

Later published in *Journal of Management* (2001) 27(3) : 235-254.

doi: 10.1177/014920630102700302

COMMUNICATING TRUSTWORTHINESS AND BUILDING TRUST IN
INTER-ORGANIZATIONAL VIRTUAL ORGANIZATIONS

Eva C. Kasper-Fuehrer
Donau-City Strasse 6
A-1220 Wien
Austria
e-mail: eva.kasper@at.unisys.com
Phone: 011-431-26064-423
Fax: 011-431-26064-525

and

Neal M. Ashkanasy
Graduate School of Management
The University of Queensland
Brisbane, QLD, 4072
Australia
e-mail: n.ashkanasy@gsm.uq.edu.au
Phone: 011-617-3365-7499
Fax: 011-617-3365-6988

Acknowledgements: The Authors are grateful to Ron Weber and Otto Krickl, Special Issue Editor Rhonda Reger, and two anonymous reviewers for their helpful comments on earlier drafts of this paper.

COMMUNICATING TRUSTWORTHINESS AND BUILDING TRUST IN
INTER-ORGANIZATIONAL VIRTUAL ORGANIZATIONS

Abstract

We propose a theory of trust in inter-organization virtual organizations that focuses on how trustworthiness can be communicated and trust built in this environment. The theory highlights three issues that must be dealt with if the potential obstacles to the development of trust in the virtual context are to be overcome. These are communication of trustworthiness facilitated by reliable Information and Communication Technology (ICT), establishment of a common business understanding, and strong business ethics. We propose four specific propositions relating to these issues, and suggest topics to be explored in future research.

Key words: Virtual organization, trust, trustworthiness, communication.

COMMUNICATING TRUSTWORTHINESS AND BUILDING TRUST IN
INTER-ORGANIZATIONAL VIRTUAL ORGANIZATIONS

An executive in a components distribution company based in Germany has to project-manage a new product requiring outsourced manufacture of 150 parts. To achieve this, she enters the web site of *Virtuelle Fabrik Euregio Bodensee* (www.virtuelle-fabrik.org), a virtual infrastructure that facilitates dynamic creation of temporary inter-organizational virtual organizations capable of fulfilling complex orders. *Virtuelle Fabrik* consists of a network of companies centered on the Bodensee region in central-western Europe, and facilitates project communication through computer technology. Through *Virtuelle Fabrik* the executive is able to establish clear roles and responsibilities for all partners, including a legal framework for participating virtual collaborations. *Virtuelle Fabrik* notes that this is achieved through “the development of a partner relationship and thence of trust within the organization”.

The example above illustrates a typical site set up specifically to facilitate creation of inter-organizational virtual organizations in the Information Age. The idea of the “virtual organization” was popularized by Davidow and Malone (1992) in *The Virtual Corporation*, and became one of the buzzwords of the 1990’s. Virtual organizations have since been the subject of considerable discussion, especially in the popular literature, where the concept has been either praised, (e.g., see Byrne, Brandt, & Port, 1993; Mowshowitz, 1994; Zwicker, 1996), or criticized (e.g., see Nohria & Berkley, 1994; Olbrich, 1994; Wicher, 1994). The virtual organization does

not, however, constitute an organizational design in the traditional sense. Instead, it embraces a variety of ways of working together, including virtual teams within organizations and inter-organizational collaboration. Our focus in this paper is on virtual collaborations *between* organizations (the inter-organizational form), rather than *within* existing organizations (the intra-organizational form).

Specifically, we seek to contribute to theoretical understanding of inter-organizational virtual organizations through the critical issue identified in our example: trust. We argue that trust is a basic ingredient of organizational functioning (Hosmer, 1995), especially in the information systems environment, where Nelson and Coopriider (1996) note that trust underlies the sharing of vital systems knowledge. Further, writers such as Handy (1995) and Klein (1994a) have emphasized that trust takes on added importance in the context of the virtual organization because the traditional mechanisms of human social interaction, based on control and hierarchy, are more often than not missing.

In this paper, we first define the terms inter-organizational virtual organization, trust, and communication of trustworthiness. We then argue first that appropriate Information and Communication Technology (ICT) is needed to communicate trustworthiness and second that establishment of a common business understanding and maintenance of ethical standards are also necessary to build trust.

We develop four propositions as a foundation for future research in this developing area. The propositions provide a new perspective on the age-old topic of business trust, and are applicable

to the new challenges of the Information Age, where writers such as Snow, Miles, and Coleman (1992) have argued that temporary inter-organizational collaborations, like those fostered by *Virtuelle Fabrik*, are likely to become the norm. In this respect, trust is the basic ingredient of collaboration (see Krackhardt & Stern, 1988; Zand, 1974).

KEY DEFINITIONS

The Inter-Organizational Virtual Organization

Fuehrer and Ashkanasy (1998) define the Inter-Organizational Virtual Organization as “a temporary network organization, consisting of independent enterprises (organizations, companies, institutions, or specialized individuals) that come together swiftly to exploit an apparent market opportunity. The enterprises utilize their core competencies in an attempt to create a best-of-everything organization in a Value-Adding Partnership (VAP), facilitated by Information and Communication Technology (ICT). As such, virtual organizations act in all appearances as a single organizational unit.” (p. 19).

This definition is a Weberian “Ideal Type”, a concept that is used to describe real social systems in hypothetical terms. The Ideal Type is defined by Weber (1949) as a social scientific construct that combines a set of concrete individual facets into an internally consistent form. As such, this form provides an appropriate framework for the present discussion, and reduces the complexity of the construct being defined. In particular, our definition emphasizes three important

characteristics of virtual organizations: the central role of ICT, the cooperative character of these organizations, and their temporary nature.

A key component of this definition is that virtual organizations are ICT-enabled (Griese, 1992; Semich, 1994), and based on computer-mediated communication (CMC: see CMC Magazine; Jarvenpaa & Leidner, 1998, 1999). CMC is a powerful tool to overcome time and distance barriers, but it suffers from the limitation that non-verbal communication, an important component in trust building, is difficult to achieve. Thus, while non-verbal cues are included in CMC (Walther & Tidwell, 1995), they are clearly not as easily transmitted as they are in face-to-face communication (e.g. see Jarvenpaa & Leidner, 1998, 1999) and interpretation of these cues is subject to cultural differences. As such, and since non-verbal cues are central to communication of trust (Ekman & Friesen, 1974; Takeuchi & Nagao, 1993; Walther & Tidwell, 1995), this represents a critical potential limitation to the value of virtual organizations.

The definition also implies that the effectiveness of virtual organizations depends on coordination and control, allowing participants to achieve their mutual objectives. In this case, we agree with *Virtuelle Fabrik* and writers such as Nelson and Coopride (1996), Sheppard and Tuchinsky (1996), Swagerman, Dogger, and Maatman (2000) that trust is essential for the functioning and success of the virtual organization. Indeed, it is arguable that trust is of increased significance in the virtual organization context because it acts as a substitute for two critical factors that exist in most traditional organizations but are usually absent in the virtual organization. The first of these is an endogenous factor: the hierarchical control associated with traditional organizations (Swagerman et al., 2000; Wigand, Picot, & Reichwald, 1997). The second is exogenous; the

legal framework needed to regulate the formation, operation, and dissolution of the organization (Fuehrer & Ashkanasy, 1998; Müthlein, 1995; Sitkin & Roth, 1993).

