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Thomas Huber

University of Bern, Thomas.Huber@iwi.unibe.ch

Thomas Kude

University of Mannheim, kude@uni-mannheim.de

Jens Dibbern

University of Bern, jens.dibbern@iwi.unibe.ch

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Resolving Tensions in Hub-and-Spoke Networks of the Enterprise Application Software Industry – An Exploratory Case Study

Thomas Huber
University of Bern
Thomas.Huber@iwi.unibe.ch

Thomas Kude
University of Mannheim
Kude@uni-mannheim.de

Jens Dibbern
University of Bern
Jens.Dibbern@iwi.unibe.ch

ABSTRACT

Enterprise application software (EAS) is often developed organizationally distributed in hub-and-spoke networks. From a theoretical point of view the specific structure of these networks is characterized by tensions: While on the one hand trust as well as informal control is of high importance in hub-and-spoke networks, on the other hand structural properties of these networks constitute the hub's preference for efficient formal control, which, following a conventional view, undermines trust. Based on an exploratory case study and driven by socio-economic theory we develop a process model. The model is based on the concept of trust-sensitive context management that explains how the tensions are resolved by clarifying the relationship between different means of control (formal / informal) and different types of trust (personal trust / system trust).

Keywords

Enterprise Software Industry, hub-and-spoke networks, system trust, context management, formal control, informal control.

INTRODUCTION

With the rise of standards and infrastructure technologies (e.g. SOA) the formerly oligopolistic enterprise application software (EAS) industry started to disintegrate into partnership networks (Messerschmitt, 2003). Within these partnership networks, a limited number of large organizations, often referred to as hubs, platform leaders, or keystones (Iansiti and Levien, 2004; Jarillo, 1988), provide the systems' architecture as well as generic core functionalities, while smaller software companies (referred to as spokes, complementors, or niche players) build their solutions upon and complement these platforms (Iansiti and Levien, 2004; Prencipe, 2003). The participants of these hub-and-spoke networks are neither linked by capital (like joint ventures), nor through joint effort in a specific project or business area (like strategic alliances). Instead, the collaboration is manifested by more general agreements usually based on certifications of the other party's products or resources (Vitharana, 2003).

Inter-organizational division of interdependent tasks requires inter-organizational coordination (Jones, 2004; Malone and Crowston, 1994). Coordination in inter-organizational networks faces the challenges to balance the (potentially) conflicting demands of cooperation versus competition, trust versus control, and autonomy versus dependency (Sydow and Windeler, 1998). While the coordination of distributed software development has recently been studied more intensely (Kraut and Streeter, 1995), studies that explicitly considered the specific hub-and-spoke structure of the EAS industry and its implications for inter-organizational coordination are rare (cp. Kude and Dibbern, 2009 as a recent exception).

In contrast to previous literature, this study aims at explicitly answering the question how the inherent tensions of coordinating hub-and-spoke networks in the EAS industry can be overcome. While general alliance literature has identified trust and informal control as highly beneficial in inter-organizational settings (eg. Jones and Hesterly, 1997; Larson, 1992), previous literature suggests that the structural properties of hub-and-spoke networks result in the hub organization's preference for formal coordination (Kude, Dibbern and Heinzl, 2008). This bears an inherent potential for conflict as formal control and trust are generally assumed to be substitutive, dichotomous constructs (Das and Teng, 1998; Reed, 2001), implicating that more control diminishes the benefits of trust and vice versa.

However, previous empirical findings show that both hubs and spokes are able to benefit in the long run from network participation (Iyer, Lee and Venkatraman, 2006). In order to understand how the tensions between trust and control in hub-

and-spoke networks of the EAS industry are resolved, this study takes an exploratory approach and empirically examines bilateral partnerships in such a network. Based on the empirical observations and driven by theory, a process model of partnership coordination in hub-and-spoke networks in the EAS industry is developed. This model is based on the concept of trust-sensitive context management, which opens a way to overcome the tensions by clarifying the relationship between different means of control (formal / informal) and different types or objects of trust (personal trust / system trust).

This study is unique in that it is, to the best of our knowledge, the first to explicitly reflect the unit of analysis (dyadic partnerships in hub-and-spoke networks) in the choice of interviewees. In answering the question how hub-and-spoke networks are coordinated, this paper contributes to existing research in two major ways. First, it adds to the current discussion on the relationship of formal and informal control in IS research (e.g. Tiwana, forthcoming) and links both to the concept of trust. Second, by interpreting trust as a dynamic concept this paper fills a gap in previous work on the coordination of inter-organizational EAS development.

