

Digital bond formation in long-term buyer-seller relationships

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Abstract

The progress achieved in microprocessors and related technologies has made information technology (IT) based solutions possible. The deployment of these solutions to enhance business activities was started first internally with elementary punch card systems and later on they were employed inter-organizationally to improve relationships. In spite of the increased popularity to study buyer-seller relationship, IT influences on business relationships and networks remains largely unstudied area although recently some progress has been made. The purpose of the paper is to show with the help of a case study how digital bond is formed in the buyer-seller relationships in the steel industry context. It is argued that digital bond is a new type of bond that is formed in IT mediated interaction between companies in addition to technology and other bonds presented in earlier research on bonding in business relationships. Looking at the successful adoption of the IT and mobile technologies the development of the formation of the digital bond is traced. With the help of the digital bond concept created it is possible to understand more fully the influences of digitization, enabled by IT, on business relationships. For academics, this paper provides interesting future research avenues around the digital bond formation and its influences on business relationships and networks. For managers, some insights are provided how digital bond is formed successfully in a business relationship. Limitation of the paper is that only one case study was conducted in one industry sector.

Introduction

Buyer-seller relationships long-term nature is presented repeatedly (Wind, 1970; Wilson and Mummalaneni, 1986; Ritter and Walter, 2006) as one of the main characteristics of buyer-seller relationships as opposed to more discrete transactions (see Williamson, 1979). Most of the research is based on studying the social exchange that occurs in the relationship (Blau, 1964). Hallén, Johanson and Seyed-Mohamed (1991) explained that product exchange is facilitated by adaptation that occurs in the relationship and also information exchange is central for the exchange to occur. Deployment of various types of IT solutions has made the information exchange more routine and effective (Naudé, Holland and Sudbury, 2000; Ryssel, Ritter and Gemünden, 2004). Relationships are created and influenced by action and interaction between the relationship and network parties. These relationships are directly or indirectly connected to other relationships from where a focal network appears (see Anderson, Håkansson and Johanson, 1994; Alajoutsijärvi, Möller and Rösenbröijer, 1999, Halinen, Salmi and Havila, 1999). These focal nets and relationships are interwoven to an intrinsic set of relationships that form a number of different business networks depending on the angle viewed (see e.g. Achrol and Kotler, 1999; Ritter and Gemünden, 2003). Business networks or even markets as networks can be seen as the wider context for studying business relationships (Easton, 1992).

In here, a buyer-seller relationship in the steel industry context is researched. Steel industry based business relationships have been studied to some extent previously (see Johanson, 1966; Håkansson, 1982; Salo, 2006a) and impacts of IT on them have been

also researched (Fuller-Love and Cooper, 1994; Chan and Swatman, 2000). However, limited attention is given to bonding process and especially how IT adoption influences these relationships. In addition to social exchange specific emphasis is put on the digital bond formation process between the buyer and the seller. The disposition of the paper is as follows. First, bonding in the buyer-seller relationships is reviewed. Second, a review of current IT usage and IT systems enabling digital bonding between organizations is provided. Third, the methodology of the study is presented and after that the case study elaborates on the formation process of digital bond in the steel industry based buyer-seller relationships. Finally, the results are analysed and implications for research and management are discussed.

Bonding in buyer-seller relationships

Buyer-seller relationships are created in social interaction between the people involved in the relationship (Håkansson, 1982). Business relationships are based on trust and frequent social communication. It is the social interaction that influences and creates the relationship (see Turnbull, 1979; Cunningham and Turnbull, 1982). Moreover, social communication has a central revitalizing role in the business relationships. Within the buyer-seller relationship literature special attention is given to bonds and understanding of bonding between companies engaged in a relationship. Basically, a bond can be seen to tie a business partners like a chewing gum, into a relationship that is created through social interaction between business parties. It is noted that, that also tie, link, and connection can be likened to a concept of bond, however using the concept of glue instead of bond refers to more permanent connection.

