E-procurement Facilitates Adversariality – Trustworthiness Signaled in Procurement in an Industrial High-Tech Cluster

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Technologically advanced environments normally use electronic procurement systems, and this paper explores their role in customer-supplier relationships in a Norwegian high-tech industrial cluster. This paper focuses on "trustworthiness", about which research has suggested some identifiable characteristics. Using how trustworthiness is signaled as a sensitizing lens, procurement practices and the utilization of ERP systems and other ICT artifacts are explored in a Norwegian high-tech industrial cluster. The findings show that in dealing with strategic suppliers, personal and informal ways of negotiating terms and requirements are dominant, while the procurement of less strategic parts and commodities is conducted via electronic procurement systems. The study finds trustworthiness-building characteristics in the ways in which buyers and strategic suppliers interact. At the same time, signals sent using e-procurement in the case of less critical procurements are generally more suited to building adversariality than trust.

Keywords: e-procurement, buyer-supplier relationships, electronic purchasing, trustworthiness, trust, transaction cost, adversariality, open-book

INTRODUCTION

It is a well-known fact that trustworthiness is imperative in all forms of customer and supplier relationships. To signal this is particularly demanding when electronic procurement systems are used. Inter-organizational trust (Janowicz & Noorderhaven, 2006) is a problematic construct when it comes to conceptualization and measurement (Seppänen, Blomqvist, & Sundqvist, 2007), and buyers and suppliers are also obliged to signal inter-personal trustworthiness as well. Acknowledging the conceptual differences between "trust" and "trustworthiness, this paper focuses on "trustworthiness", about the way in which research has suggested some manageable conceptual characteristics (Colquitt, Scott, & LePine, 2007; Gabarro, 1978; Mayer, Davis, & Schoorman, 1995; Sirdeshmukh, Singh, & Sabol, 2002). Using such characteristics as a sensitizing lens on how trustworthiness is signaled in customer-supplier relationships, the procurement practices and utilization of ERP systems and other ICT artifacts are explored in a Norwegian high-tech industrial cluster.

Some buyer-supplier relationships depend heavily on mutual (perceived) trust, while others are kept in an adversarial climate. Communicating requirement details and needs to suppliers has to be weighed against regulations and policies that require equal and transparent supplier treatment (Boonstra & van Offenbeek, 2018; Moe, Newman, & Sein, 2017). Technologically-advanced environments normally use e-procurement and this study explores its impact on the relationships in such environments. Cooperation between organizations with complementary resources is characterized by a high degree of complexity and is formed

by social processes involving multiple actors (Becker et al., 2013; Shaw & Holland, 2010). The utilization of e-procurement takes many forms where buyer-supplier relationships are affected; some relationships are characterized by trust, cooperation and mutual sympathy – others by adversariality, cautiousness and opportunism. Dedrick, Xu, and Zhu (2008) implies that e-procurement is associated with buying from a higher number of suppliers for custom goods and fewer suppliers for commodity goods because dependency risks are higher with custom goods. Wagner and Essig (2006) suggest that the impact of electronic commerce on buyer-supplier relationships may move relationships towards deeper partnerships in the case of high-involvement procurement objects, where most organizations already emphasize long-term partnerships. At the same time, when low-involvement procurement objects are involved, they find that relationships may move towards a more adversarial status. Several studies have reported that possibly the most controversial e-procurement applications ever made, electronic reverse auctions (ERAs), have adversarial effects on buyer-supplier relationships (Caniëls & van Raaij, 2009; Carter et al., 2004; Jap, 2007).

Little research has been conducted on the impact of electronic procurement software on buyer-supplier relationships when it comes to trustworthiness in high-tech industrial clusters. This paper is based on a case study in a high-tech industrial cluster hosted by a relatively small Norwegian community. The research explored how e-procurement software influence the relationships between customer organizations and their suppliers. Through meetings, interviews and discussions with buyers, procurement managers, supplier representatives and system developers, the effects of digital procurement tools and the role that perceived trust plays in strategic business relationships was investigated. The approach of this paper was to explore how trustworthiness is signaled in a business relationship by identifying characteristics of trustworthiness in procurement practices. The research question was: *How is trustworthiness signaled between buyers and suppliers when goods and services are procured in a high-tech industrial environment, and what role do e-procurement systems play in this?*

Perceived trustworthiness reduces transaction costs and correlates with greater information sharing in buyer-supplier relationships (Dyer & Chu, 2003). The paper reports the practices and policies of procuring companies in the industrial cluster and highlights how adversariality is present in the procurement of goods of minor importance, and how trustworthiness is fundamental to the development of advanced, highly technological components from strategic partner suppliers. Transaction Cost theory is used to underpin the findings analytically.

The rest of this paper is organized as follows: First, brief descriptions of theoretical concepts helpful to understanding the case is given. The next section describes the research approach and setting. Section 4 contains the case findings and Section 5 provides an attempt to analyze the case and discuss the key findings, while the final section sums up the implications of the study and offers suggestions for future research.

THEORETICAL BACKGROUND

To understand how buyer-supplier relationships have evolved in such a context, we use Transaction Cost Economics to explain motivations, as well as perceive ERP, SRM and CRM systems, e-mail, internet services and hardware as one electronic procurement infrastructure. Open-book is a concept central to understand the work practices in this industrial cluster. Trust and trustworthiness, in many ways, are associated with transaction costs. Hardin's concept of trust as encapsulated interest and concepts related to trustworthiness is used to investigate this. Adversariality is introduced to better describe a business climate related to some utilization of e-procurement.