THEORETICAL FOUNDATIONS

Formal Versus Informal Control in Inter-Organizational Networks

The need for control emerges when specialized tasks are interdependent (Malone and Crowston, 1994; Thompson, 1967). “The purpose of control is to fashion activities in accordance with expectations so that the ultimate goals of the organization can be attained” (Das and Teng, 1998). Control mechanisms are applied to serve the purpose of control. The distinction between formal and informal control is a common distinction in IS literature (e.g. Kraut and Streeter, 1995; Tiwana, forthcoming). While formal control covers these control mechanisms that are officially legitimized, informal control refers to unplanned, spontaneous adjustment between individuals and groups (Blau and Scott, 2003; Ouchi, 1979). In context of this study the terms control and coordination are used as synonyms.

By integrating transaction cost economics and social network theory, Jones and Hesterly (1997) argue that the emergence of inter-organizational networks is a result of conflicting exchange conditions “characterized by needs for high adaptation, high coordination, and high safeguarding” (Jones and Hesterly, 1997). Jones and Hesterly (1997) argue that it is the application of *informal control mechanisms* that enables inter-organizational networks to balance the conflicting demands of exchange conditions. Thompson (1967) differentiates three types of interdependence (pooled, sequential and reciprocal interdependence) and hypothesizes that a higher degree of interdependence leads to increased coordination effort. Although the emergence of standards and the definition of interfaces may reduce the necessity of intensive coordination to some extent, the interplay of software components from different vendors is contingent upon the context of use, like for example the specific business processes of a certain organization, resulting in a need for frequent adjustments between specialized actors (Kraut and Streeter, 1995). Hence, it can be argued that the task of EAS development exhibits the property of reciprocal interdependence, resulting in a *high importance of informal coordination*.

Drawing on the relational view of competitive advantage (Dyer and Singh, 1998) as well as on resource dependence theory (Pfeffer and Salancik, 1978), Kude and Dibbern argue that spokes seek to take advantage of complementarities with the single hub and hence invest in hub-specific resources (2009). Since high hub-specific investments cause a lock-in situation, spokes are exposed to a high threat of opportunistic behavior by the hub. *Informal control mechanisms* are regarded as a remedy against the threat of opportunistic behavior (Casciaro and Piskorski, 2005) and are therefore the coordination mechanisms *preferred by spokes* (Kude and Dibbern, 2009). While spokes aim at benefiting from resource complementarity in singular hub-spoke relationships, hubs are suggested to take advantage of complementarities with the network of spokes as a whole and therefore mainly invest in network-specific resources. Hence, the hub only faces minor threats of opportunistic behavior on the part of a specific spoke. Thus, instead of hedging against opportunism, *hubs* were found to aim at efficiently coordinating the network of spokes by means of *formal coordination* (Kude and Dibbern, 2009).

The Role of Trust and Control in Hub-and-Spoke Networks in the EAS Industry

Due to the fact that no equity arrangement is involved in hub-and-spoke networks, the formal coordination mechanism of contractual agreements becomes important (Das and Teng, 1998). Yet, contracts are necessarily incomplete (Hart, 1988). This contractual incompleteness is not only a precondition for flexibility (Williamson, 1991) but also the gateway for opportunistic behavior. To make incomplete contracts conceivable, the existence of trust is a prerequisite (Borch, 1994). In addition trust is seen as a key factor to sustain a satisfactory level of cooperation in situations of co-opetition (Das and Teng, 1998) and has several positive effects on network coordination (Dirks and Ferrin, 2001). *Hence, trust is of major importance in inter-organizational settings.*

As discussed above, hub organizations were found to prefer formal control mechanisms. The conventional view on the trust-control relationship suggests that trust and (formal) control are functionally equivalent but dichotomous concepts (Reed,

2001). While functional equivalence refers to the consequences of trust, implicating that both trust and control are mechanisms to reduce risk and uncertainty, dichotomy refers to trust and control's differential basis and mode of operation. Consequently, shared moral values and norms have been regarded as the fundament of trust, while asymmetric relations of power have been regarded as the fundament of (formal) control. And while the mode of operation of trust is enablement of consent, suppression of conflicting instrumental interest is the mode of operation of control (Bachmann, 2001; Reed, 2001). As a result of this dichotomous notion, trust and control are considered to be substitutional, i.e. "trust is thought to render [formal] control superfluous, control is believed to undermine trust" (Sydow and Windeler, 2003).

