

# INTERORGANIZATIONAL TRUST AND INTERORGANIZATIONAL SYSTEM'S INFORMATION QUALITY

“Research-in-progress”

Trust, Knowledge, and Society in the IQ Context

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**Abstract:** Trust has been emphasized to have important influences on the success of interorganizational systems. This paper focuses on how various types of trust impact the various types of investments in IOS related resources and the Interorganizational system's information quality (IOS IQ). The combination of the invested resources of both organizations is argued to produce IOS capabilities that fit the IOS IQ. A conceptual model is constructed combining information quality, transaction-cost economics, resources-based view and trust. Four explorative case studies are conducted on interorganizational systems. Findings suggest that different types of trust have distinctive impacts on IOS IQ, investments in resources and consequently IOS capabilities. The findings are subsequently employed in a quantitative field study.

**Key Words:** Information quality, interorganizational systems, trust, resource-based view

## INTRODUCTION

Interorganizational partnerships are utilizing IT to improve lead-time and the agility of the supply-chain through increased reliance on interorganizational systems (IOSs) that support collaboration and strategic alliances [16]. IOSs are employed in various types of interorganizational relationships yielding a variety of systems ranging from electronic markets to proprietary systems. The benefits of IOSs extend from efficiency of automating manual processes to strategic advantages of knowledge sharing [20]. Congruent with the variety of IOSs, the information needs are varied and divergent [29]. Consequently, it can be expected that the requirements of information quality (IQ) differ across different types of relationships.

A factor that is present in different degrees within the various types of interorganizational relationships is trust. Trust has been argued to be essential in economic exchanges [10] and it has been emphasized to effect the development and success of IOSs [13]. The complexity of social and economic exchanges has led to the distinction between various types of trust [23, 28, 42]. The existing level of trust within the relationship has as well been argued to influence the sharing and absorption of information and knowledge [42]. This paper aims at exploring whether the various types of trust have different influences on interorganizational system's information quality (IOS IQ) and how trust effects the investments in IOS related resources to be able to fulfill the IOS IQ requirements.

## BACKGROUND

IQ is a topic of interest for both practitioners and researchers. The increasing dependence on information and use of data warehouses intensified the need for high-quality information. The consideration of information quality ought to be a continuous process [8]. Researchers have developed various frameworks addressing the measurement of IQ by taking a consumer viewpoint of quality because the consumer judges whether or not a product is suitable [18, 22, 32]. Wang et al [37] derived IQ dimensions by adopting the concept fitness for use and distinguished fifteen IQ dimensions covering multiple categories. They argued that high-quality data should be intrinsically good in its own right, contextually appropriate for the task at hand, clearly represented and accessible to the information consumer. Within an interorganizational relationship a higher level of IQ will inherently improve the transfer of information and knowledge between organizations [22].

The transfer of information and knowledge has been argued to be influenced as well by the existing levels of trust within the relationship [12, 21]. In the presence of higher levels of trust, actors are willing to share more information that tends to be qualitatively more useful [19, 24]. A higher level of trust also makes actors more willing to listen and absorb other's knowledge [19, 21] and reduces the cost of information transfer, as less verifications are required and the frequency of conflicts is lower [42]. Within the IS field trust is highlighted as an important factor in the development and success of IOSs [13, 15, 27]. Mishra [23] defines trust as "one party's willingness to be vulnerable to another party based on the belief that the latter party is competent, open, concerned, and reliable". Competence is based on the skills and abilities of the other organization within a specific domain. Openness is based on the perceptions of honesty of communications and completeness of information. Concern is based on the belief that the other party will refrain from taking unfair advantage when the opportunity arises. Reliability refers to the consistency of expected behavior based on accumulation of interactions, specific incidents, problems and events. Each of these dimensions emphasizes expectations regarding a partner's behavior and performance.

