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**VALUE CO-CREATION THROUGH TRANSPARENT BUYER-SUPPLIER
RELATIONSHIPS**

A Case Study in the Supply Network of Industrial Machinery Manufacturer

Master's Thesis in
Industrial Management

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ABBREVIATIONS

B2B	Business-To-Business
B2C	Business-To-Consumer
CAD	Computer-aided Design
EDI	Electronic Data Interchange
ERP	Enterprise Resource Planning
IMP	Industrial Marketing and Purchasing Group
IOCM	Inter-organizational Cost Management
IT	Information Technology
JIT	Just in Time
NPD	New Product Development
OBA	Open-book Accounting
RFID	Radio Frequency Identification
ROI	Return on Investment
RP	Relationship Promoter
SCC	Supply Chain Collaboration
SCI	Supply Chain Integration
SCV	Supply Chain Visibility
SDL	Service Dominant Logic

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ABSTRACT:

This research aims to find the appropriate level of transparency in different buyer-supplier relationships in order to enhance value co-creation in the supply network. The previous literature demonstrates that transparency brings many benefits but also causes risks. Therefore, transparency needs to be balanced in different buyer-supplier relationships.

This research was an embedded single case study containing three supplier groups within the supply network. The primary and qualitative research data related to the antecedents for transparency and the effects of transparency on value co-creation was collected from 14 in-depth semi-structured interviews. This data was analyzed by a causal map analysis. The secondary research data had been collected from the web-based structured questionnaires from the customer and its 24 suppliers. This data was analyzed by a descriptive statistics in order to describe the current level of transparency in the supply network.

The research results indicated that the level of transparency in the supply network varied based on the type of the relationship where the more collaborative relationships had the higher level of transparency and the more powerful actor seemed to force the other to share information. Furthermore, transparency was believed to require trust but also the arranged methods and IT-systems for information sharing which need allocated resources and causes costs. The results also indicated that transparency had many value-creating effects related to capabilities, integration, operational performance and financial outcomes but it also had some value-destroying effects. Lastly, a framework was created in order to determine the development suggestions for the appropriate level of transparency in different buyer-supplier relationships in the supply network so that more value can be created and shared between the actors. The framework is applicable at least with the similar supply networks which provide low volume manufactured products with many different and variable items.

KEYWORDS: Supply chain collaboration, supply chain visibility, buyer-supplier relationships, relationship transparency, value co-creation.

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TIIVISTELMÄ:

Tämä tutkimus pyrkii löytämään asianmukaisen avoimuuden tason erilaisissa ostaja-toimittajasuhteissa, jotta arvon yhteisluontia voidaan edistää toimitusverkostossa. Aikaisempi kirjallisuus esittää, että avoimuus tuo monia etuja, mutta siitä seuraa myös riskejä. Näin ollen avoimuuden tulee olla tasapainossa erilaisissa ostaja-toimittajasuhteissa.

Tämä tutkimus oli sisäkkäinen yksittäinen tapaustutkimus sisältäen kolme toimittajaryhmää toimitusverkoston sisällä. Ensisijainen ja laadullinen tutkimusaineisto avoimuuden edeltäjistä ja avoimuuden arvon yhteisluonnin vaikutuksista hankittiin 14:stä puolittain jäsennellystä syvähaastattelusta. Tämä aineisto analysoitiin kausaalilla kartta-analyysillä. Toissijainen ja määrällinen tutkimusaineisto oli kerätty verkkopohjaisista strukturoiduista kyselyistä asiakkaalta ja sen 24:ltä toimittajalta. Tätä aineistoa analysoitiin kuvailevalla tilastoanalyysillä toimitusverkoston avoimuuden nykytason kuvailemiseksi.

Tutkimustulokset osoittivat, että avoimuuden taso toimitusverkossa vaihteli suhteen tyyppin mukaan, jolloin yhteistyötyyppisillä suhteilla oli korkeampi avoimuuden taso ja vahvempi osapuoli näytti pakottavan toista jakamaan tietoa. Lisäksi avoimuuden uskottiin vaativan luottamusta, mutta myös sovittuja menetelmiä ja tietotekniikkajärjestelmiä, jotka tarvitsevat allokoituja resursseja ja aiheuttavat kustannuksia. Tulokset myös osoittivat, että avoimuudella oli monia arvoa luovia vaikutuksia, jotka liittyivät kyvykkyyksiin, integraatioon, operatiiviseen suorituskykyyn ja taloudellisiin tuloksiin, mutta sillä oli myös joitain arvoa tuhoavia vaikutuksia. Lopuksi muodostettiin viitekehys kehitysehdotusten määrittämiseksi avoimuuden asianmukaiselle tasolle erilaisissa toimitusverkoston ostaja-toimittajasuhteissa, jotta arvoa voidaan jakaa ja luoda lisää osapuolten välillä. Viitekehys soveltuu ainakin samanlaisiin toimitusverkostoihin, jotka tarjoavat pienellä volyymillä valmistettuja tuotteita useilla erilaisilla ja vaihtelevilla nimikkeillä.

AVAINSANAT: Toimitusketjuyhteistyö, toimitusketjun läpinäkyvyys, ostaja-toimittajasuhteet, suhteen avoimuus, arvon yhteisluonti.

1 INTRODUCTION

This section introduces the background and scope of the thesis including the research problem, questions and objectives. Furthermore, the structure of the thesis is presented.

1.1 Background

During the past decades, companies have increased collaboration in order to have an efficient and responsive supply chain for the changing market needs (Cao and Zhang 2011: 166). Supply chain collaboration can create benefits when the actors in the supply chain jointly create the mutual way to share information and synchronize supply in order to lower inventories, avoid bullwhip effect, improve business synergy and quality as well as create flexibility and joint innovations in the supply chain (Cao and Zhang 2011: 174). However, there is a widespread belief that the most of the companies have not used the whole potential of collaboration and therefore there is a need to understand its practical value and the specific characteristics of close relationships (Min, Roath, Daugherty, Genchev, Chen, Arndtet & Richey 2005: 238; Goffin Lemke & Szwejczewskiet 2006: 190).

Zacharia, Nix and Lusch (2011: 597) argue that when companies share information, exchange knowledge and generate ideas these lead to the great operational outcomes. According to Barratt and Oke (2007: 1230), information sharing leads to visibility which improves the operational performance of a supply chain. In the buyer-supplier relationships, the two-way information and knowledge sharing can be seen as a relationship transparency which Eggert and Helm (2003: 103, 106–107) define as:

”an individual’s subjective perception of being informed about the relevant actions and properties of the other party.”

They argue that transparency have an effect on the success of a buyer-supplier relationship as it increases customer’s value and satisfaction as well as leads to positive behavioral intentions. Respectively, Lamming, Caldwell and Harrison (2004: 293–294, 2006: 208)

introduce the idea of value transparency where both parties should gain value in the relationship from exchanging sensitive information and knowledge. They describe that relationship transparency relate to the exchange of cost, technological, operational and strategic information.

1.2 Scope

Eggert and Helm (2003: 106–107.) argue that transparency brings many benefits but too much transparency can increase uncertainty if the actor does not know how to use new information. Furthermore, too much irrelevant information to the receiver can cause a negative impact on satisfaction. Similarly, Lamming, Caldwell, Phillips and Harrison (2005: 558–561) present that transparency can cause risks for both parties such as information leakages to the supplier's competitors whereas the supplier can provide false information or use the shared information from customer's processes opportunistically. Furthermore, Hultman and Axelsson (2007: 629–634) argue that even though transparency can solve problems related to the material flow, product development and search for the supplier, increased transparency can cause other type of problems. For example, suppliers' products can become commoditized or actors' power positions can change too much. Therefore, transparency causes risks and it has to be balanced in different buyer-supplier relationships. In addition, relationship transparency has received quite little research interest (Eggert and Helm 2003:101, Hultman and Axelsson 2007: 628). Therefore, the main objective of this research is to make the development suggestions for the appropriate level of transparency in different buyer-supplier relationships in the supply network, so that more value can be created and shared between the actors. Based on the main objective, the research problem is defined as follows:

What is the appropriate level of transparency in different buyer-supplier relationships in order to enhance value co-creation in the supply network?

