

TRUST-RELATED DYNAMICS IN THE SUPPLY CHAIN RELATIONSHIP

ABSTRACT

Conventionally, different company-supplier relationship areas have been illustrated by distinguishing five different relationship categories between the supplier or subcontractor and the buyer company, namely adversarial leverage, preferred supplier, single sourcing, network sourcing partnership, and strategic supplier alliance. This implies that the supplier's importance to the buyer company also changes and vice versa. One delaying element which retards the evolution of a supply relationship is a lack of trust. This element manifests itself as poor information flows, restricted knowledge sharing, and suspicion between stakeholders. Therefore trust is one of the most important elements in improving dyadic relationships. Trust is becoming an ever more essential managing element between companies when they integrate their activities, form and maintain their dyadic relationship, and create control systems.

In the paper is discussed personal trust and system-based trust affecting supplier relationships in the supply chain context. Empirical material was collected by means of a survey and interviews. The managers of the case company estimated how they trust and trusted their suppliers and how reliable their suppliers actually are or were. The case company is involved with complicated projects that include several hundred suppliers.

We introduce some results from the survey study (sample n=392 persons) and from the interviews with the focus group, in order to explore how the company's defined company-supplier relationship is related to the expected level of trust and how the expected trust varies in different supplier relationships. The results indicate that different aspects and expectation of trust in the case company has led to the situation where the supplier categorization is unclear in the company's organization, which can lead to confusion in supply management. This in turn implies that organization's own attitudes and changes in trust may be a source of dynamics that impedes efficient and effective supply network management.

Keywords: Trust, supplier relationship, supply chain management

INTRODUCTION

Dyadic supplier relationships in traditional management research and in supply chain management are based upon the typologies of relationships. In supply chain management, companies' categorizations are usually described in terms of various fourfold matrices or definitions of relationships and integration. (cf. Lamming and Cox 1999; Harland 1996; Gelderman and Van Weele 2005; Stalk 2006; Van Weele 2005) The individual company's relevance in the chain and/or in the sourcing network is determined by the following principles: i) the company's capability to add value to the chain or network, ii) the relevance of the company's core competence and iii) the position vis à vis the focal company in the supply chain i.e., the position tier from the focal company's viewpoint. The emphasis in these above-mentioned management principles is dyadic and they facilitate the allocation of managing resources in appropriate ways. This simplifies the formulation of the basis for the strategies of supply chain management which, in turn, paves the way for the relationship efforts. Conventionally, different company-supplier relationship areas have been illustrated by distinguishing five different relationship categories between the supplier or subcontractor and the buyer company, namely adversarial leverage, preferred supplier, single sourcing, network sourcing partnership, and strategic supplier alliance (cf. Cox 1996).

It can be argued that the managing principles above concentrate more on a static than a volatile relationship. In other words, decision-making in relationship management based on the results of benchmarking, best practice analyzes or developmental trends in industries. However, there are still factors which are not taken account when the relationship has been defined or new factors have appeared after the definition of the relationship has been made. One delaying element which retards the evolution of a supply relationship is a lack of trust. This element manifests itself as poor information flows, restricted knowledge sharing, and suspicion between stakeholders. Therefore it is supposed that trust is one of the most important elements in improving dyadic relationships (Breite and Koskinen, 2010; Aramo-Immonen, 2010). Trust is becoming an ever more essential managing element between companies when they integrate their activities, form and maintain their dyadic relationship, and create control systems. (Paulraj and Chen, 2007; Fugate et al., 2006; Hughes and Weis, 2007; Cohen and Roussel, 2005) It also implies that the supplier's expected trustworthiness and commitment are supposed to depend upon the type of relationship.

The objective of this paper is to enhance the understanding of the factors affecting trust related dynamics during the supply and the value forming processes. In pursuit of this objective, the following discussion first focuses on the concept of dynamics and the typologies of supply chain theories. The discussion then proceeds to the theories of supplier relationship management in the context of value forming, trust and dyadic relationship. Theoretical findings will be tested with a specific empirical study to demonstrate the firm's current supplier relationship situation and the existing difficulties and problems in purchasing and acquisition. The empirical research methodology used includes data collection, construct measurements and interviews. Next we present the discussion and managerial implications of our theoretical and empirical findings. After the discussion, the limitations and suggestions for future research will be concluded.

