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The impacts of competence-trust and openness-trust on interorganizational systems

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Abstract
Trust can have imperative influences on the use of interorganizational systems (IOSs). Management, sociology and psychology literature distinguish different types of trust and attribute distinctive impacts to these types. However, little is known regarding the influences of different types of trust on IOSs usage. This paper focuses on how trust based on partner competence and trust based on partner openness influence the use of IOS-related resources. Hypotheses are constructed relying on the use of the resource-based view and transaction-cost economics to analyse influences on relationship specificity of four types of IOS-related resources: business processes, human knowledge, organizational domain knowledge and IOS infrastructure. Three case studies are conducted on interorganizational relationships employing IOSs. Competence-trust is found to positively influence the use of human-knowledge resources, resources related to interlinkage of business processes and organizational domain knowledge resources. Openness-trust is found to positively influence use of human-knowledge resources and organizational domain-knowledge resources.
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Introduction

Aristotle emphasized the importance of trust and proposed a multi-dimensional conceptualization consisting of intelligence, virtue and goodwill. Recent studies on interorganizational systems (IOSs) continue to emphasize the positive influences of trust and recognize its multi-dimensional nature (Das & Teng, 2001; Perks & Halliday, 2003; Lui *et al*., 2006). Positive influences of trust are associated with various types of IOSs ranging from electronic markets to specialized highly customized systems (Hart & Saunders, 1997; Kotlarsky & Oshri, 2005). IOS literature on dyadic interorganizational relationships acknowledges different types of trust including competence, credibility, openness and benevolence (Hart & Saunders, 1997). Current insights however, do not shed light on the particular influences of different types of trust. In particular with regard to IOS, the understanding of how competence and openness perceptions influence organizations to share information and invest in IOS-related resources is lacking. Insights on this topic are beneficial because mismatches in investments and resources increase the failure rate of relationships (Lu *et al*., 2006; Park & Ungson, 1997).

Sociology and psychology literature provide more in-depth analysis on trust by scrutinizing different types and foundations of trust including competence, openness and affect (Lewis & Weigert, 1985; Brownlie & Howson, 2005). These types are associated with cognitive and emotional

processes and argued to impact communication, behaviour, expectations and degree of vulnerability (McAllister, 1995; Sako, 1998). This study utilizes insights from sociology and psychology literature to examine two types of trust (competence and openness) and to develop more detailed hypotheses regarding how these two types of trust influence four types of IOS-related resources (human knowledge, organizational domain-knowledge, business processes and IOS infrastructure). The analytical focus is on competence and openness because existing studies in social psychology indicate that cognitive trust 'leaps' and open transparent communication of expectations and activities significantly influence social interaction (Lewis & Weigert, 1985; Luhmann, 2000).

The main theoretical contribution of this study is the development of hypotheses that apply to a wide range of relationships and provide detailed insights regarding influences of trust. The hypotheses combine insights on trust from different fields with insights from literature on resource-based view (RBV) and transaction-cost economics (TCE). Most RBV studies focus on strategic utilization of resources of a particular organization. This paper extends this focus to include interorganizational relationships and the joint resources incorporated by both organizations to facilitate the relationship. This extension coincides with the increasing current focus in the literature on supply chain management, network organizations and interdependence between organizations.

Three qualitative case studies in the period 2004–2007 were conducted to validate the hypotheses and gain novel insights. The main practical contribution encompasses in-depth insights on how trust facilitates use of IOSs in distinctive ways and hence this study improves knowledge concerning which type of trust is required to achieve certain strategic objectives. The findings show that competence-trust positively influences use of three types of relationship-specific IOS-related resources: human knowledge, business processes and organizational domain knowledge. The findings also show that openness-trust influences use of two types of relationship-specific IOS-related resources: human knowledge and organizational domain knowledge.

This paper is organized as follows. The next section discusses related literature and it is followed by formulation of the hypotheses. The methodology and data section presents the design and concise description of three case studies. The discussion section elaborates on the influences of each type of trust and provides findings based on the acquired insights. The final section presents the overall conclusions and the contributions of this study.