It was Small (1915) who introduced the concept of social bonds and later on McCall (1970) and Turner (1970) who further developed the idea of social bonds in relation to sociology. Håkansson (1982) introduced two types of bonds namely technical and social bonds to the industrial marketing literature. Hammarkvist, Håkansson and Mattson (1982) further developed concept of bond by conceptualizing new bonds: time, knowledge and economic/legal bonds. Johanson and Mattsson (1987) introduced planning as separate additional bond. Thus, six different kinds of bonds are seen central: technical, economic, time, legal, social and knowledge bonds.

In addition to industrial marketing, also other areas of marketing have been interested in bonding. Service marketing researchers have focused on bonding in their context and found four additional bonds namely cultural, ideological, geographical and psychological bonds (Liljander and Strandvik, 1995) that are important in services marketing context. Buttle, Ahmad and Aldlaigan (2002) applied this ten bond framework to study business relationships. Thus, academic literature on business marketing has identified altogether 10 bonds that have a role in business relationships (see Hammarkvist, Håkansson and Mattson, 1982; Johanson and Mattsson, 1987; Holmlund and Kock, 1995; Buttle, Ahmad and Aldlaigan, 2002; Perry, Cavaye and Coote, 2002).

It can be seen that different types of bonds play a crucial role in business relationships and those are an important study area. To introduce, there are at least following bonds that are identified from the literature: cultural, ideological, psychological, knowledge, time, legal, economic, geographic, social and technical, bonds that have an important role

while strengthening or loosening the business relationships. Next, a review of those is presented.

Cultural bonds can be seen to develop between buyers and sellers with a similar cultural background (see e.g. Liljander and Strandvik, 1995). When people are familiar with language, gestures, concept of time is similar and other culture specific factors are known it makes business a lot easier. Thus, the culture may act as a common nominator that smoothen communication and makes decision making simpler or opposite is also possible.

Ideological bonds put weights on ethical decisions for example about using right or wrong resources and business processes. Buying domestically made products or green products could be also influenced by ideological bonds (Liljander and Strandvik, 1995). In addition, locally made products due to their less polluting nature may be favored, as a result of ideological bonds. Based on this assessment of the ideology, a buyer or a seller may decide whether to conduct further activities with the relationship party. To further elaborate on, for example the Body Shop and its suppliers have strong ideological bonds since the Body Shop is a well-known ethical producer of skin and body care solutions. Therefore, suppliers are committed to supply raw materials that are ethically produced but they are also forced to obey as the Body Shop needs pure and even organic products.

Psychological bonds are created in individual level since psychology studies the behavior of an individual. These bonds in business relationships are common. Repeated communications and exchanges between people create these bonds. One person may form likes and dislikes based on the negotiations and meetings and these influence business specific behavior. Thus, psychological bonds may have a role when e.g. assessing the quality of a product (Liljander and Strandvik, 1995).

Knowledge bonds are created over time when companies are interacting and cooperating. In the process they learn activities and ways of doing business together (see e.g. Kock, 1991; Proenca and Castro, 1997). This knowledge or relationship specific knowledge (Alajoutsijärvi & Tikkanen, 2000) acts as facilitator of doing business together. Most supreme manifestation of this type of behavior is development of new products or further streamlining of joint activities which requires knowledge from both parties.

Time bonds refer to the adaptation and development of logistic functions (Johanson and Mattsson, 1987) i.e. when processes are synchronized. Time bond is a wider collection of different types of activities. In here, it is pointed that also time zones can be seen to create bonds between buyers and sellers. It is easier to buy, sell and develop processes and products with those that are in the same time zone. Besides, time zone people have different perceptions of time e.g. some people want things done right away while others think that there is always time tomorrow to finish business. Thus, time bond in this study refers to the concept of time perceived and used in the relationship and also on logistical bonding that is likewise time sensitive. The time concept used in relationship influences on the IT systems adopted. Hence, those relationships under time pressure will adopt IT systems that hasten processes while those with more loose time concept can use different types of IT e.g. e-mail instead of IM (instant messaging).

