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The Negotiative Aspect of Media Choice in Buyer/Supplier Relationships: Communication Layers According to Flexibility and Formality

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Abstract:

This article describes how buyers in a technologically advanced industrial cluster use their electronic procurement software. I use Media Richness Theory with an expanded boundary to include business to business (B2B) communication and investigate their communication media choice. The research is based on a qualitative (interpretive) case study, and the main finding is that buyers and suppliers choose communication media in a 'formality layered fashion'. Buyers and suppliers in strategic partnerships are committed to transparency and comprehensive information exchange. At the same time, the responsibility to avoid costs and liabilities forces both parties to play their cards close to their chests, highlighting a negotiative aspect in communication media choice. This has implications for how Media Richness Theory should be applied in B2B settings. The identified communication layers are "committing", "documenting", "direct", and "personal".

Keywords: e-procurement; buyer/supplier relationships; media richness theory; computer-mediated communication; lean media; B2B

1 INTRODUCTION

Effective communication plays an important role in developing long-term buyer/supplier relationships (Carr and Pearson 1999, Palmatier 2008, Paulraj et al. 2008, Hung and Lin 2013), and even more so when technologically advanced equipment is to be developed by suppliers in tight cooperation with the customer. A limited amount of research has dealt with the impact of digital communications on such relationships in industrial marketing (Obal and Lancioni 2013), and communication through e-procurement systems may decrease the quality of buyer/supplier relationships (Longva 2020). This article focuses on media choice in buyer/supplier relationships in a high-tech industrial cluster. It is based on a qualitative (interpretive) case study, investigating what impacts electronic procurement systems have on the customer-supplier relationships. By using adapted Media Richness Theory (MRT) as an analytical lens, patterns of communication media choice are investigated. The focal research question is: *What are the emerging patterns of media choice in buyer/supplier communication in technologically advanced industries?* The subject is delimited to strategic and complex deliveries where the buyer frequently follows up with the supplier. This is also the area where sensitivity and trust are presumably most prevalent and important.

The research has as its point of departure an environment – a high-tech industrial cluster – where two decades ago the dominant enterprises, with one exception, chose to purchase the same Enterprise Resource Planning (ERP) system package. Procedures – written or tacit – evolve over time (Eriksson 2009, Atkin et al. 2009). Electronic Data Interchange (EDI), Supplier Relationship Management (SRM) systems, and Enterprise Resource Planning (ERP) systems are media for buyer/supplier communication. Along with face-to-face meetings and, phone, and email, electronic procurement systems, often as part of larger ERP packages, support transactions and communication between buyers and suppliers on the business-to-business (B2B) market.

This paper is organized as follows. Section 2 provides a short presentation of some central concepts from the MRT literature with an explanation of how the intra-organizational boundaries of MRT should be expanded to fit B2B communication. Section 3 presents related research, Section 4 describes the research approach and setting, and Section 5 presents the case findings. An analytical discussion follows in Section 6, and Section 7 offers a conclusion.

2 MRT THEORY FOR BUYER/SUPPLIER COMMUNICATION

Media Richness Theory (MRT) has become one of the most widely applied theories of media use (Dennis and Valacich 1999). Effective communication is a key factor in successful buyer/supplier relationships

(Paulraj et al. 2008), and Vickery et al. (2004) have demonstrated that media richness can affect firm performance when businesses interact in a complex environment. The seminal papers of MRT (e.g., Daft and Lengel 1983, Daft and Lengel 1986) attempt to address the question of why organizations, or at least managers, process information to reduce *uncertainty* and *equivocality*. Some media are supposed to be more suitable than others for certain tasks. “Uncertainty leads to the acquisition of data. Equivocality leads to the exchange of subjective views among managers to define the problem and resolve disagreements” (Daft et al. 1987, p. 357). Daft et al. (1987) introduce a four-level categorization where face-to-face communication is considered to have the highest level of media richness, followed by phone, addressed (written) documents, and unaddressed documents such as bulletins and standard reports at the lowest level. The richness of each medium is based on four criteria: multitude of cues (e.g., numbers, physical gestures, graphic symbols), speed of feedback, language variety, and personal focus. An MRT “lean” channel is essentially stripped down and thus lacks: (a) the ability to transmit multiple signals—for example, nonverbal cues, voice intonations, and the verbal message itself, (b) access to immediate feedback from the receiver, (c) a chance to tailor the message to the real-time situation, and (d) the ability to incorporate conversational language, slang, and ambiguous references (Stephens 2007). The Daft et al. (1987) study found that managers switch to rich media channels when equivocality is high, while leaning on lean media channels when it is low.

Several studies have had problems finding empirical support for MRT predictions when it comes to newer electronic media (Rice and Shook 1990, Fulk and Boyd 1991, Rice, D’Ambra et al. 1998, Carlson and Zmud 1999). It has been pointed out that MRT is too deterministic and mechanistic. However, MRT has been remarkably resilient against critique, alternative theories, elaborations, and suggested enhancements (Jung and Lyytinen 2014, Peltokorpi 2015). The use of MRT as a descriptive and (to a certain extent) explanatory lens for looking at communication media continues to receive support (e.g., Chen, Hsieh et al. 2021).

<i>Concept</i>	<i>Description</i>
Media richness	The ability of a communication channel to convey information ('bandwidth'). Meeting face-to-face is regarded as the 'richest' form of communication.
Lean media	Media that is limited to convey formal written documents or numeric data.
Cues	Means by which a message can be conveyed by a medium. For example, gestures, numeric symbols, voice inflection, words, and graphic symbols.
Feedback	Instant feedback allows questions to be asked and corrections to be made.
Uncertainty/equivocality	Personnel in organizations communicate for the purpose of reducing these. The more equivocality, the richer media may be preferred.