Literature review

Distinguishing competence-trust from openness-trust

Scholars distinguish different types of trust based on certain characteristics of the trustee and perceptions of the trustor. McAllister (1995) proposes that trust can be either based on rational cognition or it can be based on affect and emotions. Sako (1998) follows similar analysis and suggests that trust can be based on the trustee demonstrating competence, goodwill or contractual promise keeping. Mishra (1996) notes comparable components of trust and argues that it is founded on competence, openness, reliability and caring. Das & Teng (2001) conceptualize trust as two-dimensional construct and emphasize the importance of competence and goodwill. The variation in these studies illustrate that trust can have different foundations. However, most trust-related research concur that the trustee's competence within a certain domain and the trustee's openness in business dealings play key roles (Lewis & Weigert, 1985; Gulati, 1995; McAllister, 1995; Mishra, 1996; Hart & Saunders, 1997; Luhmann, 2000; Brownlie & Howson, 2005). The distinction between competence and openness is applied in this study as it enables analysing influences based on cognitive and calculative reasoning as well as influences based on affect and goodwill feelings. These two types are further referred to as competence-trust and openness-trust. The following sections clarify these two types by discussing related studies in IS, management and social psychology. Most social psychology studies focus on trust at the personal level. Nonetheless, we believe these studies can provide valuable insights at the organizational level because they offer in-depth analysis of the nature and influences of trust.

Competence-trust is based on perceived trustee's abilities, skills and expertise that facilitate performance within a specific domain (Mayer *et al.*, 1995; McAllister, 1995; Sako, 1998). Mishra (1996) identifies competence as the ability to interpret information correctly and Nooteboom (2002, p. 50) incorporates into competence certain skills as well as knowledge to use a technology. Social psychology literature argues that cognitive familiarity and sensible interpretations of reality provide rational foundations to trust a particular actor (Brownlie & Howson, 2005). Perceptions of trustee's competence serve as a platform from which a leap of faith is made. Competence is associated with an ability to perceive patterns more effectively (Brandt *et al.*, 2005) and to conduct forward reasoning as expertise enables use of 'functional units' to reason from the current state to the target state. Competence within a certain domain is also found to rely on automated processes, which are often parallel and function independently, somewhat like visual perception and pattern recognition (Schneider & Schiffrin, 1977). Advantages of interacting with such competent actors include observational learning (Bandura, 1977) as well as mimicry and unconscious behavioural mimicry (Lakin & Chartrand, 2003); simply seeing a person engage in a particular competent behaviour activates that behavioural cognitive representation (Chartrand & Bargh, 1999).

Openness-trust emphasizes honesty of communication and willingness to share information (Mishra, 1996). Existence of such trust is associated with organizations dropping their boundaries, learning the behaviour and

the intentions of their partners and developing interactions based on norms of transparency and equity (Gulati, 1995). Social psychology literature emphasizes the importance of communicating expectations and sincerity regarding execution of actions (Overwalle & Heylighen, 2006). Openness influences the development of relationships as it encompasses willingness of partners to share sensitive information (Mayer & Salovey, 1993). Openness also generates empathy resulting in modifying typical behaviour in response to partner's needs (Crittenden, 1990). Fairness and equality are important for openness, as reciprocation of initial openness is required to stimulate a beneficial cycle between the actors. Hence, openness-trust is more likely to be developed incrementally and founded on gradual perceptions of fair behaviour. The distinctive foundations of competence-trust and openness-trust motivate this study to examine their influences on IOS.

Studies in the IS field associate trust with numerous activities including selecting business partners, investing in relationship-specific resources, sharing of sensitive information, and realizing collaborative capabilities such as just-in-time. The influences of trust on the choice of governance are usually analysed using TCE. Theories relying on TCE postulate that relationship-specific resources enhance value creation within interorganizational relationships (Subramani, 2004). Investments in relationship-specific resources enable specialized systems fitting requirements of both partners. Interorganizational trust is frequently argued to increase the use of relationship-specific IOS-related resources (Hart & Saunders, 1997).

Sharing partnership knowledge resources

Recently, there is an increased emphasis on the benefits of knowledge resources and on partner-enabled knowledge creation (Subramani & Venkatraman, 2003; Kotlarsky & Oshri, 2005; Malhotra *et al.*, 2005). Organizations improve their core competencies by seeking business partners in areas where their expertise is lacking and create various knowledge-intensive cooperative social contexts among employees and business units to transfer information and knowledge (Kotlarsky & Oshri, 2005; Malhotra *et al.*, 2005). Knowledge is viewed as a dynamic and ongoing social accomplishment and not as an external substance (Orlikowski & Baroudi, 1991).