Finally, the definition states that virtual organizations are intrinsically temporary in nature and are “swiftly” formed. Time is an irreplaceable pre-requisite for trust building in business relationships (Wigand, et al., 1997), however. The concept of trust in collaborative virtual partnerships is therefore more than just “swift trust” based on immediate stereotypical impression (Jarvenpaa & Leidner, 1998; Meyerson et al., 1996).

Trust

Trust is not a simple phenomenon. It encompasses constructs as diverse as ethics (Brenkert, 1998), morals (Brenkert, 1998, Wicks, Berman, & Jones, 1999), emotions (Flores & Solomon, 1998; Wicks, et al., 1999), values, and natural attitudes (Flores & Solomon, 1998). Further, trust spans interdisciplinary fields, including philosophy, computer science, economics, and organizational behavior (Rousseau, Sitkin, Burt, and Camerer, 1998; Tyler & Kramer, 1996). Consequently, there is a myriad of definitions of trust. We have adopted Hosmer’s (1995) definition as the most suitable in the virtual organization context. This definition integrates views on trust from five contexts, four of which are based in organizational studies and include interpersonal relationships and economic exchanges, while the fifth is based in philosophical ethics.

Hosmer (1995) defines trust as the “expectation by one person, group, or firm of ethical behavior—that is, morally correct decisions and actions based upon ethical principles of analysis—on the part of the other person, group, or firm in a joint endeavor or economic exchange” (p. 399). This definition emphasizes the importance of trust in both personal and organizational relationships. Moreover, Hosmer points out that trust results from an expectation of fair behavior by the other party in the partnership, together with acceptance of the rights and interests of the other party. The definition also includes the idea of a joint undertaking, implying that there is a level of understanding of shared business practices between the partners. Another factor that is implicit in the definition is the role of ethical behavior. Hosmer defines ethics as moral principles or standards of human conduct that influence our attitudes and actions. Any change in ethics thus causes a change in actions and thus influences trust. Finally, the definition implies that the participants will undertake jointly to contribute to the final outcome. Hosmer notes that, ultimately, being aware of the mutuality of the relationship results in the creation of goodwill. Thus, the definition encompasses philosophical ethical principles that are independent of disciplines or of context. Rousseau, et al. (1998) argue similarly that the construct of trust transcends disciplines.

Traditionally, trust has been studied in terms of long-term relationships. This is because trust is described as being history-dependent (Meyerson, et al., 1996). According to these studies, trust builds incrementally and accumulates over time. Virtual business relationships, as illustrated in *Virtuelle Fabrik*, however, are characterized by project-oriented relationships that may entail no past history, nor any plan for future association. In these temporary relationships, time is a vital but often elusive component in the trust building process. This does not mean, however, that

trust cannot be apparent in temporary groups. On the contrary, McKnight, Cummings, and Chervany (1998) have shown that trust in initial relationships can often be high. Further, Jarvenpaa and Leidner (1998, 1999) argue that trust is maximally important in new and temporary organizations, because it acts as a substitute for the traditional mechanisms of control and coordination. Miles & Creed (1995) support this notion by suggesting that, by 2010, hierarchical management will be the exception, rather than the rule. Instead, organizations in future will be loose, changing networks in which service brokerage firms like *Virtuelle Fabrik* will play a central role, and the primary coordination mechanisms will be based on trust.

Communication of Trustworthiness

A central thesis of this paper is that communication of trustworthiness underlies trust building. Drawing on Nelson and Coxhead (1994), we define Communication of Trustworthiness as an interactive process that affects, monitors, and guides members' actions and attitudes in their interactions with one another, and that ultimately determines the level of trust that exists between them. It should be noted, however, that our conceptualization of trust goes beyond the idea of "swift trust" (Meyerson, Weick, & Kramer, 1996), where "individuals in temporary groups make initial use of category driven information processing to form stereotypical impressions of others" (Jarvenpaa & Leidner, 1998: 6). Thus, while our focus is on means for establishing trust in rapidly changing virtual settings, it is implied that communication channels between the collaborating parties are open. In this respect, Jarvenpaa and Leidner (1998, 1999) have noted that swift trust cannot be sustained without subsequent communication. In effect, swift trust is a necessary but not sufficient condition for communication of trustworthiness.

Trust in the World of the Virtual Organization

Writers such as Bleecker (1994), Garrecht (1998), and Semich (1994) have pointed out that the virtual organization constitutes a special case of network organizations, and is thus characterized by lateral rather than vertical relationships (see also Snow, et al. 1992). In vertical relationships, authority is clearly defined by the hierarchical structure in the organizational design, along with organization charts and formalized organizational procedures. Networks, on the other hand, lack this traditional method of hierarchical coordination and control. As a result, the traditional mechanisms of control, including direct supervision and enforcement of rules (Wiesenfeld, Raghuram, & Garud, 1998), are no longer adequate. Sheppard and Tuchinsky (1996), for example, argue that trust acts as a substitute for control in lateral relationship organizations. Indeed, Sheppard and Tuchinsky go further, and posit that modern organizations are more likely than not to be based on development of trust and co-dependent relationships.

Trust has also been identified by writers such as Handy (1995), Jones and Bowie (1998), and Klein (1994a) as an integral feature for sustaining the virtual organizational form. One reason is that trust acts as a buffer that facilitates the agreement and execution of transactions. Trust also fosters willingness to cooperate, and consequently reduces transaction costs (Bromiley & Curley, 1992), which in turn increases the profitability and attractiveness of the virtual organization. Trust is also a vital component contributing to risk mitigation in virtual organizations (Grabowski & Roberts, 1999). Jarvenpaa and Leidner (1998, 1999) argue in addition that trust is necessary

for conflict resolution, intra-organizational goal setting, and creation of shared values (see also Jarvenpaa, Knoll, & Leidner, 1998)

Finally, we note that, owing to the temporary nature of trust in the virtual organization context, our focus is on ways to produce trust quickly in the virtual organization, rather than dealing with the consequences of violation and/or the successive rebuilding of trust. We also assume that communication is established between the collaborating partners, so that our conceptualization is not founded solely on the idea of instantaneous “swift trust” (Meyerson, et al., 1996).

Furthermore, since trust is implicitly a reciprocal process, the term trust as we use it encompasses both the trust-giver and the trustee.

Having defined the inter-organizational virtual organization, trust, and communication of trustworthiness, and discussed the relationship between them, we now identify and discuss three factors important for development of trust across virtual organizations. We deal first with communication of trustworthiness, which we argue is predicated on appropriate use of ICT. We then discuss common business understanding amongst the members of the virtual organization network, and then the need for high standards of business ethics. We argue that each of these factors influences the level of trust in a virtual organization and, as a result, determines the virtual organization’s competitive advantage (Barney & Hansen, 1994). We conclude by discussing the limitations of our analysis, and we raise issues to be explored in future research.

COMMUNICATION OF TRUSTWORTHINESS

Fuehrer & Ashkanasy (1998) and Scholz (1994, 1996) have pointed out that ICT is the special additional attribute that underpins the virtuality of the virtual enterprise. ICT also acts as the medium for communication and coordination among the collaborating partners (Malone & Rockart, 1993). ICT therefore constitutes an integral part of communication of trustworthiness because it is the medium that generates, processes, communicates, transfers, and visualizes data and information. We argue that, without appropriate ICT to communicate trustworthiness, trust building in the inter-organizational virtual organization is compromised. Consider, for example, a member of a virtual organization who is waiting on assurance from a virtual collaborator concerning a key resource. A breakdown or miscommunication in ICT that delays or even diverts this assurance is likely to lead to a breakdown in the trust-building process, and to necessitate a long and difficult repair process.