Table 1: Summary of some key concepts of Media Richness Theory

Cues and feedback make one-dimensional richness hierarchy multi-dimensional. Feedback from a call is different from email, as Montoya, Massey et al. (2009) highlight when comparing asynchronous and synchronous technologies in communication media selection. If the call is answered, one gets immediate feedback. If not, one might leave a voice message. By email the feedback may come as fast as by phone, but it is up to the receiver when the feedback is sent. Such properties of the media can disqualify or encourage use. Being conscious of our procurement context, we need to be aware which properties are particularly important to buyer/supplier communication. Playing down MRT’s claimed prescriptive and predictive powers, its basic taxonomy and explanatory qualities still make it attractive for understanding media choice in a buyer/supplier relationship setting.

At MRT’s most abstract level, the function of the communication activity is to reduce uncertainty and clarify ambiguity. Clarifying ambiguity requires the ability to communicate complex phenomena, to easily combine multiple perspectives, and to quickly establish understanding and learning between parties (Ambrose, Marshall et al. 2008). It is important to notice that this is derived from a *managerial* perspective. Applied to relatively new computer-based media, and professionals occupied with tasks other than decision-making, the original theory’s *predictive* performance is admittedly poor.

It is essential to be aware of the boundary of a theory, which is shaped by the theory's underlying assumptions (Bacharach 1989). MRT's original boundary is communication that is going on *within* an organization. When we expand the theory's boundary *beyond* the limit of a single organization, we need to adjust this assumption. At the same time as they communicate to make things clearer, buyers and supplier representatives must protect their respective employers by avoiding additional costs and risks. Both parties try to preserve some leeway when dealing with upcoming issues. This, we can assume, is reflected in their choice of communication media, and represents a necessary adaption of MRT to a B2B environment. One must take the *negotiative* considerations of both parties into account to understand media choice in a buyer/supplier context. By 'negotiative' we mean that both parties have an objective not to incur unnecessary costs and risks to their own organizations, and this can influence media choice.

3 RELATED RESEARCH

Based on Daft and Lengel's (1983) classification of media richness (face-to-face and phone at the high end, EDI moderate, and formal numeric computer output lowest) Vickery et al. (2004) see face-to-face, phone, and electronic media as one construct, and argue that these "rich media are essential conduits" for learning and knowledge transfer within supply chain networks. Ishii et al. (2019) note that the constantly evolving information technology has enriched "lean" media in multiple ways and transformed communication. Traditional communication methods (phone, fax, email, written, and face-to-face) have been perceived as more useful for sharing information between firms than technologically advanced or automated communication methods (Kraut, Steinfield et al. 1998, Leek, Turnbull et al. 2003). Carr and Kaynak (2007) found that the use of traditional communication methods is indirectly related to product quality improvement and financial performance through information sharing between firms, and Tolmay (2018) claims that personal interaction in supply chain relationships have significant correlation with trust. Zhao et al. (2011) find that external integration with customers and suppliers is simultaneously influenced by internal integration and relationship commitment to customers and suppliers. Studies indicate that informal information and uncertainty strongly influence supplier selection (e.g., Bounnik, Giat et al. 2017, Alhourani and Saxena 2019). In a longitudinal study of task-media fit in the relationship of a manufacturer and an industrial services company, Mason and Leek (2012) observed that actors adapted communication practices, using different media in the context of the relationship atmosphere and established norms, relating to horizontal, vertical, standardized, and planned time. Similarly, in a qualitative study of six buyer/supplier relationships, involving one multinational buyer organization, Ambrose et al. (2008) report that communication media selection is affected by the communication needs of participants, the purchasing context, and the stage of relationship development. They also point out that focus has tended to be on the adoption of specific new technologies rather than media choice per se.

E-procurement in information systems research focusses on procurement systems acquisition, utilization, and impact (Longva 2019). Bensch and Schrödl (2011) address the design of electronic procurement processes, and several studies propose extensions or supplements to electronically reverse auctions (ERAs) (e.g., Fairchild et al. 2005, Adomavicius et al. 2013, Bichler et al. 2013, Dauer et al. 2015). Naturally, gains in productivity, performance, and life cycle costs have attracted attention (Rai, Brown et al. 2009, Sanchez-Rodriguez, Martinez-Lorente et al. 2012, Harnisch and Knaf 2014). Internet, electronic markets, and smart business networks are examples of the strategic utilization of e-procurement technology (Holland, Shaw et al. 2005, Mishra, Konana et al. 2007, Mishra and Agarwal 2010). The impact e-procurement has on customers and suppliers is reported in various dimensions. Batenburg and Versendaal (2008) find procurement performance positively related to procurement maturity. E-business architecture has provided customers with low cost and increased supply chain efficiency (Xia and Xia 2008, Raventos and Zolezzi 2009). The impact of ERAs on the customer/supplier relationship has often been seen as detrimental, but Caniëls and van Raaij (2009) found that suppliers are in favor of ERAs because competition could be fairer. In the context of our article, it is interesting that Dedrick, Xu et al. (2008) found that the impact of e-procurement on the number of suppliers resulted in fewer suppliers for standard/commodity goods but more for custom goods.