This research applies Hultman and Axelsson's (2007: 629–630) typology of transparency and especially its four types of transparency (cost, supply, technological and organizational). Furthermore, the strategic transparency concerning information about parties' business strategy and competitive advantage is added as the fifth transparency type because it can improve relationship value in terms of performance improvements (Klein & Rai 2009: 750). These types are related to the first research question which is defined below. The aim is to describe the current levels of five different transparency types in different buyer-supplier relationships in the supply network.

RQ1 What is the level of transparency in the supply network?

In order to make development suggestions for the appropriate level of transparency in different buyer-supplier relationships, it is important to know which things in the relationship have the effects on the level of transparency. Therefore, the second research question aims to find the antecedents for transparency in the buyer-supplier relationships by identifying the causal beliefs about how the actors understand the requirements for transparency in the buyer-supplier relationships.

RQ2 What are the antecedents for transparency in the buyer-supplier relationships?

It is also important to understand the concept of value thoroughly in order to find the value-creating effects of transparency and to propose the appropriate level of transparency in different buyer-supplier relationships. According to Corsaro (2014), value in the relationships has been conceptualized as the factors which provide value in the relationship. This has mainly related to the search for the situation where the benefits exceed the sacrifices leading to relationship value. For example, the relationship value can be categorized into integration-based, supplier capability-based and operational performance-based value factors which together form the financial outcomes (Terpend, Tyler, Krause & Handfield 2008: 40). There is also a growing viewpoint where value is understood as "value in use". Based on that viewpoint, the suppliers cannot create value included in the products and services but they can co-create value during interaction with the customer

(Vargo and Lusch 2008: 7). Value co-creation during interaction means that the supplier works together with the customer and directly impacts on the customer's processes (Grönroos 2011b: 243–245). However, the value co-creation viewpoint needs further research at the Business-To-Business (B2B) context (Grönroos 2011b: 246). This leads to the third research question defined below.

RQ3 How can transparency have effects on value co-creation in the buyer-supplier relationships?

Based on the above mentioned viewpoints of value, the effects of transparency on value co-creation are analyzed by identifying the causal beliefs of how the actors understand the value-creating effects of transparency in the buyer-supplier relationships. Value co-creation is understood as a collaborative process to create value between the actors during interaction.

In summary, the research is a descripto-explanatory research where description is a precursor to the explanation (Saunders, Lewis & Thornhill 2012: 171). At first, the level of transparency in the supply network (RQ1) is described. This leads to the explanatory phase where the antecedents for transparency (RQ2) as well as the causal beliefs related to transparency and value (RQ3) are studied. Table 1 below summarizes the research problem and questions related to the research objectives.

Table 1. Research problem, questions and objectives.

Research problem:	Main objective of the research:
What is the appropriate level of transparency in different buyer-supplier relationships in order to enhance value co-creation in the supply network?	To make development suggestions for the appropriate level of transparency in different buyer-supplier relationships in the supply network so that more value can be created and shared between the actors.
Research questions:	Research objectives:
RQ1 What is the level of transparency in the supply network?	To describe the current levels of different transparency types in different buyer-supplier relationships in the supply network.
RQ2 What are the antecedents for transparency in the buyer-supplier relationships?	To identify the causal beliefs about how the actors understand the requirements for transparency in the buyer-supplier relationships.
RQ3 How can transparency have effects on value co-creation in the buyer-supplier relationships?	To identify the causal beliefs about how the actors understand the value-creating effects of transparency in the buyer-supplier relationships.

The research strategy of this thesis is a case study containing the lead company and its 24 most important suppliers. The lead company is an industrial machinery manufacturer located in Finland. The lead company's 24 most important suppliers form 84 % of its annual purchasing volume. These suppliers are grouped into three different supplier groups which also represent the embedded cases within this single case study: contract manufacturers, technology suppliers and subcontractors. Contract manufacturers refer to the nine system suppliers who provide components and/or sub-assemblies with a collaborative long-term relationship. These various sized suppliers are mainly located in Finland. Technology suppliers refer to the eight suppliers who provide high-tech components and are usually big global companies with their own products. This group also includes technical wholesalers providing various community components. Subcontractors refer to the seven small-sized suppliers who provide machined metal components and are mainly located in Finland. In this research, the customer refers to the buyer in the buyer-

supplier relationships. Furthermore, the lead company, the customer and the buyer refer to the same company.

1.3 The structure of the thesis

This thesis is structured by theoretical and empirical parts that support each other. Chapter 2 contains the theoretical background of this study. At first, Chapter 2.1 introduces the previous empirical studies on supply chain collaboration. This is followed by Chapter 2.2 where interaction and relationship integration are introduced. After that, Chapter 2.3 introduces relationship transparency and its different types along with the related concepts. Then Chapter 2.4 introduces different viewpoints for the value in buyer-supplier relationships. Lastly, Chapter 2.5 synthesizes these theories along with the framework for the empirical part.

Chapter 3 describes the research methods and the research strategy for the empirical part of this thesis. It also introduces the data collection techniques and the data analysis procedures as well as how these are related to the research questions. Chapter 4 contains the empirical research results by following the order of the research questions. At first, Chapter 4.1 introduces the findings about the current level of transparency in the supply network. Then, Chapter 4.2 introduces the findings about the antecedents for transparency. Lastly, Chapter 4.3 introduces the findings about the value-creating effects of transparency.

Chapter 5 contains discussion and development suggestions. At first, Chapter 5.1 interprets the results presented in the previous result chapter and follows the order of the research questions as well. After that, Chapter 5.2 introduces the development suggestions for the appropriate level of transparency in the supply network. Finally, Chapter 6 concludes the whole research as well as introduces the limitations and the implications for further research.

2 THEORETICAL BACKGROUND

At first, this theoretical chapter presents previous empirical studies on supply chain collaboration. This is followed by the interaction and integration of buyer-supplier relationships. After that, relationship transparency and its different types along with the related concepts are introduced thoroughly. Then the value in the buyer-supplier relationships and the related concepts are introduced. Lastly, this theoretical part is synthesized along with the framework for the empirical part. The academic articles on these topics were searched from scientific databases (e.g. EBSCO, Emerald, Sage and Science Direct) and the reference lists in the suitable articles.

2.1 Supply chain collaboration

Cox (2004a: 347–348) explains that some authors argue that the most beneficial style to manage supplier relationships is always transparent and long-term “win-win” collaboration based on the Japanese “lean” approach and sometimes more “agile and responsive” approach. However, other authors criticize that this kind of long-term and collaborative approach requires customer dominance over the suppliers. Moreover, the creations of trust and win-win outcomes are not always realized. Cox’s (2004a: 349–355) study indicates that it is difficult for customers or suppliers to reach their relationship goals due to insufficient capability and competence or weak power position. For example, there are only a few companies who are able to have enough resources and/or dominance over its suppliers to have collaborative and resource intensive relationships with the most of its suppliers. Therefore, there is a need to find an appropriate way to manage supplier relationships in a given situation. This can happen through aligning sourcing strategy (e.g. reactive short-term or proactive long-term at the first-tier or at multiple tiers), specific power situation (e.g. dependency and dominance) and appropriate relationship management style (e.g. arm’s length or collaboration).