Informal control in contrast would enhance rather than undermine trust (Sydow and Windeler, 2003) "through creating shared goals and norms" (Das and Teng, 2001). But the relationship between informal control and trust is not uni-directional, it is reciprocal because trust also affects deployment of informal control as without a modicum of trust the principal will not give allowance for mutual adjustment (Gilbert, 2005; Inkpen and Currall, 2004).

The preceding discussion indicates a conflict that hub and spokes have to deal with: On the one hand trust as well as informal control is of high importance in hub-and-spoke networks, but on the other hand structural properties of these networks constitute the hub's preference for efficient formal control, which, following a conventional view, undermines trust. This conflict is aggravated by the fact that trust and informal control are not only important in isolation, but trust and control are intertwined in a reciprocal and therefore self-enforcing manner. To find out how this conflict is resolved we investigated bilateral partnerships in a hub-and-spoke network.

EMPIRICAL ANALYSIS

Data Collection and Analysis

This research takes an explorative, multiple-case approach. Since this study is concerned with managing tensions between hub and spoke, the *unit of analysis is the partnership*. In order to enable comparability of the individual cases, the focus is set on four partnerships in a network established by one hub. To reflect the unit of analysis in data collection each analyzed partnership consisted of (at least) two expert interviews: A spoke employee involved in managing the partnership with the hub and the respective counterpart from the hub. The semi-structured interviews were conducted on-site and in German language by the first author.

The selected hub organization is a major platform developing company (HUB) with a partner network of more than 700 spokes. Spoke interviewees have been obtained by chain sampling (Patton, 2002), i.e. HUB interviewees were asked to choose a knowledgeable interviewee from one of the spokes they were managing.

For triangulation purposes (Yin, 2003) interviews were complemented by analyzing documents relevant to the partnership (company websites, annual report, partnership code of conduct, partnership contract, partnership charter) and a non-participant observation in a meeting between hub's and spoke's partnership managers. Table 1 introduces the case companies and Figure 1 shows the number of conducted interviews for each partnership.

The data was analyzed in the following way: Each piece of data – be it document or interview fragment – was carefully interpreted in the light of the above described tensions and scanned for control mechanisms to overcome the tensions. After the emergence of first patterns we developed (and subsequently refined), driven by theory, a model that explains how the abovementioned tensions are overcome.

Case Company	Core Business
HUB	One of the largest software development companies worldwide offering five different software platforms.
Spoke A	Development of a manufacturing execution system on HUB's web server- and database-platform
Spoke B	Development of a web-analytics solution on HUB's web server- and business intelligence platform
Spoke C	Development of an ontology-based expert system and a semantic knowledge-retrieval platform on HUB's web server
Spoke D	Provision of detailed configuration of HUB's web server in context of ERP implementation