Transaction Cost Economics (TCE)

TCE was initiated by Ronald H. Coase (Coase, 1937) and subsequently developed and coined by Williamson (1985) on the basis of the problem of why companies choose to do certain tasks themselves rather than entrust the production of goods or services to the market. Petersen (1995) describes Williamson's basic assumptions as the bounded (limited) rationality and tendency to opportunism in human

nature, and transactions can be characterized by uncertainty, frequency of recurrence and asset specificity. Asset specificity points to the observation that assets such as locations, obtained knowledge, equipment, etc. may be of greater value in one particular business relationship than in others. According to Dahlman (1979), transaction costs can be divided into three broad categories: Search and information costs, bargaining costs, and policing and enforcement costs.

Ex-post hazard costs from opportunism can only be safeguarded by contracts to a certain extent (Chang, Gurbaxani, & Ravindran, 2017; Dibbern, Winkler, & Heinzl, 2008), and incur ex-ante transactions costs that they must be balanced against (Benaroch, Lichtenstein, & Fink, 2016). As complexity increases, the transactional costs of contractual safeguarding increase (Segal, 1999) along with the value of mutual trustworthiness.

Information Systems and Infrastructures
Information Systems (IS) scholars have studied e-procurement antecedents and consequences inspired by the Internet revolution (e.g. Holland, Shaw, Westwood, & Harris, 2005; Mishra & Agarwal, 2010; Mishra, Konana, & Barua, 2007). The varied use of ERAs are subject of several studies (e.g. Adomavicius, Curley, Gupta, & Sanyal, 2013; Adomavicius, Gupta, & Sanyal, 2012; Dai, Narasimhan, & Wu, 2005; Hackney, Jones, & Lösch, 2007; Petrakis, Ziegler, & Bichler, 2012). Kauffman and Tsai (2009) explored how ERP systems and procurement practices evolved during the "move-to-the-middle" (Clemons, Reddi, & Row, 1993) trend. Suggesting design principles for improving procurement network performance, Koppenhagen, Katz, Müller, and Mädche (2011) argued that the present e-procurement system provided weak support for people who network across company borderlines. Following an ERA systems integrator, Mitra (2014) has studied the evolvement of the electronic auction artifact and the strategic plan to grow the business. Information feedback schemes, information asymmetry, buyer and supplier opportunism, a bidder's incentive to learn about his/her competitors, are related problems studied (Adomavicius et al., 2013; Kannan, 2012; Sambhara, Keil, Rai, & Kasi, 2011). Reverse impacts were explored by Nagle, Finnegan, and Hayes (2006). Classifying business relationships as being adversarial and collaborative, they studied their effects on e-procurement, concluding adversarial relationships tend to influence e-procurement in the early phases of the procurement process, while the collaborative mostly affects the fulfillment and consumption phases.

During the 1990s it became increasingly apparent that heterogeneous information systems and equipment were woven together more and more by networks and gateways. Bearing a resemblance to organic growth, looking at these formations as Information Infrastructures (II), a new perspective emerged. The theoretical framework of II has been developed in order to study the design, implementation and use of large-scale information systems (Aanestad & Jensen, 2011; Hanseth & Lyytinen, 2010; Star & Ruhleder, 1996). An ERP system can constitute an information infrastructure component alongside services such as email, chat software and telephone. A basic principle of an information infrastructure is that it is never built from scratch; rather, it evolves from the installed base (Silsand & Ellingsen, 2014). In this paper, we consider the industrial cluster's SRM (Supplier Relationship Management) systems, ERP systems and other electronic services as one digital procurement infrastructure – an e-procurement infrastructure, offering buyers and suppliers a variety of digital ways of communicating, negotiating and cooperating.

Open-Book
From the literature, open-book is a management accounting concept. Compared to traditional cost management in individual organizations, additional opportunities for cost reduction arise through collaborative efforts between buyers and suppliers. In order to exploit such opportunities, the transparency of cost structures is considered to be essential (Kajüter & Kulmala, 2005). The open-book concept demands the supplier to reveal its cost structure to the customer. Open-book accounting provides information that warrants trust and information in order to master events collaboratively (Tomkins, 2001). A customer who wants a relationship on such terms must have a commitment that it will continue to buy the supplier's products for a certain length of time (Helper & Sako, 1995). There are significant differences in how open-

book accounting is applied (Cooper & Slagmulder, 1999). Often, even just a spreadsheet describing the costs and cost structure will satisfy customers.

Trust and Trustworthiness

Scholars by no means agree on a definition of "trust". Seppänen et al. (2007) have identified more than 70 different definitions. Ashraf, Bohnet, and Piankov (2006) note "a large body of work in many disciplines assumes that trust is "calculative, based on the expectation of trustworthiness". Among these works is Russel Hardin's concept of trust as encapsulated interest (Hardin, 2002). The mutual interest in the continuation of a relationship fits very well into studies of business relationships. An actor convincingly signaling a long-term relationship is considered trustworthy. Hardin is well aware that his concept of trust involves risks. The truster risks that benefits from defecting from the relationship may trump continuation, and that other loyalties may trump the loyalty to the truster. Acting on trust typically involves risks.