In addition to knowledge resources organizations use various other resources to facilitate communication with their partners. The RBV is used to emphasize the importance of specific resources to achieve strategic advantage and to distinguish different types of IT-related resources (Wernerfelt, 1984; Barney, 1991; Wade & Hulland, 2004). Powell & Dent-Micallef (1997) argue that top management commitment and the organization of IT are valuable organization-specific resources. Bharadwaj (2000) presents a classification scheme that distinguishes three types of IT-based resources including tangible IT resources, human-based IT resources and intangible IT-enabled resources (e.g. knowledge assets and synergies enabled by IT). This study builds on these insights and examines how different types of resources are influenced by interorganizational trust.

Trust and IOS

IOSs are information systems used by two or more organizations. To examine the influences of trust we distinguish between four types of IOS-related resources. The first type encompasses tacit human-knowledge resources, which comprise IT and business knowledge possessed by human agents. The focus is particularly on knowledge utilized to realize successful communication with the business partner. These resources resemble IT management skills identified in earlier studies (Mata *et al.*, 1995; Bharadwaj, 2000; Caldeira & Ward, 2003). However, our focus is on human agents in boundary spanning positions and the knowledge they use to facilitate communication and collaboration. They require IT as well as business knowledge to achieve comprehensive understanding of how electronic collaboration influences sophisticated business activities of the partner. The second type encompasses organizational domain-knowledge resources, which comprise explicit knowledge intrinsic within the organization and required to communicate and collaborate with the business partner. The information can be stored in databases or other repositories within the organization and used in designing, conceptualizing and planning for new products and determining product pricing (Subramani, 2004; Malhotra *et al.*, 2005). The third type encompasses business-process resources, which comprise organizational processes that overlap organizational boundaries. These processes are performed together with the business partner and rely on shared software, administrative procedures and operating procedures (Subramani, 2004). The fourth type encompasses IOS-infrastructure resources, which comprise physical IT assets that form the core of IOS infrastructure and include computer and communication technologies. This typology resembles earlier typologies (Bharadwaj, 2000) in terms of grouping resources based on their characteristics and functional application. However, our typology differs as it principally focuses on IOS-related resources utilized to facilitate interorganizational relationships. A resource is perceived to have a higher degree of relationship specificity if it has lesser value when it is redeployed in alternative relationships (Subramani, 2004).

This study distinguishes between competence-trust and openness-trust. Following McAllister (1995), Mishra (1996) and Sako (1998) we argue that the two types of trust relate to different dimensions but are not mutually exclusive. Hence, a high level of trust within an interorganizational relationship can indicate that a specific type or both types are present.

Competence-trust is based on the assessment that the partner organization is proficient, upholds high professional standards and honest when conveying information regarding its abilities. The focal organization is expected to be willing to cooperate with the partner, and

perhaps even to take the partner as a role model and adjust business processes according to the partner. The competent partner is a convenient source of expertise that the focal organization can use and imitate (DiMaggio & Powell, 1983). The interlinkage of business processes enables capturing various competence attributes including accuracy, efficiency and proficient conduct. The organization can also enhance its legitimacy to the outside world by sharing work practices with a competent partner. Furthermore, benefits derived from specialization and focus on core competences provide additional justifications for an organization to rely on business processes performed by its competent business partner. Accordingly, competence-trust is expected to influence interlinkage of internal processes with the business partner.

The competence of the partner is also expected to motivate human agents to acquire relationship-specific IT and business knowledge. The competent partner performs proficiently in its domain and develops strategies to achieve future goals, that is, forward reasoning. Human agents of the focal organization require partner-specific knowledge to manage the relationship and maintain suitable information exchange. Furthermore, knowledge of the partner enables solving interorganizational business issues and technical communication problems more effectively. Such knowledge can provide early indications regarding emerging problems and possible actions that can be undertaken to produce successful solutions (Malhotra *et al.*, 2005). Human agents can have additional motivation to absorb partner knowledge because they desire to mimic virtues related to competence including intelligence and dedication.

Hypothesis 1 *Competence-trust positively affects the relationship-specificity of business-process and human knowledge resources.*

Openness-trust is based on perceptions that the partner is willing to share information and is honest in business dealings. Partners do not achieve such trust by offering abundance of transaction and context information as this rather leads to information overload. Openness entails honest incentives to share accurate, comprehensive and timely information that bear in mind partner's needs and benefits. Nooteboom (2002) and Sharratt & Usoro (2003) argue that effective information exchange occurs when each party provides as well as absorbs information. Within an IOS-enabled interorganizational context, this is expected to result in embracing partner information and knowledge, yielding relationship-specific organizational-domain knowledge. That knowledge can be used in various activities including planning, designing or pricing new products (Subramani, 2004). An example is when one organization provides a product and its business partner provides additional services such as delivery, warranty and other after-sales services. In this case each organization requires sensitive knowledge from the partner regarding how products and services are designed. We argue that openness-trust leads to sharing such information and to utilizing that information to improve quality of products and services.

