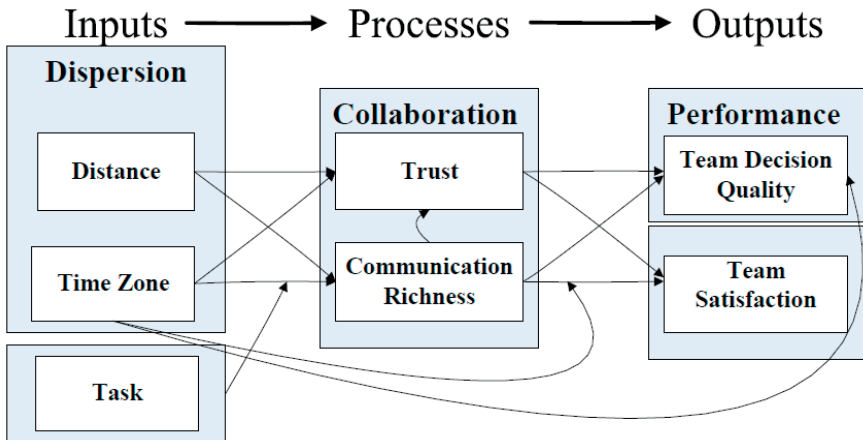
Figure 2. Roth's Model [2010]

The collaboration processes is characterized by trust and communication richness while the communication in virtual teams is mostly, if not entirely, based on Computer-Mediated Communication. Roth explores the links between Inputs, Processes and Output but does not explore the links between Communication, Trust and Collaboration (his hypothesis only proposed a link between communication and trust). My model intends to explore the connections between these three elements.

Research has found that communication and coordination are fundamental elements associated with the collaboration in virtual teams [Mattessich, Murray-Close, and Monsey 2001; Qureshi, Liu, and Vogel 2006; Hosley 2010]. ICTs have positive effects on collaboration where the type of media [e.g. synchronous and asynchronous technologies] and the purpose of the communi-

cation have impacts on the effectiveness [Qureshi, Liu, and Vogel 2006; Hosley 2010; Lau, Sarker, and Sahay 2000]. Each type of technology has benefits and constraints due to the nature of the technology [Lau, Sarker, and Sahay 2000; Kauffmann and Carmi 2014]. In other words, various media meet differing needs for the purposes of collaboration. As I have noted in the literature review, there are two kinds of communication that act out different aspects of the communication: Task-oriented and Social/Relationship-oriented [Huang 2010; Lau, Sarker, and Sahay 2000; Jarvenpaa and Leidner 1999]. In a virtual team context, Lau, Sarker, and Sahay [2000] refer to the task aspect as the part of communication that is specifically directed toward getting the project work done on time and within budget, and the Social aspect as the communication that is directed toward building social relationships and solidarity among virtual team members. Zaccaro, Rittman, and Marks [2001] refer to two task-oriented processes (team cognitive and coordination processes) and two relationship-oriented processes (team motivational and affective processes) as necessary for team effectiveness (Figure 3).
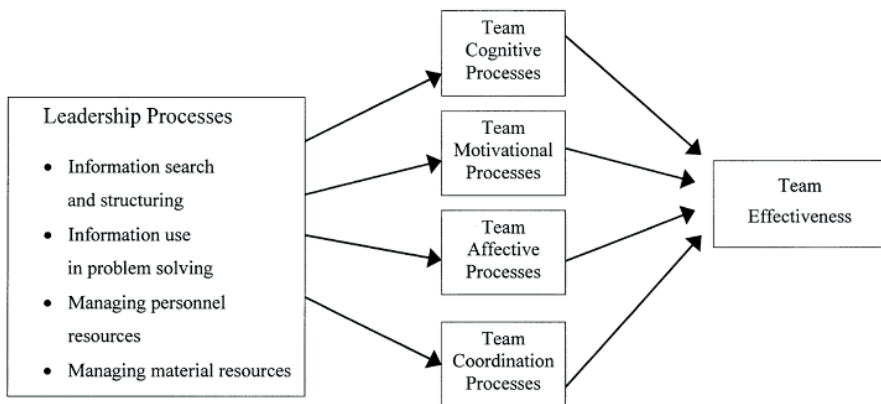
Figure 3. A model of leader performance functions contributing to team effectiveness
Source: [Zaccaro, Rittman, and Marks 2001]

Based on the research on the correlation between Communication/ICT and collaboration, and the two aspects of communication. My third and fourth Hypothesis in the conceptual model are:

H2a: *The greater Relationship-oriented Communication via ICT, the greater Collaboration among the team members.*

H2b: *The greater Task-oriented Communication via ICT, the greater Collaboration among the team members.*

Within a virtual environment, trust is mainly created via a communication behavior established in the first few keystrokes. To maintain this trust, it seems

to be necessary for the communication to gather team members around the project and tasks. Social communication that complements rather than substitutes for task communication may strengthen trust [Jarvenpaa and Leidner 1999]. Kasper-Fuehrera and Ashkanasy [2001] argue that without appropriate ICT to communicate trustworthiness, trust building in a virtual organization is compromised. Roth [2010] finds a high correlation between the richness of communication and the level of trust when the working hours and days of the team members overlap. Thomas [2010] supported the hypothesis that a significant relationship exists between virtual team trust and the use of communication technologies which also supports Roth's finding of a positive correlation between trust and richness of ICT. My fifth Hypothesis is:

H2c: *The greater Richness of ICT, the greater level of trust among the Team.*

2.3. Trust as a mediating factor for collaboration

Trust has been identified by several scholars as an important ingredient for collaboration. In collaboration between two companies, trust has been identified as the primary basis for collaboration to be successful [Johnston et al. 2004]. In their analysis, they found that there is a relation between the degree of trust and the level of cooperation behavior. This finding was confirmed by research conducted by Osman [2004] where he also argued that without trust companies will not engage in business relationships at all. Through research on working teams, the impact of trust was tested on several performance variables like "level of collaboration", "quality" and "timeliness". The variable most affected by trust was "level of collaboration" [Martínez-Miranda and Pavón 2012]. This relationship between trust and collaboration has been also examined in virtual environments and findings confirm that trust has a positive impact on collaboration in such environments too [Leitch Peters 2003; Peters and Manz 2007]. Some scholars argue that trust has a direct, well-defined impact on collaboration and performance. In Trainer's [2012] definition, "Trust, or more precisely perceived trustworthiness, is a crucial ingredient of effective and productive collaborations". Others believe that the relationship is still ill-defined. "All these studies show evidence that, in some way, the trust relationship between the members of a work team affects the performance of the team in its tasks or activities" [Martínez-Miranda, and Pavón 2012]. In her research, Marguin [2010] brings two different points of view expressed in academic studies about the relationship between trust and performance in virtual teams. The first point of view sees trust as an antecedent to success [DeRosa et al. 2004; Sarker and Valacich 2003]. The second argues that trust is a moderator-mediator factor and therefore has an indirect effect on success [Dirks 1999; Dirks and Ferrin 2001; Brahm and Kunze 2012; Qureshi, Liu, and Vogel 2006]. Based on the argument that trust is a moderator-mediator factor, and that communication, trust and collaboration are all linked [Roth 2010]: communication to
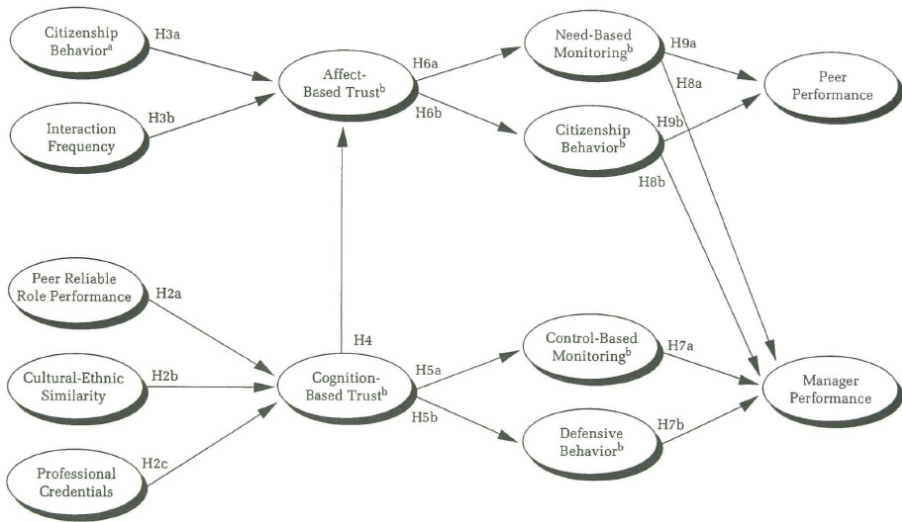
Figure 4. The McAllister [1995] Model, outlining the role of trust in interpersonal relationships within an organization

collaboration [Qureshi, Liu, and Vogel 2006; Mattessich, Murray-Close, and Monsey 2001; Hosley 2010], trust to collaboration [Trainer 2012; Martínez-Miranda and Pavón 2012] and communication to trust [Roth 2010; Thomas and Bostrom 2008], I claim that trust acts as a mediating factor between communication and collaboration.

Moreover, from the theory of cognitive and affective trust [McAllister 1995] (Figure 4) and from the distinction of two kinds of virtual team – Temporary and On-going – [Jusrud 2008], trust building and its development will be of a different nature if we are managing a temporary team as opposed to an on-going team. In a virtual temporary team, focus must be on the cognitive dimension, whereas, in a virtual on-going team, we will need to develop both the cognitive and the affective dimensions. In the virtual on-going team, the affective dimension must play a primordial role if we wish to foster good interpersonal relationships throughout the team's lifetime. As a result of these observations – trust acts as a mediator between communication and collaboration, and the differentiation between cognitive and affective trust in temporary and on-going virtual teams, my sixth and seventh Hypotheses are:

H3a: *Cognitive Trust will act as a mediating factor between communication and collaboration in Temporary Virtual Teams but Affective Trust will have an insignificant impact on it.*

H3b: *Both Cognitive and Affective Trust will act as a mediating factor between communication and collaboration in On-going Virtual Teams.*

These seven hypotheses based on the research papers I have cited are the theoretical background of my conceptual model.