Min et al. (2006: 245) and Cao and Zhang (2011: 166) argue that supply chain collaboration (SCC) has many definitions and usually these are related to two groups of conceptualization: process and relationship focus. Process focus refers to the business processes where the actors are planning and executing supply chain operations with better outcomes than when working individually (e.g. Simatupang & Sridharan 2002: 19). Respectively, relationship focus refers to the linkages between the firms or long-term partnerships where the actors are sharing resources, information, and risks in order to reach mutual objectives (e.g. Golicic, Foggin & Mentzer 2003: 64–65). Cao and Zhang (2011: 166) combine these two viewpoints and define supply chain collaboration as:

”a partnership process where two or more autonomous firms work closely to plan and execute supply chain operations toward common goals and mutual benefits.”

Cao and Chang (2011: 163) argue that sometimes the term supply chain integration (SCI) is used as SCC to determine a collaborative process between the actors in a supply chain. However, SCI concentrates more on ownership, centralized control and process integration whereas SCC have more relational approach related to governance. Flynn, Huo and Zhao (2010: 59) define SCI as:

”the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organization processes.”

Moreover, the target of SCI is to provide maximum value for the customer through improved efficiency and effectiveness in the movements of products, money, information and decisions. They argue that SCI can be understood through three dimensions: internal-, customer-, and supplier integration. Internal integration refers to the manufacturer’s own activities related to meeting its customer’s requirements and enhancing interaction with its suppliers. Customer and supplier integrations refer to the external integration where the actors’ practices, processes and strategies are structured into synchronized and collaborative processes. Table 2 below introduces the previous empirical studies related to supply chain collaboration with its activities and antecedents as well as benefits and the sacrifices.

Table 2. Empirical studies on supply chain collaboration.

Author & year	Research methods & data	Activities	Antecedents	Benefits	Sacrifices (costs, risks)
Min et al. (2006)	Survey (N=62) and interviews of logistics and supply chain managers in the US; qualitative; coding	Information sharing, problem solving, mutual planning, performance measurement and leveraging	Internal alignments, strategic intent, free flow of information, relationship orientation, relationship-specific investments, and communication as well as formalization	Improved efficiency and effectiveness, profitability, and reinforcement and expansion of the relationship	N/A
Das et al. (2006)	Survey of manufacturing companies in various industries in the US (N=322); quantitative; factor analysis	Supplier integration: synchronizing the external and internal practices	Six specific beneficial practices	Improved manufacturing performance which leads to improved financial performance	Supplier integration might cause the increased cost of coordination and inflexibilities so that there is a need to find an optimal level of collaborative efforts in supplier relationships
Nyaga et al. (2010)	Survey for buyers and suppliers in various manufacturing and service industries in the US (N=625); quantitative; structural equation modeling	Information sharing, joint relationship effort and relationship-specific investments	Commitment and trust	Satisfactions with the relationship and results. Improved performance.	Suppliers commitment to a relationship with a buyer may not guarantee increased business or improved performance
Cao and Zhang (2011)	Survey of manufacturing companies in various industries in the US (N=211); quantitative; factor analysis and structural equation modeling	Information sharing, goal congruence, decision synchronization, incentive alignment, resource sharing, collaborative communication and joint knowledge creation	Parties investments in collaboration and creation of the mutual way of information sharing, replenishment, and supply synchronization.	Increased collaborative advantage and improved financial performance	N/A

According to empirical study by Min et al. (2006: 248), collaboration happens through sharing information, solving problems, planning together, measuring performance and leveraging. Information sharing contains forecasting, scheduling, market planning and production capacity planning. Problem solving includes logistics, marketing support, quality control, development / redesign products and cost-benefit analysis whereas mutual planning refers to joint goals and objectives. Performance measurement includes regular performance reviews, key performance indicator measurements, reward decisions and corrective actions. Lastly, leveraging includes capacity, resources, skills, specialization and knowledge. Similarly, Nyaga, Whipple and Lynch (2010: 103–104, 109) describe that the

activities of collaboration relate to information sharing, mutual relationship effort and relationship-specific investments. Information sharing includes the relevant information about changes and other information that can help the other party. Joint relationship effort refers to joint planning and problem solving whereas relationship-specific investments include dedicated personnel, expertise, technology, equipment and support systems.

Cao and Zhang's (2011: 174) study demonstrate that collaboration happens when information is shared, decisions are synchronized, goals are set, incentives are aligned, collaborative communication is a norm, resources are shared and knowledge is created mutually. Information sharing includes all the needed and beneficial information that is shared between the actors. Decision synchronization means partners' joint decisions that optimize the benefits of the supply chain. Goal setting refers to actors' agreement about the supply chain goals related to their own goals. Incentive alignment relates to shared benefits, costs, and risks between the actors. Resource sharing refers to leverage and investment in capabilities and assets with the actors whereas collaborative communication refers to frequent, open, two-way and informal communication through different channels between the parties. Lastly, joint knowledge creation includes the joint creation of new and relevant knowledge related to customer needs, markets and competitive environment.

There are many antecedents for supply chain collaboration. For example, Min et al. (2006: 245) find that collaboration requires strategic intent (e.g. functional integration based on capabilities), internal alignments (e.g. process mapping and integrating internal operations), relationship orientation (e.g. long-term orientation), relationship-specific investments (e.g. tangible and intangible resources, training, information technology and time), the open information and communication flow as well as formalization (e.g. targets, performance measures, rules and procedures). Das et al. (2006: 574) find six practices of supplier integration which relate to the high performance of the company: joint problem solving, direct communication between the production schedulers, the usage of buyer-supplier councils, development and certification of suppliers by purchasing department as well as

joint goal setting between manufacturing and purchasing. Nyaga et al. (2010: 109) describe that collaborative relationships require trust and commitments. Lastly, Cao and Zhang (2011: 174) argue that collaboration requires that the parties in the supply chain invest in collaboration and create the mutual way of sharing information, making replenishment, and synchronizing supply.

Min et al. (2006: 250) reveal that supply chain collaboration improves efficiency (reduced costs, inventory, and lead-time), effectiveness (increased market share, improved customer service and pricing, and new product development), profitability (higher Return on Investment (ROI) and sales) and the relationship (commitment, trust and joint involvements). Respectively, Cao and Zhang (2011: 175–177) find that supply chain collaboration increases collaborative advantage (efficient processes, flexible offering, business synergy, new innovations and better quality) which lead to improved performance (sales growth, growth in ROI and better profit margin on sales). Furthermore, they argue that collaborative advantage helps to build up synergies and improve performance between the supply chain actors.

Das, Narasimhan and Talluri (2006: 572–573, 576–579) find that there is a curvilinear relationship between performance and supplier integration. Therefore, it is beneficial to invest in supplier integration but there is a need to have an appropriate level of collaboration because supplier integration can increase the coordination costs and cause inflexibilities. They argue that supplier integration with appropriate practices can improve manufacturing performance (reduced costs, the quality of conformance and shorter lead times) which leads to improved financial performance (improved profit, and market and sales growth). Nyaga et al. (2010: 109–110) reveal that collaborative relationships can result in improved satisfactions with the relationship and results as well as better operational performance if the trust and commitment are at high level. However, they find that commitment does not have significant positive effects on performance for suppliers. They argue that this result indicates that in the collaborative relationships where suppliers'

have strong commitment to the relationship may not be guaranteed supplier's increased business or improved performance because the customer may still require periodic contract renegotiations or rebidding which may not be beneficial to a supplier.