Openness-trust is also expected to influence human knowledge (Table 1). Human agents are expected to evaluate information received from the partner and to utilize it effectively (Caldeira & Ward, 2003). To perform these activities effectively, human agents require an existing base of relationship-specific knowledge. Human agents also play a major role in maintaining fairness and equality. They provide information based on their perceptions of the amount of sensitive information released by the partner. Furthermore, the empathetic role of human agents is essential as they can perceive partner needs and subsequently perform particular actions in the interest of the partner. Openness-trust is not expected to significantly influence interlinkage of business processes because when a partner only offers organizational knowledge, there is no demand of a fixed sequence of actions between the partners.

Hypothesis 2 *Openness-based trust positively affects the relationship-specificity of organizational domain knowledge and human knowledge resources.*

The emergence of robust technical standards (Zhu *et al.*, 2007) provides sufficient reasons to assume that trust does not have major influences on IOS infrastructure. An example is the emergence of XML (extensible markup language) as a standard to share information over the Internet and across heterogeneous programming platforms. Organizations are convening at industry level to form consortia that develop B2B standardization initiatives. RosettaNet is an example of a consortium that is formed by organizations in the high-tech industry to develop and promote standards that define electronic data formats. Hence, we don't expect competence and

Table 1 Proposed influences of competence- and openness-trust

	Relationship-specificity of IOS-related resources			
	Human knowledge	*Business-process*	*Domain knowledge*	*IOS infrastructure*
Competence-trust	High	High	Low	Low
Openness-trust	High	Low	High	Low

openness-trust to increase the customization of IOS infrastructure.

Hypothesis 3 *Competence- and openness-based trust do not affect the relationship-specificity of IOS-infrastructure resources.*

Methodology and data

This research uses the case study research approach for two main reasons. First, case study approach complements the knowledge-building process by testing the hypotheses and producing more detailed insights. The data collection techniques provide rich data that can reveal novel insights regarding the relation between various types of trust and IOS-related resources. Second, case study approach provides effective analytical tools to analyse complex constructs, for example, trust and human knowledge. The researcher can discuss issues with involved managers and employees to familiarize himself with their attitudes and views. For example, in-depth discussions lead to better understanding of how employees utilize partner-specific tacit knowledge to realize daily ordering and communication.

The unit of analysis is the dyadic interorganizational relationship. We conducted initial interviews with executives of various organizations and selected three interorganizational relationships. Two relationships are incorporated due to the dominance of a specific type of trust in each of those relationships. The first relationship is characterized by competence-trust because business collaboration is based predominantly on beliefs based on competence, skills and expertise. The second relationship is characterized with openness-trust because openness beliefs are predominant. Analysis of these two cases aims at finding typical influences of each type of trust within contemporary business practice. The third relationship involves the lack of a high level of trust to reveal contrasting results based on predictable reasons. This can also be referred to as theoretical replication (Yin, 2003).

To facilitate comparison, several characteristics are common for all cases, such as focus on logistics services and high short-term dependence. For each organization, we ensured that executives approved cooperation and are willing to participate in interviews.

For triangulation purposes, data are collected through interviews with various executives from each organization and through analysing multiple types of documents including service level agreements, data flow diagrams, annual reports, etc. On average three semi-structured interviews were conducted with each organization. Meetings range from one to four hours and key discussions are transcribed. The semi-structured interviews are based on a questionnaire (Table 2). To acquire the desired level of detail, theoretical constructs are converted into operational variables and these variables are converted into measurable items. The variables and indicators are developed using existing operationalizations found in the literature (Mishra, 1996; Hart & Saunders, 1997; Venkatraman, 1997). Besides the interviews, the author was able to observe warehouse activities and examine whether these observations coincide with insights from interviews.

Three interorganizational relationships

This section describes the contexts and types of IOSs used within three interorganizational relationships investigated in this study.[1] Table 3 summarizes the characteristics of each case.