3. Conceptual model

The models, theories and research I have raised in the preceding paragraphs allow the presentation of a conceptual model to define antecedents of collaboration and to determine "How Team Leaders can improve Virtual Team Collaboration through trust and ICT" (Figure 5).
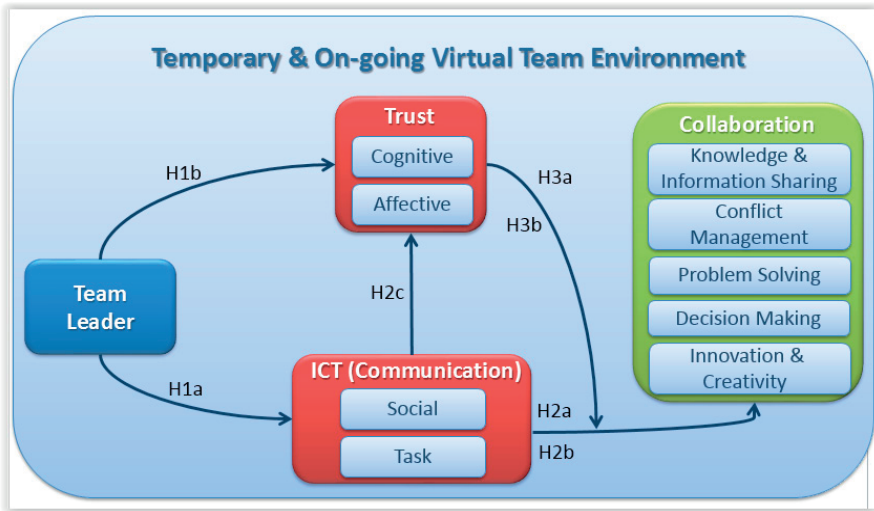

Figure 5. A conceptual model for antecedents of collaboration within virtual environment

The model claims that the team leaders, by facilitating trust within their team and by mentoring by means of the use of the right ICT channel to communicate, can consequently improve the level of team collaboration. In order to accomplish it in the most effective way, team leaders have to take into consideration multiple factors. First the virtual team must be defined as a temporary or an on-going team. According to this team definition, team leaders decide what kind of trust is needed. If the team is a temporary one, team leaders need to focus their efforts on cognitive trust team building while in an on-going team both cognitive and affective trust are critical. Then depending on the required message, relationship- or task-oriented, the team members will be able to choose the right ICT channel to communicate thanks to team leaders' mentoring. The more the team has a high level of trust, the greater the level of collaboration which will improve at every team communication event. Therefore the frequency of team communication is critical to develop collaboration aspects such as knowledge and information sharing, conflict management, problem solving, decision making, and innovation and creativity.

4. Proposed method of research

In order to validate the model and test its hypotheses, I propose to conduct research divided into stages.

The first stage will be to corroborate previous research that has been conducted on the correlation between team leaders and their impact on team communication (H1a) [Sivunen 2008], between team leaders and team trust building (H1b) [Webber 2002; Hsu 2006], between communication and collaboration (H2a, H2b) [Mattessich, Murray-Close, and Monsey 2001; Qureshi, Lim, and Vogel 2006; Hosley 2010] and finally between ICT and trust (H2c) [Jarvenpaa and Leidner 1999; Kasper-Fuehrera and Ashkanasyb 2001; Roth 2010; Thomas 2010]. This research has been conducted in a similar environment or context and their findings have already been validated. Therefore I will corroborate them in the context of the model through a qualitative research approach by an individual in-depth interview of team leaders and members of virtual teams. The variables that will be used to validate the qualitative correlations will be based on the variables used in the previous research. For example: virtual team leading practices, the communication routines and habits of the team, communication technology use and choice in the team used by Sivunen [2008] to investigate the interaction between team leaders' behavior and team communication. Another example is: relationship building, responsiveness, team cohesion and accountability, and frequency and type of ICT used [Thomas 2010] to investigate the interaction between trust and ICT richness.

The second stage will be to test hypotheses that have never been validated to my knowledge. Therefore I propose to use the mix method of both quantitative and qualitative approaches. This method improves understanding arises when quantitative [numbers, trends, generalizability] and qualitative [words, context, meaning] approaches offset the different weakness of the two approaches [Brewer and Hunter 1989]. If we are examining the same phenomenon using multiple perspectives that represent different but complementary views, then we are more likely to gain a better, more complete understanding [Hesse-Biber and Leavy 2008]. These hypotheses (H3a, H3b) claim that cognitive and affective trust have a mediator impact between communication (social- and task-oriented) and collaboration depending also on the type of virtual team (temporary or on-going). For the qualitative approach, I propose an individual in-depth interview of team leaders and members of virtual teams and for the quantitative approach, a web-based questionnaire based on the Likert scale for an online survey. The correlation between Relationship and Task communication variables (as independent variables) and collaboration variables (as dependent variables) that are based on the five concepts associated with collaboration that I raised before: Knowledge & Information Sharing, Conflict Management, Problem Solving, Decision Making and, Innovation and Creativity will be used for measuring this empirical research. While cognitive and affective trust vari-

ables will be defined as mediator variables that alter the strength of the causal relationship between communication and collaboration. The linear multiple regression analysis method will be used for the measurement.