Table 1: The Analyzed Case-Companies

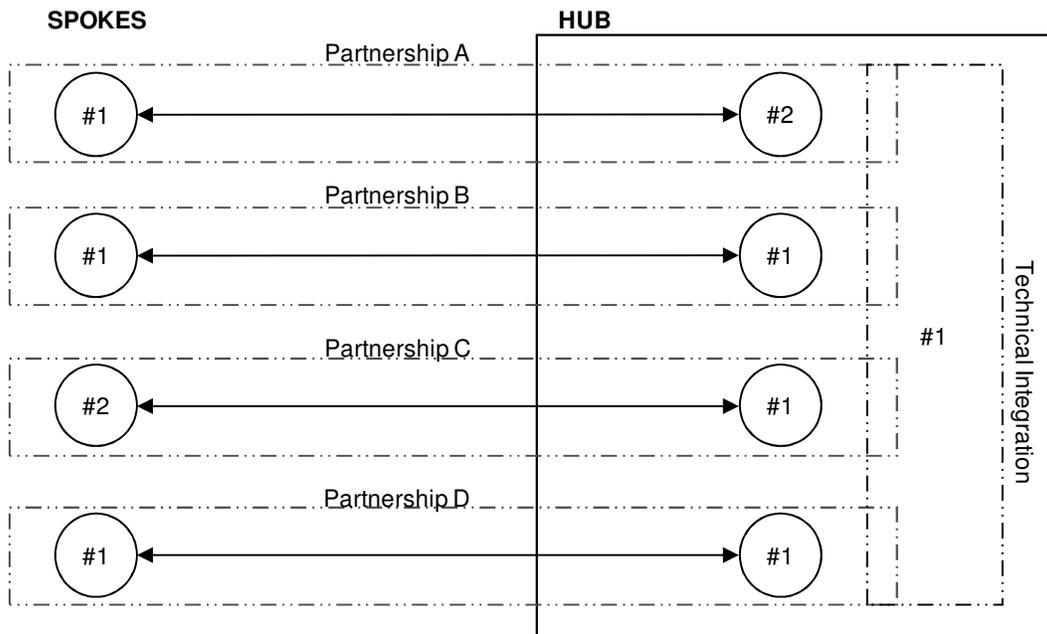


Figure 1: Interviewees of Spokes and HUB

Empirical Findings

This study is concerned with the tension between trust and different types of control in hub-and-spoke networks of the EAS industry. In order to answer the research question, the empirical findings are discussed in a sequential way. First, the control mechanisms applied in the analyzed partnerships are presented. Subsequently, the role of trust dynamics and their interplay with *choice of control* mechanisms are presented. Afterwards empirical findings are discussed in light of socio-economic theory and a process model is derived.

Formal Coordination Applied by Hub

Although being *relevant* for the partnerships, the analyzed documents were not partnership-specific; they were network-specific in that their scope was structuring the network, not the individual partnership. At the beginning of the partnership the formal control mechanism of input control in the shape of a certification process is applied by the hub. Access to the network is only provided for those spokes that fulfill clearly defined entry requirements. These requirements encompass compatibility of respective spoke software with HUB’s platform and several measures for market success (e.g. spoke software has yet to be sold to and implemented at a customer).

After entering the network *all* spokes have to submit to a standardized contract, a code of conduct and a partnership charter. The rules defined in these documents define “minimum standards of business conduct” and basic terms which HUB expects its partners to comply with. Salient is the fact that although being formally defined, the regulations in the documents touch on issues that are important for informal control – such as norms and values. For example HUB emphasizes the importance of a “long-term relationship”, which is considered to foster the norm of *reciprocity* (Bradach and Eccles, 1989). Moreover, HUB commits himself to “trust-based, cooperative” behavior in contrast to a competitive relationship with the spokes. In addition, HUB defines the relationship between hub and spoke as a “cooperation of equals”, which is mirrored in institutionalized fair decision processes with bodies for joint decision-making. Such decision processes can be characterized as compliant with the norm of *procedural fairness* (Gilbert, 2003).

In addition, in each investigated partnership – and as HUB interviewees confirmed for all partnerships within the network - hub and spoke negotiated quantitative and hence *clearly defined partnership objectives* in the form of a business plan. Interestingly, earlier research has identified clearly defined collaborative objectives to “foster the initial development of trust” (Inkpen and Currall, 2004). In addition, *guidelines of accurate behavior and sanctions in case of rule violation* were defined

by means of the formalized code of conduct. These sanctions included withdrawal of resources as well as exclusion from the network.

Moreover importance of *communication processes* was frequently stressed in the interviews. In particular, *guidelines for communication behavior* seemed to be relevant, as they were solely defined in HUB's company values ("reliability", "sincerity", "personal responsibility"), but also mentioned to be crucial in Partnership A, B and C. This result adds to existing research by replicating a pattern recognized as "communication behaviors that might facilitate trust in global virtual teams" (Jarvenpaa and Leidner, 1999). In addition, HUB actively establishes and *communicates a self-restriction concerning his business model* on network level in written documents, such as in his annual report ("Software consists primarily of middleware and operating systems software", hence not of final customer solutions) or in a statement of HUB's CEO ("We will relinquish this market for you. For the future we want to be partners, not competitors"). Such a self-restriction has been identified as fostering trust by reducing uncertainty about HUB's motives (Gawer and Cusumano, 2002).

Finally, HUB *institutionalized a partner management organization* with formally defined single-point-of-contacts for each of the spokes. One spoke interviewee mentioned that the partner manager can be described as "the interface to all organization units of HUB" and another that a trusting relationship to HUB is bound to a good "personal relationship" with the partner manager.

Trust Dynamics

The importance of a good personal relationship with the partner manager brings us to the role and emergence of trust in the analyzed partnerships. Despite the formal nature of the control mechanisms described above every single interviewee underlined the importance of trust for the partnership. But there was a consensus between the interviewees that this trust was not in place from the outset, rather it "increased slowly" (S1) "over time" (H3).