As argued earlier IOSs are utilized in different contexts to achieve various objectives [4]. To facilitate the analysis and distinction between different types of interorganizational systems the resource-based view is utilized. From the resource-based view (RBV) each organization is perceived as a bundle of resources emphasizing the heterogeneity between organizations originating from different resources and different mechanisms of combining resources [39]. A major contribution of the RBV is that it enables justifying long-lived differences in organizational performance that cannot be attributed to differences in industry conditions. It is argued that certain resources can enable the organization to achieve a sustainable competitive advantage. These resources are valuable in the sense that they exploit opportunities or neutralize threats in a firm's environment, rare among a firm's current and potential competitors, inimitable, and non-substitutable [2]. Resources are distinguished from capabilities in that resources are viewed as inputs into the production process and the capabilities are organization specific, information-based processes developed through interactions among resources [11]. Within the IS field, the resource-based perspective is adopted to distinguish different types of IS resources and capabilities. Bharadwaj [5] provided a classification scheme that distinguishes three types of IT-based resources. The first type includes tangible resources comprising the physical infrastructure. The second type includes the human IT resources comprising technical and managerial IT skills. The third type includes intangible IT-enabled resources comprising knowledge assets and synergies enabled by IT. He empirically demonstrated that firms with high IT capabilities tend to outperform on a variety of profit and cost-based performance measures.

## **RATIONALE & PURPOSE**

The objective of this paper is investigating the influences of trust on investments in IOS related resources and IOS IQ. IQ, IOSs and trust are widely studied topics in academics and they receive considerable attention in the business field. However, researchers and practitioners know little about the distinct impacts of the various forms of trust on information and communications. It is valuable to have a more comprehensive understanding as trust can have an essential role in achieving strategic objectives and information technology is increasingly employed to perform communications. The objective of the paper can be realized by introducing a conceptual model that enables investigating (1) how does trust influence the IOS IQ requirements? and (2) How does trust influence investments and use of the IOS to fulfill these IQ requirements? The conceptual model is subsequently utilized to discover these influences by means of four explorative case studies. The paper does not focus on the causes of interorganizational trust. The focus is on the influences of trust within dyadic interorganizational relationships that employ IOSs to facilitate communications.

## **METHODS**

The paper is based on a doctoral study that focuses on the impact of interorganizational trust on interorganizational systems. The study entails the conceptual model development and utilizing the model to conduct case studies and a field study. The model is constructed by utilizing theories from political economics, transaction cost economics and the resource-based view. The synthesis of concepts and insights from various fields can facilitate a more comprehensive understanding of the phenomenon. Employing the model to perform qualitative case studies and a quantitative field study is referred to as triangulation [38] and more specifically sequential triangulation, i.e. results from the case studies are used for planning the field study. Attewell and Rule [2] emphasize the complementarity between case studies and field studies stating that 'each is incomplete without the other'. The aim is to acquire improved verification for the conceptual model as inadequacies of individual methods are minimized. Attewell & Rule [2] suggest to conduct case studies first as it allows gathering insights about the causal links, motivations and reasons preceding verification. The conceptual model, case studies and field study are discussed in the following sections.

### ***Conceptual Model***

The conceptual model is depicted in figure 1. The existence of trust has been argued to facilitate the communication of information and the sharing of knowledge across organizations and between individuals [1, 24]. The perceived trustworthiness of the other organization is associated with the expectation that the other organization will not perform damaging behavior and therefore more sensitive information can be shared. At the receiving end, trust in the other organization can affect the perceived usefulness of information and knowledge obtained. The information provided by a trustworthy source is more likely to be absorbed and taken into account in decision-making [7, 42]. These advantages are attained when the increase in trust is accompanied by an increase in the quality of communicated information. Higher quality of information also reduces the verification needs and knowledge transfer becomes less costly. Hence, a higher level of trust will likely influence the IOS IQ (Arrow 1).

The interorganizational trust is as well argued to influence the degree of relationship-specific resources that an organization is willing to invest within the relationship [13, 24, 27]. When the organization has a high degree of trust in the other organization, then it expects that the other organization will not perform damaging behavior and it will be encouraged to invest in relationship-specific resources within the relationship [27]. Relationship-specific resources are viewed as resources that are of lesser value when redeployed in alternative exchanges [33]. Hence, a higher level of trust will influence the investment in IOS related resources with high relationship specificity (Arrow 2).

Transaction cost economics advocate that relationship-specific investments are important source of value creation within interorganizational relationships [40]. Focusing on IOSs, Prosser et al [26] and Subramani [33] argued that relationship-specific IOS related investments can lead to important strategic relationships that produce a competitive advantage. From a resource-based perspective, Grant has argued that the combination of resources within an organization can create capabilities, which are organization specific and information-based [11]. Applying the logic of the RBV to interorganizational relationships, we argue that combining relationship-specific resources of the two organizations will facilitate the development of relationship-specific capabilities. For example, organizational processes at each sides are more effective within the relationship when they complement each other, e.g. just-in-time capability can only be achieved when both organizations perform the agreed upon procedures. Hence, The use of IOS related resources, which have a higher degree of relationship specificity, could lead to de development of IOS capabilities (arrow 3).