Kramer (1999) distinguishes the "calculative" perspective from the "relational" perspective of trust. The relational perspective is rooted in sociological thinking and "gives primacy to the social underpinnings of trustworthiness" (Schilke & Cook, 2015). Thus, when analyzing where and why trust exists, it may prove very useful for us to turn our attention to trustworthiness. Results from a trust game survey by Bicchieri, Xiao, and Muldoon (2011) show that people do not behave as though trusting is a norm but they do behave as if being trustworthy is a norm(!). In business contexts, norms are important and actors must act on perceived trustworthiness. Sabetta, Short, and Paulus (2016) propose issuing certificates that "represent objective trustworthiness properties" in software acquisitions. Their proposed certificates do not relate to problems of potential opportunism, but document supplier competence and product quality. A wider range of characteristics is required. According to Sirdeshmukh et al. (2002) in a widely cited study, characteristics of trustworthiness are problem-solving orientation and operational competence and benevolence. Similarly, ability, benevolence and integrity have been put forward by others (Colquitt et al., 2007; Gabarro, 1978; Mayer et al., 1995). From this "ABI framework" (Pirson & Malhotra, 2011), our paper chooses to use the terms benevolence, integrity and competence as recognizable characteristics of trustworthiness. Burki and Buvik (2010) find that the prior duration of business relationships can help in attenuating organizational problems in procurement relationships, and that relationship duration is a significant antecedent in overcoming organizational difficulties in business relationships. Adding Hardin's concept of the long-term relationship to the three other characteristics gives us four recognizable characteristics for analytical purposes, bridging the two perspectives.

TABLE 1
CHARACTERISTICS OF TRUSTWORTHINESS

Characteristic	Description
Benevolence	Perceived kindness and goodwill
Long-term relationship	The mutual interest in the continuation of a relationship
Integrity	Adherence to moral business principles and honesty
Competence	Ability to deliver the right quality, on time and on budget

Table 1 describes how four characteristics of trustworthiness are to be understood in our context, and choosing "BLIC" as an acronym for these four, we can examine how trustworthiness is signaled between customers and suppliers by recognizing instances of BLICs in observed or described practices.

In thick communities the trustee not only has the negative incentive of loss of the truster's relationship, but also that of a loss of reputation and the possibility of being shunned by others if the trust given is not honored. Thus, besides being based on reciprocity in two-way trust relationships, the importance of strong external forces – not keeping your promises – leads to loss of credibility. Without credibility, a person loses the possibility of making promises. "The real penalty here is not that others will no longer rely on me but that they will no longer let me rely on them" (Hardin, 2002). The failure to keep a promise may not stem

from conscious betrayal – a lack of competence may give similar results. When you trust someone, you also believe they have the competence to deliver. This is, of course, a crucial matter in a high-tech industrial customer/supplier context. In a business context, benevolence is understood to mean kindness and goodwill, and integrity means adherence to moral business principles and honesty.

Adversariality

Adversarial purchasing is the practice of keeping a large vendor base, using formal, often short-term contracts subject to frequent rebidding, with suppliers chosen largely on the basis of price (Shapiro, 1985). Adversariality describes buyer-supplier relationships in which these features are prominent. The customer pays little attention to its suppliers' prospects of survival in the long term. The behavior is not particularly opportunistic but based on strict calculations of short-term material costs and benefits. Also, the supplier cannot expect much help or forgiveness in the event of a crisis.

Adversariality is characterized by little benevolence towards suppliers, and no interest in building or sustaining long-term relationships. The integrity of a transaction is often secured by electronic procurement systems. Competence, together with price, is the criteria for winning the contract. Adversariality from the customer side signals a low level of trustworthiness to the suppliers. As trust is based on reciprocity in two-way trust relationships, adversariality is closely related to low levels of trust in procurement transactions.

RESEARCH APPROACH AND SETTING

The empirical basis for this article is an interpretive case study (Walsham, 1995) of how buyer-supplier relationships are influenced by electronic procurement technology in an industrial high-tech cluster in Norway. It is intended to be instrumental (Stake, 1995) in helping to understand the impact of electronic procurement infrastructures on the roles of people involved in purchasing processes. The unit of analysis is the individual buyer-supplier relationships within the cluster, although inter-personal trustworthiness is closely connected to inter-organizational trustworthiness as an organization's representative must follow his/her organization's policies. By providing thick descriptions (Geertz, 1975) of how purchasers and suppliers perceive their relationships and systems, our understanding of the influence of e-procurement and how the use of these electronic artefacts is influenced by the nature of the buyer-supplier relationships can be enhanced.

The main data collection method used comprises semi-structured interviews and discussions with buyers, suppliers, managers and systems experts. The interviews lasted one and a half up to two hours. It transpired that a number of meetings with managers, which aimed to gain access to practitioners, delivered more data to the case than expected. These meetings have therefore been treated as interviews. Thus, a total of 31 informants have contributed. There have been 33 interviews/meetings/discussions. Five of the informants were subsequently contacted by telephone in follow-up conversations where the primary objective was to confirm the researcher's understanding of process details. Occasionally, casual conversations in informal settings and in unplanned encounters also provided interesting insights. The case study involved 15 companies: seven primarily informing from the customer side of business relationships, six informing from the supplier side, as well as two suppliers of e-procurement software and services. Many of these firms are connected with each other in buyer-supplier relationships. In-depth interviews have been conducted within the ten companies on the buyer and supplier sides. No informant has been recruited as the other end of a particular relationship, even when the researcher has been offered contact with a supplier by a buyer. This choice was made in order to avoid informant concerns about disturbing personal or professional relationships. All informants were informed that they would be kept anonymous.