These two stages will allow corroboration of previous findings that are similar to my first hypotheses of the model and to support or reject the last hypotheses of the mediator role of the trust in the interaction between team communication through ICT and the team level of collaboration within a virtual environment.

Conclusions

Due to the fast evolution of technology, Virtual Teams are more common every day. Organizations develop such teams because of many benefits, some of which have been raised by several scholars. Such Teams "facilitate around-the-clock work and allow the most qualified individuals to be assigned to a team" [Wakefield, Leidner, and Garrison 2008] or "the availability of a flexible and configurable base infrastructure" [Ebrahim, Ahmed, and Taha 2009] are some of these advantages. However, companies meet several difficulties in order to make these teams as effective as they first thought. Indeed, these teams have not only positive sides but also due to the lack of communication, a high level of collaboration becomes a real challenge.

Based on research to date, the model proposes the identification of antecedents for collaboration in a virtual environment. According to the model, a high level of communication via ICT using both aspects of communication which are task-oriented communication and social/relationship-oriented communication will lead to a higher level of collaboration and an increase in its effectiveness. The impact strength of communication on collaboration is mediated by the level of trust existing between the team members. Depending on the nature of the team (temporary or on-going), the level of cognitive or affective trust will mediate differently. Cognitive trust will be crucial for both temporary and on-going teams but affective trust will have a minor influence on the temporary team whereas in on-going teams it will be also crucial to the maintenance of trust over time. Finally, Team leaders are a major agent for building trust within the team and for mentoring the team to increase its ICT utilization skills in a more efficient way.

This model can help organizations and team leaders to overcome the collaboration challenges by getting a better understanding of the virtual environment. Team leaders will be able to increase the level of collaboration within their teams by using the right communication channel (ICT media) and the right type of communication (Social or Tasks oriented). They will be aware of the importance of the trust team building process (including its cognitive and affective aspect) and its role as a mediating factor depending on the kind of virtual team with which they are working.

References

Abbas, W., Asghar, I., 2010, *The Role of Leadership in Organizational Change: Relating the Successful Organizational Change with Visionary and Innovative Leadership*, University of Gavle, June.

Ashley, J., 2003, *Synchronous and Asynchronous Communication Tools*, Executive Update Online, December.

Atteya, N.M., 2013, *Examining the Effect of the Conflict Management Strategies on Job Performance*, North American Business Press, West Palm Beach.

Barczak, G., Lassk, F., Mulki, J., 2010, *Antecedents of Team Creativity: An Examination of Team Emotional Intelligence, Team Trust and Collaborative Culture*, Creativity and Innovation Management, vol. 19, no. 4: 332–345.

Bell, B.S., Kozlowski, S.W., 2002, *A Typology of Virtual Teams: Implications for Effective Leadership,* Cornell University ILR School.

Bergiel, B.J., Bergiel, E.B., Balsmeier, P.W., 2008, *Nature of Virtual Teams: A Summary of Their Advantages and Disadvantages,* Management Research News, vol. 31, no. 2: 99–110.

Bos, N. et al., 2002, *Effects of Four Computer-Mediated Communications Channels on Trust Development,* Collaboratory for Research on Electronic Work [CREW].

Boughzala, I., de Vreede, G.-J., Limayem, M., 2012, *Team Collaboration in Virtual Worlds: Editorial to the Special Issue,* Journal of the Association for Information Systems, vol. 13, no. 10: 714–734.

Brahm, T., Kunze, F., 2012, *The Role of Trust Climate in Virtual Teams,* Journal of Managerial Psychology, vol. 27, no. 6: 595–614.

Brewer, J., Hunter, A., 1989, *Multimethod Research: A Synthesis of Styles*, Newbury Park, Sage.

Casalini, M.C., Janowski, T., Estevez, E., 2007, *A Process Model for Collaborative Problem Solving in Virtual Communities of Practice,* UNU-IIST, United Nations University International Institute for Software Technology, April.

Chudoba, K.M., Lu, M., Watson-Manheim, M.B., Wynn, E., 2005, *How Virtual Are We? Measuring Virtuality and Understanding Its Impact in a Global Organization,* Information Systems Journal, December, vol. 15, no. 4: 279–306.

Cohen, S.G., 1993, *New Approaches to Teams and Teamwork*, in: *Organizing for the Future: The New Logic for*, Jossey-Bass Publishers, San Francisco: 194–226.

Cummings, L.L., Bromily, P., 1996, *The Organizational Trust Inventory [OTI]*, Trust in Organizations: 302–330.