Information systems are a means in achieving superior performance and not an end in themselves [6]. IOS capabilities can support achieving superior performance and competitive advantage when they facilitate interorganizational coordination and communications effectively. Consequently, IOS capabilities should satisfy the IOS IQ requirements to provide a higher performance (arrow 4). For example if the capabilities are based on interlinked processes then certain IOS requirements need to be fulfilled for the processes to be performed successfully. That is for just-in-time capability to be performed successfully then communicating accurate information is of the essence for successful performance. Similarly when the capabilities are knowledge based, fulfilling the IOS IQ is essential in achieving sound knowledge transfer.

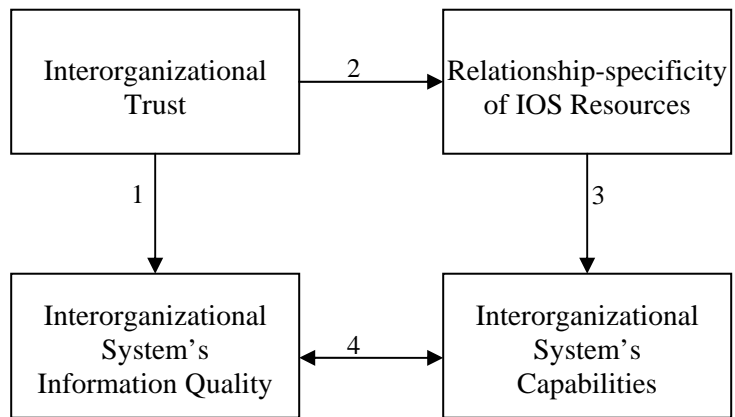


Figure 1 Conceptual Model

### Case studies

Case studies are useful to investigate phenomena in a natural setting or when the focus is on contemporary events [3]. As the conceptual model is based on theoretical and intuitive foundations and case studies are suitable for the knowledge building process [41], the aim is to acquire more profound insights on the proposed links. The design is a multiple holistic case design based on theoretical replication. The research problem, literature review and conceptual model guided the design framework. The framework has guided the site selection and the creation of specific measurement scales of the theoretical constructs (Appendix A). To investigate the influences of trust four cases were carefully identified fitting the four components of trust identified by Mishra [23]. When conducting the research, the focus was on the context of the interorganizational relationship and more specifically the unit of analysis comprised the investments and use of the IOS.

The constructs are measured using scales based on their definitions and previously employed scales found in the literature (appendix B). Trust is measured based on the belief that the other party is competent, open, concerned and reliable [23]. A resource is perceived to have higher degree of relationship specificity when it has lesser value when redeployed in other exchanges [33]. The model primarily focuses on IOS related resources and following Bhradwaj [5] three different types of resources are distinguished namely tangible, human-based and intangible IT-enabled resources. Intangible IT-enabled resources are further split into resources related to business-processes and domain-knowledge [33]. Three different types of IOS capabilities are distinguished namely basic linkage, process integration and learning and knowledge integration [20]. IOS IQ are measured according to perspective of fitness for use and following Wang et al [37] 15 IQ dimensions are measured that can be grouped into the four categories intrinsic, contextual, representational and accessibility. Data is collected through a variety of techniques including semi-structured interviews, company documents, public published information and follow-up telephone discussions. The key interviews were recorded and soon after transcribed. Finally the collected data was analyzed.

### ***Field Study***

The objective of the field study is to verify the propositions resulting from the case studies. A quantitative approach is chosen and validation heuristics suggested by Straub et al. [31] are considered to enhance the various reliabilities and validities of the findings. The data will be collected through a survey. The sample frame of the survey is randomly selected freight transportation companies consisting of 2400 companies within the Netherlands. The transportation industry is attractive for this study due to the extensive use of information and reliance on ICT [35]. The Dutch transportation industry provides good opportunity due to the geographical location of the Netherlands facilitating transportation and distribution to the European mainland.