2.2 Interaction and relationship integration

Gadde and Snehota (2000: 315) argue that supplier relationships should be viewed and treated similarly than the investments of the company because these relationships are the most important asset for a firm. The full potential from the suppliers can be capitalized by closely integrating the operations between the companies. This kind of relationship integration requires the coordination of the activities, the adaptations of the resources and interactions between the people, which all cause costs for both firms. However, heavy involvement is not always appropriate because of supplier's lack of necessary motivation and interest, realized higher costs than benefits or company's limited resources. This viewpoint is in line with Cox's (2004a) findings which indicate the need to find the most beneficial approach to manage a supplier relationship in a given situation.

Industrial Marketing and Purchasing (IMP) group's researchers argue that interaction is the main process in business that happens between firms. It also has effects on the resources and activities of the firms (Ford, Gadde, Håkansson, Snehota & Waluszewski 2010: 86–88). The process and outcomes of interaction can be understood through activity links, resource ties and actor bonds as Håkansson & Snehota (1995: 28–34) describe. The Actors-Resources-Activities (ARA) framework suggests that these three things are connected as well as each of those closely relates to the wider actor network, resource combinations and activity patterns.

Similarly with the IMP group's viewpoints, Vesalainen and Kohtamäki (2015: 108) have conceptualized relationship integration and have suggested that typically integration can be understood through three dimensions: relational capital (the relational form of social

capital), relationship structures, and relationship-specific investments. These can be also understood through structural, economic and social dimensions related to the broader relational governance theory. Moreover, one or more dimensions can be present at the same time. Furthermore, these three dimensions of integration refer to the depth of the relationship whereas interaction occurs within the relationship. Respectively, Kim, Choi and Skilton (2015: 321) have conceptualized buyer-supplier embeddedness (integration) to structural and relational dimensions by using the social embeddedness literature. In their conceptualization, relational dimension refers to relational capital whereas structural dimension contains both relationship structures and relationship-specific investments.

2.2.1 Interaction in buyer-supplier relationships

Ford and Mouzas (2013: 435) explain that the IMP group view interaction within the relationships as a process where each actor tries to solve its own problems. Interaction can contain learning, teaching, coercion and concession by the actors at the specific time and for the specific issues. It also requires trade-offs between actors' benefits and costs for the specific time period. Ford et al. (2010: 88) conceptualize interaction as:

”the substantive process that occurs between business actors through which all of the aspects of business: material, financial and human and all of the elements of business: actors, activities and resources take their form, are changed and are transformed.”

The substantive process means that interaction is not only limited only to negotiation or communication. It also relates to the actors' resources and activities and determines these factors' usefulness, form, and value. That kind of interaction aims to satisfy the needs of the actor or actors. Moreover, interaction may lead to the transformation or adaptation of the actors, resources and activities in order to satisfy the specific needs of the actor. These adaptations and transformations also relate to the interactions in the future as they cause the complex interdependencies between the actors. (Ford & Mouzas 2013: 435–436)

IMP group's researchers argue that interaction cannot be controlled by any actor directly or indirectly involved or affected by it because interaction is substantive (Ford and Håkansson

2013: 1019; Ford & Mouzas 2013: 436–437). However, many actors can influence its direction. This substantive effect can be understood through the structure of relatedness at the specific time and the process of interaction over time related to activities, resources and actors. At a specific point in time, relatedness can be understood through *the interdependencies between the activities* of the actors (e.g. integrated production or logistics systems), *the heterogeneity of resources* (the adaptation and development of companies' resources) and *the jointness of the actors* (e.g. product development collaboration). The interaction process over time can be understood through: *the specialization of activities* resulted by the evolving interdependencies between specific activities, *the path of resource development* and *the co-evolution of the actors* as they interact with each other (e.g. the adjustment of their ways of thinking).

Grönroos (2011b: 243–245) describes that interaction is a process where the other actor has ability to have an influence on another. He argues that customer-supplier interaction in a business context refers to the contact with two or more actors where they have abilities to impact on each other's processes. Interactions as a manufacturing viewpoint (including manufacturing processes as well as order taking, complaints handling, etc.) means that co-producing opportunities exist for the customer when the customer can influence the supplier's manufacturing process. Interaction from a value creation (or value-in-use) perspective means that the supplier has ability to influence the customer's processes in a way that supports customer's value creation. Therefore, value can be co-created during interaction. In practice, interaction and value co-creation can take place during manufacturing, development, design, deliveries and service-processes. Moreover, the supplier can only facilitate the customer's value creation without the interaction. However, the existence of interaction is only a starting point for the supplier to directly influence customers' value creation. Therefore, the quality of the interactions between the parties is crucial for value co-creation (i.e. how effectively the parties can use the interaction to enhance customer's value creation).

2.2.2 Relationship structures

Activity links (or relationship structures) in the ARA framework refers to the integration and coordination of activities between the actors (Håkansson & Snehota 1995: 28–29). For example, during relationship development, the activities (e.g. information sharing, production, deliveries, logistics, and administration) can be closely integrated with the partner company. Furthermore, the modification and readjustment may be needed when the activities of the partner companies change over time. When companies' activities become linked and coordinated, a complex activity pattern can emerge where different companies have different parts to handle. Therefore, the changes somewhere in the activity pattern have effects on the activity links between two companies.

Kohtamäki, Vesalainen, Henneberg, Naudé and Ventresca (2012: 1300–1301) present that relationship structures include the IT systems and organizational routines that enhance interaction in the buyer-supplier relationships. They define it through four dimensions: integrated relationship IT systems, relationship steering group, development teams and relationship process descriptions. For example, integrated relationship IT systems (e.g. Just in Time (JIT) -systems, Electronic Data Interchange (EDI) -systems, Computer-aided Design (CAD) -programs or social media) are needed to help interaction between the companies. Furthermore, relationship steering group is needed to manage the development tasks in the relationship whereas development teams are needed for implementing the development tasks. Lastly, relationship process descriptions (e.g. routines for order-delivery) direct interactions between the parties.

Kim et al. (2015: 321) present that when the structural dimension of the relationship relates to efficient exchange patterns at the multiple levels along with the high frequency of interaction and routine based responses to events. They also state that relationship-specific investments have established because they include relationship-specific investments within the structural dimension. Similarly like these previous viewpoints, Grönroos (2011b: 244) argue that interaction requires a platform for interaction where the interaction between the

customer and the supplier can occur. The interactive platform can be created through interactive systems where different collaborative activities can happen (e.g. product and service development collaboration). Lastly, Kohtamäki et al. (2012: 1306) find that relational structures do not have direct effect on relationship performance improvement. However, it can create the platform for interactions between firms and with the relational capital it can help to improve relationship performance.

2.2.3 Relationship-specific investments

Resource ties (or relationship-specific investments) in the ARA framework refers to adapted and more or less mutually tied tangible (e.g. plants and equipment) and intangible resources (e.g. commercial, technical and administrative knowledge) which make up the activities (Håkansson & Snehota 1995: 30–32). These resource ties are results from the relationship development and can lead to more efficient resource usage. Moreover, the new combinations of resources can occur when the relationship develops further. However, developing a relationship by increasing resource integrations is often costly and the benefits occur usually in the future. Furthermore, the developed relationship becomes an asset that need to be taken care of and utilized efficiently. Therefore, relationship development can be seen as an investment process. In addition, resource ties in a relationship are an element of the aggregated structure that forms a larger resource combination. This resource combination can become a valuable asset as well as a constraint for the competitors.

According to Kohtamäki et al. (2012: 1301–1306) relationship-specific investments relate to the resources that are dedicated to the specific relationship. These are also difficult to utilize in other relationships. For example, the investments can be related to the relationship-specific manufacturing competencies, information systems or equipment and tools. They reveal that relationship-specific investments have direct effects on the relationship performance resulting in the improvements of quality, delivery accuracy, productivity and capital usage.