The increasing trust level over time poses the question how changing trust and choice of control mechanisms interact. We observed a general pattern that a change in trust level was followed by a change in coordination in such a way that increasing trust resulted in an increasing application of informal control mechanisms. This change adopted multiple forms ranging from reduction of formal outcome control over a tendency towards more informal information sharing to even infringement of formalized rules. Many interviewees explicitly linked this change to increased trust. As for example in the following quote where trust is considered to be a prerequisite for informal information sharing and for ignoring formal rules of an internal marketing-program in favor of informal adjustment between the actors.

For me trust is the top issue. The more you get to know each other and the more you trust each other, the more open you deal with information and the more we are willing to allocate money of our marketing-program to the spoke – even though the respective spoke's campaign does not exactly meet our expectations. (H3)

Discussion of Findings

The first central result of the case study is that hubs institutionalize general rules and norms on the network level. This evokes associations with management concepts (*context management*) informed by sociological theories – especially systems theory (Luhmann, 2000) and structuration theory (Giddens, 1986). Context management recommends a two-stage approach. At the *macro level* the normative basis of the network is defined (Gilbert, 2005) by means of *formal coordination*. This normative basis sets general conditions (context) that civilize interaction at the *micro level*, where *informal coordination* takes place. In context of hub-and-spoke networks designing general conditions at the macro level would be synonymous with designing general conditions for the network.

Through context management and the underlying socio-economic notion of trust, the tension between a hub organization's preference for formal control and its diminishing effects on trust is resolved. Central to the socio-economic notion of trust is the distinction between two different objects of trust that mirror the two levels of interaction (interpersonal and inter-organizational level) in hub-and-spoke networks: Trust in an individual person is called personal trust. Trust "in the validity and correctness of abstract principles and procedures" (Sydow and Windeler, 2003) is called system trust. Hence, if spoke personnel trusts the hub company, system trust is in place. Although system trust and personal trust are not totally independent, system trust is only to a minor degree based on personal trust. Thus, what might undermine (or at least not promote) personal trust (e.g. formal control), might enhance system trust.

The distinction between system trust and personal trust is the basis for *trust-sensitive* context management. The main idea of trust-sensitive context management is that although formal control might undermine *personal* trust, *trust-sensitive management of the context by means of formal control fosters system trust*. In this sense (system) trust and (formal) control are not considered to be dichotomous concepts, they are complements. Thus, trust-sensitive context management provides the opportunity to resolve the aforementioned conflict: Hub organizations can satisfy their preference for formal control (macro

level), without undermining trust, while application of informal control on the micro level meets the need for that type of control.

When revising HUB organization's means of context management the fact that many of them have been identified to foster (personal) trust attracts attention. This applies for reciprocity (Das and Teng, 2001; Larson, 1992), procedural fairness (Brockner, 2002), clearly defined partnership goals (Inkpen and Currall, 2004), guidelines of accurate behavior and sanctions in case of rule violation (Bachmann, 2001) and communication processes (Arino, de la Torre and Ring, 2001; Gawer and Cusumano, 2002). It can be argued that insitutionalization of these (personal) trust-fostering principles on network level by means of formal control increases system trust. And although it is difficult to explicate knowledge about a causally ambiguous and socially complex phenomenon such as trust (Barney and Hansen, 1994) some of the interviewees directly related context management to the emergence of trust as the following statement illustrates:

...there are precise rules defining what spokes receive from HUB and what they have to accomplish in return. You could name these formalisms. For sure such formalisms are not bad, because they offer structure and they make us predictable for spokes (H5).

Hence we retain that *hub organizations manage the context of hub-and-spoke networks by means of formal control in a trust-sensitive manner*. This management approach is connected with the observed change in coordination. From a theoretical point of view the result of trust-sensitive context management will be growing system trust. But how will trust-sensitive context management affect personal trust? Answering this question alludes to the relationship of personal and system trust. According to Giddens (Giddens, 1990) *system trust and personal trust are closely connected through the processes of disembedding and reembedding*. On the one hand system trust is capable of substituting the need for personal trust by “the lifting out’ of social relations from local contexts of interaction and their restructuring across indefinite spans of time-space” (Giddens, 1990). This process is called disembedding and implicates that in settings of high system trust but low personal trust, actors’ tendency to rely on trust is higher (substitution of personal trust through system trust). And this relying in trust in turn can be understood as an advance payment that fosters trust (Luhmann, 2000). On the other hand occurrence of system trust is bound to the existence of personal trusted relationships to individuals. These individuals have to ensure the trustworthiness of the system and therefore reembed system trust to personal trust. In context of hub-and-spoke networks, boundary spanners bear this process (Sydow and Windeler, 2003). Thus, trust-sensitive context management will not render personal trust superfluous (reembedding), but it will account for increasing system trust, which over time will as well account for increasing personal trust (disembedding).