To avoid common method bias mail and web-based online surveys will be used. To increase response rate, companies will be offered to fill out a separate form and be sent a summary of the findings and if they choose to receive a benchmark of their answers with those from the entire sample. The items in the survey will consist of questions measuring the constructs of the theoretical model used during the case studies, complemented with new insights obtained in the analysis and customized to the transportation industry when necessary. To ensure content validity Lawshe's [17] quantitative approach will be employed by asking a panel including ten experts in the transportation industry to indicate whether or not a measurement in a set of other measurement items is "essential" to the operationalization of each theoretical construct. Subsequently, a pretest will be conducted on 20 companies to observe the reactions of respondents to the questionnaire under realistic conditions.

## **RESULTS**

This section describes the findings of the qualitative case studies<sup>1</sup>. For each case the context of the relationship and the type of IOS used is described<sup>2</sup>. Table 2 summarizes the findings.

### ***Fast Cuisine and Dealer***

Fast Cuisine is a member of an international chain of fast-foodservice retailers with an extensive global infrastructure. The restaurants in the Netherlands are supplied by Dealer, which is a member of a German group that is specialized in logistics. In the Netherlands, the chain of Fast Cuisine is the only customer of

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<sup>1</sup> The quantitative field study will be conducted in September 2005 and findings can be presented during the IQ conference.

<sup>2</sup> Fictitious firm names are used for all cases.

Dealer. Our analysis focuses on the relationship between Fast Cuisine (one restaurant) and Dealer. Dealer delivers on a daily basis all required products ranging from raw meat and bread to product packaging and kid's toys. The IOS is used mainly for daily ordering and occasionally for historical analysis and future forecasts. Consequently interorganizational communications comprise mainly the daily orders, which consist of filling up a fixed list of available products. These communications are conducted through dial-up connections using existing phone lines.

### ***Global Automation Companion and Integrated Logistics***

Global Automation Companion (GAC) is an industrial automation company and global provider of power, control and information solutions based in the US. For Europe, Middle East and Africa (EMEA), GAC's headquarters are in The Netherlands and sales offices are scattered in the EMEA region. The products of GAC EMEA are stored in a dedicated automated warehouse managed by Integrated Logistics. Integrated Logistics offers some value added activities such as packaging, labeling and minor product modifications that are performed last-minute according to the end customer's requirements. Communications are conducted through EDI connections between GAC US and Integrated Logistics. Orders of GAC EMEA are transferred to GAC US and then to Integrated Logistics. The communications pass through the financial systems at the headquarters in the US due to the accounting regulations of Sarbanes-Oxley.

### ***HighTech Headsets and Road Transport***

HighTech Headsets is a manufacturer of high-quality communication headsets based in the US. For EMEA, manufacturing is performed in Mexico, the sales offices are scattered throughout Europe and the Dutch office is assigned a central role in managing and coordinating activities. Products are stored in a single location and warehousing is outsourced to Road Transport. The site of Road Transport is partly automated and products of multiple customers are warehoused in the same location. Road Transport offers HighTech Headsets some value added activities such as repackaging and product testing. Communications are conducted through EDI connections. Road Transport receives from the HighTech Headsets Mexico plant information regarding inbound shipments and from the Dutch HighTech Headsets office communications regarding outbound shipments.

### ***Ceagia and Stocker***

Ceagia is European online retailer of computer equipment. It is based in Norway and operates in several European countries. It has approximately 600.000 registered customers. Products for the Scandinavian market are stored in Norway and products for UK, Ireland and the Netherlands are stored in a warehouse owned by Stocker in the Netherlands. Stocker does not provide any additional services except for storage of the products. The site of Stocker is partly automated and products of multiple customers are warehoused in the same location. Communications are conducted through multiple EDI connections between and Stocker and the sales office of Ceagia in the Netherlands located in Delft.

	Trust	IOS IQ Requirements	Specificity of Physical IOS related resources	Specificity of Human-based IOS related resources	Specificity of Intangible IOS enabled resources	IOS Capabilities
<b>Fast Cuisine and Dealer</b>	High, based on openness	- Representational - contextual	Low, standard system using existing phone lines	High, familiarity between contact persons can be decisive	High, joint product planning	Knowledge-based
<b>Global Automation Companion and Integrated logistics</b>	High, based on competence	- Intrinsic - contextual	Low, separate systems communicate through standard EDI connection	High, the workforces are blended	High, storage and delivery processes are customized	Process- and knowledge-based
<b>HighTech Headsets and Road Transport Logistics</b>	High, based on reliability	- Intrinsic - contextual	Low, standard systems communicate using standard EDI	High, strategic and middle management meet periodically	High, packaging and shipping procedures are frequently modified	Process-based
<b>Ceagia and Stocker</b>	High, based on concern	- Intrinsic	Low, separate systems communicating through EDI	Average, employees have experience with customer company	High, distribution is conducted according to customized procedures	Process-based