Reliable and effective ICT allows organizations to bridge time and distance barriers with once undreamed of ease (Alexander, 1997; Bleecker, 1994; Goldman, Nagel, & Preiss, 1995; Mowshowitz, 1994; O'Leary, Kuokka, & Plant, 1997; Wigand, et al., 1997). The necessity for ICT and CMC in virtual organizations, however, means that there is an extra layer of complexity compared to more traditional organizational forms. Thus, in addition to the usual problems of miscommunication and cultural differences, virtual organization members need to contend with shortcomings of the technology, which we characterize as comprising either physical or human components. Physical components of ICT comprise the means of transmission of CMC, while human ICT components are the means by which members communicate meanings within the CMC, especially communication of emotion and non-verbal information (see also Swagerman et al., 2000, who refer to these as the technological and human aspects of a semiotic framework).

Physical ICT Components

The evolution and increasing popularity of virtual organizations are largely a product of the advances in ICT and the expansion of the “information super-highway” (Faisst, 1995), a sophisticated wide-band technological network that fosters the development of freedom from physical and time constraints (Byrne, Brandt, & Port, 1993). As a reaction to the improved ICT bandwidth and infrastructure, international negotiations on standards and norms in regard to ICT have created a global framework (O’Leary, et al., 1997). This, in turn, has resulted in adoption of standard protocols for both the format of the data transferred and the means of communication. Many countries in turn are negotiating and creating a common ontology that supports compatibility of the different systems in use (Faisst, 1995; Ferné, 1996; Hardwick, Spooner, Rando, & Morris, 1996; McChesney, 1996; Semich, 1994). This future commonality should further enable the formation of virtual organizations and impact on the interaction process. An example of this global framework is the involvement of the US government in the design of a National Industrial Information Infrastructure Protocol (NIIP). This is intended to “develop open industry software protocols allowing manufacturers and their suppliers to incorporate as if they were part of the same enterprise” (Hardwick & Bolton, 1997: 59). For the virtual organization, the development of the information super-highway is an important facilitator, and thus also a key external determinant of the level of trust in virtual organizations. Dependence on the reliability of ICT, however, means that virtual organizational members are also vulnerable to any breakdowns in the systems upon which they rely so heavily.

The fact that ICT dominates every facet of the virtual organization creates the need for technology to be standardized in terms of products (e.g. use of the Microsoft Office suite of software) and compatible interfaces (e.g. the TCP/IP the communication protocol that underlies the Internet). These are needed to ensure smooth and efficient operation of the virtual organization, and to reduce uncertainty (which is normally increased in the virtual context, see Handy, 1995). We maintain that awareness of these requirements is necessary in order to communicate trustworthiness.

In this respect, Merkle (1996) has identified some of the information infrastructure requirements vital for communicating trustworthiness in the virtual organization. These include modular technical devices, which necessitate the negotiation of international standards and norms, such as the NIIP, and physical separation of the data storage and the resource sharing between the virtual organization members. Merkle has also identified availability, reliability, capacity, and user friendliness of the technology used in the collaboration as additional factors required to communicate trustworthiness. Aldridge, White, and Forcht (1997) have stressed the added role of network security as a requirement. Finally, multimedia functions, retrieval possibilities, bandwidth, and efficiency are also important. To date, most of these requirements are already realized, although Merkle (1996) notes that the capacity, efficiency, and reliability of these technologies continue to be problem areas with the ICT architecture of virtual organizations.

This argument leads to our first proposition:

Proposition 1. Lack of ICT standardization, bandwidth, and reliability is associated with less effective communication of trustworthiness in inter-organizational virtual organizations.

In summary, without a foundation for a stable and reliable wide-band platform provided by the physical ICT environment, the communication of trustworthiness in virtual organizations is impeded. We have deliberately worded Proposition 1 negatively to emphasize the point that this impediment is directly a function of the extent to which ICT is rendered ineffective. Nonetheless, we acknowledge that members of inter-organizational virtual organizations can usually rely on the global ICT network and the information super-highway to provide a dependable environment for the process of communicating trustworthiness to proceed.

Human ICT Components

While reliable and ethical behavior underlies trust (Hosmer, 1995), we argue in this paper that communication of trustworthiness also depends upon a component of safe interpersonal communication. In this instance, and consistent with Handy (1995), we propose that both verbal and non-verbal cues are necessary for humans to communicate trustworthiness. Thus, as Nohria and Eccles (1992) and Grundy (1998) have noted, face-to-face communication is the most effective means to facilitate trust. Nohria and Berkley (1994) comment further that, compared to electronic groups where CMC prevails, decision-making is usually more efficient in face-to-face interaction. This fast decision-making seems to be a result of the immediate feedback given by other group members in both an implicit and an explicit manner. Furthermore, group interactions and the resulting group-influenced behavior act also to increase decision-making speed. Clearly,

since there is often little chance that face-to-face meetings will occur in many virtual organizations, members must be able to transmit as many non-verbal cues as are necessary if they are to maximize the communication of trustworthiness.

The problem, of course, is that most communication between inter-organizational virtual organization members is computer-mediated. CMC is an integral part of virtual organizations whose members are geographically dispersed (Jarvenpaa & Leidner, 1998, 1999), but provides a limited channel for transmission of non-verbal cues (Takeuchi & Nagao, 1993; Walther & Tidwell, 1995; Yates & Orlikowski, 1993). An example of the difficulties of maintaining trust through CMC is provided in the study by Jarvenpaa & Leidner (1998, 1999). They describe a series of case studies of temporary global virtual teams whose members were geographically dispersed. These groups were culturally divided, had no common past or plans for future collaboration, and lacked face-to-face contact. The only communication medium used was CMC. The studies indicated that, although these groups exhibited a type of swift trust, that trust was temporal and fragile (see also Jarvenpaa, Kroll, & Leidner, 1998; Jones & Bowie, 1998; Meyerson, et al., 1996). Jarvenpaa and Leidner (1998, 1999) concluded that swift trust can be maintained only so long as the members communicate enthusiastically. In this instance, maintenance of the level of trustworthiness needed to ensure effective virtual organization functioning requires on-going communication of emotional expression (Weiss & Cropanzano, 1996; Wicks et al., 1999).

Indeed, a good deal of research has been conducted on how to compensate for the lack of non-verbal and emotional cues in CMC. Sony Corporation researchers, for example, studied the

effect of facial displays in systems enabling computer-human interaction (Takeuchi & Nagao, 1993), and found that systems that communicate facial displays at least partially facilitate computer-human interaction. Takeuchi and Nagao (1993) reported further that facial displays also improve subsequent interactions, even when the following systems lack such displays. Based on Ekman, and Friesen's (1974) finding that trust (and deception) are largely inferred from perceptions of facial expression, we argue that implementation of some means of facial display in the early stage of a virtual organization aids communication of trustworthiness. Further, Takeuchi and Nagao's (1993) findings suggest facial display can increase the level of trust perceptions in the computer system and the overall level of trust in later stages of the partnership, even after the transmission of facial expression has been discontinued.