Legal bonds are considered to be the binding legal contracts that are written up in the relationship (Macaulay, 1963; Johanson and Mattsson, 1987). Besides contracts, there are obligations between business parties that are based on different laws that govern business.

The existence of legal bonds acts as concrete barriers to exit relationships quickly and protects both parties and also orientates toward future thinking (see Cannon and Perreault, 1999).

Economic bonds are formed e.g. with special credit arrangements (Johanson and Mattsson, 1987; Halinen, 1994). For example seller may give credit for the buyer to pay purchases after those have been sold or in more common situation are mutual investments to a company (Proenca and Castro, 1997; Proenca and Castro, 1998). Additionally, if the buyer or the seller represents a large volume of the business parties are more economically jointed than if volume is smaller. For example, a number of suppliers of mobile phone parts to Nokia have shut down factories in Finland due to the fact that Nokia is not anymore sourcing locally.

Geographical bonds concerns with the suitability or match of locations of business parties (Lincoln, Gerlach and Takahashi, 1992; Liljander and Strandvik, 1995). Either buyers or sellers view may be applied to asses the bonds. An example is Dell or Toyota which have arranged their suppliers within a short distance from their factories to enable smooth supply of materials to the assembly (Kogut, 2001; Overby and Min, 2001). This type of geographical bond is favored in manufacturing industries to guarantee steady flow of materials without warehousing them.

Social bonds were the starting point of studies focusing on bonding (Small, 1915; McCall, 1970; Turner, 1970; Wilson and Mummalaneni, 1986). Social bonds are created between people who are interacting on behalf of the company. As interaction continues, the social distance decreases and people come more familiar with each other's ways of thinking and working. Thus, the social exchange within the interaction process plays an important role in reducing number of uncertainties or distances between the two parties (Håkansson and Östberg, 1975). Social exchange episodes slowly lock two companies together and involve the exchange of emotions, feelings, and feeling of togetherness in the relationship (Håkansson, 1982). Relationships are based largely on the gradual accumulation social exchange that leads to formation of personal and firm level trust. How trust and commitment are built as part of social exchange has been discussed vividly in different marketing and management related works (see e.g. Coleman, 1990; Sako, 1992; Morgan and Hunt, 1994; Narayandas and Rangan, 2004).

Technical bonds relate to the characteristics of products and services exchanged in the relationship (Hammarkvist, Håkansson, and Mattson, 1982; Johanson and Mattsson, 1987). Companies can adjust their production processes in relation to their counterpart's specifications which makes their joint actions more effective. These kinds of technical bonds are many times related to manufacturing processes rather than communication processes like new product development using the Internet. Just in time deliveries are also mentioned as technical bonds between companies although these could be labeled time bonds too. According to Wilson and Mummalaneni (1986) technical bond is formed when two companies adapt to each other in some economic or structural way.

Thus, as investment in IT system is both economic and requires some changes in IT architecture and in a relationship, *digital bond* is considered to be a subset of technical bonds. IT and bonding together has been studied to some extent previously in business relationship contexts (see e.g. Perry Cavaye and Coote, 2002; Rao, Perry and Frazer, 2003; Salo, 2007a). Basically, Perry, Cavaye and Coote (2002) and Rao, Perry and Frazer (2003) studied how IT impacts technical and social bonds in relationships. Salo (2007b)

argued for the emergence of new bond types that are pertinent to explain changes in the nature of business relationships. However, bonding literature up-to-date has been blind sighted as technological bonds are seen only as manufacturing bonds while modern IT has enabled radically improved processes utilizing the Internet and mobile communication systems and this change in the way humans communicate indicates that IT based digital bonds are worthwhile study area.