De Dreu, C.K.W., Beersma, B., 2005, *Conflict in Organizations: Beyond Effectiveness and Performance,* European Journal of Work and Organizational Psychology, vol. 14, no. 2: 105–117.

De Dreu, C.K.W., Harinck, F., Van Vianen, A.E., 1999, *Conflict and Performance in Groups and Organizations,* International Review of Industrial and Organizational, vol. 14: 369–414.

De Jong, B.A., Elfring, T., 2010, *How Does Trust Affect the Performance of Ongoing Teams? The Mediating Role of Reflexivity, Monitoring, and Effort,* Academy of Management Journal, vol. 53, no. 3: 535–549.

Dennis, A., Wixom, B., Vandenberg, R., 2001, *Understanding Fit and Appropriation Effects in Group Support Systems Via Meta-analysis*, MIS Quarterly, vol. 25, no. 2: 167–197.

Den Otter, A.F., 2005, *Design Team Communication and Performance Using a Project Website,* Bouwstenen series of the Faculty of Architecture, Building and Planning of the Eindhoven University of Technology, Issue 98.

DeRosa, D.M., Hantula, D.A., Kock, N., D'Arct, J., 2004, *Trust and Leadership in Virtual Teamwork: A Media Naturalness Perspective*, Human Resource Management, vol. 43, no. 2–3: 219–232.

DeRosa, D.M., Lepsinger, R., 2010, *Virtual Team Success: A Practical Guide for Working and Leading from a Distance,* First ed. San Francisco, Jossey-Bass.

De Vreede, G.J., Briggs R.O., Massey A.P., 2009, *Collaboration Engineering: Foundations and Opportunities*, Journal of the Association of Information Systems, vol. 10, no. 3: 121–137.

Dillenbourg, P., 1999, *What do You Mean by 'Collaborative Learning'?*, in: Dillenbourg, P. (ed.), *Collaborative-learning: Cognitive and Computational Approaches*, Elsevier, Oxford: 1–19.

Dirks, K.T., 1999, *The Effects of Interpersonal Trust on Work Group Performance*, Journal of Applied Psychology, vol. 84: 445–455.

Dirks, K.T., Ferrin, D.L., 2001, *The Role of Trust in Organizational Settings*, Organization Science, vol. 12: 450–467.

Duarte, D.L., Snyder, N.T., 2011, *Mastering Virtual Teams*, 3rd ed., Jossey-Bass, San Francisco.

Ebrahim, N.A., Ahmed, S., Taha, Z., 2009, *Virtual Teams: a Literature Review*, Australian Journal of Basic and Applied Sciences, vol. 3, no. 3: 2653–2669.

Erdem, F., Ozen, J., 2003, *Cognitive and Affective Dimensions of Trust in Developing Team Performance*, Team Performance Management: An International Journal, vol. 9, no. 5–6: 131–135.

Evans, N., 2012, *Destroying Collaboration and Knowledge Sharing in the Workplace: A Reverse Brainstorming Approach*, Knowledge Management Research & Practice, vol. 10: 175–187.

Fjermestad, J., Hiltz, S., 1998, *An Assessment of Group Support Systems Experimental Research: Methodology and Results*, Journal of Management Information Systems, vol. 15, no. 3: 7–149.

Ghaznavi, M., Toulson, P., Perry, M., Logan, K., 2013, *Organisational Learning and Problem Solving through Cross-firm Networking of Professionals*, Academic Conferences International Limited, Kidmore End.

Grabner-Kräuter, S., Kaluscha, E., 2003, *Empirical Research in on-line Trust: A Review and Critical Assessment*, International Journal of Human-Computer Studies, vol. 58, no. 6: 783–812.

Gray, B., Wood, D.J., 1991, *Collaborative Alliances: Moving from Practice to Theory*, Journal of Applied Behavioral Science, vol. 27, no. 2: 3–22.

Gray, R., 2004, *How People Work and How You Can Help Them to Give Their Best Harlow*, FT, Prentice Hall.

Hackman, J.R., 1990, *Groups that Work [And Those that Don't] – Creating Conditions for Effective Teamwork*, Jossey-Bass Publishers, San Francisco.

Hassall, S.L., 2009, *The Relationship Between Communication and Team Performance: Testing Moderators and Identifying Communication Profiles in Established Work Teams*, Faculty of Business, School of Management, Qeensland University of Technology, Brisbane, Australia.

Hellriegel, D., Slocum, J., Woodman, R., 1998, *Organizational Behavior*, s. l, South-Western, Cincinnati, OH.

Hertel, G.T., Geister, S., Konradt, U., 2005, *Managing Virtual Teams: A Review of Current Empirical Research*, Human Resource Management Review, vol. 15: 69–95.

Hesse-Biber, S.N., Leavy, P., 2008, *Handbook of Emergent Methods*, Guilford Press, New York.

Hirotani, M., 2009, *Synchronous versus Asynchronous CMC and Transfer to Japanese Oral Performance*, CALICO Journal, vol. 26, no. 3: 413–438.