An alternative way of compensating for the lack of informal communication in CMC was investigated by Andersen Consulting. In a project undertaken by Andersen Consulting's Center for Strategic Technology Research (CSTaR) named *Prairie: A vision for the virtual enterprise of the future* (<http://www.ac.com/cstar/hsil/virtorg>), CSTaR created a prototype virtual organization to research the impact of ICT on a "real virtual workplace". An interesting aspect in the setup of this project was the way CSTaR tried to tackle the lack of informal communication between geographically dispersed team members by facilitating and encouraging "accidental communication" (Cohen, 1997: 33). They put several support mechanisms in place to facilitate informal communication in order to help people create a common identity as a means to engender trust. One of these mechanisms was an area called "commons", to which every community member has access. Whenever a person "enters" the commons, the person's picture pops up on the screen and, by double-clicking on the icon, other members can start an informal chat. This

mechanism has proven effective in helping people to share context more effectively than has been achievable using the usual collaboration technology (Cohen, 1997).

The problem also exists in e-mail communication, the earliest and still the most popular means of CMC. E-mail messages appear to have the informality of speech, but they lack the visual and tonal clues of verbal communication. There are, however, various surrogate means to communicate emotional and non-verbal cues in e-mail messages. These include chronemic cues (Walther & Tidwell, 1995) such as delayed responses, use of lexical expressions such as “hmmm“ or “yuk“, and use of “emoticons” (Rivera, Cooke, & Bauhs, 1996).

Emoticons are especially illustrative of the innovative tricks that e-mail correspondents use to communicate emotion (Rivera, et al., 1996; Walther & Tidwell, 1995). The term “emoticon” is derived from the words: “emotion” and “icon”. Emoticons are typed symbols that represent emotions, for example the “smiley” :-). Emoticons are used in an attempt to clarify a point or to indicate when the intent of a phrase could be misinterpreted. Rivera and his associates (1996) studied the effects of emotional icons on remote communication, and showed that they can play an important role in CMC, and that they do affect the focus of messages. They found in particular that emoticons permit positive and negative messages to be interpreted as intended.

The proposition that emerges from the foregoing discussion of human factors in ICT is:

Proposition 2. Effective communication of trustworthiness in inter-organizational virtual organizations depends in part on the capacity of the CMC to permit members to transmit

emotional and non-verbal messages, preferably involving transmission of facial expression, facilitated by, for example, use of emoticons in e-mail communication.

In this section, we have argued that a reliable and effective ICT infrastructure provides the medium for communication of trustworthiness. In this respect, ICT comprises physical and human components. Physical components include standardization and bandwidth, while human elements include ability to transmit emotional and non-verbal messages. As a final point, we note that, although ICT facilitates dyadic communication between individual actors, reliable and effective ICT is essentially an industry phenomenon. Thus, communication between dyads in inter-organizational virtual organizations is made much easier and effective because of the existence of standards and protocols put in place through formal or informal industry standards.

BUILDING TRUST

Earlier in this paper, we defined communication of trustworthiness in virtual organizations as an essential precursor to the establishment of trust in inter-organizational virtual organizations. We argued subsequently that communication of trustworthiness requires that attention be given to both the physical and human components of ICT. There are, however, other factors that have an impact on the development and acceptance of trust. In the following, we deal with two of these: common business understanding and strong business ethics.

Common Business Understanding

Wigand, et al. (1997) note that an important element in any business cooperation is common business understanding. Moreover, Faisst (1995) has stressed the importance of a common identity in what he calls the “mission identity” of virtual organizations. The concept of common business understanding that we present therefore shares similarities with Organizational Identity (Albert and Whetten, 1985), but is different in important respects. Albert and Whetten define Organizational Identity as a set of distinctive and enduring traits that members associate with their organization. Scott and Lane (2000) have proposed further that identity is determined in part by the nature of stakeholder networks. Common business understanding, however, is more akin to Barney’s (see Barney et al., 1998: 103) broader concept of identity: “the theory organizational members have about who they are”. In this respect, we agree with Gioia, Schultz, and Corley (2000) that Organizational Identity is not necessarily a stable phenomenon, but mutates to suit the prevailing environment. The examples that Gioia and his colleagues cite are of modern firms but, in the specific context of virtual organizations, we consider that Organizational Identity may still be too limiting.

To generalize beyond the Gioia et al. (2000) definition of an adaptable Organizational Identity, applicable to inter-organizational virtual organizations, therefore, we define a Common Business Understanding as a transient understanding between network partners as to what they stand for, about the nature of the business transactions that they engage in, and about the outcomes that they expect—their “vision”. In the virtual context, common business understanding is facilitated by ICT.

Klein (1994b) and Scott and Lane (2000) emphasize that a common business understanding requires the creation of a shared vision, together with communication of mutual aims through clear definition of the roles and expectations within the team, especially in the early stages of the partnership. In this respect, the process is typically initiated by agreement on a symbolic logo and/or design for a product or service. This is because understanding each member's role, together with group identification, determines critical behaviors such as willingness to cooperate with others, and willingness to engage in mutual goal setting (Albert & Whetton, 1985; Wiesenfeld, et al., 1998). The virtual organization partners thus need rapidly to establish group identity and an awareness of mutual needs and expectations, along with the clarification of tasks and responsibilities. In traditional partnerships, awareness and identity are in part shaped by the legal framework that regulates organizational relationships, as well as by networks, artifacts, and the organization chart (Scott & Lane, 2000). In the case of the inter-organizational virtual organization, however, mechanisms outside of the domain of traditional organizations need to be put in place to establish a common business understanding, which we argue constitutes an important precursor of trust formation (Faisst, 1995; Jarvenpaa & Leidner, 1998, 1999). We discuss these additional mechanisms in the following paragraphs.

Wenitzky & Baumann (1996) propose that there are three specifications necessary for the establishment of a common business understanding in the virtual context. The first is a clear product specification: the design, quality, and functionality of the product or service. The second is specification of the level of cooperation, which requires agreement about deadlines, liability, prices, profit allocation, and staff and resource input. The third is formal specification of agreements between the virtual partners such as those found in *Virtuelle Fabrik*. In a virtual

organization, these specifications need to be communicated clearly between the partners to achieve a common business understanding. There is always varying uncertainty between members, however. Therefore, the need to guard against opportunistic behavior varies between the partners (Fichman, 1997, Wicks et al., 1999). This depends on the risk that the member is prepared to sustain as a potential loss, and also the partner's fear of opportunistic exploitation and the uncertainty of their behavior (see Grambowski & Roberts, 1999). Some members will prefer to clarify specific aspects in more detail than others (Fichman, 1997). Therefore, the partners need to be aware of signals from other partners in order to be able to minimize this problem early in the partnership. By so doing, they can avoid future perceptions of trust violation amongst virtual organization members.

The three specifications (production, cooperation, and agreements between partners) can be achieved by negotiating relational contracts that guide the formation, operation, and dissolution of the virtual organization, thereby facilitating an increase in the level of collaboration-enabling trust (Fichman, 1997; Krackhardt & Stern, 1988). Inter-organizational virtual organizations, like other organizations, create fiscal and legal issues that must be clarified (Müthlein, 1995; Sommerlad, 1996), but they lack a formalized legal framework (Fuehrer & Ashkanasy, 1998). Therefore, it is incumbent on the organization's members to develop their own (formal or informal) guidelines for the operation of the enterprise (Sommerlad, 1996). Such agreements may include clarification of members' tasks and responsibilities, agreement on contracts, allocation of funds, potential liability, and how members will contribute their expertise (Arnold, et al., 1995). In this sense, clear guidelines, spelled out in an early stage of the partnership, serve to reduce misperceptions and to foster the establishment of trust (Cohen, 1997; Garrecht, 1998;

Handy, 1995; Mertens & Faisst, 1996; Ott, 1996; Sommerlad, 1996). In our opening example, a key function of *Virtuelle Fabrik* is to provide a standardized legal framework for participating collaborators.