To continue, bonding in a buyer-seller relationship can have two opposing and neutral impact, depending on the context where the bonding occurs. First, it can have a positive impact on a business relationship as it may enhance interfacing processes. Second, it can have a negative impact as it may hinder cooperation with other parties. This can happen if e.g. a company has intensive bonding with directly competing companies. Third, neutral bonding occurs if the bonding does not have direct or indirect influences on the business relationship. By adding in the concept of time it is possible to see that positive impacts may turn into negative and vice versa as the context of the bonding and relationship environment changes. Hence, bonding is always time and context specific. Based on this review of bonding it is clear that, different types of bonds play a crucial role in business relationships and that bonding is an important study area.

Information technology deployment in buyer-seller relationships

Usage of computers in business activities has been an area that is widely studied (see e.g. Kaufman, 1966). Computers were later on connected to each other to form computer networks. The invention of the Internet exploded the commercial usage of computers in late 1990s and newish trend is the Web 2.0 in which socially created content is rapidly proliferating (see e.g. Secondlife and Myspace). When computers and other mobile devices are used in the telecommunication networks for business purposes literature presents it as electronic business or commerce. Electronic business can be seen as an upper construct and defined as an integration of systems, processes, organizations, value chains and markets utilizing Internet-technology, while electronic commerce can be described as being a part of e-business but confined to dealing mainly with marketing and sales processes (see e.g. Chaffey, 2004). However, limited attention is given to deployment of IT in business relationships (see e.g. review by Reid and Plank, 2000, Sheth, 2007). Despite this observed lack of research on this subject it is rightfully acknowledged, studies have been conducted focusing on some aspects of this phenomenon as early as the mid-1970s (see e.g. Mathews and Wilson, 1974; Mathews, Wilson and Backhaus, 1977). Different types of IT systems (see review Salo, 2006b/2007a) may have different influences on business relationships depending on their operating logic as suggested in the literature (see e.g. Leek, Naudé and Turnbull, 2003). Internal IT systems can be seen as antecedents for inter-organizational system creation and integration (see Stern and Kaufmann, 1985; Ryssel, Ritter and Gemünden, 2004).

It is noted that there is altogether 10 different types of IT systems identified in reviews conducted by Salo (2006b). There are also other IT systems and different types of versions of those systems and also internally developed systems which have different influences on relationships. Three types of IT systems that are employed in the studied relationship are presented.

Networking technologies such as the Internet, Intranet, and Extranets present one IT solution and those have been studied in business marketing context widely (see Bello et al. 2002; Boyd and Spekman, 2004). By taking a value creation point of view, Boyd and Spekman (2004) illustrate how the Internet requires aligning its attributes with the economic and relational factors driving value creation. The Internet is seen as supporting digital resource sharing between parties. In other words, the Internet facilitates exchange of digital products, blue-prints, other digital documents, contracts and digital meetings enhancing R&D and new product development. Intranet is created for internal purposes of a company while the Extranet is an Intranet that is secured and opened for business parties (see Vlosky, Fontenot and Blalock, 2000).

Besides, the Internet also enterprise resource planning (ERP) system was deployed in the relationship. There are many systems that have different functions which are called ERP systems in addition there is a difference between first and second generation systems (see Salo, 2006a). In the relationship first generation tailored ERP system was procured from a local software house.

In addition to ERP and networking technologies mentioned above, mobile solutions and mobile technologies are used in the business relationships. Basically, mobile business (m-business) or mobile commerce (m-commerce) can be seen as subsets of electronic commerce or business. Mobile business has been studied for over a decade now (Okazaki, 2005) and many conceptual papers exist that address the general business logic of m-commerce (Dholakia and Dholakia, 2004), describe applications employed (Balasubramanian, Peterson and Järvenpää, 2002), and discuss suitable business models (Lee, 2001). More specifically, in a business context mobile technologies can be deployed internally or inter-organizationally. Within an organization m-business can be used to enhance, for example selling activities in the form of sales force automation (SFA) (Aungst and Wilson, 2005). Managers and sales force can check e-mails, place orders, and log onto company networks from the road (Aungst and Wilson, 2005). Inter-organizationally, mobile solutions can be used to manage information flows in wireless network (e.g. WLAN) (see Salo, 2007a/b). Table I depicts the various IT systems that were deployed in the studied case which caused digital bond formation. It is noted that the Extranet system requires Internet or similar e.g. private network connections