As mentioned above, HUB institutionalized a boundary spanning organization and the following quote of a boundary spanner illustrates that the socio-economic notion of trust and the closely connected processes of reembedding and disembedding explains why trust in course of time has increased:

At the beginning it is not me that is in the foreground – it is HUB. HUB is the reason why spokes are willing to partner with us [HUB’s boundary spanners] [Disembedding]. But in the course of time this changes. When Spokes realize that I have a name, that I am person in charge for them and that I am doing a good job for them [Reembedding], then this impinges on my colleagues, because I have become a symbol for HUB. And this trust is transferred to my colleagues [Disembedding].

As noted above (a modicum of) trust is considered as a prerequisite for the application of informal control. Hence, one could argue that *trust-sensitive context management over time leads to increased trust which in turn results in increased application of informal control*. This might even result in an upward spiral, because informal control has positive effects on trust, which in turn allows application of more informal control.

Summing up, empirical findings indicated that the tensions in hub-and-spoke networks were resolved by means of a particular management style (trust-sensitive context management). Application of this style seemed to result in increased system trust. The processes of disembedding and reembedding explained increasing overall trust, which induced a change in coordination over time. Since change in coordination appeared as more application of trust-fostering informal control an upwards spiral was the result. Both, the mode of action of trust-sensitive context management as well as change of coordination could be explained by drawing on a socio-economic notion of trust. These findings constitute a process model, in which *trust-sensitive context-management*, and *application of informal control* can be seen as “ingredients” (Mohr, 1982) that are linked through a distinct “recipe” (Mohr, 1982) - the socio-economic notion of trust and the intertwined processes of disembedding and reembedding. Thus, the process model explains how the tensions in hub-and-spoke networks are overcome (s. Figure 2).

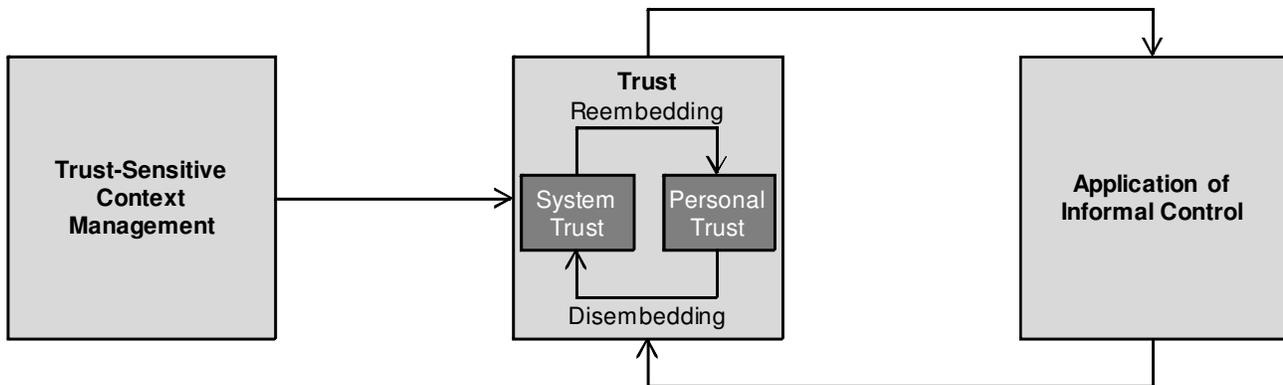


Figure 2: Idealized Process Model

CONCLUSION

This paper has addressed the question how the tension between trust and control in hub-and-spoke networks of the EAS industry can be overcome by means of formal and informal control. With trust-sensitive context management a concept to overcome this tension has been developed based on empirical findings and existing research. The study is unique in that it focuses on the trust-control-tension in hub-and-spoke partnerships as a new form of inter-organizational cooperation.

