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## **Combining bases of trust development in virtual teams**

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**Abstract:** In the setting of a virtual team where cooperating team members are not physically co-located and where technology is used as the major means of communication, trust plays a vital role – the glue that holds the entire team together. We suggest that the key assumption in conceptualisation of trust is its dynamic nature, and analyse the formation and maintenance of trust. The purpose is to look holistically at a number of bases including calculative-, cognition-, value-norm-, affect-, and impersonal-based trust. Our conclusion is that most of the trust bases are important in making a decision to trust in the initial phases of the virtual group's life. However, as trust has a very dynamic nature, the bases of trust change their relative importance through time under the influence of people's interactions among themselves. We present a framework for further empirical research into trust formation and maintenance in virtual teams.

**Keywords:** trust; virtual teams; virtual organisation; trust development; trust base.

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Maria Khryashcheva completed her Master in International Business programme at the Copenhagen Business School, and accumulated highly specific knowledge for the current research while studying a combined programme in e-business/e-commerce at the University of Calgary. Khryashcheva is employed by one of the largest investment banks in Scandinavia. In an industry where all communication and trading transactions happen online, Khryashcheva finds it very relevant to continue her research on virtual teams and virtual collaboration.

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## 1 Introduction

Potentially more effective than a traditional work setting, virtual forms of organising can pose problems as well (Gundry, 2001). In this article, we suggest that a solution to some of the problems in designing effective virtual teams is a better understanding of the trust formation and trust maintenance amongst humans. Virtual forms of organising are actually only 10% about technology and 90% about people, and the same principles and processes that work in the traditional settings continue to work in the virtual organisations (Lipnack and Stamps, 2000). The problems in virtual teamwork are often based not on the malfunctioning of technology, but rather on how people collaborate using this technology. Therefore, sociological and psychological perspectives are usually at the centre of attention in the information system and management literature concerning virtual networking in teams and organisations (Smagt, 1998; Ross, 2001; Iacono and Weisband, 1997; Clemmensen, 2007).

In their operations and geography, however, ICT-enabled virtual teams have to deal with the complexities of asynchronous time and different space (Grudin, 1994; Sarker and Sahay, 2004). Virtual teams are fragmented and may not collaborate effectively in ways comparable to traditional teams, *i.e.*, “...they are not co-located teams at a distance” (Furst *et al.*, 1999, p.266). One of the problems in virtual teams is that there is often a time lag between the message/question and the answer/response. This stems from the fact that in contrast to traditional work settings, which are potentially designed for hierarchical systems where all employees are co-located and have opportunity to check each other’s performance at any time, virtual communication allows for people to be in different places, resulting in possible asynchronicity of the workday and hence virtual communication. In the traditional work environment, if a misunderstanding occurs or additional information is required, an employee can contact another person in a matter of

minutes. In contrast, in the virtual organisation there is often a time lag, which leaves the misunderstanding unsolved. Without the skills to work as true virtual work teams, potential can be wasted, and people become frustrated (Jarvenpaa and Leidner, 1998).

Unresolved misunderstandings are a clear example of a possible larger 'dark side' of the virtual social setting (Jarvenpaa and Leidner, 1998). Media channels used for pure verbal communication can result in various restrictions on the ease of information flow among members of virtual teams. First, if the information and concepts are highly complex, verbal communication over electronic media is not adequate for the complete understanding of a message, and therefore richer visual cues are necessary – video conferencing or face-to-face meetings. Second, interpersonal conflicts are common in a traditional workplace, and face-to-face communication plays a very important role in resolving interpersonal issues. However, in the case of a virtual organisation the situation is more complicated because people usually do not see and mostly do not hear each other. Third, the communication problem becomes even more complex with the greater diversity of team members, a situation occurring frequently in virtual teams. People, who may have never met each other, who live in different countries and work in different professional disciplines, who have differing national cultures and social backgrounds often need to work together in virtual space. A negative outcome of electronic communication can represent “a dark side of the new virtual form” that exaggerates “low individual commitment, role overload, role ambiguity, absenteeism, and social loafing” (Jarvenpaa and Leidner, 1998), and basically stems from a lack of familiarity with members, differing cultural and professional contexts, varying professional and personal objectives of the members, and conflicting incentives for work.

It has been suggested that effective virtual teams have three important characteristics: they are real, meaning that they are intact with identifiable social systems, even if they are very small; they are work groups that have to do a specified piece of work that results in a product, service or decision whose acceptability is measurable; and finally, they are self-managing groups whose members have the authority to manage their own tasks and interpersonal processes as they carry out their work (Davidow and Malone, 1992; Miles and Snow, 1986; Mowshowitz, 1997). A fourth factor of significant importance to virtual teams compared to face-to-face teams may be the recordability of the team's work processes (Furst *et al.*, 1999), which may add to the traditional factors in team effectiveness research, such as how best to create trust, as important issues for further research into the specifics of virtual teams.