According to Laaksonen, Pajunen and Kulmala (2008: 911, 916–917), relationship-specific investments tie both parties in the buyer-supplier relationship together because these investments' value is much smaller in the other relationships and the current customer or supplier has capability to produce the items more cost efficiently than alternative suppliers which have not made these investments. Moreover, relationship-specific investments reduce the number of possible suppliers or customers and lead to reduced bargaining power for the other party. They have found out from their case study that relationship-specific investments improve customer's trust to the suppliers in terms of supplier's competence and goodwill. This leads to the commitment and long-term contracts as well as enhances information sharing in the relationship. Lastly, these arrangements improve the resources in the relationship which lead to the more competitive customer-supplier relationship. Respectively, the case study by Grönroos and Helle (2010: 581–584) indicate that when the supplier and the customer make relationship-specific investments in order to integrate both parties' resources, processes and competencies in new ways, they were able to create more value and share it for both parties by using a transparent pricing mechanism.

2.2.4 Relational capital

The actor bonds (or relational capital) in the ARA framework refers to the interpersonal bonds that are developed between the people of partner companies during interaction (Håkansson & Snehota 1995: 32–34). The actor bonds have effects on the actors' present and future interaction in the relationships. Moreover, the wider web of actors in the network can change when the individual actors learn and adjust their actor bonds.

Kohtamäki et al. (2012: 1300), argue that relational capital can be understood as a social capital that occurs within the buyer-supplier relationships and is related to trust, community and open interaction. Similarly, Kim et al. (2015: 321) demonstrate that relational dimension indicates partnership orientation when trust is at high level, information is shared freely, and relational norms and shared values help to control and solve conflicts. Furthermore, parties' intention is to reach a lasting commitment.

Laaksonen et al. (2008: 911) define trust in a buyer-supplier relationship as:

”a belief by one party in a relationship that the other party will not act against his or her interests, where this belief is held without undue doubt or suspicion and in the absence of detailed information about the actions of the other party.”

Laaksonen et al. (2008: 911, 915) also distinguish trust to three different types: contractual, competence and goodwill. Contractual trust means that the other party will behave based on the oral or written agreements. Competence trust relates to the other party’s ability to perform based on the agreement. Lastly, goodwill trust refers to the other party’s intentions to perform based on the agreement. They argue that these types of trust closely relate to each other and usually these develop dynamically within the relationship. However, they find that contractual trust is not needed in a close buyer-supplier relationship. Day, Fawcett S., Fawcett A. and Magnan (2013: 153–154) argue that trust enhances the creation of relational capital and defines it as a function of benevolence and credibility. They argue that trust can be seen as:

”confidence that each party in a relationship will perform as promised and genuinely take each other's welfare into consideration as each makes decisions.”

Huang and Wilkinson (2013: 459–463) point out the dynamical aspects of trust and argue that trust always changes based on the actions and interactions which occur over time.

Kohtamäki et al. (2012: 1306) demonstrate that relational capital have direct effects on relationship performance improvement (delivery accuracy, product quality, productivity and capital usage) which can be explained as the relational capital’s ability to increase knowledge creation and sharing. Moreover, relational capital is required for the relationship structures so that these can have positive effects on relationship performance. For example, relationship structures provide the platform for interactions between companies whereas relational capital improves interaction, knowledge sharing and creation between the parties which then lead to improved relationship performance.

The high level of relational capital can also bring some negative effects such as customer’s reduced objectivity and decision making capability as well as supplier’s increased

opportunistic behavior as Villena, Revilla and Choi (2011: 570–573) have found out. Their survey results indicate that there is a curvilinear relationship between performance and social capital. They argue that customers can create social capital so that they can leverage resources in the buyer-supplier relationships and improve operational performance (reduced total costs and lead time as well as improved flexibility, product quality and processes) and strategic performance (new products, markets, and technological areas, and extended product range). However, too high level of social capital can take away those benefits where operational performance starts to decrease at first followed by strategic performance a bit later. These findings are also supported by the case studies by Day et al. (2013: 160–161). They argue that trust development can create benefits such as transactional efficiency and collaborative innovation as well as responsive and harmonious relationships. However, it also includes different risks such as the opportunism in the relationship, resource misallocation, reduced objectivity, and negative dependency.

2.3 Relationship transparency

Cox (2004a: 349–353) argue that when a buyer-supplier relationship moves from a low involvement arm's length market relationship towards a high involvement collaborative relationship, the parties began to provide the more transparent cost and operational information in order to reduce costs and / or improve the functionality of a product or service offering. It is usually impossible to provide that kind of offering in arm's length relationships. Eggert and Helm (2003: 103), defines transparency in the relationships as:

”an individual's subjective perception of being informed about the relevant actions and properties of the other party.”

Lamming et al. (2004: 293–294, 2006: 208) introduce the idea of value transparency where both parties should capture relationship value from exchanging sensitive information and knowledge. They present that the transparency in the relationship refers to the exchange of various valuable things related to costs, technologies, operations and strategic issues. Hultman and Axelsson (2007: 629–630) extend the concept of relationship transparency

and divide it into four different types of transparency. The first type, cost and price transparency means that the information on costs and prices and their flows become transparent between the parties. The second type, supply transparency refers to the transparent information on the flows of products and materials between the parties. The third type, organizational transparency, concerns the information about other company's organization so that the parties know who to contact with and how the other organization processes work. The fourth type, technological transparency concerns the shared information about product data and technologies as well as product development. Table 3 below introduces the previous studies related to the relationship transparency as a whole.

Table 3. Empirical studies on relationship transparency.

Author & year	Research methods & data	Transparency types	Antecedents	Benefits	Sacrifices (costs, risks)
Eggert & Helm (2003)	Survey of purchasing managers in Germany (N=342); quantitative; structural equation modeling	Cost (economic situation), Technological (technical abilities), Organizational (organizational structure)	Shared information needs to be relevant and available with right amount. The level of transparency needs to be optimized within the given competitive context rather than maximized.	Create value to the customer (increase customer's perceived value in terms of quality vs. price and net-value), increase customer satisfaction, repurchase intentions, word-of-mouth intentions and reduce search for alternative suppliers.	Too high level of transparency can increase uncertainty if the actor does not know how to use the new information. Too much information (especially irrelevant for the receiver) can have negative impact on satisfaction.
Lamming et al. (2001), (2004), (2006)	Theoretical study and action research of four high technology manufacturing companies in the UK; qualitative; iterative process of data collection, analysis, reflection and synthesis	Cost, Technological, Supply (operational), Strategic	Transparency requires joint sharing or pooling of risk, two way exchange of information and trust.	Help the creation of valuable outputs which the final customer may be expected to buy and eliminate waste (non-value adding activities).	Risk for the supplier that the critical information may leak to the supplier's competitors. Suppliers' sales turnover and profits can be lower. Risk for the customer that the supplier give false information or supplier act opportunistically.
Hultman & Axelsson (2007)	Case studies of two manufacturing companies in Sweden; qualitative; labeling	Cost, Supply, Organizational, Technological	Transparency requires trust and information technology. The level of transparency needs to be balanced in the relationships.	Help to solve problems of efficiency in flows of materials, product development and supplier search.	Transparency can produce problems such as suppliers' products can become commoditized or actors' power positions can change too much.