Other mechanisms can serve to establish a common business understanding in virtual organizations include development of an organization handbook (Faisst, 1997), design of a mutual Internet site such as *Virtuelle Fabrik*, chat room technology (Johnson, 1997), or the use of team addresses for e-mail. A specific example is *Livelink*, software developed by (Siemens, 1999) to enable creation of a common business understanding through a standard computer interface. *Livelink* provides a single-server database that can be accessed from anywhere and anytime via a web-browser. A similar tool (with similar but less functionality) is the free Internet service *Visto.com* (<http://www.visto.com>), a web-based communications center. *Visto.com* members log into their group account and can exchange files, emails, and calendar information, effectively creating a common identity and business understanding.

These examples illustrate how the creation of a sense of shared meaning, member identification, and mission identity, especially in an early stage of the partnership, facilitates collaboration at an individual level and the operation and productivity of the inter-organizational virtual organization as a whole. As such, a common business understanding provides an essential condition for the development of trust within the organization. Wiesenfeld, et al. (1998) note that such understanding fosters mutual goal setting, willingness to collaborate and to share information, and the creation of interpersonal trust. Zucker, Darby, Brewer, and Peng (1996) have shown in particular that perceptions of membership within a common organizational structure in a high-

technology environment facilitate and develop trust in working relationships (see also Sitkin & Roth, 1993). In effect, a common business understanding provides the virtual organization's members with an opportunity safely to create and to share their perceptions of the organization's defining features, and creates a feeling of ownership and trust. Thus:

Proposition 3. Development of trust in inter-organizational virtual organizations depends in part on the prior establishment of a common business understanding expressed as common product specifications, cooperative agreements, and a sense of shared identity.

Business Ethics

Awareness and acceptance of a high standard of business ethics is a central plank of Hosmer's (1995) definition of trust, and is therefore also an essential ingredient of trust inter-organizational virtual organizations. This applies to the ethics of specific prospective partners and also in respect of global business ethics (Sirgy, 1996). An organization's business ethics form the basis of members' decisions in regard to all their business dealings, both internally and externally (Hosmer, 1995; Jones & Bowie, 1998). Wicks et al. (1999) have also emphasized the intrinsic nexus between trust and ethical values. Thus, although the construct of business ethics is conceptually distinct from business understanding, consistent with Hosmer we posit that it is embedded within common business understanding. In essence, a shared agreement about business standards becomes the core element around which a common business understanding is built.

Three factors uniquely characterize the virtual organization's position in regard to business ethics. Firstly, inter-organizational virtual organizations are rarely guided by pre-existing codified laws, where values and standards are written into legal systems enforceable in court. Since the organization's partners are not usually legally bound to the organization, any negative outcomes or perceptions attributed to poor business ethics could result in the organization's reputation suffering (Fichman, 1997). Second, because inter-organizational virtual organizations, like those created in our opening example, are intrinsically temporary (see also Fuehrer & Ashkanasy, 1998), corporate ethics are difficult to develop because members will typically be finishing one virtual collaboration and entering into another. Thirdly, inter-organizational virtual organizations are intrinsically boundary spanning in nature, so that they must incorporate a diversity of culturally based values and morals.

Researchers such as Johnson (1997), Orwant (1994), and Pearson, Crosby, and Shim (1997) have focused on the notion of advances in ICT and the related effects on social behavior. These authors agree that unethical behavior in the virtual context is predominantly caused by technological changes and by the "inside keepers of the information systems" (Pearson, et al., 1997: 94). They also agree that social behavior needs more than "new laws and modified edicts" (Johnson, 1997: 60), and that ethical issues will become increasingly important to enable business transactions to be carried out safely and securely (Orwant, 1994). Although technology has been largely secured by advancing software and technology for virus detection, as well as encryption/decryption of information to ensure the security of business processes, Johnson (1997) notes that technology can never be sufficient to control all aspects of social behavior. Consequently, online behavior is predicated on an awareness and acceptance of ethical norms and behaviors.

This can best be achieved through specification and clarification of the members' tasks, responsibilities and agreed sanctions for proscribed behavior.

Johnson (1997: 60) posits further that the "only hope to control online behavior is for individuals to internalize norms of behavior", and suggests three rules for online ethics: (1) Know and follow the rules of the forums participated in; (2) respect the privacy and property rights of others and, if there is any doubt, assume the user's desire for privacy and ownership; and (3) respect interacting partners by not deceiving, defaming, or harassing them. Not surprisingly, these rules for online behavior are essentially identical to rules for offline behavior. Indeed, there is no reason why the same ethical guidelines that apply to regular behavior should not be employed in respect of online behavior.

In this respect, Pearson, et al. (1997) reported on ethical standards for the IS profession proposed by three major professional associations in this field. These associations share an agreed set of behavioral obligations to society, to colleagues, and to professional organizations. The standards aim to promote the principle that individuals within the professions act in an ethical and responsible manner in order to influence the success of their organizations (Pearson, 1997). Clearly, similar standards can be developed for the operation of individual virtual organizations specifying, for instance, the obligation to virtual organization members and clients.

Other possible mechanisms to promote ethical behavior in virtual organizations include a formal code of ethics (Mitton-Smith, 1995; Murphy, 1995). Mitton-Smith has noted in particular that codes of ethics are formal statements of prescribed and proscribed values or behaviors, and thus

provide a strategic tool within organizations to inculcate and to demonstrate ethical standards. Ethical standards also fulfil a strategic external role through recognition by government agencies and insurance companies. In the case of virtual organizations, informal rules known as “netiquette” are usually in place, but a lack of a formal legal infrastructure means that a code of ethics is simultaneously both imperative and difficult to achieve (see Sitkin & Roth, 1993, for discussion of the trade-off between trust and legal formality). This is further compounded by different ethical standards and regulations between countries.

Nevertheless, trust in inter-organizational virtual organizations clearly cannot be established until all members recognize that ethical standards are in place and are made aware of what the standards are. Further, Stead, Worrell, and Stead (1990) note that there needs to be evidence that the ethical standards are being adhered to. Thus, business ethics are developed internally by behavior, the example of the organization’s management, and the feedback received and given via the communication of trustworthiness as we discussed earlier (see also Tyler & Kramer, 1996). In the case of the inter-organizational virtual organization, it is the organization’s members whose interactions and behavioral decisions provide the basis for the overall level of business ethics. Payment habits, for instance, are an example of how the members of these organizations can influence future decisions regarding future transactions. This leads to our final proposition:

Proposition 4. Establishment of trust in inter-organizational virtual organizations depends in part on all virtual organization members having in place a recognized policy on business ethics.

This policy must exist as a set of formal or informal norms, and also as a demonstrated propensity to behave ethically (i.e. an ethical reputation).

Business ethics thus comprise the last piece in our theory. We have argued that effective communication of trustworthiness is a prerequisite for trust building, and that this requires appropriate and reliable ICT and a means to transmit human emotion and feelings. Trust development further requires a common business understanding and recognition by the collaborators that all partners will adhere to acceptable standards of business ethics. In this respect, we maintain that trust in the context of the inter-organizational virtual organization, where the traditional hierarchical control mechanisms are often missing, is essential to ensure effective functioning of the virtual organization.