Among the firms on the buyer side, two of them make advanced equipment for oil drilling companies, two of them operate in the aviation (civil and defense) industry, another company operates within defense and aerospace, one company operates within the automotive industry, and the last firm supplies advanced, complex systems to the maritime market. With one exception, all firms historically belonged to a large defense company, and three of them still do. However, their product portfolio is much more diversified nowadays.

The six supplier companies comprise three mechanical workshops, two custom manufacturers of integrated data equipment and one company that delivers parts to distribution systems to companies in the oil sector, among others. Table 2 provides an overview of how the informants were distributed.

TABLE 2
INTERVIEWED INFORMANTS BY ORGANIZATION

Organization	Meetings/discussions	Interviews
Company in oil engineering, part of large conglomerate	Purchasing manager	Buyer (twice) Purchasing manager+Senior buyer
Company in oil engineering	Project manager	2 consultants
Firm in the aviation industry		Purchasing manager+Senior buyer (manager)
Automotive company		Project buyer Operational buyer (twice)
Defense conglomerate (3 companies/divisions)	Senior buyer+Purchasing manager marine Purchasing manager aviation	Senior buyer Buyer defence (twice) Buyer aviation chemist Buyer aviation details Buyer aviation parts/MRO Buyer aviation composits
Supplier parts		Key account manager
Supplier complex technology		Department manager
Supplier mechanics and electronics		CEO Marketing manager
Supplier mechanics		Owner/manager
Supplier electronics		Sales manager
Supplier engineering and production		Manager development and sales
ICT support	Pensioned manager	2 Support consultants
Supplier ERA system		Sales manager

The analytic approach is inspired by grounded theory (Glaser & Strauss, 2009) and in particular the "stepwise deductive-inductive method" by Tjora (2012), a code structured empiricism approach. Notes from interviews were openly coded and the codes were generated from what was found in the paragraphs, not from predetermined categories. A total of 228 codes were generated. Further, the process linked the codes according to what was interpreted as connected messages. Patterns were investigated and reported, resulting in the presentation of the findings and clues to elaborate in the analysis and discussion. Data analysis and coding have been supported using Nvivo 10/11 research software. The software linked the codes (nodes in Nvivo) to the paragraphs in the data documents, and from the node list codes were grouped in main themes. The theme constituting the basis for this paper, named "trust/adverse", contained 39 codes.

The study's focus leans towards the procurement of strategically important goods, as opposed to commodities and MRO (maintenance, repair and operations) items for which quality is usually of minor importance. The importance of strategic suppliers and their products is very significant in high-tech industries. A company will often have limited choice when it comes to the procurement of vital components due to restrictions made by the customer or scarcity of suppliers.

THE USE OF E-PROCUREMENT IN A BUYER-SUPPLIER CONTEXT

This section describes how buyers and suppliers interact performing procurement by personal contact and by electronic means (e-procurement). The description consists of subsections relating to different facets of procurement where positive and negative signals of trustworthiness can be identified.

A general observation is that in the industrial cluster there is much focus on supplier contact and strategic partnerships, although there are certainly elements of adversarial behavior towards some suppliers in order to keep the costs of parts and services at a minimum. One company operates with three groups of suppliers: partners (around 15), main suppliers (20–30) and suppliers. The latter constitutes the largest proportion and the procurement manager reported that there were no limits to how much you could make a supplier reduce its price. It was entirely the supplier's responsibility to make a profit that was large enough to survive in the long term. The large number of suppliers was going to be reduced, anyway. The company was in the process of focusing on a smaller number of suppliers in the belief that this would improve supplier relationship management, and that it would get more from each remaining relationship. At present, the manager was recruiting buyers from the supplier side, "asking them to set aside any concerns they might have about switching sides of the table."

Bargaining

One of the companies in the oil business had tried electronic reverse auctions (ERAs) and abandoned them after a while. This company belongs to a large, diversified conglomerate. A systems manager at the company submitted a global query in the conglomerate's ERP system and reported that their ERA module was no longer being used anywhere. Three informants provided different reasons for abandoning it: protests from suppliers, suspected countermeasures from suppliers (cartels) and problems with changing specifications. In a brief telephone conversation, a project buyer explained that the tool did not suit a work practice in which you are constantly working with suppliers to enhance specifications. Besides, the ERAs failed to deliver the expected economic gains. We can interpret this to mean that ERAs were seen as counterproductive in building trust and trustworthiness: minimal benevolence and low integrity.

From the supplier side the ERA was regarded as adverse and of little benefit to both sides. Suppliers believed there were minimal savings to the customer because margins were already tight. Contact was very limited. "We realized they'd dropped it because requests for quotations ceased."

Sourcing is the process of selecting one or more vendors for components that are to be incorporated into a company's products. Qualifying processes require time-consuming efforts on the part of hopeful suppliers. Among the companies in the cluster, a policy of inviting at least three suppliers to compete for a contract is commonly adopted. One company in the oil business sends a tender to four suppliers and narrows it down to two suppliers on a shortlist, before terms and conditions are negotiated.