DEFINING DYNAMICS IN SUPPLIER RELATIONSHIPS

As mentioned above, the individual company's position (its thickness or weakness) in the chain and/or in the sourcing network is determined by the following principles: i) the company's capability to add value to the chain or network, ii) the suitability of the company's core competence,

iii) the position tier from the focal company's viewpoint. *The company's capability to add value to the chain or network* is understood to mean that a company must add value either directly or indirectly for its end customers. This implies that a single company must know the demands of the supply chain and know how to satisfy these demands. For example, when asked from the performers in the supply chain do they know, what the end customer's needs are. The answer was typically positive. However when investigated what these need assumed to be the performers in supply chain expressed it in very general level: Customer wants us to build a vessel for example. In order to be able to create added value it would be necessary to crystallize the position of focal company in value creation process. *The suitability of the company's core competence* is the main prerequisite for the formation of a supply chain. Therefore each company has the necessary core competence i.e., the necessary organization, people, and particularly the technology for the supply chain. A company has to understand how the supplier's and the customer's core competence supports the focal company's business concept. (Cox 1996; Hamel 2000; Breite 2003) In this context the focal company (one economic actor according to Ramirez 1999) is the company in focus of the study (the company in the supply chain in which interview was conducted for example).

The position tier from the focal company's point of view can be examined in different ways: i) The company's competitive position in networks – which is understood to mean the company's capability to utilize the resource potential of the network (Harland 1996; Cunningham 1994) ii) The definitions of the components of networks – the company is the actor that performs activities and controls resources (Harland 1996; Gadde et al. 2003). iii) The company is part of the network structure – the position of the company is defined on account of its placement in the tiers (Harland 1996; Nishiguchi 1994).

These position definitions reveal two elements which affect the management of the relationship between companies. The first element emphasizes the company's capability to create value for another company or customer by utilizing its external environment and the efficiency and effectiveness of its internal processes. The second element emphasizes the company's position in the network or the supply chain from another company's point of view. The position is ranked by making use of the company's importance to its customer and its physical location in the network or in the supply chain. Such thinking is also close to the contingency approach which highlights the type of relationship and the current state of the relationship (cf. Bagchi and Skjoett-Larsen 2002).

The results of the examination above, sources of dynamics can be summarized as follows:

1. the perceived added value differs from the anticipated added value
2. the perceived demand differs from the real demand
3. the company's position tier is defined wrongly.

These differences encourage dynamics in the supply chain. A single company has to reset its importance and tier position with reference to the supplier, supplier's supplier, customer, customer's customer etc. (see Figure 1). Such dynamics can be seen as: i) the company's principles regarding purchasing and supply changes ii) changes in delivery priorities iii) time, cost, and quality related factors are emphasized in new ways.

Managing and researching dynamics and its effects is complex, therefore they have been simplified and encapsulated into two elements. The first element has been entitled the *area of horizontal dynamics* and the second one has been entitled the *area of vertical dynamics*. Figure 1 is formed utilizing these elements. In Figure 1 the area of horizontal dynamics indicates the variance of the expected value added. According to Ramirez (1999) the value forming can be defined with value co-producers (co-productive view) that mutually created and re-created value among economic

actors (cf. Ramirez, 1999). However, the concept of supply chain management itself is theoretically and practically complex to manage, therefore the concept of the value forming is simplified with the concept of added value (industrial view).

This indicates that the suppliers' capability to deliver products or services varies. Figure 1 illustrates the external cumulative value added which starts from 0% and ends at 100%. The principle of the basic idea is based on Cox's (1996) findings that a company's value chain differs from its supply chain. In the context of the value chain and from the ultimate consumer point of view, 100 % value is realized when a consumer has paid the price asked for the product or service. This value (100%) indicates the total margin of product and divides into the margin of the members of the supply chain. The proportions of value between companies depend on companies' ability to manage both their supply and value chains. Before the product or service goes into production the total value is 0 %. On the other hand, the value may be below 100 % when the end customer does not buy the product or service, and when the product or service has not been delivered to the end consumer. In these cases the margin of one or more supply chain members is negative.

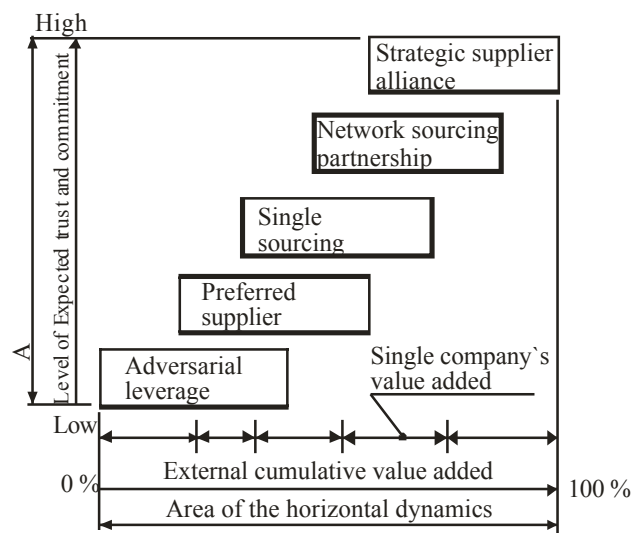


Figure 1 Vertical and horizontal dynamics (Breite and Torkkola, 2009)

Value added to the supply chain is 100 % when the product or service has been delivered to the end consumer. As mentioned above 100 % value added is a cumulative value which consists of every supply chain company's value added. In ideal supply chain management a value of 100% indicates that every member of the supply chain has a common perception of the delivered value added and a single company's delivered value added is in balance with its margin.