Table 1. Summary of Case Study Findings

## DISCUSSION

### *Case Study Findings*

The cases included relationships where information is exchanged as means to achieve particular business objectives and not as an objective in itself. The objectives of the relationships varied from exchanging products to performing services. Different types of trust are found to have different consequences on IOS IQ and on investments in the different types of resources. However, in all the investigated relationships the physical IOS related investments are observed to have low relationship-specificity. This can be contributed to a propensity of high IT standardization [9]. Interorganizational trust is found to influence investments only in the areas of human-based and intangible IOS-enabled resources.

When the trust is mainly based on the competences, skills and abilities of the partner in delivering products and services, the emphasized IOS IQs are intrinsic and contextual qualities. Accurate and objective information was expected due to the high competence of the partner. Information provided by a competent partner was also expected to have an added value and to be relevant and timely to achieve the objectives of the exchange. To make the most of the competencies of the partner, interpersonal relationships are formed at multiple levels within the interorganizational relationship. Coordination between employees based on accurate, objective and timely information is imperative to obtain related potential benefits. Trust based mainly on competence is found as well to stimulate the use of resources that enable knowledge transfer. The abilities of the other organization seem to induce the focal organization's resources to facilitate the absorption of domain intelligence and streamline rich information exchange across organizations. As the other organization possesses expertise, cooperation is desired as it is more likely to yield benefits.

When trust is based on the reliability of the partner through the accumulation of positive interactions, the emphasized IQs are intrinsic and contextual qualities as well. Human-based investments in the form of periodic interactions between employees at multiple levels occurred. The objective of the interactions is the facilitation of product or service provision and engendering the harmonization of processes between organizations. To succeed in the harmonization of processes across organizations, the accuracy and timeliness of communicated information is of at most importance. This is enabled by XML-based standard electronic business interfaces that allow real-time information exchange and application integration.

Trust that is based on openness is essentially based on candid and open communications that encourage collaboration. Such a relationship requires common and shared objectives that can be achieved through partnership and joint endeavors. This will enable lowering the 'organizational guard' to achieve more open communications. Emphasized IQs are the good representation and contextual fit qualities. The consistent access to interpretable and understandable information was essential. Frequent contacts at multiple levels within the relationship occurred, however key contact persons played a critical role in enabling successful communications. The candid collaboration enabled the performance of superior market analysis, demand forecasts and joint planning for future products. The transfer of tacit knowledge is crucial for the success of these activities, however the communication of interpretable explicit information that is appropriate within the context of the task at hand was found to support the transfer of tacit knowledge.

Trust based mainly on concern relates to the perception that another party would keep the best interests of the trustor at heart. Regular high performance is emphasized however the decisive factor for developing concern is the reaction of the partner to the occasional low performance. The understanding and cooperation to overcome exhortations are central in building mutual concern and benevolence. This benevolence in turn stimulates organizations in revealing their lack of knowledge and competence in areas beyond their core competence. Organizations will abandon defensive behaviors, which block effective communications and learning. The intrinsic information quality was emphasized. This can be explained by taking into account the argument of Levin et al [19] that trust based on benevolence facilitates tacit-knowledge transfer. As the information communicated via the IOS is explicit, its accuracy and objectivity facilitates the face-to-face communications and the tacit knowledge transfer.

### ***Propositions***

The case study findings supplement the conceptual model by providing complementary insights on the relationships between the constructs. This section describes the propositions that are constructed based on conceptual model and the case study findings.

The interorganizational trust affects the manner organizations perceive and process information provided by the partner organization. Trust based mainly on competence is found to emphasize intrinsic and contextual quality categories of information to complement and support the main objectives of the relationship. Similarly, trust based on reliability is found to emphasize the intrinsic and contextual quality categories of information to facilitate the accumulation of positive interactions. Trust based on openness is found to emphasize the representational and contextual information quality categories to facilitate the extensive communications. Trust based on concern is found to emphasize the intrinsic information quality to ultimately facilitate the tacit knowledge transfer. Hence,

**P 1A:** trust based mainly on competence is positively associated with the importance of intrinsic and contextual categories of information quality.