Hosley, C.F., 2010, *The Perceived Effects of Technology on Product Management Team Collaboration*, UMI Dissertation Pulishing, Ann Arbor.

Hsu, S.-Y., 2006, *Team Transformational Leadership, Trust, Empowerment, Satisfaction, and Commitment: Testing a Structural Equation Model in Software Development Teams,* s. l, UMI Dissertations Publishing.

Huang, M., 2010, *Behavior, Trust and Leader Emergence in Virtual Teams*, The Stevens Institute of Technology, Hoboken, New Jersey, United States.

Jarvenpaa, S.L., Knoll, K., Leidner, D.E., 1998, *Is Anybody Out There? Antecedents of Trust in Global Virtual Teams*, Journal of Management Information Systems, vol. 14, no. 4: 29–64.

Jarvenpaa, S.L., Leidner, D.E., 1999, *Communication and Trust in Global Virtual Team*, Organization Science, vol. 10, no. 6: 791–815.

Jehn, K.A., 1995, *A Multimethod Examination of the Benefits and Detriments of Intragroup Conflict*, Administrative Science Quarterly, vol. 40: 256–282.

Johnston, D.A., McCutcheon, D.M., Stuart, F., Kerwood, H., 2004, *Effects of Supplier Trust on Performance of Cooperative Supplier Relationships*, Journal of Operations Management, vol. 22: 23–38.

Jones, G.R., George, J.M., 1998, *The Experience and Evolution of Trust: Implications for Cooperation and Teamwork*, Academy of Management Review, vol. 23: 532–546.

Jusrud, T.E., 2008, *Trust Across Distance – A Network Approach to the Development, Distribution and Maintenance of Trust in Distributed Work Groups*, Norwegian University of Science and Technology, Faculty of Social Sciences and Technology Management, Trondheim.

Karau, S.J., Kelly, J.R., 2004, *Time Presssure and Team Performance: An Attentional Focus Integration*, Research on Managing Groups and Teams, vol. 6: 185–212.

Kasper-Fuehrera, E.C., Ashkanasyb, N.M., 2001, *Communicating Trustworthiness and Building Trust in*, Journal of Management, vol. 27: 235–254.

Kauffmann, D., Carmi, G., 2014, *How Team Leaders Can Use ICT to Improve Trust among Virtual Teams To Increase Collaboration?*, International Journal of Engineering and Innovative Technology [IJEIT], vol. 3, no. 9: 204–221.

Kurland, N.B., Bailey, D.E., 1999, *Telework: The Advantages and Challenges of Working Here, There, Anywhere, and Anytime*, Organizational Dynamics: 53–67.

Lau, F., Sarker, S., Sahay, S., 2000, *On Managing Virtual Teams*, Healthcare Information Management, Communications Canada, vol. 2nd Quarter: 46–52.

Leitch Peters, L.M., 2003, *Now You See Them, Now You Don't: Toward a Greater Understanding of Virtual Team Effectiveness*, Amherst, University of Massachusetts.

Lewicki, R.J., Bunker, B.B., 1995, *Trust in Relationships: A Model of Trust Development and Decline*, in: *Conflicts, Cooperation, and Justice*, Jossey-Bass, San Fransisco.

Lynch, R.P., 2007, *The Architecture of Collaborative Innovation Using Cross-Boundary Alliances as Innovation Engines to Unleash the Power of the Value Chain*, in: *The Architecture of Collaborative Innovation*, s. l, The Warren Company.

Mankin, D., Cohen, S.G., Bikson, T.K., 1996, *Teams and Technology: Fulfilling the Promise of the New Organization*, s. l, Harvard Business Press Books.

Marguin, J.A., 2010, *A Meta-Analysis of Interpersonal Trust and Team Performance*, Long Beach, s.n.

Martins, L.L., Gilson, L.L., Maynard, M.T., 2004, *Virtual Teams: What Do We Know and Where Do We Go from Here?*, Joumal of Management, vol. 30, no. 6: 805–835.

Martínez-Miranda, J., Pavón, J., 2012, *Modeling the Influence of Trust on Work Team Performance*, Simulation, vol. 88, no. 4.

Mattessich, P.W., Murray-Close, M., Monsey, B.R., 2001, *Collaboration: What Makes It Work*, 2nd ed., Fieldstone Alliance, Minnesota.

Mayer, R.C., Davis, J.H., Schoorman, F.D., 1995, *An Integrative Model of Organizational Trust*, Academy of Management Review, vol. 20: 709–734.

McAllister, D., 1995, *Affect- and Cognition-based Trust as Foundations for Interpersonal Co-operation in Organizations*, Academy of Management Journal, vol. 38, no. 1: 24–59.

McGrath, J.E., 1962, *Leadership Behavior: Some Requirements for Leadership Training*, U.S. Civil Service Commission, Office of Career Development, Washington, DC.

McKnight, D.H., Cummings, L.L., Chervany, N.L., 1998, *Initial Trust Formation in New Organizational Relationships*, Academy of Management Review, vol. 23, no. 3: 473–490.