In the case of high-involvement procurement objects, Wagner and Essig (2006) find that the impact of electronic commerce on supplier relationships may move the relationships towards deeper partnerships where most organizations already emphasize long-term partnerships. Computer Mediated

Communication (CMC) is known to have a strong influence on workplaces. MacDonald and Smith (2004) confirm that buyers' satisfaction with technology-mediated communication has a direct and positive effect on buyers' future purchase intentions. As an early expansion of the MRT hierarchy, email in particular has received much attention by the MRT community. CMC use may be perceived differently by different individuals, and Sumecki, Chipulu et al. (2011) report that individuals having a positive attitude towards emails feel less stressed by them. In a study of how communication media impact B2B relationships, Murphy and Sashi (2018) find indications that personal communication has a stronger satisfaction association than digital on buyer/supplier contacts, whereas the link to rationality is weaker. In a combined quantitative and qualitative study, Stich et al. (2017) find that together, desired and actual use of email influence workplace stress, but not other media. The influence depends on organizational conditions, e.g., available media and colleagues' and counterparts' preferences. Thomas (2013) reports two surprising results from a survey in the US manufacturing industry: video conferencing showed no significant effect on knowledge exchange, whereas email and face-to-face communication performed equally well. B2B communication media use is still, at least partially, unmapped territory.

4 RESEARCH APPROACH AND SETTING

The chosen approach is an interpretive case study (Walsham 1995) of how buyer/supplier relationships are impacted by electronic procurement technology and the research field is an industrial high-tech cluster in Norway. It can be characterized as 'instrumental' (Stake 1995), meaning it may help understand what impact electronic information infrastructure components have on the roles of buyers and suppliers involved in purchasing processes.

The researcher's own experiences as a systems developer and IT advisor in consulting companies in the same cluster from 1992 until 2004 have provided background and context to the study. Dubois and Salmi (2016) emphasize serendipity or unsought findings (Merton and Barber 2006) in case studies when the researcher utilizes his/her background knowledge and understanding. Openness to such serendipitous insights has been an important ambition in the study.

The data collection used semi-structured interviews, minutes was made from discussions with buyers, suppliers, their managers, and systems consultants. Most interviews lasted 1.5 - 2 hours. A number of meetings with managers, in order to gain access to practitioners, informed the case more than expected, and minutes from these have become field data like the interview data. A total of thirty one informants have contributed. Thirty three interviews/meetings/discussions were recorded. Five informants were contacted for follow-up questions and to confirm their media choices. Casual conversations in informal settings and in occasional encounters also provided useful insights. The data was collected from fifteen companies: seven primarily informing from the customer side, six from the supplier side, and two e-procurement software and services providers. In-depth interviews have been conducted with ten companies on the buyer and supplier sides.

Many of these firms connect in buyer/supplier relationships. A choice was made to avoid informants' concerns about this. No informant has been recruited as the other end of a particular buyer/supplier relationship, even when a buyer has offered to help recruit a supplier he or she transact with. All informants were reassured they would be kept anonymous.

With one exception, all firms have belonged to a large defense company, and three of them still do. However, their product portfolio is much more diversified nowadays. Two companies make advanced equipment for oil drilling, two are in the aviation (civil and defense) industry, while another operates within defense and aerospace. One company designs and manufactures automotive parts, and one supplies advanced, complex maritime systems.

Among the supplier companies we find three mechanical workshops, two custom integrated data equipment manufacturers, and one company that delivers distribution systems parts for the oil sector, among others.

<i>Organization</i>	<i>Meetings/discussions</i>	<i>Interviews</i>
Company in oil engineering, part of large conglomerate	Purchasing manager	Buyer (twice)

		Purchasing manager + Senior buyer
Company in oil engineering	Project manager	Two 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 defense (twice) Buyer aviation chemist Buyer aviation details Buyer aviation parts/MRO Buyer aviation composites
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	Two Support consultants
Supplier ERA system		Sales manager

Table 2: Interviewed informants by organization.

The stepwise deductive-inductive method by Tjora (2012) and grounded theory (Glaser and Strauss 2009), have inspired the analytical approach. Notes from interviews have been openly coded generating 228 codes from what was found in the paragraphs in the interview minutes. Further, the codes were linked according to what was interpreted as connected messages. Patterns were investigated and reported, resulting in the written presentation of the findings and giving clues to elaborate and discuss.

Nvivo 10/11 research software was used to link the codes (nodes in Nvivo) to the paragraphs in the interview minutes. The codes/nodes were grouped in main themes. The themes constituting the basis for this paper were “avoids systems” (9 codes), and “trust/adverse” (39 codes).

The focus has been on procurement of strategic goods, as opposed to Maintenance, Repair, and Operations (MRO) items of minor importance to quality. The significance of strategic suppliers and their products is very high in most industries in the cluster. When it comes to sourcing of vital components companies often have little choice. There are crucial suppliers that do not have status as ‘strategic supplier’, but supply products based on specialized competence.

5 FINDINGS

The core of this industrial cluster is made up of companies that were created when a large Norwegian industrial technology company was split up in the 1980s due to bankruptcy. As part of a relatively small community, these new companies possessed many strong business areas as well as personal relationships with each other. When the millennium came closer, managements acquired new ERP systems. A motive for the replacement was that one expected new, standardized software packages to be better prepared to deal with date problems and a better way to transition to the new millennium than through renovation of old custom-made software.

5.1 The company in the oil business

One of the dominating companies in the cluster is part of a large international conglomerate and is built up around deliveries to the oil industry. Approximately 70% of the costs in a delivery project are linked to procured goods and services. The creation of purchase orders is characterized by a rigid process of identifying every little part – down to the smallest O-ring – that are to be assigned part numbers and

requirements of every kind. This is because any small part that fails may incur astronomic costs if it halts oil production down at the seabed.