The *area of horizontal dynamics* consists of the factors which affect volatility in a company's value creation in a supply chain or a network. During the company's value adding process, it is essential to know how to create value for the customer and what kind of elements affect and form the customer's and supplier's value thinking (see e.g. Petersen et al. 2008; Hines et al. 2000). It can be argued that the value-adding processes should not contain value gaps or discontinuities and customers should perceive value superiority in which they take into account perceived costs and perceived value (Vandermerwe 2000; Harland 1996). Therefore the goal of the company is to satisfy its customers' needs in a holistic way, not by the partial optimization of its own position but an ideal value adding process in the supply chain. It can be assumed that ideal holistic value-adding processes are not

realized in every delivery or supply case, and therefore the sources of the dynamics set the scene for lack of value, which has been presented in the *area of horizontal dynamics*. The authors' findings can be presented as the following factors which set the scene for the horizontal dynamics: 1) *Internal confusion of value formation* - the different functions in the organization understand value forming differently and the place where value creation occurs is wrongly identified. (cf. Handfield et al., 2000). 2) *External confusion of value formation*. In supplier-customer relationships there may be differences in the understanding of value formation. (Harland 1996) 3) *Unsuitable circumstances regarding the delivery of value* – The circumstances change during the process of delivery of value. 4) *Unsuitable measuring system*. The measuring system utilized emphasizes the value added from the wrong stakeholders' point of view and vice versa. (cf. Payne and Holt 2001). 5) *Value gaps on the chain level*. Lack of demand management (e.g. the Forrester effect) on the chain or network level will affect the value delivery processes negatively in a single relationship.

The area of vertical dynamics affects the supplier relationships, which indicates that the circumstances of the relationship environment change. This area has been illustrated by distinguishing five different relationship categories between the supplier or subcontractor and the buyer company, namely adversarial leverage, preferred supplier, single sourcing, network sourcing partnership, and strategic supplier alliance (cf. Cox 1996). This implies that the supplier's importance to the buyer company also changes and vice versa. Figure 1 also illustrates how the supplier's expected trustworthiness and commitment are supposed to depend upon the type of the relationship.

The source of vertical dynamics can be divided into two bases: the people basis and the firm basis. The firm basis, is related to the following factors: 1) *Wrong relationship architecture* - the structure of the supply network is poorly defined. In other words, the basics of the suppliers' importance and capability are poorly estimated and reciprocal relationships and commitments are not sufficiently taken into account. (cf. Handfield, et al. 2000). 2) *Wrong scope of outsourcing* - the scope of outsourcing, for example out-tasking (the responsibility for the performance of a specific task is assigned to an outside supplier), co-managed services, managed services and full outsourcing (cf. Sanders et al. 2007), are insufficiently defined. 3) *Confusion between strategy and operations*. Confusion between the strategies of purchasing and acquisition activities and operations and logistics stem from the role of a single function, which in turn implies that the company's intended strategy is not realized. 4) *Insufficient attention in the formation and maintenance of the supplier relationship* - the lack of awareness of a certain value of the supplier relationship impedes efficient and effective supplier relationship management in the organisation. (cf. Lummus et al. 2007; Petersen et al. 2008). 5) *Inappropriate tactics* - negotiations between the buyer company and the suppliers are not based upon the strategic goals of the company or the selection criteria set. 6) *Unstable ability to take risks*. The sources of risks can be categorized as resource-based, financial-based and interest-based (e.g. a supplier's interest in developing a relationship may decrease if better customers appear or circumstances change in industry). The vertical dynamics affect the supplier's trustworthiness and commitment, which has a positive or negative effect on the supplier's readiness to share risks and adaptability to changes (cf. Camuffo et al. 2007).