In this article we focus on trust. Only trust seems to be able to overcome geographical and organisational differences of global team members from becoming real psychological distances (O'Hara-Devereaux and Johansen, 1994). Trust is used to reduce uncertainty in the working group (Dasgupta, 1988) and is about believing that others will behave in the the best interest of the group. Some of the reported benefits of increased trust include:

- better productivity, efficiency and quality performance (Hagen and Choe, 1998)  
– the non-productive behaviours (*e.g.*, excessive checking and protective control) are reduced
- improved knowledge sharing among members, who are then not afraid that the other party will take advantage of them through received information (Hardt, 1998)
- reduced internal uncertainty in the group and reduced possibility of interpersonal tensions.

Various worries associated with distrust, on the contrary, drain emotions and distract attention from the worker's current job goal (Kramer, 1999). When such a virtual trust gap exists between geographically dispersed individuals, this gap may pose severe problems owing to the lack of face-to-face communication. In some cases, companies question whether trust in a virtual world can ever be obtained.

The rest of the article investigates the bases for trust formation and maintenance in virtual teams, and reviews different theories of trust and virtual communication to propose a framework for speaking about trust development in virtual teams. The focus is on analysing the bases that explain trust at the formation and maintenance stages in a virtual team.

## 2 Trust in virtual teams

We first review different definitions of trust and then elaborate upon the bases of trust.

### 2.1 Defining trust

The notion of trust has been studied by sociology, psychology, economics and management. The diversity of approaches, goals and methods of different scholars has made the literature on trust a gathering of ideas without a coherent framework (Beccerra and Gupta, 1999). Therefore, no definition has been commonly accepted in the trust research.

Common to the constructs of trust is the notion of trust as social capital or social process. This means that in order for trust to exist, at least two parties need to be present in the relationship – the trusting party (trustor) and the trusted party (trustee). The trustor opts to trust or not to trust the trustee in performing a specific task or action. Thus, the parties are interdependent in this social process, which is the first common element of trust as proposed in the literature. A second recognised element is risk or uncertainty in exchange relationships between two parties (see *e.g.*, Beccerra and Gupta, 1999). The information about whether the trustee will act as expected is delayed in time and, therefore, an action of a trustee cannot be predicted with certainty. This exposure to risk leaves the trustor vulnerable to further actions of the trustee in the social exchange. Thus, three common characteristics of the social process view of trust include interdependence, risk or uncertainty in exchange relationships, and vulnerability resulting from the acceptance of this risk.

Trust can be seen as the most important factor in decision making in social contexts, that is, in the sense that trust may be decisive in accepting a risk that a cooperator will meet or not meet certain behavioural expectations (Zolin *et al.*, 2000). Trust can be understood:

“as part of social process that unites these different images of trust into a holistic perspective that includes *situational factors*, such as the level of risk, *state parameters*, such as the current levels of trustworthiness, *choice behaviour* within the constraints of the state and *relational aspects* such as history of the relationship and *expectations* for the future with their associated affective components”. (Zolin *et al.*, 2000, p.15) (our italics)

We will adopt this general understanding of trust in this article.

## 2.2 Bases of trust

Now that we have defined trust, it is necessary to understand what the bases of trust are. Similar to the paucity of definitions in the literature of trust, there is no consensus for the bases of trust. Having said that, we will use the five most recognised bases of trust presented in Table 1 (with further explanations in the following sections).

**Table 1** Bases of trust

<i>Basis of trust</i>	<i>Construct</i>
Calculative-based trust (Rational perspective)	“The rational actor only bestows trust if her calculation suggests the gain from reciprocated trust is higher than the loss threatened by a betrayal of trust.” (Preisdorfer, 1995)  “...actors are limited rationally and are influenced by opportunistic behaviour. As opportunistic behaviour is dealt with by control mechanisms it incurs a cost.” (Leeds and Leeds, 2001)
Cognition-based trust (Expectation-based)	“Cognition-based trust is based on the factual knowledge the trustor has of the trustee...” (McAllister, 1995)
Value-/Norm-based trust	“...trust cannot exist unless individuals share common values.” (Parsons, 1951 quoted in Leeds and Leeds, 2001)  “Trust entails the suspension of self-interest in favour of collectivity orientation.” (Parsons, 1951 quoted in Lane and Bachmann, 1998)
Affect-based trust	“...affect-based trust consists of the emotional bonds between people.” (McAllister, 1995)
Impersonal trust	“The literature on trust makes an important distinction between two fundamental forms of trust: personal trust and impersonal trust. While an everyday understanding of trust tends to see it as a phenomenon that emerges in an intimate relationship between two individuals, many scholars emphasise the role of impersonal trust, particularly in the field of organisational relations.” (Lane and Bachmann, 1998)

The bases of trust must be distinguished from factors that affect trust. As we are not interested in exploring the factors that affect trust, we focus only on the bases of trust or that which provides a foundation for trusting another person.