The company does not use the very lean media EDI or XML to communicate with its suppliers. Instead, it has made the supplier contacts users of its own system, very much the same way as with its own buyers. Each supplier has a logon to this SRM (Supplier Relationship Management) system to read specifications and communicate with the buyer. Suppliers can read the purchase orders and respond to these, as well as upload documents of various kinds from their own computer. A buyer's main tool for communicating with suppliers is the SRM system, which is more or less one-way linked to the SAP ERP system. For instance, the supplier can write Variation Order Requests (VOR's) in SRM, and these are subsequently transferred into SAP. The physical integration between the customer and the supplier's computer systems is not expanded beyond web level. Both buyers and suppliers have mailboxes in the SRM system. Suppliers can add proposals specifying price and delivery dates. In this way, quality, delivery date, price, and any other matters related to the delivery are worked out. Some suppliers do not communicate via the SRM system, as their businesses are too small or their deliveries are rarely in demand. The SRM system stores the documents and information – at least with the suppliers that are hooked up to it. Still, much of the communication takes place via other media. While the SRM system provides a somewhat richer channel for buyer/supplier communication than EDI and XML, the number of cues available are rather limited.

While contractual correspondence is fed into the SRM, the buyer can monitor how the suppliers may use VOR's to raise the price on parts they are to deliver. "My responsibility is to see to that the supplier is not expanding its profits at the cost of the customer after contracts are signed, terms agreed, and orders placed" a buyer explained. This type of control is seen as essential to preserve the company's bargaining strength.

Even when the SRM system provides a mailbox function to both buyer and supplier, this is not where most communication happens – only the formal part that has contractual importance. One buyer, assigned to tactical procurement, explained: "I use a tremendous amount of ordinary email, and we use phones a lot. And I receive many phone calls from the project. A lot of details are negotiated and problems solved this way. If by email, the claims or promises are documented, but not directly as part of a contract."

The contact between people takes place through SRM, email, and phone and some by customer/supplier visits. System support people were unaware of any use of Skype or other video conferencing systems when they were asked, and they suggested that internal security restrictions might prohibit their use. One of these IT personnel pointed out that her suggestion to use a video conference call when speaking to colleagues in the US was met with uneasiness on their part. More recently, the company has acquired the video and web conferencing package WebEx, but the common practice is to transmit voice and graphics, even within the company. The appetite for video transmitted cues seems to be limited, possibly because richer media can unintentionally reveal more information than what is in an organization's interest.

Like most companies in the cluster, they claim to adhere to the "Open Book", which demands that the supplier's books and calculations are open and transparent to the customer, displaying cost structure and other relevant information that are affecting the deliveries. When asked whether there were any digital couplings from the company's ERP system into the suppliers' ERP systems, the answer was a definite "no". To their knowledge, such integration was not on the table. The company keep close ties to its main suppliers, but not in the most automated way. A common way for a supplier to make this kind of information transparent to its customer is to present paper reports explaining the cost structure. This lean media documentation makes discussions conveyed by richer media as email or face-to-face meetings possible.

5.2 The company in the aviation industry

This company has been manufacturing jet engine parts for more than three decades, and is closely integrated with several engine makers. However, the ownership of the firm has changed substantially over the years. Originating as a department in the old defense company, it has been owned and sold by government and aviation industry enterprises at least three times. The government sold its shares in the

late 1990s. It was then 100% owned by a foreign manufacturing corporation until the current owner took over in 2012. Most insiders have regarded these takeovers as friendly and constructive, but they have caused disruptions in the customization and development of the ERP systems.

The ERP system (SAP) provides support for the procurement department. No SRM system was in use at the time of writing. According to two purchasing managers, there had been very little development of the data support since the new ERP system was introduced just before the year 2000. There is much a buyer wants to check – credit worthiness, business indexes, empirical data from its own ERP system, etc. Thus, business intelligence is probably the area where data support is lacking the most. Today, in order to keep most of these parameters under control, buyers rely heavily on spreadsheets. The managers mentioned an evaluation matrix in which the various weighted cost components associated with a purchase are included. One advantage is that one can relate more flexibly to the specifications against what suppliers actually offer– sometimes a better solution is to change the specification to leverage other benefits or possible savings. “A buyer needs to overlook his own priorities in order to negotiate and select the optimal solutions.”

The procurement department was said to have some distance to cover when it came to data warehousing. They had even seen some setbacks after the last takeover because their former owner had a more enhanced ERP installation to support their needs. The two managers recognized they might have had better tools to investigate suppliers and products and do forecasting. This applied to queries in the enterprise’s own databases as well as research on the Internet.

Over the years they have seen a change in focus from price alone to TCO – Total Cost of Ownership. “Utilizing purchasing power is restricted to indirect goods where quality is less important.” Maintaining strong relationships with suppliers is very important, and they have established “transparent contracts” to monitor the suppliers’ cost structures. Face-to-face contact as well as phone conversations have become rare and to some extent been replaced by email. Transparency and control are main concerns for reducing uncertainty and equivocality.

The two purchasing managers were not happy about the fading personal contact. “When we meet, nobody is speaking their first language. Misunderstandings and unintended insults can very easily occur when you communicate by email. It is extremely important to be acquainted when something happens!” They iterated that personal contact and physical meetings represent a level of communication above email when it comes to building understanding and trust. Having established a healthy relationship by face-to-face contact, then phone calls can sort out problems and issues. They firmly emphasized the use of these means of communication as important.

The company had used video conferencing with wall-mounted screens to allow participants to hear and see each other, but this system has been replaced by webcast – a tool where every participant who is logged on can hear voices and see a presentation shared on all screens. This withdrawal of a richer medium in favor of a leaner parallels the dispositions in the company in the oil business. The demand for cues transmitted by video appears to be limited in the context of procurement.