As a project buyer in the automotive business stated: "There's a danger these processes will burn out suppliers if they are constantly invited without being awarded a contract. We've seen examples of this." He'd heard of a case involving a Chinese supplier who had lodged one hundred quotations, received nothing in return and was regrettably not interested in responding to a request for quotation number 101 from the company, even though he would have been a good candidate. "You don't switch suppliers overnight", he continued. "We're trying to get into long-term agreements with an annual reduction of 2–3% per year, which is standard in the automotive sector, and all participants know this is the norm." It was described that a delivery runs from 5 to 10 years. The purchaser tries to put together a package of products for the supplier. "Negotiations in which several suppliers compete fiercely for a contract are tough, but the parties know the game". In such cases, two to three suppliers are played against each other. They get to know where they stand in relation to each other ("You are 10% above your competitor ..."). Another instrument is the price target as the buyer sets up. Something that suppliers have to stretch (down) towards.

The automotive company buys 100% of its components from external sources. Local suppliers had been directed towards oil and other markets where price has traditionally been less in focus. This may now be changing as the oil industry has been forced to reduce its costs dramatically. A manager at a local firm with advanced deliveries to several customers believed that operators in the oil industry – the major end

customers – had begun to push prices down through the supply chain in such a way that this would affect the operational stability of the oil fields in the long term. Price pressure spreads and results in compromises in standards and quality. Equipment that is supposed to operate on the seabed for many years can easily fail prematurely, with the huge risks involved in such operating environments. "I doubt whether those at the top of the supply chain are aware of the consequences of what they're doing."

A key account manager at a supplier of distribution systems confirmed that it participates in bidding competitions and might be told "You'll get the order if you can lower your price by this much…". She partially attributes this to good contacts and communication but is unable to verify whether this is necessary in order to obtain the order. Another supplier representative explained that its customers focus solely on two things – delivery time and price. They can also bargain – "Go down by 50,000 and you'll get the job." Such informal contacts reflect benevolence and long-term partnerships, while the integrity may be questioned.

Performance

Monitoring supplier performance is an important task for most buyers. The ERP system gives a typical buyer access to information on the vendor's performance in previous deliveries. It is important to see how Quality Notifications (QN) relate to deliveries, i.e. how many QNs the supplier incurs. Too many QNs may result in a supplier audit. The number of Variation Order Requests (VOR) is another kind of information in the ERP system that is of interest to a buyer. A VOR can be a means for a supplier to leverage the price of a component. Sometimes you can see patterns in these data. The ERP system provides a tool for monitoring the supplier's competence and integrity.

Advanced and complex components must be subject to a series of tests at the supplier's site. The customer – being noticed of when it is scheduled – can send a quality engineer to be present at such "witness points".

Sometimes a buyer procures goods from within the company as well as from outside suppliers. Speaking on behalf of herself and others, the buyer stated: "Internal suppliers disappoint us more often than external suppliers." External suppliers place more emphasis on showing competence and integrity than internal suppliers, who lean on the benevolence of belonging to the same enterprise.

Transparency

During the initial process of obtaining access to the companies in the cluster, a former CEO at one of the largest enterprises provided the names of prospective contacts, and also stated that "open-book is key to business relationships in the industrial cluster." The open-book concept is widespread and known by the majority of the companies visited. The extent to which it is known and adhered to varies considerably. In the automotive industry it is considered standard, while two other companies only knew it from being in the role of supplier. Some companies reported that it was currently only used in service contracts and was not supported electronically. One of the smaller supplier firms reported having supplier partners in Taiwan where open book was used, but did not directly adhere to it at home by name – only by presenting the same type of cost structure information to its customers. "The motivation for doing it is to be able to show how little we earn." This information is not presented onscreen, but prepared and shown on paper to the customer.

The automotive company ran technical discussions with each (candidate) supplier. The project buyer in sourcing processes was concerned about transparency, "to understand their cost split". From the major suppliers the basis for costing is very clear. Material costs, processing times, etc., are visible. When the customer knows the reasonable levels of these, it is possible to pinpoint where certain estimated costs should be reduced. These numbers are presented to the buyers on paper.

Among the firms visited in this study, with one or two exceptions, every one claimed it had adopted the open-book concept. Transparency is considered important among customers and suppliers inside the cluster, while formalism plays a minor role. In this industrial cluster, the open-book is described as a two-way affair in which the supplier has communicated its costs and regulatory framework so that the purchaser cannot just continue pushing in order to further reduce the price/costs.

Partnerships

There is a trend in the cluster towards narrowing down the number of suppliers each company uses. One buyer claimed his company wanted to reduce its supplier database from 3,000 suppliers to approximately 2,000 suppliers. The remaining suppliers would become more "strategic partners" or "preferred suppliers". To achieve the latter status, a supplier had to have a quality system (and certificate) in place, quality results/deliveries and a smaller portfolio delivered over time. Project procurement had to identify strategic suppliers. There is a requirement that three suppliers must be considered for each acquisition for a project, if possible. This is to avoid becoming too dependent on one supplier, as well as preserving purchasing power.