### 2.2.1 Calculative-based trust (*Rational perspective*)

Calculative trust is rooted in the economic theories of transaction costs (*e.g.*, Chiles and McMackin, 1996) and the agency theory (Dasgupta, 1988), which view a person as a rational actor, calculating his or her decisions to gain maximum utility for them. According to these theories, the trustor will only make a decision to trust if the benefits of expected actions will outweigh the loss connected to the betrayal of trust. The calculation then is based on situational factors (*e.g.*, expectancy of future cooperation, vulnerability of the relationships to the external environment, opportunity cost for trust, switching cost, *etc.*).

Calculative trust, however, has been widely criticised for its failure to consider the social nature of economic agents. Another common criticism lies in the notion of ‘bounded rationality’ – the calculation of risk that takes place in an environment of imperfect information. Therefore, there exists a gap between imperfect information at hand and the final decision to trust. In spite of all the criticism of calculative trust, researchers agree that an “...element of calculation may be present in most trusting behaviour...We merely need to abandon the assumption of hyperrationality and of rational calculation as a sufficient basis for trust.” (Lane and Bachmann, 1998, pp.7–8).

### *2.2.2 Cognition-based trust (Expectation-based)*

The notion of cognition-based trust says that trust is based on the factual knowledge that the trustor has about the trustee (McAllister, 1995). Such knowledge is based on the history of interaction between the two parties. Cognition-based trust also insists on the homogeneity of expectations between two parties to produce higher trust. The notion of homogeneity can be elaborated upon by three types of cognition-based trust – process-based, characteristic-based and institutional-based trust – all of which increase the level of homogeneity (Zucker, 1986).

Being tied to the past exchange relationships in a process-based trust “entails the incremental process of building trust through the gradual accumulation of either direct or indirect knowledge about the other” (Zucker, 1986). The information accumulated through time would relate to the trustee’s performance, task-related behaviours, competence and professional skills. This incremental process can be built at the organisational level in the form of corporate norms. Even if cultural or social congruence between members is not present, their expectations certainly will gain more homogeneity when all team members follow the same procedures and organisational norms.

In contrast, the second type of cognition-based trust, the characteristic-based trust, implies that the trustor has actual knowledge of the trustee’s social status and national culture. The knowledge is gained during the history of the trustor’s interactions with the trustee during which the incremental knowledge accumulation has taken place. Such a characteristic-based trust focuses not so much on the trustor’s knowing that the trustee is from a certain culture, but the trustor’s awareness and factual knowledge of what that culture means (or what the norms are of that social status) and knowing how to behave accordingly. Therefore, the expectations of the trustor towards the trustee would be more predictable.

The third type of cognition-based trust, the institutional-based trust, is tied to the trustor’s actual knowledge of formal social structures or categories, which may be person- or firm-specific, but not directly related to the organisation, to which all members of a group belong. The nature of this trust is given not to an individual per se, but rather to the category (both professional and social) that this individual represents. However, if the trustor is unaware of what one or another social structure entails, then the trustee’s belonging to that structure will make no difference to the trustor’s decision to trust or to not trust.

### 2.2.3 Value-/Norm-based trust

Value-/Norm-based trust, in contrast to calculative trust, stresses the importance of human nature as a social being. According to this approach, individuals need to share common values and norms in order to trust each other. This basis for trust implies common actual personal values between the trustor and the trustee. This means shared personal values and norms; it is not so much about the trustor's knowledge of the trustee's national culture and values, but about how much they are, in fact, alike, sharing the same culture of origin, common background, *etc.*

Value-based trust stresses the altruistic behaviour of agents, *i.e.*, trust involves individuals serving the collective, (Parsons, 1951) (as quoted in Lane and Bachmann, 1998). The common criticism of this approach lies in the reliance on the oversocialisation of man and the ignoring of other factors. Although a collective orientation is important, it is, as in the case of the calculative trust, not the only basis for trust.