Table I IT systems deployed in the business relationship

IT system	Purpose	Author(s)
Extranet	An extranet is usually built to communicate and exchange information with customers, suppliers, and other important third parties. In a technical sense, an extranet is formed when an organization permits outsiders to access their internal TCP/IP networks such as their intranet. It is often less costly than previous systems. Can be used to deliver more information-rich material than EDI.	Vlosky, Fontenot and Blalock, (2000)

First generation Enterprise Resource Planning (ERP1) system	Total automation of the procurement process, from the point where an employee places an order, through the internal approval process, and right to eventual fulfillment with the help of different software modules. May include human resource management, pay-roll activities and other financial documentation modules.	Krapf, (1999); Hodge, (2002); Motwani et al., (2002)
Mobile technologies (WLAN, PDA and RFID)	Can be used to mobilize various activities including sales force automation (SFA), order pick-ups and other information and transaction flows between business parties. Warehouse and logistic processes are made less costly and more accurate.	Salo, (2007a/b); Aungst and Wilson, (2005); Balasubramanian, Peterson and Järvenpää, (2002)

These presented technologies were adopted in the relationship in sequential style as a consequence of successful adoption of the earlier technology. Thus, digital bond was first created and then considerably strengthened due to additional investments in relationship specific IT solutions. Common to all IT investments, when those are made, create a counterpart-specific and often irreversible link or bond (Wilson and Mummalaneni, 1986) which is further studied in following case study but first methods are presented.

Methods

The aim of this study is to expand existing knowledge on buyer-seller relationships and how IT influences them with the help of bonding discussion. Thus, a case study method was selected. Due to the fact that research on IT usage in business relationships is emerging study area, in which the researcher has only some or no control over the events that are occurring in a real-life context, a case study is a very appropriate method (Stake, 1995, pp. 435-454). Furthermore, a case study can be applicable to situations in which researchers require deeper understanding, solid contextual sense, and provocation toward theory building (Bonoma, 1985). It is noted, that the case selection is a pertinent stage in case research, and advice on case selection is therefore extensively provided in literature (Eisenhardt, 1989; Pettigrew, 1989; Perry, 1998). The business relationship was selected based on theoretical sampling, in which the cases are selected so that they represent the problem of the study. Two companies further on called the Mill and the Steeltec form the business relationship studied. The identities of the companies or the respondents are not revealed for reasons of confidentiality. The perspective of both parties on the business relationship needs to be studied to be sure of the value of findings (John and Reve, 1982). The main data source through which digital bonding and bond formation will be described consists of semi-structured interviews (Kumar, Stern and Anderson, 1993; Arksey and Knight, 1999). The interviewees were accordingly asked to describe the history and current state of the relationship as accurate as possible. After that, they were asked to highlight the key persons and events in the relationships. Finally, they specifically discussed the IT solutions employed and how those have shaped the relationship. The choice of informants was premised on the principle that information is best elicited from people who have knowledge of the phenomenon and who have been

involved with the relationship. Further interviews were not needed as towards the end respondents were telling similar things about the relationships and it could be said that data saturation occurred.

Table II Interview Data

Company	Position	Date, and duration of interview
Mill		
	Purchasing Manager	November, 2003, 1 h 40 min
	Business IT Manager	March, 2004, 1 h 30 min
	IT Manager	March, 2004, 1 h 45 min
	Production Planner	March, 2004, 2 h
	Product Manager	March, 2004, 2 h
Steeltec		
	CEO	November, 2003, 2 h 10 min
	CIO	November, 2003, 1 h 45 min
	CFO	November, 2003, 1 h 55 min
	Production employee	November, 2003, 1 h 10 min

Interviews were taped with the interviewee's permission and then transcribed and analyzed accordingly. Qualitative data analysis was employed in order to thematize the material (see Miles and Huberman, 1984). Besides interviews also documents, minutes of meetings, industry reports and company visits were used to triangulate the respondents' answers, as suggested in literature (Patton, 1987; Yin, 1994). Data triangulation was used between the information sources mentioned above. In practice, data triangulation was first used to compare the different perspectives presented by each of the interviewees and, subsequently, to compare the interviews with other sources, such as industry reports, in order to validate observations and interpretations. The validity and reliability of the research was increased with the use of data triangulation (Eisenhardt, 1989).