Lamming, Caldwell, Harrison and Phillips (2001: 6.) argue that transparency in relationships requires joint sharing or pooling of risk, two way exchange of information and

trust. Eggert and Helm (2003: 103.) argue that the shared information needs to be relevant and available at right amount. Therefore, the level of transparency needs to be optimized within the given competitive context rather than maximized. Hultman and Axelsson (2007: 633–634.) argue that transparency requires trust and information technology. Also they argue that the level of transparency needs to be balanced in the relationship in order to avoid its risks. Hultman and Axelsson (2007: 634) argue that there can be a strong relationship between trust and transparency as well as between information technology and transparency which can have effects on the realized outcomes of transparency.

The outcomes of the increased transparency are usually positive but some negative effects can occur according to previous empirical studies. For example, Eggert and Helm (2003: 106–107.) find out from the survey that transparency can create value to the customer (increase customer's perceived value in terms of quality vs. price and net-value), reduce the search for suppliers, and increase customer satisfaction as well as the word-of-mouth and repurchase intentions. However, the results also show that too much transparency can increase uncertainty if the actor does not know how to use the new information. Furthermore, too much information (especially irrelevant to the receiver) can affect negatively on satisfaction. The results also indicate that there are limited effects of transparency on customer value and satisfaction. Therefore, transparency alone is not sufficient to create customer value and enhance customer satisfaction. They argue that product and other relationship factors are still very important issues. Similarly, Lamming et al. (2004: 292) suggest that transparency is not appropriate in all supply relationships but it can leads to significant success and brings benefits for both parties when it is managed as one element of the relationship along with the other relationship elements.

Lamming et al. (2005: 558–561) have found out from their action research that transparency helps to create a valuable and attractive offering for the customer as well as eliminate waste (non-value adding activities). However, the benefits are usually realized by the customer whereas supplier's benefits are limited to the retention of the business and

improvements in efficiency especially if the transparency is only one-way action. Transparency can also cause risks for both parties. Risks for the supplier are that the critical information may leak to the supplier's competitors when the customer encourages them to reduce costs. Moreover, suppliers' sales turnover and profits can be lower due to reduced process costs and thus prices. Risks for the customer are that the supplier gives false information (e.g. distort the cost information) or supplier use the knowledge about customer's processes opportunistically. Hultman and Axelsson (2007: 633–634) have found out from their case studies that increased transparency provide positive effects such as help the problem solving related to the efficiency in the flows of materials, supplier search and product development. However, transparency also causes negative effects such as suppliers' products can become commoditized or actors' power positions can change too much.

Next, the four different types of transparency (cost / price, supply, organizational, technological) suggested by Hultman and Axelsson (2007: 629) are presented more detailed based on previous empirical findings. In addition to these four types, strategic transparency is added as fifth type of transparency. At first, the definition of each transparency type is introduced with related theories and concepts. Then, the antecedents for the transparency types are introduced. Lastly, the realized benefits and sacrifices (e.g. risks and costs) of the transparency type are introduced.

2.3.1 Cost transparency and open-book accounting

According to Hultman and Axelsson (2007: 629–630), cost transparency means that the cost and price information become transparent between the parties. This type of transparency is closely related to open-book accounting (OBA) which relates to cost information that is shared between the parties in the relationship (Möller, Windolp & Isbruch 2011: 124). Similarly, Caglio and Ditillo (2012: 62) conceptualized open-book accounting as the exchange of management accounting information between legally independent actors and add that this information would be otherwise kept secret. Table 4 below introduces previous studies related to cost transparency and open-book accounting.

Table 4. Empirical studies on cost transparency and open-book accounting.

Author & year	Research methods & data	Transparency types	Antecedents	Benefits	Sacrifices (costs, risks)
Kajuter & Kulmala (2005)	Case studies of German car manufacturing network and three Finnish manufacturing networks; qualitative; cross-case analysis	Cost	Cost accounting systems and support for the data collection or development. Members' commitment to the network, mutual trust, and team thinking.	Reduced costs and warrant of trust. Usually customers gain more benefits than suppliers.	Sharing internal cost data involves the risk of being misused.
Agndal & Nilsson (2010)	Case studies of three buyer-supplier relationship in different industries in Sweden; qualitative; cross-case analysis	Cost	N/A	Support cost efficient products and manufacturing processes, achieve price control, communicate price reduction expectations, avoid misunderstandings and supplier's overcharge, supplier's better ability to meet customer's requirements in supplier selection as well as becoming more competitive and favored supplier with possibility for long contracts. It can also reduce tension and allow profit sharing from increased sales and mutual improvements as well as bring compensation to fluctuations in raw materials and quantities	N/A
Suomala et al. (2010)	Interventionist researches of two supply networks one manufacturing mining equipments and other excavators; qualitative; creating and refining interventions	Cost	Companies awareness of their own costs (e.g. activity-based cost models). Goals set for the OBA process.	Cost reduction, significantly improved cost-awareness on product level (and consensus on that between buyer and supplier), better visibility into suppliers' processes, reduce risk for relying on wrong conclusions or beliefs, help to create positive relationship through open-book negotiations	Risks of buyer's opportunistic behavior (e.g. the buyer share supplier's development ideas to suppliers' competitors or re-organizing the supply chain)
Möller et al. (2011)	Survey of 1st and 2nd tier automotive suppliers in Germany (N=147); quantitative; structural equation modeling	Cost	Commitment (e.g. relationship-specific investments) but not necessarily trust.	N/A	N/A
Caglio & Ditillo (2012)	Survey of a fashion firm and its 18 suppliers in Italy (N=57); quantitative; social network analysis	Cost	Information technology and the long duration of the relationship.	N/A	The risk that the quantity of the management accounting information is too high and costly to control certain tasks and too low to control others.
Alenius et al. (2015)	Case study of one buyer-supplier relationship in Swedish food grocery sector; qualitative; coding	Cost	N/A	OBA can enable the use of price mechanism more effectively and lower costs. Increase revenue by guiding managers to prioritize and identify the opportunities for sales increases.	N/A

Kajüter and Kulmala's (2005: 200) case studies demonstrate that the benefits from OBA require technical factors such as the appropriate cost accounting systems and support for

data collection or development. Furthermore, OBA requires actors' commitment to the network, team thinking and trust. Moreover, each participating actor should gain benefits from the OBA practices (i.e. reach win-win situation in the relationship). Surprisingly, Möller et al. (2011: 126–129) have found out from their survey that supplier's trust does not have a big effect on the implementation of OBA or inter-organizational cost management (IOCM). They argue that the relationships between trust and these two factors are very complex. Suomala, Lahikainen, Lyly-Yrjänäinen and Paranko (2010: 91–92) present that the biggest effect on the outcomes of OBA came from the goals set for the implementation process. For example, their case studies show that the powerful customer can set mutually beneficial explicit goals for OBA but can also have a silent agenda (e.g. re-organizing the supply chain) that can lead to the win-lose outcomes.

According to previous researches, the benefits of OBA are mainly related to cost reductions in products and manufacturing processes (Kajüter and Kulmala 2005: 200; Suomala et al. 2010: 87–88; Agndal and Nilsson's 2010: 158; Alenius, Lind & Strömsten 2015: 204). Furthermore, the studies of Suomala et al. (2010: 90–93) indicate that OBA can significantly improve cost-awareness on product level as well as bring consensus on that between the customer and the supplier. Other realized benefits relate to better visibility into suppliers' processes, reduce risk of relying on wrong conclusions or beliefs and help to create a positive relationship through open-book negotiations. Moreover, the case studies of Agndal and Nilsson (2010: 158–159) show that OBA can help customers to achieve price control and communicate price reduction expectations as well as help to avoid misunderstandings and supplier's overcharge. It can also help to gain insight into supplier's condition and the supply chain as well as support to commoditize complex offerings. Potential benefits for the supplier are better ability to meet customer's requirements in supplier selection as well as becoming more competitive and favored supplier with long contracts. It can also reduce tension and allow sharing profits from increased sales and mutual improvements as well as bring compensation to fluctuations in raw materials and quantities. Lastly, Alenius et al. (2015: 204) find that OBA can increase revenue by guiding

managers to prioritize and identify the opportunities for sales increases in the relationships. Furthermore, OBA can enable the use of price mechanism more effectively when the cost element is added in the relationship.