### 2.2.4 Affect-based trust

Another basis for trust is the affect-based trust, defined as the emotional bonds that are between people (McAllister, 1995). Affect-based trust has typically been studied in the context of close social relationships such as couples, family members and friends. However, affection in the relationship between work group members may be as important as cognition-based trust. The formation of cognition-based trust is positively correlated with the formation of affect-based trust and precedes its development (McAllister, 1995).

Emotional bonds with the third party may well explain trust. Granovetter (1985) emphasises the importance of 'rumor and gossip' in providing information to the trustor about the trustee. He explains it by 'structural embeddedness' – meaning that trust is more likely between people with mutual friends: this makes it safer to trust in the dense network than in the situation where this network is absent.

### 2.2.5 Impersonal trust

As a basis of trust, impersonal trust is closely intertwined with the institutional-based trust mentioned earlier. Trust in another person can expand to the impersonal trust in the whole company (Zucker, 1986). With respect to members of an organisation, it would mean that a trusting relationship between the trustor and the trustee is supported by the fact that they both belong to the same organisation and they believe that the organisation keeps only trustful and reliable people inside. Impersonal trust is the most abstract type of trust, an area which has not been studied intensively by empirical research.

Summing up, in the traditional view there are five different bases of trust in virtual teams: the calculative base, the cognitive base, the value base, the affect base, and the impersonal base. The cognitive base can be further subdivided into three different bases of trust in virtual teams: the process, the characteristics of the trustee and the institutional base. In the next section we assess the value of, and suggest ways to combine the bases for, the development of trust.

### **3 The new theory – combining theories of trust development for the virtual team**

Considering the context of this article – virtual teams operating for a time period – we apply the developmental view to our analysis. The choice is explained not only by the long-term operation of many virtual teams, but also by the fact that often some of the team members know each other before the group has been set up. Face-to-face contact is usually developed prior to and during the team's activities. Hence, when we analyse trust, we do not take into account the kind of trust that emerges in intermediary short-term virtual teams (but see swift thrust theory for example (Meyerson *et al.*, 1996) for an account of this). Instead, we understand trust as unfolding over time, meaning that it is relatively low at the outset, and can increase over time, depending on the development of the relationship between the parties.

The classic developmental approach to trust views trust development as divided into three time-dependent stages: deterrence-based (intertwined with calculation-based trust); knowledge-based (intertwined with cognition-based trust) and identification-based (intertwined with norm-/value-based trust and affect-based trust) (Shapiro, 1987). We take this notion of separate stages in the development of trust as the conceptual foundation for a theory of trust development. However, we explore the bases for trust at different stages of the trust development process. Therefore, we do not give 'names' to the stages as proposed by Shapiro (1987), since we are conducting exploratory research examining the different bases of trust among the different stages. Trust development can be seen as composed of three compounding parts:

- 1 predisposition to trust
- 2 trust formation
- 3 trust maintenance.

#### *3.1 Predisposition to trust*

Determinants of trust exist even before the initial formation of the work group. As it has been widely discussed in the trust literature, human nature includes a predisposition to trust, but some people tend to be more trusting than others. The preconditions for this may lie in their cultural background (country, upbringing, *etc.*) and their personal and psychological characteristics. Here, predisposition to trust does not depend on the trustee. The concept of dispositional trust has been developed by Rotter (1967), who created a scale of 'General Trust' that significantly correlated with his sociometric measure of interpersonal trust among college students (Zolin *et al.*, 2000). Other researchers have further developed Rotter's scale and identified other important personality characteristics (*e.g.*, prudence, caution, risk taking), and have discussed predispositional or general trust as a 'trust in strangers' where there is a constant tension between safety and risk (Hayashi and Yamagishi, 1998).

#### *3.2 Trust formation*

Trust formation is the initial stage of interaction among parties in the work group, which allows for preliminary formation of each other's perceived trustworthiness. As proposed by Shapiro (1987), at this first short stage the interpersonal interaction between members

is characterised by behaviours based on the calculation of risks and benefits of engaging in trusting relationships, and focused on task-related activities. However, a virtual team with a long-term perspective is likely to enhance social communication as a highly important activity at the outset as well.

The trust formation process takes place during the first meetings of the work group members where they accumulate first experiences of communication with each other. Group members establish communication rules according to their mutual preferences. During these first meetings, group members obtain the initial first-hand information about each other's professional and social background, finding additional information about group members from the third parties who have had prior experience of working with them, *etc.* (Granovetter, 1985) emphasised the importance of 'rumor and gossip' in providing information about the other party. Third-party theory of trust proposes that information from other people influences the trustor's perceived trustworthiness of the trustee. Granovetter (1985) pinpoints his explanation of 'structural embeddedness' – trust is more likely between mutual friends: this makes it safer to trust in the dense network than in the situation where this network is absent.