5.3 The automotive company

The manufacturing of car parts has a long history in the cluster - dating back to the 1960s. From a division producing brake parts to becoming a large global company developing and manufacturing, for instance, transmission components, the automotive company has gone a long way. The whole enterprise had about 10 000 employees worldwide, still with its headquarters in the relatively small town.

Traditionally the automotive business differs substantially from the oil and defense industries. The prices on parts are constantly under pressure, standard yearly reductions are 2-3%. At the same time, it is a long and costly process to replace a supplier to meet all quality process requirements. The company had hardly any Norwegian suppliers at the time of the interview. “There is more money in oil and gas”, the informant said.

One of the buyers proclaimed: “SAP is the best tool we’ve got!” He used it to extract data for strengthening his position in negotiations with the suppliers. The system generates a warning when there are discrepancies between an invoice and agreed price. The suppliers receive market and production plans by EDI to adjust deliveries according to these. EDI and ERP are the tools to steer deliveries under

established contracts. These lean transmissions go via an automated channel from customer to supplier, and responses are also automated under normal circumstances. The data from the SAP system are supported by email communication with the suppliers when there are discrepancies. Email seems to be valued as a richer medium when elements of negotiation were involved as it provides quick feedback and documents the promises that are made.

The sourcing function saw less process automation by the ERP system, except for the large digital forms hopeful suppliers are supposed to fill in. Filling in those forms was a time-consuming activity that tended to “burn out” suppliers who frequently lose bids. An informant mentioned a supplier they had lost this way just before they had a case for which the supplier in question would have been a very strong candidate. Whether forms are filled out on paper or on the monitor screen, they are very lean media and reveal very little to the applicant about the chances for securing a contract.

Most procurement communication was said to be conducted via email, even though some of the formal sourcing processes were supported by an impressive system of digital process description charts and forms. Discussing communication media choice, it was said some standard outgoing communications, such as orders, were sent through SAP, while the order confirmation was scanned into digital form and delivered by email. Delivery delays and other deviations from agreed terms were communicated by phone and email. Phone was the preferred media for quickly acquiring information, while promises needed to be documented by email. No written procedure directly describing this practice existed, however. The buyer explained that they also used phone conferencing and video conferencing tools, having many Asian suppliers and a steady focus on costs. “We used to travel a lot before. Now, we save costs by using Skype!”

5.4 The defense conglomerate

This industrial technology cluster started as a factory making firearms, and over the years it expanded its operations into other industries based on technology it developed through defense contracts. The companies described above are spawn from this mother company. Today, the defense company is also involved in aerospace, maritime, and oil and gas manufacturing business.

Unlike the other large companies in the cluster, the mother company decided not to go for the market leading ERP system. The chosen ERP package (Baan) later changed name and vendor(s), and in time, it was complemented by other systems. A typical industrial purchaser must log into three or four other systems besides the ERP system to get the job done. These are to handle purchase management, material certificates, supplier invoices, deviation reports, bill of materials, quality requirements, and supplier performance statistics.

One of the purchasers remarked that the systems probably should have been connected but were not. He communicated with the suppliers by email, phone, and face-to-face meetings. If promises were made, he preferred to receive them in writing. If something was late, the supplier normally (and preferably) informed him by email, but sometimes by phone. Using email documents promises made and who is responsible for deviations from plan. If transferring information is urgent, the phone enables the sender to directly contact the receiver. In one of the follow-up telephone conversations, a buyer from another department confirmed that the level of formality in the exchanges rises along with the level of automation. She could not recall having seen any written procedure to enforce this but regarded it as an established practice.

Purchasing goods of lower strategic importance was sometimes more automated. The department responsible for purchasing tools placed some orders online like in B2C web stores. This type of online buying was not in use by the other departments. Buyers did not access the suppliers' extranets, except DHL for tracking deliveries. A purchaser mentioned that access to a supplier's inventory status would have been useful. She also wanted to download certificates from the suppliers' extranets instead of having the supplier printing them and sending them by letter. Certificates are lean information, documenting the purchased goods' quality. The buyers are often contractually obligated to only purchase parts and raw materials that have certificates.

One division in the company had an extranet service. Suppliers had to login to read information that was prohibited to send by email. The extranet service was not a preferred way of communicating, but due to

rigid security procedures on sensitive data, email could not be trusted on certain issues. In the same division, suppliers had to send documents to the customer by email instead of EDI or other more automated links. This was due to security concerns about hacking, and restrictions on defense information. "Ideally, we would use EDI or SRM, but security prevents us."

A buyer claimed she did not envy colleagues in the other companies any functions in their systems. She used a custom-made system that kept track of supplier delivery performance - conformance, deviations, certificates, ratings, and much more. She had provided specifications for some of the functions herself. With few exceptions, the buyers in this company were content with the electronic purchasing systems at their disposal, and seemed confident that they could influence further developments.

The need for some space to maneuver when negotiating was evident. When asked if she thought the suppliers should have access to her firm's production plans, she answered: "I think of my suppliers as partners, but I don't want them up in my pocket!" A statement we can interpret as pointing to the need for holding cards close to one's chest.

In a discussion about the choice of communication media with another buyer, he explained that the phone was the medium of choice if they needed to clear up something or solve a problem. The phone allows for quick and concrete answers and one's sense of responsibility is enhanced when speaking directly. He said face-to-face meetings were even better, especially when the stakes were high. Asked about video conferencing, he answered that it was not much in use, even though they had the necessary equipment. They considered they did not gain much by using it, and their counterpart might not have the same system or competence in using it. "The defense industry is rather conservative when it comes to such things."