Global automation companion and integrated logistics

Global Automation Companion (GAC) is the EMEA (Europe, Middle East and Africa) headquarters of a U.S.-based organization. It is specialized in industrial automation and it provides power and control solutions to large organizations. The products of GAC EMEA are stored in an automated dedicated warehouse managed by Integrated Logistics. Integrated Logistics also offers value-added activities such as packaging, labelling and minor product modifications that are performed last minute according to customer requirements.

The initial contact was between GAC and the holding of Integrate Logistics. The holding demonstrated the potential of Integrated Logistics competence by showing GAC executives an automated warehouse of one of its subsidiaries. This allowed the holding to honestly communicate information regarding their abilities, proficiency and accuracy in processing transactions. GAC executives subsequently granted a multi-year contract to Integrated Logistics. The trust is thus based on competence, expertise and expectation that professional standards are achieved. An example of such a standard is that Integrated Logistics is expected to process and ship all orders received before 3pm within same business day. The reliance on competence is also illustrated by the fact that both partners upfront set accurate deadlines concerning how the volume is processed. This enables them to realize progressive performance targets. The EMEA distribution manager of GAC explained regarding this issue 'we then also give them an estimate on the volume … we then negotiate what the service KPI's should be and traditionally, also given the performance, it is normally an improvement versus last year. So, their KPI get's tougher and tougher. But what we have is a sight where we really focus on continuous improvement, and productivity etc. has gone basically I think last or two years ago at 9 order lines per man hour, and today we are almost at 13.5'.

Even though GAC is their only customer, Integrated Logistics belongs to a holding that can provide various types of support to its members. Such support can include additional expertise in a specific logistics domain, providing additional resources when needed

[1]Fictitious firm names are used for all relationships.

Table 2 Questionnaire items

Competence-based trust
- The business partner is competent in accurately and efficiently processing transaction information.
- The business partner is honest and accurate when setting deadlines.

Openness-based trust
- The business partner is willing to share information.
- The business partner is honest in his business dealings.

Relationship-specificity of human knowledge resources
- Our workers require specific IT knowledge to be able to communicate with the business partner.
- Our workers require specific business knowledge to be able to communicate with the business partner.

Relationship-specificity of business process resources
- The extent to which the *software and applications* used (e.g. billing, inventory management, EDI, etc.) in exchanging products/services with the business partner are relatively similar or are significantly different from what you use with other business partners.
- The extent to which the *administrative procedures* used (e.g. vendor selection, cost accounting procedures, etc.) in exchanging products/services with the business partner are relatively similar or are significantly different from what you use with other business partners.
- The extent to which the *operating procedures* used (e.g. manufacturing, bar-coding, packaging, shipping procedures, etc.) in exchanging products/services with the business partner are relatively similar or are significantly different from what you use with other business partners.

Relationship-specificity of organizational domain-knowledge resources
- The extent to which the knowledge and understanding used in planning for new products is relatively similar or is significantly different from what you use with other business partners.
- The extent to which the knowledge and understanding used in product conceptualization and design is relatively similar or is significantly different from what you use with other business partners.
- The extent to which the knowledge and understanding used in determining product pricing is relatively similar or is significantly different from what you use with other business partners.

Relationship specificity of IOS infrastructure
- Our organization conducted IT investments to facilitate communication with the business partner (new computers, barcode printers, etc.).
- Our communication devices can be used to facilitate communication with other business partners as well.

Interviewees are requested to rate the following items. Subsequently, they are asked to clarify their response.

Table 3 Case characteristics

Context	*Business partners*	*Trust based mainly on*	*Size*	*Role of each organization*	*Interviews with*
Relationship A: Warehousing services for a large industrial automation supplier	Global automation companion Integrated logistics	Competence	Large Medium	Industrial automation provide Storage of products	Site manager, IT executive IT directors, site managers, IT executives
Relationship B: Daily supplies of fast food restaurant	Fast cuisine Dealer	Openness	Medium Medium	Fast food restaurant Storage and transportation	Franchisee, Operational manager Strategic manager, account manager
Relationship C: Supply of bath room commodities	Fretadia (and phoselot)	Intermediate level of trust	Small	Supplier	Director

and finding a new customer in case the relationship is terminated.

Electronic communication is conducted through multiple EDI connections. Both organizations use existing standards and conversion tools to communicate EDI messages. GAC communicates orders to Integrated Logistics through the headquarters of GAC in the U.S. because the products are property of GAC and stock

modifications need to be processed by the financial systems due to the accounting regulations of Sarbanes-Oxley.