LIMITATIONS, FURTHER RESEARCH OPPORTUNITIES, AND CONCLUSIONS

In this paper we have argued that inter-organizational virtual organizations lack traditional hierarchical control mechanisms. Consequently, communication of trustworthiness is vital to enable these organizations to build trust and therefore to function effectively. Nonetheless, we recognize that the theory presented in this paper is subject to two constraints.

In the first instance, we have limited our arguments to the *inter-organizational* virtual organization. Although our theory could also be applied to the *intra-organizational* virtual organization, there would be some significant differences in the discussion of the three components important in the generation of trust. Information sharing is vital in both types of

virtual organization because it is one of the factors that contribute to the virtual organization's flexibility and responsiveness. It also a basic ingredient in the creation of the "best-of-everything" organization (Byrne, et al., 1993; Fuehrer & Ashkanasy, 1998; Mertens & Faisst, 1996). The creation of a common business understanding in the intra-organizational virtual organization is also important but on a different level. Intra-organizational teams also need to create a vision for the project they are currently working on. This organizational vision, however, should already be communicated to the team members. Further, ethical behavior also has a different effect on the intra-organizational virtual organization. Ethical behavior within an organization is easier to enforce in the framework of an organization than in collaborations with other organizations (Milton-Smith, 1995). Intra-organizational virtual organizations can, of course, exist in parallel with a traditional organizational structure. Therefore, hierarchical control and coordination mechanisms may still be in place and unethical behavior can more easily be controlled by, for instance, threatening sanctions and penalties for ethical code violations within the organization.

A second limitation is that we have treated trust as a monolithic construct. Different forms of trust have been identified in the literature, however, such as calculative trust (Zucker, 1986), authentic trust (Flores & Solomon, 1998), and ethics-based trust (Jones & Bowie, 1998). Clearly, there is scope for future research to examine differential effects in the context of virtual organizations across the different types of trust.

Nonetheless, the concept of the virtual organization is relatively young, and has created an exciting new field of research. Most of the literature pertaining to trust relates to traditional

organizational forms. Thus the unique contribution of our paper is that it provides an initial framework for adapting these principles and ideas to the virtual organizational forms that are emerging in the Information Age. Each of the critical issues that we have identified as contributors to the communication of trustworthiness and trust building carries opportunities for further research.

In respect of the first factor, the role of ICT in facilitating communication of trustworthiness, we have proposed that system stability and bandwidth, as well as features that communicate emotion are important. Other more fundamental aspects concerning the nature of trust, however, such as deep versus shallow system structure (Sheppard & Sherman, 1998) and different forms of trust (Flores & Solomon, 1998; Jones & Bowie, 1998; Zucker, 1986), have implications for the manner in which trustworthiness is communicated, and provide additional areas for further research.

The second issue we identified, common business understanding, is a precursor of trust building. To date, however, little is known of the means by which members of virtual organizations communicate their shared values and visions, and the idea of a transmutable organizational identity (Gioia et al., 2000) is new and has not been empirically validated. Clearly, this too remains an area in need of further research.

Thirdly, we have proposed that development of trust in virtual organizations is contingent on establishment and recognition of mutual ethical practices. Wicks et al. (1999), however, have argued that there is an optimal level of trust in business transactions, governed by the need for to

take appropriate safeguards against trust violations. In the case of virtual organizations, where their temporary nature mitigates against establishing deep levels of trust (Jarvenpaa & Leidner, 1998, 1999), there is therefore scope for research to see if an appropriate situation-contingent level of optimal trust can be determined.

Finally, the interaction of the three factors poses some interesting issues. Our arguments suggest that common business understanding is the central construct in trust building. In the absence of a shared vision and associated aspects of business understanding, blind trust based on ethics may work, but even the most impeccable ethics cannot make up for the inevitable breakdown in the trusting relationship that must occur if the virtual partners lack understanding. Similarly, provided there is a commonality of understanding within the inter-organizational virtual collaboration, problems in communicating trustworthiness occasioned by poor ICT can probably be overcome, albeit with difficulty. Clearly, these interactions also present some exciting possibilities for future research into trust building in virtual organizations.

In conclusion, we have presented a theory of trust development in inter-organizational virtual organizations as a means to advance our understanding of this new organizational form. We have argued that there are three important factors. These comprise communication of trustworthiness facilitated by a standardized and reliable ICT, a common business understanding, and a strong sense of business ethics amongst virtual collaborators. In particular, means to enable expression of non-verbal and emotional cues in computer-mediated communication is an important element in the process of communicating trustworthiness. Support mechanisms such as *Livelink*, *Visto.com*, and the *Prairie* “commons” room are already available and provide further means to

establish trust. These facilitate creation of a common identity and business understanding, including a business ethic needed for build and maintain virtual partnerships. Overall, these factors contribute to creation of a high level of trust within inter-organizational virtual organizations such as those created through *Virtuelle Fabrik*. This, in turn, facilitates realization of the potential advantages of these organizations: flexibility, responsiveness and, ultimately, competitive advantage (Barney & Hansen, 1994).

REFERENCES

- Albert, S. & Whetton, D. 1985. Organizational Identity. In L. L. Cummings & B. M. Staw (Eds.) *Research in Organizational Behavior*, vol. 7: 263-295. Greenwich, CT: JAI Press.
- Aldridge, A., White, M., & Forcht, K. 1997. Security considerations of doing business via the Internet: Cautions to be considered. *Internet Research: Electronic Networking Applications and Policy*, 7(1): 9-15.
- Alexander, M. 1997. Getting to grips with the virtual organization. *Long Range Planning*, 30: 122-124.
- Barney, J. B., Bunderson, J. S., Foreman, P., Gustafson, L. T., Huff, A. S., Martins, L. L., Reger, R. K., Saranson, Y., & Stimpert, J. L. 1998. A strategy conversation on the topic of Organizational Identity. In D. A. Whetton & P. C. Godfrey (Eds.) *Identity in Organizations: Building theory through conversations*: 99-168. Thousand Oaks, CA: Sage.

Barney, J. B. & Hansen, M. H. 1994. Trustworthiness as a source of competitive advantage. *Strategic Management Journal*, 15: 175-190.

Bleecker, S. E. 1994. The virtual organization. *The Futurist*, 28(2): 9-14.

Brenkert, G. G. 1998. Trust, business and business ethics: An introduction. *Business Ethics Quarterly*, 8: 195-203.

Bromiley, P. & Curley, S. P. 1992. Individual differences in risk taking. In J. F. Yates (Ed), *Risk-taking behavior*: 87-132. Chichester, UK: Wiley.

Byrne, J. A., Brandt, R., & Port, O. 1993. The virtual corporation. *Business Week*, Feb 8: 36-40.

CMC Magazine. 1997. "What is CMC? An overview of scholarly definitions":
<http://www.december.com/cmc/mag/1997/jan/ferris.html>

Cohen, S. 1997. On becoming virtual. *Training and Development*, 55(4): 30-37.

Davidow, W. & Malone, M. 1992. The virtual corporation: Structuring and revitalizing the corporation for the 21st century. New York: Harper Collins.

Ekman, P., & Friesen, W.V. 1974. Detecting deception from the body or face. *Journal of Personality and Social Psychology*, 29: 288-298.