Kajüter and Kulmala's (2005: 200) case studies indicate that usually customers gain more benefits than suppliers. Moreover, sharing internal cost data has the risk of being misused. However, OBA can also maintain trust. This is based on the future potential for increased volume, but it requires that the customer can guarantee the information is not misused. This is also supported by the case studies of Suomala et al. (2010: 88, 91–93) which indicate that the powerful customers perceive the OBA process useful and financially rewarding. At the same time, some of their suppliers' realize win-win outcomes but others realize negative outcomes when the customer behaves opportunistically (e.g. sharing supplier's development ideas to suppliers' competitors and re-organizing the supply chain). The findings indicate that the customer's commitment to long-term collaborative relationship and close personal relations may help to avoid these kinds of problems.

Kajüter and Kulmala (2005: 199) argue that open-book accounting is successful only in the specific circumstances such as in a hierarchical and long-term supply network that manufacture functional products. Caglio and Ditillo (2012: 69–73) argue that without considering the specific characteristics of the tasks and the relationships, the risk is that the quantity of management accounting information is too high and costly to control certain tasks and too low to control others.

2.3.2 Supply transparency and supply chain visibility

The second type of the Hultman and Axelsson's (2007: 630) conceptualization of transparency is supply transparency which refers to various materials and products which flow between the customer and the supplier. Similar to that term is supply chain visibility (SCV) which is a generally used term in logistics and supply chain management disciplines (Francis 2008: 181, Barratt and Oke (2007: 1217). It is also one of the most important thing

or challenge among supply chain management researchers and practitioners but has not any general definition. Barratt and Oke (2007: 1218) make distinction between information sharing and visibility by proposing that information sharing is an activity whereas visibility is an outcome of this kind of activity. They define supply chain visibility as:

”the extent to which actors within a supply chain have access to or share information which they consider as key or useful to their operations and which they consider will be of mutual benefit.”

Francis (2008: 182–183) combines the previous definitions of SCV and tries to give a more precise definition for the supply chain visibility concept. He defines it as:

”Supply chain visibility is the *identity, location and status of entities* transiting the supply chain, captured in timely *messages* about *events*, along with the *planned and actual dates/times* for these events.”

An entity in this definition refers to the objects which move through supply chain (e.g. an order, a package, a shipment or a vehicle). The identity of the entity is a specific identifier (e.g. a bar code, an order number or a Radio Frequency Identification (RFID) tag). Location is the position of the entity and can be static or dynamic (e.g. static in a warehouse or dynamic in transfer by truck). Status refers to the state of the entity which depends on the processes relating the entity (e.g. waiting to be machined). A message refers to communication and it contains the information about the entity (e.g. identity, location and its status) through various types of communication (e.g. EDI transmission, automatic data capture, web information, a phone call). An event refers to the particular time when the status and / or the location of the entity changes. Lastly, actual and planned times are the specific times when the event occurs or when it is planned to occur. This definition indicates that SCV is a requirement for the effective decisions about supply chain operations and clearly shows that the information technology is required to be integrated with the partners in the supply chain.

Williams, Roh, Tokar & Swink (2013: 548, 548) explain supply chain visibility as:

”access to high quality information that describes various factors of demand and supply.”

They describe that the requirements for the high quality information relate to accuracy and completeness as well as it must be current and in a form that is usable. Therefore, various types of high quality supply chain information are needed. This information contains market-level (i.e. supply and demand information) and two-way partner-level information. For example, the suppliers gain visibility when it gets information from customer's sales, demand, inventory, and promotions. Respectively, the customer gains visibility from getting information from the supplier about its order lead times, shipments, inventory levels, and the locations of finished goods. Table 5 below introduces previous studies related to supply transparency and supply chain visibility related researches.

Table 5. Empirical studies on supply transparency and supply chain visibility.

Author & year	Research methods & data	Transparency types	Antecedents	Benefits	Sacrifices (costs, risks)
Akkermans et al. (2004)	Case study (action research) of one high-tech electronics supply chain in Netherland; qualitative; iterative process of data collection, analysis, reflection and synthesis	Supply (order and production statuses, plans and forecasts)	Self-enforcing dynamic interactions between shared hard working (travail), believe in the honesty, integrity, reliability and justice of the partners (trust)	Increased transparency leads to improved decision-making quality which leads to better supply chain performance. This then leads to habituation, which, in turn, increases trust and transparency	If performance is low then also trust and transparency remain low without the hard work by all involved people
Barratt & Oke (2007)	Case studies of five supply chain relationships in the UK consumer packaged goods sector; qualitative; cross-case analysis	Supply (demand, POS, promotions, inventory levels, production schedule); Technological (product development plans)	The level of visibility depend on the strength of a particular linkage, time spent in developing the relationship, informal procedures, trust and commitment	Visibility leads to an improved operational performance (reduced inventory and quality issues, increased product availability and flexibility, and improved responsiveness)	N/A
Zhou & Benton (2007)	Survey of manufacturing companies in North America (N=125); quantitative; structural equation modeling	Supply (order changes, planned orders, inventory level, forecasts, production plans, production capacity, order status, delivery schedule and changes, lead times); Technological (product design)	Effective information sharing enhances supply chain practices (e.g. supply chain planning, JIT production and delivery practices) and can lead to enhanced supply chain transparency	Information quality has positive effect on delivery performance (on-time delivery, perfect order fulfillment rate, delivery reliability)	Too much customer information has negative impact on delivery performance
Barratt & Barratt (2011)	Case study including interviews of 48 informants in UK retail grocery sector; qualitative; searching linkages and identifying patterns	Cost (cost drivers); Supply (forecasts, inventory levels, production plans and schedules, lead-time, promotions); Technological (product development plans, new products)	Visibility requires internal information-based linkages within the organization and external information-based linkages between the organizations in the supply chain	Supply chain visibility can improve operational performance	
Williams et al. (2013)	Survey of supply chain executives throughout the world (N=206); quantitative; regression analysis	Supply (POS or actual sales data, demand forecasts, inventory levels, and customer promotional plans. supplier lead time/delivery dates, adv. shipment notices)	Visibility requires the acquisition of multiple types of high quality information. Increased responsiveness through SC visibility requires high levels of internal integration	Visibility improve responsiveness if internal integration is also at the high level.	N/A
Lee et al. (2014)	Survey of component manufacturers in Korea (N=124); quantitative; structural equation modeling	Supply (inventory status, order status, production schedule, current production capacity, demand forecast information)	Inter-organizational systems (IOS) visibility require asset specificity, interorganizational trust, complementary resources, and joint governance structures	IOS visibility improves overall supply chain performance (cost efficiencies from higher sales volumes, improvements to processes and increased profitability)	N/A

Akkermans, Bogerd and Doremalen (2004: 448–449) argue that transparency in a supply chain requires dynamical interactions related to mutual hard working (*travail*), believe in the honesty, reliability, integrity and justice (trust). Barratt and Oke's (2007: 1230.) case studies demonstrate that the level of visibility varies based on the strengths of the specific connections because these relate to the resource deployment, time allocation to the relationship development, informal discussions as well as commitment and trust between the partners. Barratt M. and Barratt R.'s (2011: 524–525) case study indicates that visibility requires internal information-based connections between organization's functions as well as external information-based connections between the supply chain partners. Lee, Sun Kim and Kyu Kim (2014: 290–291) have found out that supply chain visibility through inter-organizational information systems requires trust, asset specificity, complementary resources, and joint governance structures.