Case study – Digital bond formation in the steel industry buyer-seller relationship

The Mill is a fairly large corporation operating in Europe and Steeltec is a subsidiary of a larger corporation Workshop, which is a Finnish steel workshop focusing on heavy steel objects and welding competencies. The Mill-Steeltec business relationship is offspring from an earlier 40 year business relationship that still exists between the Mill and the Workshop. The relationship between Mill and Steeltec is seven years old. Steeltec hardens steel plates produced by the Mill which then sells hardened parts to their customers as part of total steel solutions. Besides, hardening for the Mill it has other customers demanding hardened steel component ranging from paper mills to army. This paper reports the digital bonding that has been occurring in the relationship after IT specific investments which were used to increase the efficiency and effectiveness of internal and interfacing processes.

Early stages of the buyer-seller relationship

At the early stages of the business relationship when it was initiated, the process from the order to delivery was handled in traditional way where almost everything was conducted manually and on paper. All documents that related to orders, which were made by phone or fax, were handled manually. When orders arrived, envelopes or faxes were checked by sales assistants and sellers. After the orders were processed, the order information was manually inputted to hardening machines. Verbal notification of the new order was provided to the manufacturing manager by the production employee. Thus, delays in production and cost overruns occurred on many occasions.

Paralleling this traditional logic of processes all documents delivered to the financial department for billing purposes were paper based and delivered by sales people or people that had extra time. Furthermore, the scheduling of transportation between Mill and Steeltec was ordered via phone or fax. From, Mill side this physical paper based inefficient process required manual inputting of information to ERP and other systems. Thus, the process from order to delivery was extremely laborious with multiple manual phases involving many information gaps. Therefore it took days, which often turned into weeks to deliver hardened products.

Formation of digital bond in the buyer-seller relationship

Due to the delays, mistakes and manual processing the current way of doing business was perceived too cumbersome. As the managers from both organizations realized the problems a mutually created scheme was created to develop the relationship. Without the mutually perceived economic importance of the relationship and trust established early on, this type of a sequential development program initiated would not have been possible.

After several meetings and negotiations concerning the information flows and usage of IT systems the first concrete redesign step was taken when orders from Mill were made into digital form with the help of shared IT. However, before digital ordering was possible Steeltec arranged negotiations with a local IT vendor and based on that ordered a specifically tailored small scale system that enabled to receive and process orders in digital form. Now when both parties had internal IT in place and working, sharing of internal IT with some connecting IT was possible. Moreover, systems used were rather compatible and hence sharing was possible. Steeltec internal IT system was integrated or shared over secured Internet connection with one of the Mills first generation ERP systems.

This sharing of IT and consequent usage of the shared IT formed the first digital bond between the companies. Although, not fully tailored and relationship specific IT solution, it was a considerable investment to the relationship and bonded both parties. After successful sharing of the IT, orders were issued by the subcontracting-manager of Mill through the ERP while the internet based secure connection assisted in delivering orders in the relationship. After an order arrives, the Steeltec internal system informs production employees via e-mail of the new order. A similar e-mail is received by the production manager.

The state of the internal IT systems and skills acts as first step which enabled digital bond formation. In addition, internal IT systems must be compatible in order to sharing of

them would be successful. Third, condition for the formation of digital bonds is the successful sharing of IT which leads to the digital activity between the parties exchanging and interacting.