The human-knowledge resources at both organizations are relationship specific. To utilize the competence of the partner and ensure correct execution of orders, workforces of both organizations have frequent intensive meetings. These meetings enable the investment in idiosyncratic assets, such as human knowledge related to the business and IT abilities. Increased knowledge regarding partner-specific characteristics and abilities facilitates relationship-specific improvements. This is exemplified in the cross-dock project that aims at decreasing the minimum period between arrival and shipment from 48 to 24 hours. The project necessitates collaboration of logistic executives and IT experts from both organizations.

The design of all stock modification processes of Integrated Logistics is done in cooperation with GAC due to the influential role of GAC. Similarly, to be able to operate successfully, GAC designed its ordering processes in cooperation with Integrated Logistics. GAC also attained organizational knowledge concerning specific warehousing practices used by Integrated Logistics. GAC uses that relationship-specific knowledge to proficiently service its customers and to promise reliable delivery dates in the EMEA region. Hence, the IOS-related business processes and organizational domain knowledge of both organizations are relationship specific.

Fast cuisine and dealer

Fast Cuisine is a member of an international chain of fast food restaurants with an extensive global infrastructure. Dealer is based in Germany and its Dutch branch supplies Fast Cuisine numerous products ranging from raw meat and bread to product packaging on a daily basis. Initially products were supplied twice every week. Elaborate open communications and sharing of information enabled Dealer to conduct modifications that allowed daily deliveries benefiting both organizations. Fast Cuisine is able to offer more fresh products, for example, fruit salads and fruit juices, to its customers. Dealer enjoys more freedom in terms of delivery planning due to the omission of delivery windows.

The incremental improvements and gradual increase in the intensity of information sharing are characteristic for the open trust existing within this relationship. Managers provide genuine forecasts as effective planning and improved activities are useful to both organizations. However, the provision of information by each side is contingent on the information received from the partner. This is exemplified by the activities concerning the specialized analyst at Dealer as he evaluates their repository of organizational domain knowledge specific to Fast Cuisine. He combines the historical information with up-to-date information received from Fast Cuisine executives to enhance product planning and product pricing. Contingent on the outcomes of his activities, executives of Fast Cuisine can adjust their activities.

The ordering process is initiated by filling up the required quantities within a fixed list of available products. The communication is done through standardized IOS infrastructure, that is, dial-up connections utilizing existing phone lines. However, only particular employees of Fast Cuisine are able to place orders due to quantitative analyses that should be conducted to determine volume of ordered products. Employees of Fast Cuisine follow initial training and periodical follow-ups on sight at Dealer to ensure they comprehend the complexities of post-ordering processes and consequences of communicating erroneous data. This training enables the development of idiosyncratic knowledge assets that are important for a smooth information flow between organizations. Similarly, at Dealer, there are specific managers focusing on the relationship with Fast Cuisine and they maintain up-to-date knowledge of Fast Cuisine to be able to solve any problematic issues without significant delays. Hence, relationship-specific human-knowledge and domain-knowledge resources are utilized to ensure successful communication.

Fretadia and Phoselot

Fretadia is a manufacturer of stylish home and bathroom commodities. It is based in the Netherlands and has production facilities in Hong Kong. Phoselot operates several types of discount and department stores in the U.S. and it has maintained a relationship with Fretadia for the past four years. We were only able to conduct interviews with Fretadia. Their trust in Phoselot is not high but intermediate due to Phoselot's use of reverse auctions for sourcing contracts and due to their partial openness in the communication of strategic information. Phoselot provides a plethora of operational information obtained from its ERP system. However, Fretadia is bothered by the enormous quantity of data.

Communication is conducted using an extranet offered by Phoselot to many of its suppliers. The system is linked with Phoselot's ERP system and provides plentiful up-to-date information and performance metrics including previous and current stock levels, percentage of damaged products and various predictions. Phoselot also uses the system to perform reverse auctions to purchase commodity products. Phoselot determines most of contract terms in advance and accordingly the main selection criterion is price. Fretadia has been successful in acquiring supply contracts for the past three years. Phoselot's utilization of the reverse auction mechanism to ensure low prices has inhibited Fretadia's trust from improving in spite of the successful progression of the relationship.