The study has several limitations. First, the fact that all cases are partnerships within one hub-and-spoke network, that is, the hub organization is the same throughout all analyzed partnerships. Although this approach enables comparability between the analyzed cases, we are aware that the transferability of our findings to other hub-and-spoke networks should be empirically substantiated by future research. Second, it has to be kept in mind that the results of this study are based on a limited set of data and the qualitative nature of the analysis may therefore be biased. This is aggravated by the fact that hub interviewees were involved in the process of data selection, that is, the selected case studies may be biased towards well-functioning partnerships. Again, this paves the way for future research, as this study could be the fundament of a methodologically more rigorous approach to investigate the research question.

This study contributes to existing research in several ways. First, it adds to the current discussion on the relationship of formal and informal control in IS research (Tiwana, forthcoming) and links both to the concept of trust. In line with (Tiwana, forthcoming) we regard informal and formal control under specific conditions as complementary rather than dichotomous concepts. In contrast to (Tiwana, forthcoming), not the type of formal control (outcome vs behavior control) but the level (macro vs micro level) in combination with the type (trust-sensitive vs not trust-sensitive) determines consequences on trust level. The empirical findings support our perspective that managing the context in a trust-sensitive manner via formal control positively relates to trust and therefore the findings emphasize importance of the macro/micro level distinction as well as of the underlying personal/system trust distinction. Hence, both distinctions could be fruitful for future investigations on the complex relationship between different type of controls (formal/informal) and trust. Especially the distinction between system and personal trust could have the explanatory power to unify contradictory empirical results in this field, as it is conceivable that a control mechanism fosters system trust while diminishing personal trust.

As a second contribution, this study has interpreted trust as a dynamic concept and linked changing trust level over time to the choice of control mechanisms. Although rich bodies of research are devoted to either trust or control of IS development projects, none of these studies has systematically investigated why trust increases over time and how this increase affects control. The proposed concept of trust-sensitive context management and the proposed change in coordination close this gap.

Third, this study contributes to existing work on network structures in the EAS industry through its unique empirical approach reflecting the unit of analysis (dyadic partnership). To our best knowledge, for the first time we enabled insight into the complex interplay of individual action and reaction taking place in dyadic partnerships of hub-and-spoke networks.

REFERENCES

1. Arino, A., de la Torre, J. and Ring, P. (2001) Relational quality: managing trust in corporate alliances, *IESE Research Papers*,