Meyerson, D., Weick, K.E., Kramer, R.M., 1996, *Swift Trust and Temporary Groups*, in: *Trust in Organizations*, s. l, Sage Publications, Thousand Oaks, CA: 166–195.

Michie, S.G., Dooley, R.S., Fryxell, G.E., 2006, *Unified Diversity in Top-level Teams: Enhancing Collaboration and Quality in Strategic Decision-making*, International Journal of Organizational Analysis, vol. 14, no. 2: 130–149.

Mishra, A.K., 1996, *Organizational Responses to Crisis: The Centrality of Trust*, Trust in Organizations: 261–287.

Morgeson, F.P., DeRue, D.S., Karam, E.P., 2010, *Leadership in Teams: A Functional Approach to Understanding Leadership Structures and Processes*, Journal of Management, vol. 36, no. 1: 5–39.

Mourtos, N.J., DeJong Okamoto, N., Rhee, J., 2004, *Defining, Teaching, and Assessing Problem Solving Skills*, 7th UICEE Annual Conference on Engineering Education, Mumbai.

Mumbi, C., 2007, *An Investigation of the Role of Trust in Virtual Project Management Success*, Technology of Murdoch University.

O'Neil, H.F., 1999, *Perspectives on Computer-based Performance Assessment of Problem Solving*, Computers in Human Behavior, vol. 15: 225–268.

Osman, B., 2004, *Antecedents to Effective Collaboration to Innovate*, York University, Toronto.

Pazos, P., Ustun, A., DelAguila, R., 2011, *The Role of Conflict Management on Virtual Team Performance and Satisfaction*, Institute of Industrial Engineers-Publisher, Norcross.

Peters, L.M., Manz, C.C., 2007, *Identifying Antecedents of Virtual Team Collaboration*, Isenberg School of Management, University of Massachusetts, Amherst Massachusetts, USA.

Powell, A., Piccoli, G., Ives, B., 2004, *Virtual Teams: A Review of Current Literature and Directions for Future Research*, The DATABASE for Advances in Information Systems, vol. 35, no. 1: 6–36.

Pulnam, L.L., 1992, *Rethinking the Nature of Groups in Organizations*, in: *Small Group Communication: A Reader*, s. l, William C Brown, Dubuque, IA: 57–66.

Quinn, R.E. et al., 2010, *Becoming a Master Manager: A Competing Values Approach*, s. l, John Wiley & Sons Inc.

Qureshi, S., Liu, M., Vogel, D., 2006, *The Effects of Collaboration in Distributed Project Management*, Group Decision and Negotiation, vol. 15: 55–75.

Raghu, T., Ramesh, R., Chang, A.-M., Whinston, A.B., 2001, *Collaborative Decision Making: A Connectionist Paradigm for Dialectical Support*, Information Systems Research, vol. 12, no. 4: 363–383.

Roth, I., 2010, *Virtual Teams Effectiveness as a Function of Using CMC*, Recanati Business School, Tel-Aviv University.

Salas, E., Dickinson, T.L., Converse, S., Tannenbaum, S.I., 1992, *Toward an Understanding of Team Performance and Training*, Teams: Their Training and Performance: 3–29.

Sarker, S., Valacich, J., 2003, *Virtual Team Trust: Instrument Development and Validation in an IS Educational Environment*, Information Resource Management Journal, vol. 16, no. 2: 35–55.

Saunder, C.S., Ahuja, M.K., 2006, *Are All Distributed Teams the Same? Differentiating Between Temporary and Ongoing Distributed Teams*, Small Group Research, vol. 37: 622–700.

Schaubroeck, J., Lam, S.S.K., Peng, A.C., 2011, *Cognition-Based and Affect-Based Trust as Mediators of Leader Behavior Influences on Team Performance*, Journal of Applied Psychology, vol. 96, no. 4: 863–871.

Sivunen, A., 2008, *The Communication of Leaders in Virtual Teams: Expectations and Their Realization in Leaders' Computer Mediated Communication*, The Journal of E-working, vol. 2: 47–60.

Sørensen, E., Torfing, J., 2012, *Collaborative Innovation in the Public Sector*, The Innovation Journal: The Public Sector Innovation Journal, vol. 17, no. 1: 1–14.

Thomas, D., Bostrom, R., 2008, *Building Trust and Cooperation through Technology Adaptation in Virtual Teams: Empirical Field Evidence*, Information Systems Management, vol. 25: 45–56.

Thomas, V.B., 2010, *Virtual Team Effectiveness: An Empirical Examination of the Use of Communication Technologies on Trust and Virtual Team Performance*, s. l, UMI Dissertations Publishing.

Thomson, A.M., Perry, J.L., 2006, *Collaboration Processes: Inside the Black Box*, Public Administration Review, vol. 66, no. 6: 20–31.

Thomson, A.M., Perry, J.L., Miller, T.K., 2010, *Linking Collaboration Processes and Outcomes: Foundations for Advancing Empirical Theory*, Big Ideas in Collaborative Public Management: 97–120.