**P 1B:** trust based mainly on reliability is positively associated with the importance of intrinsic and contextual categories of information quality.



**P 1C:** trust based mainly on openness is positively associated with the importance of representational and contextual categories of information quality.

**P 1D:** trust based mainly on concern is positively associated with the importance intrinsic category of information quality.

The interorganizational trust as well affects the degree of relationship-specific resources that an organization is willing to invest in the relationship. Trust based on competence is based in the perception that the other party is knowledgeable and possesses particular skills. Therefore, a high level of trust in the other party's competence is argued to cause a motivation to rely on the actions of the other organization by customizing the processes within the focal organization. Trust in the competence and knowledge of the other party is as well likely to be complemented by actions from the focal organization to maximize its benefits from the relationship. Such actions are performed by employees and aimed at coordinating activities. Trust based mainly on reliability is related to the extent to which an organization can depend upon and have confidence in the actions performed by the other party. A higher reliability of the partner is likely to motivate the focal organization to have a higher degree of business-process specificity to exploit benefits of interlinking business processes. Trust based mainly on openness has an important role in motivating knowledge sharing. When the other party is perceived to be honest, there is likely to be a greater desirability to share knowledge. On the other hand, when the other party is perceived to be dishonest then the incentive to share information and knowledge is depleted. Effective transfer of knowledge results eventually in embracing the information and knowledge by the other organization. A higher degree of openness is found to result in greater sharing and incorporation of information and knowledge leading to domain-knowledge relationship-specific resources of the focal organization. Hence,

**P 2A:** trust based mainly on competence will positively affect the use of IOS related business-process resources with high relationship specificity.

**P 2B:** trust based mainly on competence will positively affect the use of human-based IOS relates resources with high relationship specificity.

**P 2C:** trust based mainly on reliability will positively affect the use of IOS related business-process resources with high relationship specificity.

**P 2D:** trust based mainly on openness will positively affect the use of IOS relates domain-knowledge resources with high relationship specificity.

The findings regarding the influences of trust based mainly on concern are conflicting and doubtful and therefore the analysis in that area is unreliable. As a result, no propositions are incorporated regarding the impact of trust based mainly on concern.

Grant [11] has argued that combining the organization's various resources can create capabilities, which are organization specific and information-based. Applying the logic of the RBV to interorganizational relationships, it is argue that combining the relationship-specific resources of the two organizations will facilitate the development of relationship-specific capabilities. More specifically, processes at both sides are effective when they complement each other, e.g. just-in-time capability can only be achieved when both organizations perform the agreed upon procedures. Similarly, the sharing of relationship-specific knowledge by both sides would produce knowledge based IOS capabilities. For example successful R&D collaborations are more beneficial when the knowledge of organizations within R&D collaborations is complementary. Relationship-specific human-based resources are argued to increase both process-based and knowledge-based IOS capabilities. IOS related human resources comprise training, expertise and relationships between employees. These are all factors that support both types of capabilities. Hence,

**P 3A:** Incorporating business-process specific IOS related resources, which have a high degree of relationship-specificity, will facilitate the development of process-based IOS capabilities.

**P 3B:** Incorporating domain-knowledge IOS related resources, which have a high degree of relationship-specificity, will facilitate the development of knowledge-based IOS capabilities.

**P 3C:** Incorporating human-based IOS related resources with high relationship specificity will facilitate the development of process-based IOS capabilities.

**P 3D:** Incorporating human-based IOS related resources with high relationship specificity will facilitate the development of knowledge-based IOS capabilities.

Process-based IOS capabilities require extensive communications to realize successful coordination of interlinked processes across organizations. The complexity and precision of coordination emphasizes the importance of the information flow and the intrinsic information quality. The success of such relationships is as well reliant on each organization's understanding of its partner's information needs. When processes are interlinked, the communication of contextually qualitative information is essential. Relevant, timely and complete information is indispensable for successful execution of processes.

Knowledge-based IOS capabilities leverage knowledge assets of both organizations to achieve superior performance. The contact persons between the two organizations are conduits for information sharing and knowledge creation. Their diverse cognitive needs require the use of information systems that are capable of presenting information in suitable ways to allow effective interpretation. Moreover, the dynamic business environment emphasizes the importance of the contextual information quality. The communicated information needs to be relevant to the new opportunities offered by the environment.