The people basis is related to commitment and trust. *Commitment of the people working for the transaction*. People can be committed to tasks by many means: money, promotion, travel, etc. However, researchers (e.g. Nonaka and Takeuchi 1995; Senge 1990) believe that genuine bonding and commitment derive from the interesting content of the work and from the goals of the job being significant. They want to contribute toward building something important, and they value doing it with others. (Senge 1990) From the above discussion we draw the conclusion that the acquisition

and sharing of knowledge within the supply processes is enhanced by a person's (firm's) strong commitment to the goals of the transaction. *Trust between the people involved*. One delay element which retards the evolution of a supply relationship is lack of trust. This element manifests itself as poor information flows, restricted knowledge sharing and suspicion between stakeholders. Therefore it is supposed that trust is one of the most important elements in improving dyadic relationships. (Breite and Koskinen 2010) Most conceptions of how trust develops emphasize that trust is a history-dependent process (cf. Lindsfold 1978). Trust builds incrementally and accumulates. Trust is based on understanding, with people trying to understand their partners' behavior state of mind and motives. Trust in relation to the organizational mind and collective action is an important issue, because it ties together a complex and attentive system, which forms the collective mind required for reliable performance. According to Weick and Roberts (1993), co-operation is imperative for the development of the mind, and trust is imperative for co-operation. Trust does not come as a part of particular procurement system, thus the system can enable the trust to flourish (Walker and Hampson 2003; Koskinen and Pihlanto 2007). Trust is becoming an ever more essential managing element between companies when they integrate their activities, form and maintain their dyadic relationship, and create control systems. (cf. Paulraj and Chen 2007; Fugate et al. 2006; Hughes and Weis 2007; Cohen and Roussel 2005)

In Figure 1 is illustrated the connection between relationship types and the level of trust. In order to form strategic supplier alliance a high level of mutual trust between companies (and individual workers) is required. As a consequence higher the trust level, higher the single companies' ability to add the value as a part of the supply chain. These findings indicate that trust has role as a driver when dynamics appear in relationships. In order to explore this phenomenon, we first define trust types more detail and after that a survey study was introduced.

TRUST TYPES

The notion of trust is complex. The social scientist Barber (1983, p. 164) characterized trust as a *"set of socially learned and socially confirmed expectations that people have of each other, of the organizations and institutions in which they live, and of the natural and moral social orders that set the fundamental under standings for their lives"*. Lewicki and Wiethoff (2000, p. 87), who have an organizational behaviour theory background, described trust as *"an individual's belief in, and willingness to act on the basis of, the words, actions, and decisions of another"*. Social scientists Mayer (Mayer et al. 1995, p. 712; Schoorman et al. 2007) defined trust as the *"willingness to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party"*. In the context of supply chain management trust lowers the transaction costs in the supply chain and provides companies with a source of competitive advantage (Doney et al. 1998; Barney & Hansen 1994). Trust facilitates long-term relationships between companies (Ganesan 1994); therefore it is an important success factor in long-term strategic alliances (Gulati 1995). Trust may, for example, facilitate the alignment of partner interests (e.g. Maurer 2010). Trust also enhances stakeholder satisfaction and supports the achievement of project goals (Maurer 2010). Thus also trust-building in inter-organizational relations contributes to a more effective implementation of strategy, greater managerial co-ordination and more effective work teams (Doney et al. 1998; Aramo-Immonen 2010).

An individual's ability to trust another is based on one of three elements, the first of which is rooted in one's personality. The belief system developed through one's life experiences is related to trust.

These experiences are linked to the cultural environment in which the individual has lived. Secondly, the belief system may be based on a set of rules and norms established by institutions or society. Thirdly, trust may be based on experiences within a given relationship. Society and relations between two individuals are also dominated by cultural influences. (Lewicki & Wiethoff, 2000) Trust is based on the attempt to understand partners' behaviour, state of mind and motives. Trust in relation to the organisational mind and collective action is an important issue, because it ties together a complex and attentive system, which forms the collective mind-set required for reliable performance (Weick and Roberts, 1993; Senge, 1990; Cox, 1996).

The notion of trust is a complex one, trust definitions can be classified based on their focus. Firstly individual based, secondly system based and thirdly trust definitions related to both. At one level, reasoned expectations will be fulfilled. Predictability is related to past experiences. On both the personal and business level, trust is as much about something happening as not happening (Walker and Hampson, 2003). Commitment is the practical manifestation of the concept of trust. In practice it can also be an act of loyalty. This occurs when trust and commitment are tested. In supply chain management contexts, relationship loyalty is an element of sustainability. Both personal trust and system-based institutional trust are needed in the supply context. Personal trust is a base for intentional commitment. However, it is vulnerable and dependent on individual actors. System-based trust is embedded in predictable performance processes, contracts and institutional organizational behaviour. At one level, reasoned expectations will be fulfilled. Predictability is related to past experiences. On both the personal and business level, trust is as much about something happening as not happening (Walker and Hampson, 2003).