5.5 General observations

The companies are all characterized by their technically advanced products, but they operate in a wide range of industries. Nevertheless, the patterns of communication media choice were remarkably similar. Some standardized information was added directly into ERP and procurement systems through EDI or extranets. These are "lean" media, and the information commits the parties when entered.

Supplier Transparency in the form of Open Book is important as part of the buyers' control regimes towards the suppliers. Data in the procurement systems are used to analyze supplier behavior and secure the customer's negotiation strength and control.

Email is used frequently, and a purchaser prefers email to phone when receiving variance notifications, especially when promises are made. The phone is regarded as a fast way to exchange a lot of information, but it requires that the receiver be available. Moreover, contrary to email, the phone does not document what was said or agreed on, but is direct, and offers quick and flexible exchanges. Emails and phones are in between rich and lean, with important characteristics related to documentability, synchronization, and response time.

Management is concerned about not having enough face-to-face meetings between buyers and suppliers. Buyers share their concern but blame it on the need to save time for their day-to-day duties. At the same time, video conferencing tools are met with restraint, even though they represent a high level of richness and offer time and cost-saving opportunities. The more costs are in focus, the more frequent video conferencing is used.

6 DISCUSSION

When analyzing media selection through the lens of MRT, the fundamental assumption of uncertainty and equivocality as in the managerial perspective, needs a complementary – negotiative – aspect when it comes to buying – the need for some leeway. Even strategical partnership suppliers seek to minimize costs and expand margins, and so do their counterparts on the buying side. It is a fundamental part of the procurement "game", respectfully played by both parties.

Buyers use data from the procurement systems to analyze supplier behavior and performance to oversee deliveries and enhance their own bargaining strength. This upholds a tension between buyer and supplier, a cautiousness that is contrary to the goals of reducing uncertainty and equivocality.

Both the supplier and the buyer, while working to eliminate uncertainties and ambiguities, will seek to keep some leeway to avoid reducing their organizations' bargaining powers. This caution affects the choice of communication media so that they do not make premature commitments and maintain some degree of flexibility. Documentation can normally not be attributed to the phone as a communication medium. On the other hand, buyers describe phone calls as a quick and direct way to inform them that a delivery is delayed. Email also fits very well into the desire to communicate in a quick and flexible way, and at the same time document the information given.

<i>Company</i>	<i>Purpose</i>	<i>Formality</i>	<i>Media</i>	<i>Cues</i>	<i>Feedback</i>	<i>Richness</i>
Oil	Purchase order	High	SRM	none	medium	lean
Oil	VORs	High	SRM	none	medium	lean
Oil	Supplier proposals price/delivery	High	SRM mailbox	few		medium
Oil	Negotiate project details	Low	Email + telephone	many	high	high
Oil	Open-book cost structure	Medium	Paper	few	none	lean
Aviation	«Transparent contracts»	Medium	Paper	few	none	lean
Aviation	Establish relationships	Low	Face-to-face	many	high	rich
Aviation	Sort out problems & issues	Low	Email + telephone	many	high	high
Automotive	Market and production plans to suppliers + confirmations back	High	EDI/ERP	none	none	lean
Automotive	Supplier qualifying descriptions	High	ERP (extranet)	few	none	lean
Automotive	Deviations from agreed delivery terms	Medium	Email/phone	many	high	rich
Automotive	Promises on deliveries	Low	(phone +) Email	many	high	rich
Automotive	Meetings with suppliers	Low	Face-to-face or Skype	many	high	rich
Defense conglomerate	Promises on deliveries	Low	Email	many	high	rich
Defense conglomerate	Deviations from agreed delivery dates	Medium	Email (phone)	many	high	rich
Defense conglomerate	Purchase of MRO goods	High	Web stores	few	few	lean
Defense conglomerate	Quality certificates	Medium	Paper (letter)	few	None	lean

Table 3: Media choice in buyer/supplier communication

Table 3 shows how types of information is conveyed by different media depending on the level of formality. Flexibility versus formality follows the rich-lean axis remarkably well. Email and phone are treated as equally rich, even knowing they contain cues and feedback of different character. Face-to-face meetings and video conferencing provide even richer communication, but that distinction is left out in the table.

The case data show that buyers (and suppliers) choose communication means according to the level of formalism. Several purchasers explain how they use the SRM or ERP system for formal communication. In this way, they document the contractual aspects, but they need to be careful not to run into “you've put it down! [in writing]” situations. As information transmitting media, EDI, SRM, and ERP systems are lean, they represent a high level of automation, and the data entered *commit* the users to contractual terms. From a transaction cost point of view, the efficiency of this brings down the policing and enforcement costs, provided all uncertainties are removed before data entry.

Communication at a slightly more informal – and in MRT terms richer – level is performed by extensive use of email. The flexibility is greater than filling out forms in an ERP application. Clarifications can quickly go back and forth due to a richer set of cues and speedy feedback. Email keeps track of what is going on, what is stated or required, and in a way that promises and agreements on different issues are *documented*. Still, a buyer and seller can sit in their own offices, without spending time and money to meet face-to-face, thereby avoiding waste of resources in terms of travel time and money. However, this is at a hidden cost of flexibility and information richness in terms of cues. We have seen that various managers are not happy about this reduction in physical meetings and contact – an observation that is in line with the general theory of media richness.

The phone is also frequently used, being just as fast and informal as email, but with no written documentation. In return, phone calls encourage the development of personal relationships between buyer and seller. This approach is *direct* and provides fast feedback.