A purchaser in the oil industry said his company had developed some of its suppliers for many years to such an extent that his company should have been co-owner. Instead, some suppliers have been bought by firms, which, from time to time, compete with his company. However, since he represents a major player in this market, they will still supply his projects without really daring to challenge him. Sometimes his company is on the owner side, and the supplier will then be preferred unless the terms and conditions are significantly worse than the competition's. The end customer can override the choice of supplier, so this policy is not always observed. There is, of course, a certain limitation to such an internal policy, but he feels that this is offset by the fact that different problems can get managers from both sides to talk and agree on priorities. These long-term relationships have developed a climate of competence, benevolence and necessary integrity.

A supplier manager at a company that was a strategic partner for many others in the cluster reported that a "strategic partnership" is mainly an informal status and may change over time. This is reflected in frame agreements, purchase agreements and informal statements such as: "We ask you about these services first..." – some form of exclusivity (benevolence).

Trust

A senior purchaser in the aviation industry explained: "Some people say that lawyers can come in and clean up a conflict. However, with a developed relationship of trust, people become solution-oriented when errors occur. When lawyers enter the game, the participants start to behave defensively."

A remarkably consistent view of the interviewed procurement managers was the perception that purchasers nurture too little personal contact with their counterparts. Several purchasers admitted they should have seen their suppliers more often, and blamed day-to-day priorities for this lack of personal contact. A manager explained how difficult it is to nurture accommodativeness without face-to-face contact and claimed that in commodity procurement they had lost some of the good relationships they'd experienced in former days. "A salesman I've had as a contact for many years says he will quit the business because he doesn't enjoy it anymore. There has been an end to personal contact with dinners and face-to-face meetings." This indicates the electronic procurement system has depleted personal buyer-supplier relationships.

A purchaser delivering on defense contracts stated that the rationale behind face-to-face meetings with suppliers was to get an impression of the firms, conduct negotiations, see if they take any actions in problem cases and become better acquainted in order to improve communication via telephone and email later. During visits he highlights delivery precision and explains risks, needs and requirements. A procurement manager at the aviation company gave examples of the benefits of good personal relationships: making verbal agreements with handshakes, getting the supplier to start delivering immediately, and that formal agreements would be finalized afterwards. He said this could save a lot of time.

From the supplier side the technological aspects of getting things right was highlighted. One local manufacturing workshop owner (and manager) claimed it was increasingly becoming a resource of competence as its customers' engineering purchasers are increasingly less likely to be people who have operated machinery themselves. Relying on the supplier's competence shows the trust that is placed in some local suppliers when personal contact is prevalent.

An R&D manager of a supplier of advanced robotic customized solutions described how it received orders and, together with the customer, worked on design specifications and inventions along the way. With

some afterthought he said: "You know, in an industry where specially-developed electronics are made to fit into larger high-tech products, a lot of trust must be present in order for this to work."

ANALYSIS AND DISCUSSION

While Nagle et al. (2006) focused on the effects adversarial versus collaborative relationships have on e-procurement, our focus is the other way around, studying the effects e-procurement can have on the customer-supplier relationships.

Table 3 attempts to interpret selected points from the findings and categorize these by how they signal trustworthiness. Pos B, L, I , or C means trustworthiness is signaled, while Neg B, L, I, or C means the opposite signal is given. The column to the right relates the signals to personal contact in procurement (P-proc) and electronic procurement (E-proc).

TABLE 3
EXAMPLES OF TRUSTWORTHINESS SIGNALS IN THE CASE PROCUREMENT CONTEXT

#	Reported	Interpretation	Effect	E-/P-proc
1	ERA tool was abandoned after protests and suspected countermeasures from suppliers.	ERA was regarded as a sign of customer opportunism.	Neg B Neg L	E-proc
2	A project buyer explained that the ERA tool does not suit a work practice in which you are constantly working with suppliers to enhance specifications.	ERA undermined cooperative flexibility and signaled adverse relationship.	Neg B Neg L	E-proc
3	Suppliers realized ERA was dropped because requests for quotations ceased	No activity through the ERA was the only signal to suppliers.	Neg B	E-proc
4	Qualifying processes require time-consuming efforts on the part of hopeful suppliers filling out long and detailed online forms.	Suppliers were signaled the customer did not mind wasting supplier time.	Neg B	E-proc
5	A delivery runs from 5 to 10 years and the purchaser tries to put together a package of products for the supplier.	Building strategic suppliers.	Pos B Pos L	P-proc
6	"Go down by 50,000 and you'll get the job."	Customer favors local suppliers with personal contact.	Pos B (Neg I)	P-proc
7	The ERP system is a tool for monitoring the suppliers' competence and integrity by statistics on QNs and VORs	Adverse scrutiny by e-proc utilization.	Neg B	E-proc
8	With one or two exceptions, every informant claimed they had adopted the open-book concept. Said to be presented on paper to customer.	Transparency is considered important among customers and suppliers inside the cluster, (while formalism plays a minor role).	Pos I	P-proc
9	To achieve status as "strategic partner", a supplier had to have a quality system (and certificate) in place, quality results/deliveries and a smaller portfolio delivered over time.	Suppliers demonstrate competence and are rewarded with prospects of a long term relationship.	Pos C Pos L	P-proc
10	A purchaser in the oil industry said his company had developed some of its suppliers for many years to such an	Long term customer-supplier partnerships can become very benevolent.	Pos B Pos L	P-proc