Lewicki and Wiethoff (2000) looked at the relationship between trust and conflict in relationships. As relationships are based on differing levels of trust, if trust breaks down, conflict may arise between the stakeholders involved. Lewicki and Wiethoff (2000) discussed two types of trust, which are related to professional and interpersonal relationships. Professional relationships are normally task-oriented and aimed at achieving objectives, while personal relationships deal more in the social or emotional realm and focus on the relationship itself.

Calculus-based trust (CBT) and identification-based trust (IBT) are distinguished from each other. In CBT, which is most often related to the workplace, people tend to operate on a reward-punishment system (Lewicki and Wiethoff, 2000). The value in completing a task or goal is not seen as personal satisfaction, but rather because of the consequences of doing so. In CBT, trust is built slowly. In contrast, identification-based trust (IBT) is seen more in the personal arena, even though it may also occur to some degree in professional relationships. In IBT, parties come to know and understand the expectations of one another. In time, they develop the ability to know what behaviour the other would expect in a certain situation and take the initiative of acting for each other in certain situations (Lewicki and Wiethoff, 2000). Creation of IBT requires that these individuals share common values and goals based on mutual benefit. IBT develops a collective identity. In order to create this type of relationship inside the company or supply network there has to be a mutual understanding of each other's objectives. Once IBT exists, it will be much easier for parties to work together as a team, understanding the expectations, goals, and needs of one another.

EMPIRICAL STUDY

The empirical study contains two phases. In the first phase, a questionnaire was sent to the recipients and in the second one, a focused interview was conducted among members of shipyard management. A questionnaire with 93 questions was sent to the e-mail addresses of 392 recipients

in the supply chain of the focal shipyard. Participation activity was 12 % (47 answers). Here the focal shipyard is the customer, since the questionnaire was conducted upstream in the supply chain. The method utilized was a survey with responses on a 5-point Likert-scale including some open questions (Aramo-Immonen, 2010; Aramo-Immonen et al., 2010). In the second phase interviewed actors responded literally in assessment questions. In both phases of the study researchers observed and interpreted the resulted level of trust. In other words the researchers' evaluation of results is important factor in trust level assessment. (cf. Aramo-Immonen and Porkka, 2009)

Some examples of the empirical survey results are shown in Figures 2 and 3. The arrows added to the figures point out the interesting differences with the self-assessment result. In Figure 3 the trend was to value one's own performance higher than customers' and suppliers' performance except in the case of delivery accuracy measurement.

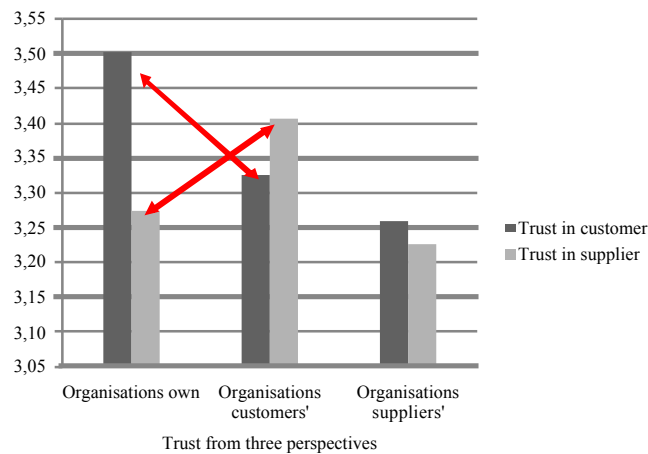


Figure 2. Trust from three perspectives, the organization's assessment of their own performance, the organization's assessment of their customers' performance and the organization's assessment of their suppliers' performance. Trust in the customer (darker bar). Trust in the supplier (lighter bar). The Y-axis is the mean value of respondents' answers about the assessed amount of trust.

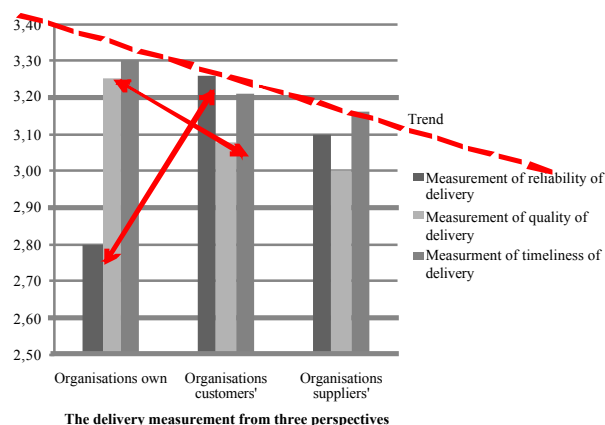


Figure 3. The delivery measurement from three perspectives, the organization's assessment of their own performance, the organization's assessment of their customers' performance and the organization's assessment of their suppliers' performance. The Y-axis is the mean value of the respondents' answers about the assessed amount of trust.