Several purchasers admit willingly that they visit their suppliers too rarely, and their managers express concern about this. The managers stress that *personal* visits and meetings face-to-face are important to build relations and knowledge of the suppliers' (and customer's) operations. It helps identify opportunities and flexible solutions to upcoming problems. The notable difference between what management wants and buyers do when it comes to media choice in procurement practice is at least partly due to the negotiative aspects of buying and selling where an actor perceives a need to keep some cards close to her/his chest despite the general need to reduce uncertainty and equivocality.

Observing this, there seems to be some kind of a layered hierarchy of media choice in buyer/supplier communication. The more formal, the more automated. The automated information media channels are often leaner than the not-so-automated media, but not always. For instance, the phone provides faster feedback than email, but email's richness when it comes to cues, especially documenting, make degree of automation a more precise dimension to associate media into in this context.

The words highlighted in italics above depict these virtual layers; four communication *layers* have been identified that correspond with the technological means conveying the communication:

- Committing;
- Documenting;
- Direct; and
- Personal.

At one end, we have the more or less informal personal conversation in a visit or a meeting. At the other end, we have highly automated systems of EDI, extranets, or SRM where hardly any additional information follow the data entered, and the data commit the sender to a high degree. We can see this as two dimensions influencing the choices – one the degree of formalism in the exchange, and the other the degree of automation. A tentative figure of how these two dimensions affect the choice of communication means is shown below.

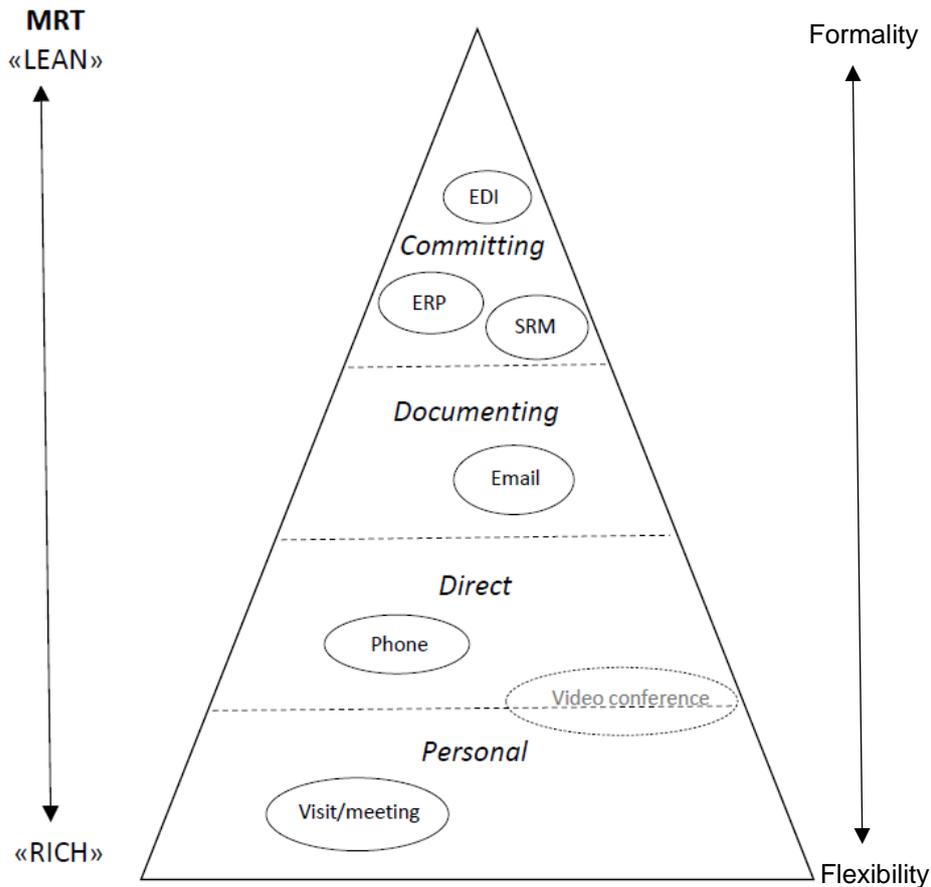


Fig. 1 Layered buyer/supplier communication structure

The committing layer enters lean information directly into the electronic purchasing systems, which ensures that necessary transactional data are stored efficiently. Both buyer and supplier must see to it that the information to be entered this way is painstakingly correct, as it commits in the sense that other actors base their actions upon it, and making corrections is often complicated.

For a lot of the buyer/supplier communication, the documenting layer is selected as the middle course, mainly in the form of email exchanges. There is a need to be able to recall what information is given, and still be able to adjust and define precisely details and agreements.

The direct layer is the most flexible in the sense that (unless it is taped) what is said stays between the actors. Informal discussions on how to solve problems are often conducted by telephone. When a supplier promises a delivery date by phone, the buyer is prevented from having it mutually documented. In such a case, the supplier may have prioritized quick notification, or wanted to make the promise less binding.

The personal layer is used to expand understandings and flexibly work out agreements. Face-to-face meetings and site visits can enable the actors to smooth out issues that come up at a later stage by deeper insights in the others' operations. The broad pallet of cues – body language, voice, expressions, represent in MRT terms the ultimate media richness.

Furthermore, the findings in this case study indicate that initiatives to use video conferencing and similar tools for visual communication meet some resistance despite the expressed need for personal contact and the obvious advantage of not spending time and money on traveling. The reasons may be mixed: uncertainty and a lack of feeling of mastery of technology could be one thing – the desire to keep a certain distance may be another. In addition, a possible element is that the uneasiness reflects uncertainty where in this layered communication practice structure, the relatively new video conferencing

technology fits in. In our layered communication context, video conferencing would have belonged in the middle, between the direct and the personal layer.