Human knowledge within this relationship has a general and non-relationship-specific nature. Phoselot offers Fretadia standard contracts similar to its other suppliers and the nature of products does not require specific domain knowledge. Managers of Fretadia also do not need in-depth information to maintain the relationship

with Phoselt. They acquire information regarding prices of raw materials and manufacturing costs from various other sources and try to place competitive bids at the reverse auction. Even after signing contracts, there is no need for frequent meetings between representatives of both organizations. There is also no training required to use the extranet system as it is easy to use and Phoselot provides support in case of technical problems (Table 4).

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Investments in IOS-related business processes are relationship specific. Phoselot requested specific packaging and shipping requirements and Fretadia's manufacturing plant adjusted procedures to accommodate those requirements. Investments in domain-knowledge IOS related resources are also relationship specific as Fretadia had to acquire specific data on U.S. market and Phoselot to be able to issue a competitive bid during the auction.

Discussion

The findings suggest that both types of trust influence relationship-specificity of human knowledge. However, each type of trust is associated with distinctive role of human agents. Competence-trust motivates human agents to take advantage of partner competence. Human agents utilize their knowledge to enhance interlinkage of business processes and improve transfer of organizational-domain knowledge. This is exemplified by the improvements of the cross-dock project in the GAC–Integrated Logistics case. In that case, competence-trust also motivates each organization to rely on proficient partner processes to acquire specialization benefits and core competence advantages. Competence-trust is also found to stimulate interorganizational sharing of domain knowledge to enable development of enhanced delivery services of GAC. However, the improvements are mainly enabled by interpersonal collaboration and human agents' ability to improve current situation, that is, forward reasoning.

The existence of intermediate level of trust, as in the case of Fretadia and Phoselot, yields low human knowledge relationship specificity as human agents relied on elaborate agreements to customize business processes.

The empirical analysis, applied to verify the hypotheses formulated in the third section, leads to new insights that are incorporated in the following finding:

Finding 1 *Competence-based trust increases the use of relationship-specific human knowledge to interlink business processes and transfer organizational domain knowledge.*

Openness-trust motivates sharing of information even beyond contractual obligations and guidelines. Fast Cuisine and Dealer can take the risk of sharing sensitive information because their trust diminishes opportunistic behaviour concerns. The case illustrated how human agents have two roles in this context. The first role involves interpretation as human agents ensure correct interpretation and processing of received information. The human agents utilize existing relationship-specific knowledge to understand and comprehend new perceived information. At the same time, correct interpretation accumulates relationship-specific human knowledge. The second role involves transfer as human agents ensure transfer of suitable information to the partner, that is, diminishing erroneous and useless information. This role requires empathy, as it requires human agents to evaluate their partner's needs. Both roles of human agents are interconnected. Balancing between these roles is essential for equality between the organizations and for achieving fair positive outcomes that enable incremental trust development. The described activities of the data analyst at Dealer exemplify both roles. First, he ensures correct interpretation of received data and subsequently he transfers to Fast Cuisine information including suggestions to improve their procurement process. Another example encompasses the employees of Fast Cuisine, who interpret information they receive during on-sight training and afterwards ensure correct information is transferred for the ordering process to be performed correctly. In both examples, human agents accumulate relationship-specific human knowledge to manage successful interorganizational knowledge transfer and utilization of organizational domain knowledge resources.

The case of Fretadia and Phoselot reemphasizes the influence of trust on both roles of human agents. Openness-trust is not high and sensitive information is not shared between the business partners. Human agents do not conduct efforts to interpret and analyse data received from Phoselot as it consists of overabundance of redundant operational information. The analysis is not conducted even though it could yield advantages for the relationship. Regarding their second role, they didn't provide any sensitive information to Phoselot due to two main reasons. It was apparent that Phoselot will exploit that information for its own advantage and Fretadia did not bother to analyse which

Table 4 Results summary

Case	*Business partners*	*Type of trust*	*Relationship-specificity of IOS-related resources*			
			Human knowledge	*Business-process*	*Domain knowledge*	*IOS infrastructure*
Relationship A	Global Automation Companion	Competence	High, the workforces are blended	High, storage and delivery processes are customized	High, product specific requirements are reckoned with	Low, separate systems communicate through EDI
	Integrated Logistics		High, the workforces are blended	High, Procedures are customized	High, Knowledge of product market of GAC is essential	Low, Standard systems are used
Relationship B	Fast Cuisine	Openness	High, employees follow specific training from Dealer	Low, standard delivery processes	High, product planning and pricing-based knowledge of Dealer	Low, standard modem connections
	Dealer		High, executives developed experience with customer	Low, standard delivery processes	High, product planning and pricing based on knowledge of Fast Cuisine	Low, same system offered to all customers
Relationship C	Fretadia (and Phoselot)	Intermediate, trust based on partial openness	Low, no need for specific human knowledge	High, Production and packaging procedures are customized	High, specific market data are required	Low, Extranet uses industry standards

modification is beneficial for Phoselot. Hence, the analysis supports the second finding to convey the new insights:

Finding 2 *Openness-based trust increases the use of relationship-specific human knowledge to successfully utilize relationship-specific organizational domain knowledge.*

The IOS infrastructures within all three cases are characterized with low relationship specificity. The organizations use existing standards that are available and have low specificity. GAC and Integrated Logistics rely on Internet-based systems that utilize XML for communication while Fast Cuisine and Dealer utilize slightly customized spreadsheet applications that communicate using existing phone-line infrastructure. These analyses support earlier research arguing that IOSs increasingly utilize open standards (Gabrielsson & Gabrielsson, 2004). Hence, the following finding is put forward:

Finding 3 *Competence- and openness-based trust do not affect the relationship-specificity of IOS-infrastructure resources due to the existence of robust open standards.*

This study has two main limitations. Firstly, findings from the first case study may have limited generalizability as GAC is the only customer of Integrated Logistics. GAC case study findings are constructive as dependence is comparable with the other two cases. Nevertheless, future research can further validate proposed findings by incorporating organizations with multiple customers. Secondly, in the long term trust can be influenced by the success or failure of human interactions, process interlinkage or knowledge transfer. Future research can adopt a longitudinal design to examine two-directional influences between specific types of trust and different types of IOS-related resources. An additional direction for future research is the incorporation of other concepts of RBV to analyse the use of IOS. The RBV literature encompasses interesting concepts such as path dependence (Teece *et al*., 1997) and the distinction between resources and capabilities (Grant, 1991; Bharadwaj, 2000). These concepts can be very useful in gaining novel in-depth insights on the use of IOS.

Conclusion

The main objective of this paper is to investigate how two types of trust influence use of relationship-specific IOS-related resources. Three qualitative case studies are conducted to validate hypotheses and provide additional insights. Competence-trust leads to human agents acquiring partner specific knowledge to enhance the interlinkage of business processes and to improve transfer of organizational domain knowledge. Openness-trust leads to human agents acquiring partner-specific knowledge to manage interorganizational knowledge transfer.

The main practice contribution of this paper encompasses insights regarding the role of human agents and going beyond traditional theories that simply advocate empowering human boundary spanners. The findings reveal that if an organization perceives its partner as competent, human boundary spanners should try to acquire knowledge from the partner and utilize their cognitive abilities to realize two objectives: interlinkage of interorganizational business processes and knowledge transfer. These activities enable shared value creation and performance improvement. When an organization perceives its partner as open and cooperative, human boundary spanners should balance their actions between correct interpretation of received information and transfer of useful information to the partner.

This paper makes theoretical contributions to the literature on trust and strategic management. In the area of trust this paper provides two contributions. First, we combine two literature streams, that is, literature on different types of trust (McAllister, 1995; Sako, 1998) and literature on influences of trust on use of IOS (Hart & Saunders, 1997). Second, this paper supplements literature focusing on influences of various social mechanisms such as collaborations relying on social ties and knowledge sharing (Kotlarsky & Oshri, 2005). In the area of strategic management, this paper provides two contributions. First, we apply concepts of the RBV within an interorganizational context. This has been done by a limited number of studies (Das & Teng, 2000; Wade & Hulland, 2004). The conceptualization in this paper enables distinction between different types of resources at the interorganizational level and enables more detailed analysis of IOS usage without loss of generality. The findings complement insights of previous studies such as Inkpen and Tsang (Inkpen & Tsang, 2005), which emphasize the importance of the social dimensions for knowledge transfer. This paper complements their findings by articulating the role of human knowledge. Furthermore, this paper examines the role of human agents in two trust contexts. Their role in reconfiguring resources as they deem appropriate resembles the concept of dynamic capabilities as advocated by Zahra *et al*. (2006) and Cepeda & Vera (2007). Hence, findings in this paper can be used to analyse how trust influences dynamic capabilities within an interorganizational context. Second, this paper supplements studies discussing organizational imitation (Guillen, 2003). Organizations adopt similar practices for several reasons and not only for competitive reasons (DiMaggio & Powell, 1983). This study complements their findings by examining how trust increases the customization of various resources and thus increasing imitation of certain practices.

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