**P 4A:** Process-based IOS capabilities are associated with higher intrinsic and contextual information qualities.

**P 4B:** Knowledge-based IOS capabilities are associated with higher contextual and representational information qualities.

## LIMITATIONS AND CONCLUSION

The presented findings are limited in two respects. Firstly, the study features only particular types of trust, resources and IQ dimensions and does not consider other types. Within the literature other types of trust, resources, and IQ dimensions have been identified [14, 28, 36]. Including a high number of types decreases the focus and impedes effective findings on each type. Considering the time frame of a doctoral study, this study is on the verge concerning the number of types of the various constructs. The difficulty of formulating propositions regarding the influences of concern-based trust and the relationship between IOS IQ and IOS capabilities is a direct consequence of that. However, the study provides a conceptual model that can be used in future research to examine the other types discussed in the literature. Future research can as well specialize the model by focusing on particular IQ dimensions that are most influenced by trust. Secondly, all the investigated organizations didn't conduct relationship-specific investments in physical IOS resources. This can be contributed to a propensity of high IT standardization [9]. Future research can examine to what extent organizations succeed in avoiding customizing such resources in the presence of increasingly robust standards and how that can impact IOS IQ.

As this research is still in progress the conclusion should be read with precaution. This paper investigated whether different types of interorganizational trust affect IOS and IOS IQ in different ways. A conceptual model is presented that enables analyzing the influences of different types of trust. The findings of multiple case studies are discussed and propositions are formulated that will be tested in the next phase of the research. The current results suggest that different types of trust have distinctive impacts on IOS IQ and as well distinctive impacts on investments in the various types of IOS related resources. The findings are in line with the previous research suggesting that competence and benevolence-based trust enhance tacit knowledge transfer [19], the notion of complementarity of transaction-cost economics with the resource-based perspective [36] and the employment of the concept of quality from the consumer's viewpoint of fitness for use [37].

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## APPENDIX A: CASE STUDY PROTOCOL

Step	Activity	Measures
Getting Started	Definition of research questions	(1) How does trust influence the IOS IQ requirements? (2) How does trust influence investments and use of the IOS to fulfill these IQ requirements?
	Possibly a priori constructs	Figure 1
	Theory or propositions	Figure 1
Selecting Cases	Specified population	Dyadic interorganizational relationships that employs IOSs to facilitate communications
	Theoretical, not random sampling	Focus on cases featuring four types of trust
Crafting Instruments and Protocols	Multiple data collection methods	Interviews and documentation
	Qualitative data	Focus on qualitative reasoning
	Multiple investigator	Multiple investigators (inter coder reliability)
Entering the Field	Overlap data collection and analysis	Conducting interviews, reading documents and interpreting data at the same time
	Flexible and opportunistic data collection	Interested companies are included
Analyzing Data	Within-case analysis	Evaluating constructs and preliminary proposition evaluation
	Cross-case pattern search using divergent techniques	Elucidate similarities and differences between cases
Shaping hypotheses	Iterative tabulation of evidence for each construct	Data is compared for each case and multiple cases
	Replication, not sampling, logic across cases	Analyzing differences between cases
	Search evidence for “why” behind relationships	Explanation building
Enfolding Literature	Comparison with conflicting literature	All the time
	Comparison with similar literature	All the time
Reaching closure	Theoretical saturation when possible	When the insights from cases and (modified) theory is not conflicting with cases.

## APPENDIX B: CONSTRUCT MEASUREMENT

Construct	Variables	Number of Indicators	Source
Interorganizational Trust	Competence	2	Hart and Saunders [13] Mishra [23]
	Openness	2	
	Concern	1	
	Reliability	3	
Relationship Specificity of IOS Related Resources	Physical IOS resources specificity	2	Nootboom and Noorderhaven [25] Subramani [33]
	Human IT resources specificity	2	
	Domain Knowledge specificity	3	
	Business process specificity	3	
IOS Capabilities	Basic linkage	1	Subramani and Henderson [34] Malhorta, Gosain and El Sawy [20]
	Process integration	1	
	Learning and knowledge integration	1	
IOS IQ	Intrinsic IQ	4	Wang and Strong [37]
	Accessibility IQ	2	
	Contextual IQ	5	
	Representational	4	