A focused interview was conducted among members of shipyard management. The survey results indicated a significant difference in the expressed (by the focal supplier) level of trust in the customer and trust in the supplier, for example (Figure 2 and 3). In the focused interview these contradictions were discussed with shipyard management group members (including line managers and project managers) in order to find out the reasons for this phenomenon.

After introducing the results of the financial statements analysis and the report of the survey results to a sample of 44 shipyard management level actors, they were asked the following two questions. Firstly: What are the reasons for the lack of trust in the supply chain? Secondly: What kind of impact does the lack of trust have on differences in financial results? Managers were required to look at Figures 2 and 3 in particular and asked to answer the questions (in writing) in their own words.

Two weeks later we received 27 answers. The answers applying the Lewicki and Wiethoff (2000) distinctions of identification-based trust (IB) and calculus-based trust (CB) are collected and categorised. Reasons for lack of trust could be grouped into eight main categories: Different cultures, suppliers, deliveries, supply chain, collaboration, own organization, flow of information, economics. The explanations indicated for example: The suppliers' reputation and lack of accurate knowledge about the network companies; The quality and accuracy of deliveries; Lack of knowledge and control over supply chains; Long supply chains in the network; Insufficient collaboration models and lack of development of collaboration; Lack of commitment; Short-sightedness e.g. over-estimated beliefs in one's own performance capability and quality; Knowledge hoarding and lack of openness. When all answers were analysed, they revealed that Different cultures contain only IB trust, suppliers contain both IB (4 different view point) and CB (5 different view point) trust, deliveries contain both IB (2 different view point) and CB (3 different view point) trust, supply chain contain both IB (2 different view point) and CB (3 different view point) trust, collaboration contain both IB (8 different view point) and CB (5 different view point) trust, own organization contain both IB (2 different view point) and CB (1 different view point) trust, flow of information contain both IB (3 different view point) and CB (2 different view point) trust, economics contain only CB trust. (See Appendix 1)

When managers were asked about the impacts of a lack of trust in the supply chain, their answers could be grouped in six main categories: Quality, scheduling, costs, collaboration, financial success and differences in financial results, risk management. The explanations given by management indicated for example: Lack of trust has a direct impact on schedule and product quality; Inaccurate deliveries (time and scope) lead to uncontrolled performance (at the shipyard) and consequently to higher costs; Distrust weakens profitability. Furthermore it was stated that *“One reason for the difference in results between the shipyard and suppliers today is that when the supplier network improves their production and gains from a higher return on investments, the benefits are not shared with the customer but with the suppliers' own shareholders. When there is a lack of trust, companies try to maximize their own profits.”* One manager made a sharp observation that *“The lack of trust between shipyard and the supply network and/or between the customer and the supply network is not desirable but it is difficult to deduce or establish a direct relationship between differences of (financial) results at such a general level”*. Concerning risk management it was stated that *“The lack of trust leads to a situation where the company must invest in risk management due to the fact that suppliers are not trustworthy. This causes the company extra costs and leads to lower revenues.”* When all answers were analysed, they revealed that Quality contain both IB (2 different view point) and CB (3 different view point) trust, scheduling contains only CB trust, costs contain only CB trust, collaboration contains both IB (2 different view point) and 1 CB trust, financial success and differences in financial results contain both IB (7 different view point) and CB

(11 different view point) trust, risk management contain both IB (2 different view point) and CB (5 different view point) trust. (See Appendix 2)

In the case the relationships were defined as follows: several optional suppliers on the market where competitive bidding is possible; a limited amount of relevant suppliers on the market; a supplier has a monopolistic position or a customer has decided to comply with a strategy of only one supplier; a turnkey supplier which is responsible for its own subcontracting network, and a strategic partnership in the form of a subsidiary or a joint venture. However, the relationship definitions were not separated in questionnaires and interviews, because trust issues were examined in more trust specific level and our earlier empirical studies (Breite and Torkkola, 2009) revealed that trust was not directly related the supplier categories.