Faisst, A. 1997. Information Technology as an Enabler of Virtual Enterprises: A Life-cycle-oriented Description. Paper presented at the IT-Vision - European Conference on Virtual Enterprises and Networked Solutions - New Perspectives on Management, Communication and Information Technology, Paderborn, Germany.

Faisst, W. 1995. Welche IV-Systeme sollte ein virtuelles Unternehmen haben? [Which data processing systems should a virtual corporation employ?] (1/95): Arbeitspapier der Reihe "Informations- und Kommunikationssysteme als Gestaltungselement Virtueller Unternehmen", Universität Bern, Universität Leipzig und Universität Erlangen-Nürnberg.

Ferné, G. 1996. Compatibility for data transmission. *The OECD Observer*, 200: 31-34.

Fichman, M. 1997. A multilevel analysis of trust in inter-organizational customer-supplier ties. Paper presented at the Paper presented at the Annual Academy of Management Meeting, Boston, MA.

Flores, F., & Solomon, R. C. 1998. Creating trust. *Business Ethics Quarterly*, 8: 205-232.

Fuehrer, E. C. & Ashkanasy, N. M. 1998. The Virtual organization: Defining a Weberian ideal type from the inter-organizational perspective. Paper presented at the Annual Meeting of the Academy of Management, San Diego, CA.

Garrecht, M. 1998. Entstehung von Virtuellen Unternehmen [The origin of virtual corporations]. In H. Nolte (Ed.). *Aspects of resource-oriented corporate governance*: 110-133). Mering, Germany: Rainer Hampp Verlag.

Gioia, D. A., Schultz, M., & Corley, K. G. 2000. Organizational Identity, image, and adaptable instability. *Academy of Management Review*, 25: 63-81.

Goldman, S., Nagel, R., & Preiss, K. 1995. Agile competitors and virtual organizations: Strategies for enriching the customer. New York: Van Nostrand Reinhold.

Grambowski, M. & Roberts, K. H. 1999. Risk mitigation in virtual organizations. *Organization Science*, 10: 704-721.

Griese, J. 1992. Auswirkungen globaler Informations- und Kommunikationssysteme auf die Organisation weltweit tätiger Unternehmen [The effects of global information and communication systems on the organization of worldwide operating corporations]. In W. Stähle & P. Conrad (Eds.), *Managementforschung*, Vol. 2: 163-175. Berlin: Walter de Gruyter.

Grundy, J. 1998. Trust in virtual teams. *Harvard Business Review*, 76(6): 180.

Handy, C. 1995. Trust and virtual organization: How do you manage people whom you do not see. *Harvard Business Review*, 73(3): 40-50.

Hardwick, M. & Bolton, R. 1997. The industrial virtual enterprise. *Communications of the ACM*, 40(9): 59-60.

Hardwick, M., Spooner, D., Rando, T., & Morris, K. 1996. Sharing manufacturing information in virtual enterprises. *Communications of the ACM*, 39(2): 46-54.

Hosmer, L. 1995. Trust: The connection link between organizational theory and philosophical ethics. *Academy of Management Review*, 20: 379-403.

Jarvenpaa, S. L. & Leidner, D. E. 1998. Communication and trust in global virtual teams. *Journal of Computer Mediated Communication*, 3(4): 1-36

Jarvenpaa, S. L. & Leidner, D. E. 1999. Communication and trust in global virtual teams. *Organization Science*, 10: 791-815.

Jarvenpaa, S. L., Knoll, K., & Leidner, D. E. 1998. Anybody out there? Antecedents of trust in global virtual teams. *Journal of Management Information Systems*, 14(4): 29-64.

Johnson, D. 1997. Ethics Online. *Communications of the ACM*, 40(1): 60-65.

Jones, T. M. & Bowie, N. E. 1998. Moral hazards on the road to the “virtual” corporation. *Business Ethics Quarterly*, 8: 273-292.

Klein, S. 1994a. Virtuelle Organisation [Virtual organization]. *WiSt Das Wirtschaftsstudium*, 6: 309-311.

Klein, S. 1994b. Virtuelle Organisation - Informations- und Kommunikationstechnische Infrastrukturen ermöglichen neue Formen der Zusammenarbeit [Virtual organization - Information and communication technology infrastructures enhance? new forms of cooperation]: <http://www-iwi.unisg.ch/iwi4/cc/genpubs/virtorg.html>.

Krackhardt, D. & Stern, R. N. (1988). Informal networks and organizational crises: An experimental simulation. *Social Psychology Quarterly*, 51: 123-140.

Malone, T. & Rockart, J. 1993. How will information technology reshape organizations? In S. Bradley, J. Hausmann, & R. Nolan (Eds.), *Globalization, Technology, and Competition: The Fusion of Computers and Telecommunications in the 1990s*: 37-56. Boston: Harvard Business School Press.

McChesney, R. W. 1996. The Internet and U.S. communication policy-making in historical and critical perspective. *Journal of Communication*, 46: 98-124.

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

Merkle, M. 1996. Virtuelle Organisationen - ihr Erfolgspotential: Eine integrative Informationsinfrastruktur. [Virtual organizations – their potential for success: An integrated information infrastructure -]. Institutsbericht des IFI, Universität Zürich im Rahmen eines Doktorandenseminar. <http://www-iwi.unisg.ch/iwipub/dr-semi/ss96-zh/mme/iwi.html>.

Mertens, P. & Faisst, W. 1996. Virtuelle Unternehmen: Eine Organisationsstruktur für die Zukunft? [Virtual corporations: An organizational structure for the future?]. *WiSt Das Wirtschaftsstudium*, 25(June 6): 280-285.

Meyerson, D., Weick, K. E., & Kramer, R. M. 1996. Swift trust and temporary groups. In R. M. Kramer (Ed.), *Trust in organizations: Frontiers of theory and research*: 166-196. Thousand Oaks, CA: Sage.

Miles, R. E. & Creed, W. E. D. 1995. Organizational forms and managerial philosophies: A descriptive and analytical review. In B. M. Staw & L. L. Cummings (Eds.), *Research in Organizational Behavior*, vol 17: 333-372. Greenwich, CT: JAI Press.

Milton-Smith, J.: 1995, Ethics as excellence: A strategic management perspective. *Journal of Business Ethics*, 14: 683-693.

Mowshowitz, A. 1994. Virtual organization: A vision of management in the information age. *Information Society*, 10: 267-288.

Murphy, P. E.: 1995, Corporate ethics statements: Current status and future prospects. *Journal of Business Ethics*, 14: 727-740.

Müthlein, T. 1995. Virtuelle Unternehmen - Unternehmen mit einem rechtssicheren informationstechnischen Rückgrat? [Virtual corporations - Corporations with a legally secured IT framework]. *HMD Handbuch der modernen Datenverarbeitung*, 32(185): 68-77.

Nelson, K. M. & Coopriider, J. G. 1996. The contribution of shared knowledge to IS group performance. *MIS Quarterly*, 51: 123-140.

Nelson, T. & Coxhead, H. 1997. Increasing the probability of re-engineering/culture change success through effective internal communication. *Strategic Change*, 6: 29-48.

Nohria, N. & Berkley, J. 1994. The virtual organization: Bureaucracy, technology, and the implosion of control. In C. Heckscher & A. Donellon (Eds.), *The post-bureaucratic organization: New perspectives on organizational change*: 108-128. Thousand Oaks, CA: Sage.

Nohria, N. & Eccles, R. G. 1992. Face-to-face: Making network organizations work. In N. Nohria & R. G. Eccles (Eds.), *Networks and organizations*: 288-308. Boston, MA: Harvard Business School Press.