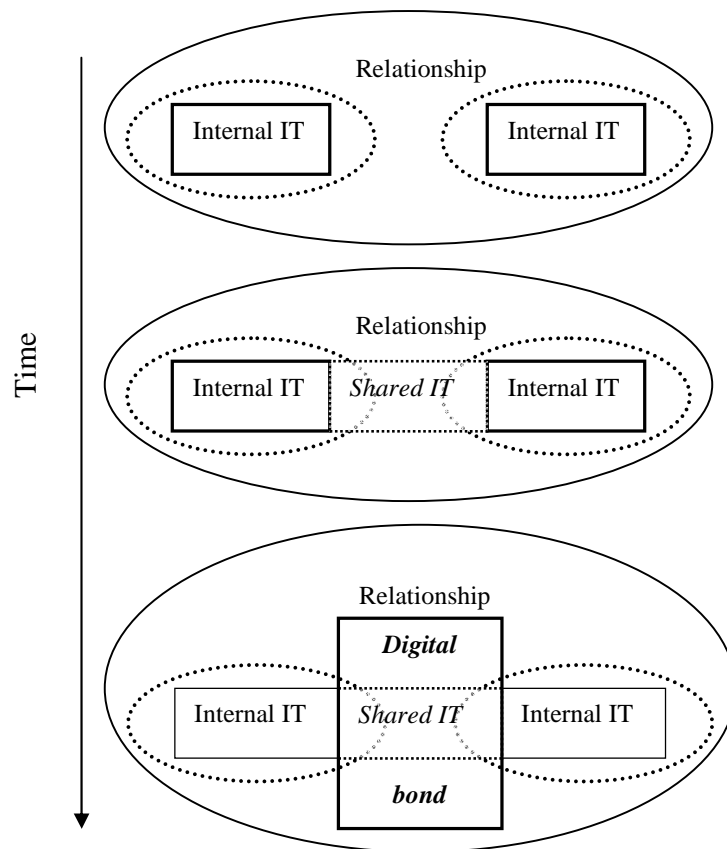
This adoption of novel technology and adaptation in the business relationship made by Steeltec signaled Mill that they were willing to help in every possible way to make the business relationship even more productive and profitable. Similarly, Mill signaled to Steeltec with increasing orders that the relationship was worth continuing.

At the end of 2004, Steeltec acquired new pricing module for their internal ERP system and made considerable changes to pricing policies and routines. Based on this, products that already had pre-determined prices are now digitally priced and checked automatically. When an order arrives that contains non-standardized products, the order e-mail is sent to the production manager who, depending on the order size, solely or together with the CEO defines and inputs the price information required.

The most recent addition to the business relationship is the mobile IT system. The main point is to use the mobile system to speed up inventory control, test-report transmissions and other non-routine communications. The mobile solution renders paper based and manual strength measurement reports obsolete and transforms these into a digital form that is easier to process. Before that, reports were first conducted by writing the required information down on paper, inputting this information to a system, printing the report and then sending it to Mill's administration who filed it. The mobile system enables information to be input directly to personal digital assistants which updates Steeltec's ERP system and provides e-mail notification to Mill about the new reports, which are essential for the documentation of the steel solutions delivered to customers. This required no adaptation from the Mills side. Furthermore, Mill can now receive information about Steeltec's hardening capacity, which is vital for generating new sales. Previously, a hardening capacity check was manual and information received by Steeltec's sales department was usually too outdated to reliably act upon and thus information needed to be re-checked. With access codes to Steeltec's system, Mill employees can now retrieve information from the real-time database updated by Steeltec's employees and the mobile system.

The adoption of the shared IT through the Internet connection was the initial digital bond created. It was strengthened and widened when automatic pricing was introduced and further on strengthened and widened with the clever mobile solution. This, virtuous cycle of digital bonding that occurred between the parties created a strong bond between the parties that exists today. The formation of digital bond strengthened existing technical bonds in the relationship by making manufacturing process tighter than previously and it also enhanced information exchange and knowledge exchange between parties. How the digital bond formation influenced other bonds it's complicated to say but social bonds still play a pertinent role in the relationship as there are several negotiations and meetings between the parties e.g. concerning the enlargement of production capacity. It is noted that business relationship can be seen to be built out of several interlinked bonds. Figure 1 depicts the formation process of the digital bond.