CONCLUSION AND DISCUSSION

In this study dynamics between the supplier and the buyer company have been examined in a way which is based upon the theoretical classification of supplier relationships, and upon the supplier's capability to deliver an expected value added to other companies. According to this view point the concepts of horizontal and vertical dynamics were formed, which in turn were examined applying the concept of trust in supply relationships. Furthermore, it was indicated that the reasons for lack of trust are based on both levels of identification-based trust (IB) and calculus-based trust (CB). As transactions are mediated by human actors in the supply network the individual assumptions, beliefs, attitudes, past experiences and reputation affect trust-building processes. The theoretical findings were applied to empirical study, where trust-building processes and supply relationships in the focal European shipbuilding supply network were examined.

The empirical results support the theoretical findings. The impact of system-based and calculus-based trust-building processes in the network was equally clear. In managers' estimations, their own, suppliers', and customers' measurement principles revealed different deficiencies in trust with the category of the supplier relationship referring to the vertical dynamics and the perspective of trust. It can be suggested that the vertical dynamics appeared as volatile commitment and trust between companies; furthermore companies did not fully understand the requirements of the different types of relationships. The empirical study suggests that the sources of vertical dynamics can be utilised when a company estimates difficulties in management in the supply chain. The case study may indicate that both the suppliers' and company's different functions and operating principles are based upon short term project activities and therefore there is no continuity in the relationships. Although the empirical study contains the features of an explanatory analysis, we can still suggest that only one of the trust perspectives used does not fully explain the trust related dynamics. Therefore the theoretical findings of this study led to an interesting theoretical consideration whether in future studies the current theories of supply chain management should increasingly emphasise the point of view in which the examination is based on trust related dynamics of the supply chain relationships.

The findings of this study have interesting implications for supply chain managers, who are responsible for producing the contribution in the dynamic business environment where supplier relationships have not formed in the course of long-term business cooperation. The results of our paper suggest that managers should take careful account of the sources of dynamics defined in contemporary business relationships and they should also understand that trust in different relationship categories are understood different ways by other supply chain members.

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Appendix 1

What are the reasons for the lack of trust in the supply chain? The first column shows the category of the reason. In the second column there is the assessment of the reason as identification-based (IB) or calculus-based (CB). The third column contains the explanation given by the interviewees.

The Reason	IB/CB	Explanations
Different cultures	IB	Acting in different cultures without knowing the culture behaviour norm.
Suppliers	IB	Bad experiences concerning the supplier in the past.
	IB	Even small problems and delivery difficulties weaken the trust and harm the reputation of supplier.
	CB	It is perceived that suppliers do not have project competencies. Therefore there is a lack of trust in the supply chain downstream.
	IB	Insufficient knowledge of information and requirements supplier/customer.
	CB	Bad experiences with company's own equipment suppliers create a lack of trust.
	CB	Contractor (shipyard) is forced to deal with very many suppliers. If one of these fails in a tight supply chain it can easily cause loss of ability to perform for others too.
	CB	The shipyard is blamed for this weakened ability to perform by suffering suppliers. This causes weakening trust towards the shipyard.
	CB	The same unsuccessful suppliers (those who blamed the shipyard) also shift responsibility for their failures to the shipyard. In other words the customers' trust in the shipyard might be weakened.
	IB	Alternatively, clearly weaker trust in one's own suppliers might be a reflection of typical negative attitudes towards the actors in the subcontractor position which is a typical phenomenon in this branch of industry.
Deliveries	CB	Likelihood of uncertain deliveries.
	IB	Quality of delivered goods is not up to standard.
	IB	After service of deliveries does not function.
	CB	Difficulties in deliveries in the supply chain may cause a lack of trust.
	CB	There may be many reasons for the lack of trust. Delayed payments or deliveries for example.
Supply Chain	CB	We (the shipyard) order a job from a supplier. But we cannot be sure how many different suppliers have been hired to do this job by the original vendor.
	CB	Correspondingly, our customer cannot know from where we (the shipyard) order the work for which we are responsible. It is only known by the customer in cases where it is mentioned in the contract.
	CB	The further down the supply chain we go, the less trust seems to exist. This may be caused by the suppliers' high reliance on customers and the bullwhip effect, hence general insecurity.
	IB	The supply chain is not completely known, and therefore we cannot control...
	IB	Lack of trust may also be caused by distance: the supplier of the supplier is not known very well. Therefore opinions of them are more pessimistic than optimistic.
Collaboration	IB	The performance is not honest and open.
	CB	There are problems in collaboration models.
	CB	Development of collaboration is insufficient in certain sectors.
	IB	Fundamental values differ too much.
	IB	Lack of trust is evidence of insufficient co-operation.
	IB	Lack of motivation to commit and lack of commitment capability etc.
	IB	Customer has highest trust in its own performance capability. This is caused by the old saying: "The customer is always right". We are not in a "win-win" situation between supplier and customer.
	CB	We (the shipyard) do not know new suppliers.
	CB	Trust is built from long-term relationships from which both parties mutually benefit.
	IB	In the case of old suppliers, trust is built on earlier experiences.
	IB	I have experience from another branch of industry. There we could make reasonable earnings for both parties via a real partnership with the importers.
	CB	
	Own organization	CB
IB		Our own reliability is overestimated compared to the customer and underestimated compared to the
IB		Strong belief in our own organization's reliability.
Flow of information	CB	Lack of trust is caused by a lack of information among other things.
	CB	Knowledge hoarding and concealment.
	IB	Unrealistic expectations.
	IB	Assumptions based on beliefs.
	IB	Could the explanation be in a failure in information flow? This might have created distrust between the stakeholders.
Economics	CB	If a company cannot perform profitably, is it capable of taking care of its responsibilities in the project?
Do not know		I cannot answer, complicated question.
		I do not understand the relation between the question and the figure.
		I do not understand the figure.