- Olbrich, T. 1994. Das Modell der "Virtuellen Unternehmen" [The model of "virtual corporations"]. *Information Management*, 9(4): 28-36.
- O'Leary, D., Kuokka, D., & Plant, R. 1997. Artificial intelligence and virtual organizations. *Communications of the ACM*, 40(1): 52-59.
- Orwant, C. 1994. EPER Ethics. Paper presented at the Proceedings of the Conference On Ethics in the Computer Age. Gatlinburg, TN.
- Ott, M. 1996. Virtuelle-Unternehmensführung: Zukunftsweisender Ansatz im Wettlauf um künftige Markterfolge [Virtual management: Forward-looking approach in the race for future market success]. *Office Management*, 44(7-8): 14-17.
- Palmer, J. W. & Speier, C. 1997. A typology of virtual organizations: An empirical study. Paper presented at the Paper presented at the Association for Information Systems, Indianapolis, Indiana.
- Pearson, J. M., Crosby, L., & Shim, J. P. 1997. Measuring the importance of ethical behavior criteria. *Communications of the ACM*, 40(9): 94-100.

- Rivera, K., Cooke, N. J., & Bauhs, J. A. 1996. The effects of emotional icons on remote communication. Paper presented at the CHI96: http://www.acm.org:82/sigs/sigchi/chi96/proceedings/inpost/Rivera/rk_txt.htm.
- Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. 1998. Not so different after all: A cross-discipline view of trust. *Academy of Management Review*, 23: 393-404.
- Scholz, C. 1994. Die virtuelle Organisation als Strukturkonzept der Zukunft? [The virtual organization as a structural concept of the future?]. Arbeitsbericht Nr. 30. September. Lehrstuhls für Betriebswirtschaftslehre, insbesondere Organisation, Personal- und Informationsmanagement an der Universität des Saarlandes. Saarbrücken. Germany. http://www.orga.uni-sb.de/_archiv/Publikationen/allgvo.html.
- Scholz, C. 1996. Virtuelle Organisation: Konzeption und Realisation [Virtual Organization: Conception and realization]. *Zfo Zeitschrift Führung und Organisation*, 65(4): 204-210.
- Scott, S. C. & Lane, V. R. 2000 A stakeholder approach to Organizational Identity. *Academy of Management Review*, 25: 43-62.
- Semich, J. 1994. Information replaces inventory at the virtual corporation. *Datamation*, 40(14): 37-40.

Sheppard, B. H., & Tuchinsky, M. 1996. Micro-OB and the Network Organization. In R. M. Kramer & T. R. Tyler (Eds.), *Trust in organizations: Frontiers of theory and research*: 140-165. Thousand Oaks, CA: Sage.

Sheppard, B. H. & Sherman, D. M. 1998. The grammars of trust: A model and general implications. *Academy of Management Review*, 23: 422-437.

Siemens. (1999). Livelink: Putting knowledge to work. Paper presented at the Exponet, Vienna, Austria

Sirgy, M. J. 1996. A Pragmatic Approach to Business Ethics. *Journal of Macromarketing*, 16: 147-149.

Sitkin, S. B. & Roth, N. L. 1993. Explaining the limited effectiveness of legalistic remedies for trust/distrust. *Organization Science*, 4: 367-392.

Snow, C., Miles, R., & Coleman jr., H. 1992. Managing 21st century network organizations. *Organizational Dynamics*, 20(Winter): 5-19.

Sommerlad, K. 1996. Rechtslage: Virtuelle Unternehmen -juristisches Niemandsland? [The legal position: Virtual corporation - a legal no-man's land?]. *Office Management*, 44(7-8): 22-23.

Stead, W. E., Worrell, D. L.; & Stead, J. G. 1990. An integrative model for understanding and managing ethical behavior in business organizations. *Journal of Business Ethics*, 9: 233-242.

Swagerman, D. M., Dogger, N., & Maatman, S. 2000. Electronic markets from a semiotic perspective. *Electronic Journal of Organizational Virtualness*, 2 (2): 22-42

<http://www.virtual-organization.net>.

Takeuchi, A. & Nagao, K. 1993. Communicative facial displays as a new conversational modalit. CHI 93. *Conference Proceedings on Human Factors in Computing Systems*: 187-193.

Travica, B. 1997. The Design of the Virtual Organization: A research model. Paper presented at the Association for Information Systems, Indianapolis, IN.

Tyler, T. R. & Kramer, R. M. 1996. Whither Trust? In R. M. Kramer & T. R. Tyler (Eds.), *Trust in organizations: Frontiers of theory and research*: 1-15. Thousand Oaks, CA: Sage.

Walther, J. & Tidwell, L. 1995. Nonverbal cues in computer-mediated communication, and the effect of chronemics on relational communication. *Journal of Organizational Computing*, 5: 335-378.

Weber, M. 1949. Objectivity in social science and social policy. In E. Shils & H. Finch (Trans. & Eds.), *The methodology of the social sciences*: 49-112. Glencoe, IL: Free Press.

Weiss, H. M. & Cropanzano, R. 1996. Affective events theory: A theoretical discussion of the structure, causes and consequences of affective experiences at work. In R. I. Sutton and B. M. Staw (Eds.), *Research in Organizational Behavior*, vol. 18: 1-74., Greenwich, CT: JAI Press.

Wenitzky, M., & Baumann, A. 1996. Virtuelle Unternehmen [Virtual Corporation]. Artikel aus zwei internen Arbeitspapieren der Technischen Universität Wien und der Technischen Universität Chemnitz-Zwieckau, Dezember: <http://ebweb.tuwien.ac.at/wenitzky/vu/vu2.htm>.

Wicher, H. 1996. Virtuelle Organisationen [Virtual organizations]. *WiSt Das Wirtschaftsstudium*, 25(6): 541-542.

Wicks, A. C., Berman, S. L., & Jones, T. M. 1999. The structure of optimal trust: Moral and strategic implications. *Academy of Management Review*, 29: 99-116.

Wiesenfeld, B. M., Raghuram, S., & Garud, R. 1998. Communication patterns as determinants of organizational identification in a virtual organization. *Journal of Computer Mediated Communication*, 3(4): 1-22.

Wigand, R., Picot, A., & Reichwald, R. 1997. Information, organization and management: Expanding markets and corporate boundaries. Chichester, UK: Wiley.

Yates, J. & Orlikowski, W. J. 1993. Knee-jerk anti-loopism and other e-mail phenomena: Oral, written, and electronic patterns in computer-mediated communication. *MIT Sloan School Working Paper* #3578-93.

Zand, D. E. 1974. Collateral organization: A new change strategy. *Journal of Applied Behavioral Science*, 10: 63-89.

Zucker, L. G. 1986. Production of trust: Institutional sources of economic structure; 1840-1920. *Research in Organizational Behavior*, 8: 53-111.

Zucker, L. G., Darby, M. R., Brewer, M. B., & Peng, Y. 1996. Collaboration structure and information dilemmas in biotechnology: Organizational boundaries as trust production. In R. M. Kramer & T. R. Tyler (Eds.), *Trust in organizations: Frontiers of theory and research*: 90-113. Thousand Oaks, CA: Sage.

Zwicker, H. 1996. Die virtuelle Firma - ein zukunftsweisendes Modell für Kleinunternehmen [The virtual firm – a forward-looking model for small businesses]. *IO Management*, 65(9): 36-38.