Carr and Kaynak (2007) find that buying firms' use of traditional communication methods with key suppliers is positively related to the extent to which the information is shared between them, but they find the relationship insignificant when it comes to the use of advanced communication methods. This can be seen as providing a degree of support for our findings – much of the communication is deliberately done via phone and email. The strong preference for email among our informants is a finding consistent with Thomas (2013), Kraut, Steinfield et al. (1998), and Leek, Turnbull et al. (2003).

Taking the ERP, EDI, and SRM systems into account, the whole specter of CMC options influences the work practices in buyer/supplier relationships. As previous research has shown, emails and phones play a prominent role in modern buyer/supplier communication, and while there is hesitation towards adopting video conferencing, the ERP-integrated systems are left with conveying the formal information between parties. The hesitation towards Skype and video platforms is in line with the Thomas' (2013) survey data where video conferencing showed no significant effect on knowledge exchange. Whether this reluctance to adopt video conferencing in buyer/supplier communication will persist over time remains to be seen; indications are that cost considerations and the increase in online conferencing due to the pandemic may pave the way for more video conferencing in buyer/supplier partnerships in the years to come. Yet, as late as in summer 2021 an engineer in the aviation firm described conversations over Internet normally taking place without video. Some of the resistance may be explained by video conferencing being positioned between the 'direct' and the 'personal' layer as shown in Figure 1, indicating that it conflicts with the established layered structure.

One may ask why communication through social media as Facebook, LinkedIn, Instagram, Tick Tok, and Snapchat are not taken into consideration. They have never been mentioned in the interviews, and somehow procurement seems to possess a conservative element. Another reflection is that social media tend to violate integrity concerns, and it is hard to see how sensitive transactional information would fit into such platforms.

7 CONCLUSION

The research has depicted a layered structure of chosen communication media depending on the degree of formalism. In an attempt to illustrate how different media elements support the making of the business transactions, four layers of communication were identified: committing, documenting, direct, and personal.

Buyers and suppliers choose means of communication by the level of formality in a layered fashion (vs. flexibility/informality). In a follow-up on interviews, some buyers confirmed this as a familiar practice, though not (to their knowledge) described in any documented procedure. In maintaining flexibility by avoiding the automated and logging means of communication, buyers seem to find the informality beneficial in contact with their suppliers. Further research should investigate the extent to which this is a common strategy in buyer/supplier relationships. Another aspect to look into is how the construction of electronic tools for purchasing in any way reflects these concerns, and to what extent such (possibly) non-documented behavior is desirable.

As a *theoretical contribution*, this paper identifies implications for how Media Richness Theory should be applied in B2B settings. This is an extension of MRT to include communication between organizations and as a descriptive theory it can be a useful lens in such contexts.

Buyers and suppliers in strategic partnerships are committed to transparency and comprehensive information exchange. At the same time, the responsibility to avoid costs and liabilities forces both parties to play their cards close to their chests. The MRT cues and feedback media properties should be carefully evaluated when actors' media choices are explained held up to conflicting concerns in the actors' professional roles.

The *main contribution to practitioners* is the highlighting of the four layers to enable more deliberate communication media choices. Organizations should develop and document how to utilize different media by establishing a media use policy in procurement processes. Suppliers of electronic procurement

software may benefit from these insights by developing functions that facilitate communication along these layers.

Besides the primary contribution about layered communication, the reluctance towards video conferencing services may deserve some attention from researchers in the e-procurement arena. As there is time and money to be saved by using rich media CMC systems; from a business perspective, it is important to establish if this is a hindrance to overcome, and how overcoming it might be accomplished.

From a *managerial* point of view, it is important to bear in mind how the layered communication structure is motivated by balancing formality and flexibility when new e-procurement systems and procedures are introduced. The reengineering of business processes must reflect these needs in buyer/supplier transactions. Media richness is vital for establishing trust and mutual understanding of business and technological needs and requirements. E-procurement does not make site visits and face-to-face visits redundant. The load of information, the flexibility on handling issues, are not taken care of by the e-procurement systems of today nor in the visible future. The need for direct and speedy contact between customer and supplier are today provided by telephone. Considering the rapid developments in smartphone technology, there may be room for apps that sophisticate the "Direct" layer and tie it closer to the ERP systems. An impression from this research is that email is here to stay for still a long time. The combination of simpleness and nimbleness, not to mention the installed base everywhere, on any platform, are features it is hard to replace for the next generation of e-procurement systems.

It is important to acknowledge the *limitations* of this study. There are few informants from each company, and there will always be some uncertainty as to how representative individual informants are of the organization or company, along with the fact that companies are often not homogenous working environments. The fact that they are spawn from one large company not too far back in time supports that. While the companies operate in quite varied businesses where industry standards sometimes differ, informants were concentrated in a small geographical area, working in the same industrial cluster of technologically highly advanced organizations. However, they buy and deliver goods and services worldwide, and buyers may have had to adapt to internationally standardized procedures. Similar studies from geographically different environments would be highly welcomed. Further research may also investigate to what extent the same layering of means of communication occurs under purchasing of non-strategic/MRO goods and services, and in different industrial contexts. These dimensions are for the most part outside the scope of this case study. The amount of influence buyers can have on how procurement information infrastructures evolve is another issue that deserves further attention, and is possibly very different in work life cultures other than the Norwegian.

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