In the following sections, we assess which of the five major bases for trust is applicable during the trust formation stage in group life.

### 3.2.1 *Calculative trust formation*

The trustor's calculation of costs and benefits and the decision to trust or not to trust is based on situational factors. The approach of calculative trust views a person as a rational actor, calculating his or her decisions to gain a maximum utility for them. Therefore, during the trust formation process a number of calculations are bases for trust decisions in the team. These are, for instance, the team members' speculations about:

- the level of risk they are at, if other team members do not perform as expected
- the extent to which the organisation is influenced by external environment
- the benefits of trusting relationships and cooperation with other team members.

### 3.2.2 *Cognition trust formation*

Team members also develop the first impressions of each other based on the factual knowledge they obtain after the first meetings of a virtual team. According to Zucker (1986), the higher the trustor's awareness of the other team members' expectations, the higher the level of trust that is being formed within the team. There are three types of trust that give ground for the homogeneity of expectations and, therefore, the basis for trust formation under the umbrella of cognition trust.

Cognitive process-based trust formation explains trust between parties based on the history of their interactions and the trustor's actual knowledge about the trustee's performance, professionalism and competence. At the trust formation stage, the history of interactions is very limited and may matter to a limited extent. One example would be if the trustor had a personal or working relationship with the trustee prior to the existence of a present team, or had graduated from the same university, *etc.* The homogeneity of expectations helps to develop a higher level of trust. As mentioned earlier, it can be

reached at the corporate level as well, in the form of corporate norms, so that each party would have aligned expectations towards each other, and therefore the behaviours would be more predictable. So, the trustor would set his expectations according to what is expected from the trustee, giving to the trustee a higher possibility of meeting those expectations which, in turn, would lead to a higher trust level between the parties.

Cognitive characteristic-based trust formation implies social and cultural knowledge of the parties about each other. It means that the trustor's decision will also be influenced by such factors as his knowledge of the trustee's social background and culture of origin. Overall, the more the trustor knows about the trustee (and understands the information properly), the more trustworthy s/he will be in the eyes of the trustor. However, even though other empirical investigation (Dickson, 1996) has proven the importance of the stereotypes, research has shown that the first impression does not always correlate with the later actual behaviour of the trustee. What people expect, based on their perceptions about one or another culture, is not always what they get afterwards.

Regarding cognitive institutionally based trust formation, there is a form of depersonalised trust – 'presumptive trust' – that predicates on information regarding knowledge of the other person's role in a particular organisation or membership in the social or organisational category (Kramer, 1999). This means that during the trust formation process, membership in the salient category can provide a basis for trust. Types of membership may include in-group versus out-group membership (the person is a member of the already existing work group). Newcomers, particularly at the early stages of their in-group socialisation, would be perceived differently as opposed to members who have been in-group for some time.

### 3.2.3 *Value-/Norm-based trust formation*

This basis of trust explains trust between parties when they share common cultural and social background (*e.g.*, country of origin, social status, gender, *etc.*). The idea here states that trust will be influenced by the extent of similarities between the trustor and the trustee. The difference between norm-/value-based trust and characteristic-based trust (within cognition-based trust) is: the former implies the trustor's factual knowledge about the values and norms that the trustee is following, while the latter implies actual similarity of values and norms between the two parties.

The similarity of personal values and norms may as well be rooted in the roles that the parties perform within the team. Given that the trust decision is concerned with trusting a person in performing a particular task or activity, this requires certain professional capabilities, dispositions and intentions from the trustee. The obligations inherent in different roles, such as professions (engineer, programmer, *etc.*) or organisational positions (*e.g.*, head of department), can carry knowledge about the other party in the relationship in a number of ways. Role occupancy is a signal of technical competence of the trustee and that he or she intends to fulfil his or her relevant obligations associated with this role (Kramer, 1999). Trust based on role occupancy, and therefore on the associated role norms, may arise even when the parties have not had any previous working experience together. It is not so much the individual that is trusted as it is the system of expertise, which actually is trusted because it produces and maintains role-appropriate behaviour of role occupants (see *e.g.*, Kramer, 1999).

### 3.2.4 *Affect-based trust formation*

Teams that have a long-term life span will be most likely to put significant emphasis on building personal social relationships at the trust formation stage. It means that not only a rational-choice view of team members' decisions will influence trust formation, but the importance of human nature as a social being will play its role as well. Indeed, the first trust decision is heavily dependent on the professional background of the trustees and task-related situation (roles/obligations). During this period social communication may prevail, when people ask questions related to the team members' social background (their families, friends, travel experience, *etc.*). At the trust formation stage, when team members have little history of working together, the trust, to the greatest extent is imported into the team. Trust formation can be facilitated if team members reveal certain types of emotional behaviours, such as enthusiasm, openness and initiative.