2. Bachmann, R. (2001) Trust, power and control in trans-organizational relations, *Organization Studies*, 22, 2, 337-365.
3. Barney, J. and Hansen, M. (1994) Trustworthiness as a source of competitive advantage, *Strategic Management Journal*, 15, 175-190.
4. Blau, P. and Scott, W. (2003) Formal organizations: A comparative approach, Stanford University Press,
5. Borch, O. (1994) The process of relational contracting: developing trust-based strategic alliances among small business enterprises, *Advances in strategic Management*, 10, 113-135.
6. Bradach, J. and Eccles, R. (1989) Price, authority, and trust: From ideal types to plural forms, *Annual Review of Sociology*, 15, 1, 97-118.
7. Brockner, J. (2002) Making sense of procedural fairness: How high procedural fairness can reduce or heighten the influence of outcome favorability, *The Academy of Management Review*, 27, 1, 58-76.
8. Casciaro, T. and Piskorski, M. J. (2005) Power Imbalance, Mutual Dependence, and Constraint Absorption: A Closer Look at Resource Dependence Theory, *Administrative Science Quarterly*, 50, 2, 167.
9. Das, T. K. and Teng, B. (1998) Between trust and control: developing confidence in partner cooperation in alliances, *The Academy of Management review*, 23, 3, 491-512.
10. Dirks, K. T. and Ferrin, D. L. (2001) The Role of Trust in Organizational Settings, *Organization Science*, 12, 4, 450-467.
11. Dyer, J. H. and Singh, H. (1998) The relational view: Cooperative Strategy and sources of interorganizational competitive advantage, *Academy of Management Review*, 23, 4, 660-679.
12. Gawer, A. and Cusumano, M. A. (2002) Platform Leadership. How Intel, Microsoft, and Cisco Drive Industry Innovation, Harvard Business School Press, Boston (MA).
13. Giddens, A. (1986) The constitution of society: Outline of the theory of structuration, Univ of California Press, Berkeley.
14. Giddens, A. (1990) The Consequences of Modernity, *Polity, Cambridge*,
15. Gilbert, D. (2003) Vertrauen in strategischen Unternehmensnetzwerken. Ein strukturierungstheoretischer Ansatz, Deutscher Universitäts-Verlag, Wiesbaden.
16. Gilbert, D. (2005) Kontextsteuerung und Systemvertrauen in strategischen Unternehmensnetzwerken, *Die Unternehmung*, 59, 5, 407-422.
17. Hart, O. D. (1988) Incomplete Contracts and the Theory of the Firm, *Journal of Law Economics Organization*, 4, 1, 119-139.
18. Iansiti, M. and Levien, R. (2004) The keystone advantage: what the new dynamics of business ecosystems mean for strategy, innovation, and sustainability, Harvard Business School Press,
19. Inkpen, A. C. and Currall, S. C. (2004) The Coevolution of Trust, Control, and Learning in Joint Ventures, *Organization Science*, 15, 5, 586-599.
20. Iyer, B., Lee, C. and Venkatraman, N. (2006) Managing in a "Small World Ecosystem": Some Lessons from the Software Sector, *California Management Review*, 48, 3, 28-47.
21. Jarillo, J. C. (1988) On Strategic Networks, *Strategic Management Journal (pre-1986)*, 9, 1, 31-41.
22. Jarvenpaa, S. L. and Leidner, D. E. (1999) Communication and Trust in Global Virtual Teams, *Organization Science*, 10, 6, 791-815.
23. Jones, C. and Hesterly, W. S. (1997) A general theory of network governance: exchange conditions and social mechanisms, *The Academy of Management review*, 22, 4, 911-945.
24. Jones, G. (2004) Organizational theory, design, and change: Text and cases, Pearson Prentice Hall, Upper Saddle River, NJ,
25. Kraut, R. E. and Streeter, L. A. (1995) Coordination in software development, *Communications of the ACM*, 38, 3, 69-81.
26. Kude, T. and Dibbern, J. (2009) Tight versus Loose Organizational Coupling within Inter-Firm Networks in the Enterprise Software Industry—The Perspective of Complementors, *AMCIS 2009 Proceedings*, 666-675.
27. Larson, A. (1992) Network Dyads in Entrepreneurial Settings: A Study of the Governance of Exchange Relationships, *Administrative Science Quarterly*, 37, 1, 76-104.
28. Luhmann, N. (2000) Familiarity, confidence, trust: Problems and alternatives, *Trust: Making and Breaking Cooperative Relations. Electronic edition, Department of Sociology. University of Oxford*, 94-107.
29. Malone, T. and Crowston, K. (1994) The interdisciplinary study of coordination, *ACM Computing Surveys (CSUR)*, 26, 1, 119.
30. Messerschmitt, D. G. S., C. (2003) Software Ecosystems - Understanding an Indispensable Technology and Industry, The MIT Press, Cambridge, USA.
31. Mohr, L. (1982) Explaining organizational behavior, Josey-Bass, San Francisco.

32. Ouchi, W. G. (1979) A conceptual framework for the design of organizational control mechanisms, *Management Science*, 25, 9, 833.
33. Patton, M. Q. (2002) *Qualitative Research and Evaluation Methods*, Sage Publications, Thousand Oaks.
34. Pfeffer, J. and Salancik, G. R. (1978) *The External Control of Organizations: A Resource Dependence Perspective*, Harper & Row, New York.
35. Prencipe, A. (2003) Corporate Strategy and Systems Integration Capabilities: Managing Networks in Complex Industries, in A.; Hobday Davies, M. (Ed.) *The Business of Systems Integration*, Oxford University Press, Oxford.
36. Reed, M. I. (2001) Organization, Trust and Control: A Realist Analysis, *Organization Studies*, 22, 2, 201-228.
37. Sydow, J. and Windeler, A. (1998) Organizing and evaluating interfirm networks: A structurationist perspective on network processes and effectiveness, *Organization Science*, 9, 3, 265-284.
38. Sydow, J. and Windeler, A. (2003) Knowledge, Trust, and Control, *International Studies of Management Organization*, 33, 2, 69.
39. Thompson, J. D. (1967) *Organizations in Action*, McGraw-Hill, New York.
40. Tiwana, A. (forthcoming) Systems Development Ambidexterity: Explaining the Complementary and Substitutive Roles of Formal and Informal Controls, *Journal of Management Information Systems*,
41. Vitharana, P. (2003) Risks and Challenges of Component-Based Software Development, *Communications of the ACM*, 46, 67-72,
42. Williamson, O. (1991) Comparative economic organization: The analysis of discrete structural alternatives, *Administrative Science Quarterly*, 36, 2,
43. Yin, R. (2003) *Case study research*, Thousand Oaks, California.