|				
	extent that his company should have been co-owner.			
11	A "strategic partnership" is mainly an informal status and may change over time. This is reflected in frame agreements, purchase agreements and informal statements such as: "We ask you about these services first..."	Tokens of this status are agreements and exclusive, verbal requests for quotations (RQs).	Pos B Pos L	P-proc
12	There has been an end to personal contact with dinners and face-to-face meetings. According to one manager the electronic procurement system has depleted personal buyer-supplier relationships,	E-procurement substitutes personal contact.	Neg B	E-proc
13	Face-to-face meetings with suppliers was to get an impression of the firms, conduct negotiations, see if they take any actions in problem cases and become better acquainted in order to improve communication via telephone and email later.	Establishing confidence in supplier's competence and prepare communication in the future.	Pos C Pos L	P-proc
14	Benefits of good personal relationships: making verbal agreements with handshakes, getting the supplier to start delivering immediately, and finalizing formal agreements afterwards.	A buyer considered trustworthy saves time and transaction costs. Such behavior strengthens the buyer-supplier relationships.	Pos B Pos L Pos I	P-proc
15	From the supplier side the technological aspects of getting things right was highlighted. One local manufacturing workshop owner (and manager) claimed it was increasingly becoming a resource of competence as its customers' engineering purchasers are increasingly less likely to be people who have operated machinery themselves.	In meetings and on telephone suppliers demonstrate their competence to buyers with mainly mercantile background.	Pos C	P-proc
16	"You know, in an industry where specially-developed electronics are made to fit into larger high-tech products, a lot of trust must be present in order for this to work."	Advanced development depends on both parties trust the other party's competence and benevolence.	Pos C Pos B	P-proc

Table 3 show a striking contrast between the positive signals of trustworthiness in the excepts where personal procurement interactions (P-proc) were involved, and the negative signals derived from electronic procurement (E-proc).

The evolved digital procurement infrastructure of ERP systems, SRM applications, Internet services and other ICT artifacts empowers purchasers to exchange information and transact with suppliers in multiple ways. As all the procurement managers explained, there is a strong tendency among buyers to lean too heavily on e-procurement systems and emails, reducing valuable personal contact. In this way the e-procurement infrastructure can make the adversarial treatment of non-strategic suppliers easier. When the goods to be purchased are commodity-like, the digital forms and bidding procedures tend to be more rigorous and dominating. In the automotive industry, which had no local suppliers, the tendency was most noticeable, with "burnt out" suppliers giving up answering requests for quotations. Completing time-

consuming electronic forms with no positive results must be interpreted as a wasted effort by the bidding supplier, and the customer's integrity, benevolence and competence in inviting the supplier to take part will be questioned. In the eyes of the supplier, the customer fails on every trustworthiness criteria.

The digital procurement tools available in the industrial cluster constitute an e-procurement infrastructure that enables actors to trade in an adversarial as well as a trusting manner. When they choose to perform open-book transactions more by personal contact and on paper than through integrated digital linking of computer systems, this appears to be a chosen strategy and is not dictated by a lack of digital tools. When the supplier of advanced integrated solutions regarded the disclosure of cost structures as a positive measure, he trusted the customer's integrity and benevolence. When three procurement managers from three enterprises express concern about too little personal buyer contact with their suppliers, they highlight the broad set of information and trustworthiness conveyed through that channel in contrast to electronic forms, quotations, VORs, etc.

FIGURE 1
PERSONAL CONTACT ENHANCES TRUSTWORTHINESS WHILE E-PROCUREMENT IS DIRECT AND ADVERSE
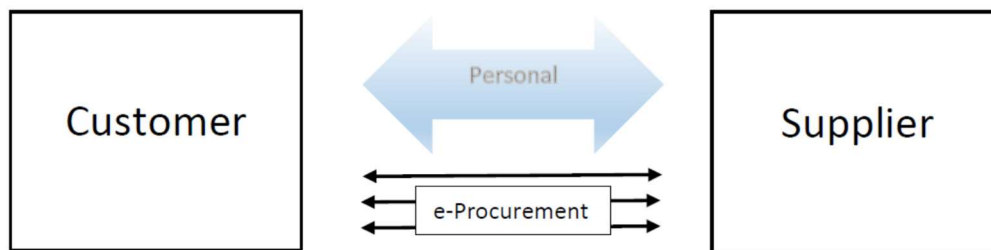
From a Transaction Costs perspective, the enhanced emphasis on partnerships with suppliers underscores the advantages of reducing search and bargaining costs. Complex and innovative solutions require considerable time to be spent on developing specifications and design, whether or not a component is made in-house. Complexity also makes policing and enforcement costs higher because legal assistance becomes difficult when a neutral law enforcement third party would have to struggle to understand the issues. When trust can substitute legal safeguarding, it is economically sound from a TCE perspective as ex-ante and ex-post costs are reduced (Benaroch et al., 2016; Chang et al., 2017; Dibbern et al., 2008; Segal, 1999).

A long-term, strategic buyer-supplier relationship is frequently regarded as an instance of asset specificity – the relationship keeping costs down and increasing the prospects of new orders. Typically, the effort invested in developing a stable relationship that positions the supplier strategically and technologically in the right 'spot' for new orders creates an asset that is not easily transferable into relationships with other actors. This applies to both sides of the business relationship.