### 3.2.5 *Impersonal trust formation*

At the trust formation stage the impersonal trust as a basis may not matter, as this concept states that trust towards team members as individuals may develop into the trust for the team as a whole. A sufficient period of time is required for interactions among team members before this process can take place.

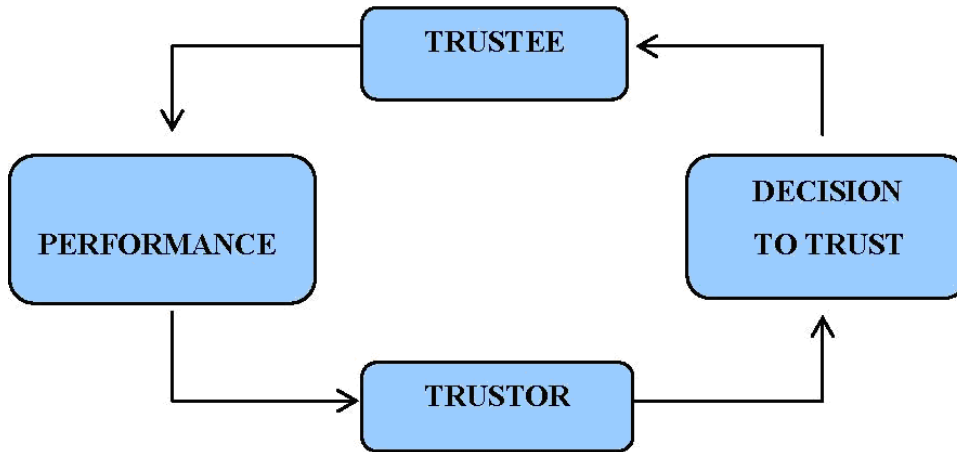
We now examine how the bases of trust would function during the trust maintenance stage of trust development.

## 3.3 *Trust maintenance*

The trust maintenance process is defined as the stage of the trust relationship where task-related activities become highly important. At the previous stages of trust evolution, we have identified the categories of salient factors contributing to trustworthiness at the early stage of a group's life. The trust decision is not based solely on the information from the third parties, superficial knowledge of the role and membership of the trustee, and the trustee's social background. Instead, actual actions of the trustee in this particular work group become the most important source of information for the trust decisions.

In addition to general knowledge about the trustee, the trustor adds up insightful knowledge about both performance-related and social behaviours of a trustee (task- or performance-related behaviours would be follow-through, deliverables, *etc.*; social ones would be, for instance, emotional care in the form of respect to the differences in time zones, *etc.*).

According to the developmental view of trust, the quality of information plays an important role in the dynamics of the trust maintenance process. The better the quality of information (availability, relevance and accuracy) that the person has to work with, the faster the trustor will progress through the trust process. The simplest graphical representation of this process is shown in Figure 1. According to this model, the history of interaction is the basis for both the initial configuring and then the later updating of expectations to trust (Kramer and Tyler, 1996).

**Figure 1** The progress of the trustor through the trust process

Source: Adapted from Zolin *et al.* (2000)

### 3.3.1 Calculative trust maintenance

The element of calculative trust is argued to be always present in most trusting behaviours. It is based on the analysis of a situation. At any point in time in the virtual organisation's life, the situational factors are dynamic, because of changes in the external business environment, and therefore the team members' potential risks from trust are changing. The benefits of trust might differ as well. Calculative trust is not enough to explain trusting relationships among members of a work group, but nonetheless it is always present in any trust decision-making process (Lane and Bachmann, 1998).

### 3.3.2 Cognition trust maintenance

According to the developmental view, trust is a time- and history-dependent process. During the trust maintenance process, the factual knowledge about the trustee's competence, reliability, professionalism, *etc.*, takes over the first trustor's impressions that were built on the stereotypes, perceptions and the very first superficial factual knowledge about the trustee. In the context of cognition-based trust, there are three major constituents that help to increase the homogeneity of expectations between two parties (Zucker, 1986). Aligned expectations are tied to past and/or expected exchange relationships among team members. In the trust formation stage, individuals have their *a priori* expectations of others' behaviour. When parties start an actual task-related interaction, they see whether their previous expectations have been reciprocated or violated. Depending on this result, the trustworthiness of the trustee gradually changes and is updated.