Trainer, E.H., 2012*, Supporting Trust in Globally Distributed Software Teams: The Impact of Visualized Collaborative Traces on Perceived Trustworthiness*, University Of California, Irvine, UMI Dissertation Publishing.

Turban, E., Leidner, D., McLean, E., Wetherbe, J., 2006, *Information Technology for Management: Transforming Organizations in the Digital Economy*, John Wiley & Sons, Hoboken.

Turban, E., Liang, T.-P., Wu, S.P., 2011, *A Framework for Adopting Collaboration 2.0 Tools for Virtual Group Decision Making*, Group Decision and Negotiation, vol. 20, no. 2: 137–154.

Ustun, A., Pazos, P., 2012, *The Impact of Online Collaboration Spaces on Virtual Team Outcomes*, s. l, s.n.

Van Gelder, S., 2011, *The Effectiveness of Knowledge Sharing and Collaboration in Creating High Performance Work Teams*, Pepperdine University: UMI Dissertations Publishing.

Wakefield, R.L., Leidner, D.E., Garrison, G., 2008, *A Model of Conflict, Leadership, and Performance in Virtual Teams*, Information Systems Research, vol. 19, no. 4: 434–455.

Warkentin, M.E., Sayeed, L., Hightower, R., 1997, *Virtual Teams versus Face-to-Face Teams: An Exploratory Study of a Web-based Conference System*, Decision Sciences, vol. 28, no. 4.

Webber, S.M., 2002*, Leadership and Trust Facilitating Cross-functional Team Success*, Journal of Management Development, vol. 21, no. 3–4: 201.

Williams, M., 2001, *In Whom We Trust: Group Membership as an Affective Context for*, Academy of Management Review, vol. 26: 377–396.

Yukl, G.A., 2012, *Leadership in Organizations*, 8th ed., Prentice Hall, NJ.

Zaccaro, S.J., Rittman, A.L., Marks, M.A., 2001, *Team Leadership*, Leadership Quarterly, vol. 12: 451–483.

Zofi, Y., 2012, *A Manager's Guide to Virtual Teams*, AMACOM, New York.

Aims and Scope

Economics and Business Review is the successor to the Poznań University of Economics Review which was published by the Poznań University of Economics Press in 2001–2014. The Economics and Business Review is a quarterly journal focusing on theoretical and applied research work in the fields of economics, management and finance. The Review welcomes the submission of articles for publication dealing with micro, mezzo and macro issues. All texts are double-blind assessed by independent reviewers prior to acceptance.

Notes for Contributors

1. Articles submitted for publication in the Economics and Business Review should contain original, unpublished work not submitted for publication elsewhere.

2. Manuscripts intended for publication should be written in English and edited in Word and sent to: review@ue.poznan.pl. Authors should upload two versions of their manuscript. One should be a complete text, while in the second all document information identifying the author(s) should be removed from files to allow them to be sent to anonymous referees.

3. The manuscripts are to be typewritten in 12' font in A4 paper format and be left-aligned. Pages should be numbered.

4. The papers submitted should have an abstract of not more than 100 words, keywords and the Journal of Economic Literature classification code.

5. Acknowledgements and references to grants, affiliation, postal and e-mail addresses, etc. should appear as a separate footnote to the author's name[a, b, etc] and should not be included in the main list of footnotes.

6. Footnotes should be listed consecutively throughout the text in Arabic numerals. Cross-references should refer to particular section numbers: e.g.: See Section 1.4.

7. Quoted texts of more than 40 words should be separated from the main body by a four-spaced indentation of the margin as a block.

8. Mathematical notations should meet the following guidelines:
   - symbols representing variables should be italicized,
   - avoid symbols above letters and use acceptable alternatives (Y^*) where possible,
   - where mathematical formulae are set out and numbered these numbers should be placed against the right margin as... (1),
   - before submitting the final manuscript, check the layout of all mathematical formulae carefully (including alignments, centring length of fraction lines and type, size and closure of brackets, etc.),
   - where it would assist referees authors should provide supplementary mathematical notes on the derivation of equations.

9. References in the text should be indicated by the author's name, date of publication and the page number where appropriate, e.g. Acemoglu and Robinson [2012], Hicks [1965a, 1965b]. References should be listed at the end of the article in the style of the following examples:

   Acemoglu, D., Robinson, J.A., 2012, *Why Nations Fail. The Origins of Power, Prosperity and Poverty*, Profile Books, London.

   Kalecki, M., 1943, *Political Aspects of Full Employment*, The Political Quarterly, vol. XIV, no. 4: 322–331.

   Simon, H.A., 1976, *From Substantive to Procedural Rationality*, in: Latsis, S.J. (ed.), *Method and Appraisal in Economics*, Cambridge University Press, Cambridge: 15–30.

10. Copyrights will be established in the name of the E&BR publisher, namely the Poznań University of Economics Press.

More information and advice on the suitability and formats of manuscripts can be obtained from:
Economics and Business Review
al. Niepodległości 10
61-875 Poznań
Poland
e-mail: review@ue.poznan.pl
www.puereview.ue.poznan.pl

Subscription