Figure 1 Formation of digital bond in the buyer-seller relationship



To sum up, each party in the business relationship made changes to existing procedures and routines, making information gaps smaller and even forcing them to close. This would not have been possible without the warm and trusting relationship the parties have. Most importantly, the adoption of specific IT systems and mobile technologies has made the business relationship more effective (“doing right things”) and efficient (“doing things right”). It is noted that like any other models, stages models have problems in depicting in detail the change that is about to be described. More detailed description of the change is needed in order to fully understand how the digital bond is formed.

Results

The case study illustrated how the digital bond was formed in the relationship and after its formation how it was strengthened and widened from a weaker bond into a strong bond. Clearly, digital bond i.e. connection of IT systems is a different from technical or time bonding discussed above. The digital bond is formed when the internal IT systems of the parties in a relationship were made compatible, or systems which were compatible in the first place are shared or integrated in order to form a hybrid system, in which digital information exchange and other activities are possible. A hybrid system is formed by jointing internal systems with a specific IT system like the Internet that was the case in

here. Also, ERP adapters can be used to join ERP systems and web services and enterprise application integration (EAI) to join IT systems. Second generation ERP systems have sharing possibilities purposefully built in. After, first activities with the hybrid system are conducted it can be said that digital bond was formed. Digital bond is weak early on as bugs or malfunctions may appear. As the time passes by and systems are up and operational bond may be strengthened. Hence, digital bond creation is based making buyers and sellers internal IT alike in those parts that are to be integrated. After sharing or integration is conducted and first digital activity occurs through the hybrid system the digital bond is formed.

Besides formation of the bond i.e. bonding process also the result could be evaluated. It is indirectly said already that there are two basic kind of digital bonds, strong and weak ones. Strong bonds as opposed to weak ones are formed over time when IT systems are adopted continuously modified according to company specific needs. In practice, as there may be several IT systems in place that support communication in the relationship, it may be difficult to assess the existence, weakness, and even strength of a digital bond.

Conclusion

It was stated in the beginning that IT influences on business relationships and networks are studied rarely at least in the steel industry context while focusing on bonding. The aim of the paper was to illustrate how digital bond is formed in the buyer-seller relationships in the steel industry context. First, the concept of digital bond was introduced and placed to a broader context of bonds existing in business relationships (see Salo, 2006a). Then with a case study the digital bond formation was elucidated and the impacts of digital bonding on other bonds and relationship were discussed. The formation of digital bond seemed to strengthen existing technical bonds by making manufacturing process tighter than previously and it also enhanced information exchange and knowledge exchange between parties.

It is noted that social bonds still play a pertinent role in the relationship as it revitalizes and questions routines in the relationship. Digital bond after its formation is clearly a bond that binds. However, loose shared IT that is based on the idea that third parties provide middleware type of software or other plug and play type of sharing IT makes digital bond weaker as switching is easier. Other influences of digital bonding remains unclear and merits further research. For managers, it was illustrated how digital bond is formed successfully in a business relationship. Furthermore, trust and security are issues needs to be dealt with however, sharing of strategic information with the help of IT systems is almost always unwise. Interesting future research area from the managerial point of view would be the creation and management of digital bonds. Limitation of the paper is that only one industry sector with a case study was studied. For academics, this paper provides interesting future research avenues around the digital bond formation detailed next. First, academics could study the digital bond formation in another context to see if bonding occurs similarly. This would enable generalization over industries. Second, research on the loosening or strengthening of other bonds due to the formation of digital bond is called for. Third, it might be interesting to see how the existing digital bond impacts the relationship as whole and how managers handling a complex portfolio of relationships should manage digital bonds. Decision needs to be made regarding which

relationships should be strongly bonded digitally and in which a looser digital bond is appropriate.

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