Appendix 2

What kind of impact does the lack of trust have on differences in financial results? The first column shows the category of the impact. The second column gives the assessment of the reason as identification-based (IB) or calculus-based (CB). The third column shows the explanation given by the interviewees.

The Impact on	CB/IB	Explanations
Quality	CB	Production of excess quality.
	CB	Lack of trust has a direct impact on schedule and product quality
	IB	Surely, it must also have a positive effect on quality in shipbuilding for example.
	CB	The lack of trust always makes extra work. Extra energy has to be directed to unprofitable work. In other words already agreed performance has to be controlled unnecessarily
	IB	The supplier does not trust the shipyard. Therefore offers includes extra buffers.
Scheduling	CB	Schedules are not kept
	CB	Lack of trust has a direct impact on the schedule and product quality
Costs	CB	Inaccurate deliveries (time and scope) lead to uncontrolled performance (at the shipyard) and consequently to higher costs
	CB	A potential lack of trust has to be solved in another way. Not by increasing control and contracts. These do have indirect cost consequences and therefore an effect on the financial outcome of the organization.
Collaboration	IB	Collaboration is very difficult if stakeholders do not trust each other.
	IB CB	For example: Subcontractor cannot be committed; project-based nature, fluctuation of workload and demand; supplier is missing in the next project; no permanent relationship between subcontractors and their subcontractors; contracting; foreign workforce, language barriers, working in different ways,
Financial success / differences in financial results	CB	The less a company trusts its suppliers, the poorer the company's financial success
	CB	Own organization's financial result decreases if trust decreases.
	CB	Differences (in financial result) can grow further
	CB	Negative effect
	CB	High level of trust in customer is in correlation to better financial outcome
	IB	According to the survey, too much trust in the customer is not profitable and there should be more
	CB	reliance on the supplier
	CB	A lack of trust between shipyard and supply network / customer and supply network is not desirable.
	IB	However, a direct impact on the financial result is difficult to conclude on such a general level. In order to assess the effects it is important to know what kind of lack of trust there is and the reason for it
	CB	The lack of trust is directly reflected in the project result
	IB	The lack of trust inevitably affects the result negatively
	IB	Maybe there is a tendency to maximize one's own benefit when there is a suspicion that the other party is trying to do so
	IB	You trust the customer too much and therefore the customer gets more than originally agreed
	CB	When the lack of trust is minor there are better chances to make profit than in the case of a major lack of trust
	IB	Distrust weakens profitability
IB	As shown in Figure 1 "the organization itself" is the only one with a negative result. This is probably the reason for the lack of trust in Figure 2.	
CB	One reason for the difference in results between shipyard and suppliers today is that when the supplier network improves their production and gains from a higher return on investments, the benefits are not shared with the customer but with the suppliers' own shareholders. When there is a lack of trust, companies try to maximize their own profits	
Risk management	CB IB	There is not enough trust in the customer in other words there is no courage to take risks. Only certain deals are accepted. When it is a suppliers' market, which is obviously the case, there is also an opportunity to make a profit. At the same time we (the shipyard) struggle with deliveries and are forced to bear more of the risk
	CB	The lack of trust leads to a situation where the company must invest in risk management due to the fact that suppliers are not trustworthy. This causes the company extra costs and leads to lower revenues
	CB	In a situation of lack of trust, parties usually accept higher risk buffers in the sales prices. The shipyard however cannot do this on the same scale as equipment manufacturers. On the other hand, if a project with high risk buffers is successful, it is also profitable
	CB	A distrust supplement is added to the sales price
	CB IB	Sometimes the cheapest supplier is not chosen because it is unknown to the company. On the other hand a supplier may be familiar but is known to have taken more than they can handle and will therefore be incapable of delivering the products or services