Regarding cognitive process-based trust maintenance, during the trust maintenance process the trustor incrementally accumulates the information about the trustee's performance, competence, commitment, consistency in follow-through behaviour and meeting the deliverables. This knowledge allows parties to adjust their expectations towards each other as they learn each others' preferences and behaviours. According to

Zucker (1986), the production of trust based on personal contacts and experiences with individual actors is insufficient, and therefore, the team members' expectations towards each other may be significantly reinforced under the umbrella of corporate culture. When there is a high diversity among team members, the knowledge about and expectations from each other can be built at the higher level in the form of organisational norms.

In cognitive characteristic-based trust maintenance, through time, team members accumulate more knowledge about each other's cultural and social background (country of origin, family, *etc.*). This may well explain trust during the trust maintenance process. The trustor acquires more understanding of what are another's cultural and social requirements, and sets the expectation to the trustee's performance accordingly. Further, the trustor consciously adjusts his own behaviour to the trustee's cultural values.

Cognitive institutional-based trust maintenance implies the trustor's accumulation of actual knowledge about the trustee's belonging to a certain professional or social category. Of course, if the performance of the trustee does not meet the trustor's expectations consistently, then the institutional-based trust is not sufficient for trust maintenance; however, for some time it can explain the maintaining of trust between two parties.

### *3.3.3 Value-/Norm-based trust maintenance*

Value-/Norm-based trust refers to the actual sharing of personal values and norms between the trustor and the trustee. Recurring exchanges during the trust maintenance process create ongoing aligning of team members' values and norms. According to the developmental view of trust, during the trust maintenance process the virtual team further develops shared values and norms, as team members accumulate knowledge about each other's preferences. Through time, they may well become more similar to each other, and this can explain trust maintenance among them. For example, they may develop such shared personal value as addressing the issues of cultural differences in a highly careful way, and of establishing procedures for dealing with conflicts stemming from the cultural diversity.

### *3.3.4 Affect-based trust maintenance*

During the trust maintenance process, affect-based trust plays a role in trust development. Communication of the emotions of team members is important because of the inability for them to see each other. Certain indicative behaviours such as respect of time-zone differences of other members, ability to share and to listen to the social, not task-related, information, help to maintain the trust within the virtual team.

### *3.3.5 Impersonal trust maintenance*

Impersonal trust implies trust not for the individuals within the group but for the group as a whole. For this basis to exist there should be sufficient time period passed. It should be a period of successful interactions among team members, when each of them meets each other's expectations on a consistent basis; team members also learn more about each other, and perfectly understand each other. After that the trust for individuals can develop into trust for the team, meaning that the trustor will believe that as long as the trustee is in-group, the trustee will behave for the good of the group and all others will put the

benefits of the group as a whole ahead of their own personal needs. Therefore, impersonal basis explains trust maintenance among team members when they reach a state when each party understands, agrees with, and endorses what the other wants, and can act for the other with the passion of making good for the team as a whole.

#### **4 Discussion and conclusion**

The analysis reveals that while not all of the bases may be relevant during the initial formation of a virtual team in a company or during the maintenance phase, most of them will be relevant. A modification to trust development was suggested by the analysis. The maintenance phase should itself be divided into two time periods, the initial phase and the later phase when team members are working extensively together.

Calculative trust may be a base of trust that is developed during the formation of a virtual team and again during the initial phase of the maintenance stage. However, its importance may decline and there may be no evidence that it is a base during the later phase of the maintenance stage. Similarly, there may be no evidence that the cognition process is a base for trust during the formation stage, as in the case where some of the team members knew each other before they formed the virtual team; while the cognition process in general may be a base for trust throughout the maintenance stage and remain constant in that particular virtual team.

Although research on virtual trust is specifically concerned with the virtual context, often this research has been rooted in traditional trust theories. Yet virtual trust development is different from the development of trust in the traditional workplace. The central element of this process may for 90% stay the same – interpersonal interactions between group members and their socialisation (Lipnack and Stamps, 2000) – but the addition of 10% technology has important consequences for the trust development in the virtual team.

##### *4.1 Trust and the design of ‘sociability–usability’ of virtual teams*

The framework for trust development in virtual teams that we suggest should be seen in the context of the design of the social aspects and the collaborative technology of virtual teams, as they both are important for trust development in effective virtual teams. The ‘sociability–usability’ approach to design suggested by De Souza and Preece (2004) is a semiotic and sociological framework for support of evaluators, designers, moderators and users in identifying and solving the problems involved in designing virtual communities. In this framework, online communities have three constituents:

- 1 an online community composed of four ontological elements: community, people, purposes and policies
- 2 an interpretative constituent testing the adequacy of the community’s communication behaviour by applying a base of culturally determined sign systems (signs given in the semiotic sense such as common conversational signs familiar to any speaker of a given language)

- 3 the usability and sociability constituents examining both collective sociability attributes such as the community culture, and individual attributes such as reciprocity and trust (De Souza and Preece, 2004).