We note how strategic and preferred suppliers – in particular local suppliers – can work out terms and requirements with their customers' buyers and engineers. The comment of the R&D manager from the advanced robotic customized solutions company points towards possibly the most important attribute of an actor in a buyer-supplier relationship – trustworthiness.

The strong basis for trustworthiness in a transparent local setting provides the cooperation and flexibility necessary for entering projects that develop complex new components for high-tech products in a range of business areas. When actors can comply with the open-book concept in an informal manner, this is based on their standings as trustworthy.

The Wagner and Essig (2006) claim that the impact of electronic commerce on buyer-supplier relationships can move relationships towards deeper partnerships in the case of high-involvement procurement objects appears to be highly debatable. When buyers choose to communicate with suppliers via a computer screen, they defy their managers' concerns about maintaining personal contact with their

suppliers and they reduce search and bargaining costs. The e-procurement infrastructure enables them to work in this manner. Thus, it appears that electronic procurement systems facilitate adversariality in buyer-supplier relationships. Without explicitly saying it, the procurement managers expressed their concerns towards this.

The perceived trustworthiness of personnel fronting their organizations in the cluster is also about known and demonstrated competence, experienced benevolence cultivated by face-to-face contact, often made convenient by short physical distances, and the integrity that a "thick community" nurtures. Observing how practices concerning the procurement of strategic parts and services have the characteristics of trustworthiness, including open book and personal contact, we see a contrast to the adverse buyer-supplier relationships in non-critical procurements.

The practical implications of customers and suppliers in relationships characterized by partnership bypassing electronic procurement systems in order to build or preserve trustworthiness, can be discussed following the lines of the four BLIC characteristics. Even relationships of adversarial character benefits from some trustworthiness among parties, and many customer-supplier relationships have elements of partnership as well as adversariality.

Signalling benevolence – make your business partner perceive kindness and goodwill – is acted by offering more than formal digitalized procedures allow. Benevolence can be signalled on an organizational level and on a personal level between buyer and supplier representative. Every procurement manager in the study stressed the importance of personal contact and the dangers of buyers seeing their suppliers too seldom. The personal contact represents also an investment in a long term relationship, and organizations ought to be careful not to let timesaving electronic procurement delude buyers into staying in by the desk.

Integrity – adherence to moral business principles and honesty – is an issue when decisions on utilizing e-procurement are made. Adversarial ERAs will by many suppliers be regarded as signals of opportunism, while a few appreciates the level playfield they provide (Caniëls and van Raaij 2009). Integrity issues should also be considered in the utilization of electronic procurement in general.

Competence does not only apply to the ability to manufacture advanced equipment, but is also signaled by professional behavior in buyer-supplier exchanges. Choosing the adequate means of procurement software can underpin perceived trustworthiness of a business partner.

CONCLUSION

The study points towards trustworthiness as a crucial attribute of a strategic business relationship when it comes to custom-made components in high-tech industries, and this paper provides two main practical contributions:

First, the analysis contributes to explain Nagle et al. (2006) why collaborative relationships involve to a lesser degree electronic procurement because of the adverse signals e-procurement tends to send.

The second contribution suggests that the Wagner and Essig (2006) claim that electronic procurement has a strengthening effect on buyer-supplier relationships could be moderated, while the findings are supportive of their claim that adversariality will have a stronger presence in low-involvement commodity-like procurements on the global market, electronically supported, often in a rigorous fashion.

The first theoretical contribution is the suggestion that "adversariality" is often a more precise description of business relationships than "opportunism" as the opposite of trusting. "Opportunism" is closely linked to "betrayal" in theoretical works on trust. "Adversariality" appears to be a useful distinction when it comes to describing procurement practices.

The second theoretical contribution is that by identifying the characteristics of trustworthiness, the BLICs, the pattern of adversariality versus trust become salient. BLICs signal trustworthiness – and since trustworthiness is a social norm while trusting is not (Bicchieri et al., 2011), understanding business relationships by studying signals of trustworthiness may move research closer to understanding how trust develops and deteriorates.

Addressing the question of generalizability, we can look at the numbers, the boundaries, and the environment. This study used an interpretational approach based on 33 interviews and meetings with

managers and staff in seven customer companies and three supplier companies. Inside every organization there will be some variation concerning practices and routines. However, these organizations are subject to rigid quality systems and audits, enforced partially by demanding international customers. The study has geographical limitations when it comes to informant selection, as well as limitations regarding what industries were involved. At the same time automotive, aviation, defence, maritime, and oil and gas cover a significant set of industrial sectors, and the products involve to a great extent advanced digital technological solutions. We should also keep in mind that the enterprises in this study operate in global markets and are obliged to follow tacit as well as documented business practices. It seems fair to assume practices and priorities are familiar to practitioners outside Norway. When it comes to how much business partners lean on trust, and recognizes signals of trustworthiness, there are large differences from country to country. In this aspect this study leans heavily on the generalizability from the research making the foundation for the BLIC criteria.

Quantitative surveys aimed at supporting the findings in this paper would be welcome. The role of trustworthiness in e-procurement enabled business environments should receive more attention from the IS research community. Electronic procurement may have unintended effects on buyer-supplier relationships, and new business practices should account for that. Therefore, a further suggestion could be an action research approach that worked on refining these practices and further enhancing crucial relationships, as well as mediating the negative effects of adversarial conduct in electronic procurement.

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