The ‘sociability–usability’ framework can be used to analyse particular instantiations of the general online community concept. An analysis of the ‘sociability’ in one or more virtual teams should include how people’s goals with online participation are related to their online behaviours, and how social interaction, online roles and community policies influence virtual teams. However, development of successful virtual teams requires that the designers understand the team participants, their skills and preferences and the tasks they can do with the virtual team support software, and the analysis should therefore include the ‘usability’ of the collaborative software as suggested by *e.g.*, Gutwin and Greenberg (2000).

The need for a parallel focus on sociability and usability for the design of effective virtual teams is supported by the collection of real-life data on the working of virtual teams. In an ethnographic study of globally distributed software development teams, Kotlarsky and Oshri (2005) did ten interviews with counterparts in manager/developer roles in SAP teams in India and Germany and LeCroy teams in Switzerland and the USA. By grounded theory analysis the authors found that three different concepts of trust were important for social ties. Social ties and knowledge sharing were associated with successful virtual team on approximately the same level – but not higher – than collaborative tools such as groupware and e-mail. Hence it is recommended for the design of virtual teams with face-to-face meetings on a regular basis supported by a variety of communication tools (Kotlarsky and Oshri, 2005).

#### 4.2 Training in computer-mediated communication to improve trust

Empirical studies of virtual team working in large companies reveal that team support technology (*i.e.*, groupware (Grudin, 1994)) cannot ensure a sufficient level of trust for the durability of virtual team effectiveness, since trust gradually fades away if the individual team members do not meet face-to-face on a regular basis (Nandhakumar and Baskerville, 2006; Vickery *et al.*, 1999). Over a two-year period, Nandhakumar spent one day a month observing and interviewing team members in more than ten virtual teams associated with a construction project in a large petrochemical company. By the qualitative technique of iterative coding, the authors were able to distinguish different kinds of trust and how the relations between these various aspects of trust developed over time. They found that personal trust from face-to-face meetings between individual team members was needed to maintain online personal trust, and that technology could not provide the basis for trust (Nandhakumar and Baskerville, 2006).

Instead of focusing on technology, it may be possible to improve trust by training team members in virtual team communication. In an exploratory study, (Warkentin and Beranek, 1999) trained six teams of three to four students in virtual team communication such as awareness of team roles, team life cycles and methods to overcome cooperation problems. These and six control group teams were then asked to solve problems related to computer architecture by the use of a virtual communication environment. The findings indicated that without this kind of communication training, trust in the virtual team decreased over time, but with this training, trust within the virtual team increased

over time (Warkentin and Beranek, 1999). Training in virtual team communication through increasing awareness of the possibilities, aims and process of cooperation is recommendable for trust development in long-term virtual teams (Leinonen *et al.*, 2005).

#### 4.3 Trust in weak ties organisations

The research on virtual teams has been quite focused on the ‘glass half-empty’ comparisons with ‘traditional’ teams (Dixon and Panteli, 2007). This is also true in terms of the trust concept and trust development that have been discussed in this article. Here we looked at some of the limitations to the trust development process presented by the absence of rich communication channels, such as face-to-face communication. However, there is a recent trend to start looking at the ‘glass half-full’ aspects of the virtual teams. One of these aspects is the increased efficiency of virtual teams in forming weak-tie relationships. These relationships are needed in the complex tasks where skills and expertise of the closed strong-tie teams are not enough, and outside help should be appropriated. This is increasingly true for knowledge-intensive economy, which is characteristic of developed countries.

Adler and Kwon (2002) argue that more specific constructs, such as trust, fail to capture social capital’s higher level construct of ‘appropriability’. The definition of social capital is adopted from Nahapiet and Ghoshal (1998, p.243). It is “the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit”. Nahapiet and Ghoshal differentiate the relational ties into closure relationships (strong ties) and bridging relationships (weak ties). The latter are important in widening appropriation of resources for multitasked projects.

There is no conclusive evidence shown about the exact nature of the interrelationship of trust and social capital. However, in view of the changing economy where relationships between teams become more fluid and flexible, as well as more open versus closed teams, it is important to understand that trust, although an important factor, should no longer be viewed as the only determinant of the team efficiency. Resource appropriation is becoming another important element. The teams continuously working together over time should still have an important foundation of trust. However, their bridging relationships for resource appropriation reasons should not necessarily be a part of the trust development theories we used here. To conclude, there is a further research needed into the interplay of trust and social capital in forming efficiencies for virtual teams.

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