The finding from the study of Akkermans et al. (2004: 448–454) indicates that increased transparency in a supply chain improves the quality of decision-making that leads to improved performance. This then results in habituation which can increase trust and transparency leading to better performance. However, when performance is at the low level then also trust and transparency stay at the low level especially if the partners are not working hard together to start the causal loop that increases transparency, trust and performance. Similarly, Barratt and Oke's (2007: 1230) and Barratt M. and Barratt R.'s (2011: 524–525) results reveal that visibility in a supply chain improves operational performance (e.g. increased flexibility and product availability, reduced inventories and improved quality and responsiveness).

Zhou and Benton (2007: 1361) have studied information sharing in supply chains and have found out from their survey that effective information sharing improves JIT-production, planning and delivery practices in a supply chain. Moreover, supply chain practices and high quality information have direct positive effect on delivery performance in terms of delivery accuracy and order fulfillment. However, they also argue that when the customer

provides information more frequently it can lead to difficulties for the supplier to meet the continuously changing delivery requirements.

Williams et al. (2013: 549–552) present that supply chain visibility improves companies' capabilities to handle the changes in their business environment (i.e. better responsiveness). However, this requires that internal integration within the organization is at the high level because it helps to reach a mutual understanding about the visible information as well as reduces uncertainty. Lee et al. (2014: 290–292) demonstrate that supply chain visibility gained by integrated information systems improves the overall supply chain performance in terms of cost efficiency, process improvements, new process creation and increased profitability.

2.3.3 Organizational transparency

The third type of the Hultman and Axelsson's (2007: 630) conceptualization of transparency is organizational transparency which concerns the information of other company's organization so that the parties know who to contact and how the other organization's processes work.

The results of the case studies by Hultman and Axelsson (2007: 631) indicate that high level of organizational transparency can also bring problems. Problems occurred when the customers' personnel are given direct contacts with suppliers' personnel causing the lack of information to the key actors. This situation leads to mistakes such as lack of needed information for the key-account managers. Previously, all information was shared only through key-account managers. The solution to this problem was to get even more transparency and to ensure that shared information was located in the same place by using a web-based project platform.

2.3.4 Technological transparency and supplier involvement in NPD

The fourth type of the Hultman and Axelsson's (2007: 630–633) conceptualization of transparency is technological transparency which refers to the shared information about product data and technologies as well as product development. This type of transparency is related to suppliers' early involvement in customer's product development and the customers' willingness to move development activities to suppliers. For example, the actors in the network can share product data (e.g. CAD-files) and work together by using shared software (e.g. extranet) in order to improve the efficiency of the product development.

Supplier involvement in new product development (NPD) has been studied since the 1980s and especially in the automotive industry where supplier involvement was believed to be the most important thing for the excellent NPD performance of Japanese automotive companies (Johnsen 2009: 188). Van Echtelt, Wynstra, van Weele and Duysters (2008: 182) describe that supplier involvement in NPD has usually been understood as the information provided by the suppliers and supplier's participation in decision making or as parties' integrated capabilities. They provide their own definition as follows:

”Supplier involvement refers to the resources (capabilities, investments, information, knowledge, ideas) that suppliers provide, the tasks they carry out and the responsibilities they assume regarding the development of a part, process or service for the benefit of a buyer's current or future product development projects.”

Table 6 below introduces previous studies on technological transparency and supplier involvement in NPD.

Table 6. Empirical studies on technological transparency and supplier involvement in new product development.

Author & year	Research methods & data	Transparency types	Antecedents	Benefits	Sacrifices (costs, risks)
Walter (2003)	Standardized interviews of 267 German supplier companies (N=510); quantitative; structural equation modeling	Technological	Supplier commitment and trust, relationship promoters and supplier-specific investments	N/A	N/A
van Echtelt et al. (2008)	Case studies of 8 supplier involvement cases in one manufacturer in the printer and copier industry; qualitative; cross-case analysis	Technological	Strategic and operational management activities	Short-term and long-term benefits related to NPD	Concentrating only to operational activities can lead to failures to capture long-term learning and technology benefits
Jayaram (2008)	Survey of US manufacturing companies (N=338), quantitative, factor analysis	Technological	Communication, information sharing, design involvement and infrastructure development of joint programs	Improved NPD project performance (product cost, conformance quality, design quality and market introduction time)	N/A
Johnsen (2009)	Literature review on supplier involvement in NPD between 1985-2008; theoretical; critical analysis and synthesis of empirical studies	Technological	Supplier selection, supplier relationship development and adaptation, and internal customer capabilities	Reduced new product introduction time, improved product quality, reduced development and product costs	N/A
Smals & Smits (2012)	Case studies of 2 relationships between large high-tech OEM and medium-sized supplier in Netherland; qualitative; cross-case analysis	Technological	N/A	Direct value for supplier: financial payment for sales volume and product development services; Indirect value for supplier: technological knowledge and product designs that can be used to other customers and references	Indirect value may not be realized if the supplier may not be able to use its relationship-specific investment for other customers when the customer reduce its involvement in product development
Sjoerdsma & van Weele (2015)	Case studies of 4 global NPD projects in a large multinational company; qualitative; cross-case analysis	Technological	Better relationship quality resulting better more knowledge transfer (explicit and tacit)	Reduced new product introduction time, increased product quality, reduced NPD costs	Supplier's poor capabilities and different culture can delay the NPD project and increase costs even that the relationship quality is at high level

Walter's (2003: 728) study indicates that supplier involvement in NPD relates to supplier's commitment and trust. Moreover, the managers who are working as a relationship promoter (RP) in the customer's company have major impact whereas supplier-specific investments

have not as major impact on supplier involvement in NPD. Furthermore, the RPs and supplier-specific investments have effects on supplier's trust and commitment. Similarly, Johnsen (2009: 193) describes that previous studies indicate that supplier relationships with trust and commitment require excellent supplier selection processes, internal coordination, and long-term adaptation of the relationship.

The results from Jayaram's (2008: 3724) study reveals that supplier involvement in NPD requires involvement in design, the development of infrastructure, communication, and information sharing related to mutual projects with the suppliers. The case studies of van Echtelt et al. (2008: 195–196) indicates that benefits from supplier involvement in NPD require strategic and operative management activities. For example, strategic activities are needed to provide operational support and a long-term, strategic direction for the project teams as well as to develop suppliers who are able to meet the requirements related to current and future capabilities and technologies. Respectively, operational activities help to plan, manage, and evaluate the collaboration in the different development projects.

Johnsen (2009: 193–194) have synthesized the previous researches on the supplier involvement in NPD and divide the success factors into three different groups: internal customer capabilities, supplier selection, and supplier relationship development and adaptation. Internal customer capabilities relate to the commitment of top management and cross-functional coordination. Supplier selection relates to supplier's early involvement, separation between supplier roles and involvement levels, and supplier evaluation / selection based on complementarity and innovation capability. Lastly, supplier relationship development and adaptation relate to mutual training and commitment, the sharing of risks / rewards, the agreements of target performance and measures, and supplier's representatives in the NPD team.

Sjoerdsma and van Weele's (2015: 199–201) case studies reveal that benefits from the supplier involvement in NPD require improved relationship quality resulting in increased

knowledge transfer between the actors. They argue that relationship quality includes satisfaction, loyalty, reputation, relationship-specific investments, customer's / supplier's attractiveness, performance, trust, communication, information and knowledge sharing, cooperation and coordination, commitment, transparency, flexibility, and capability and competence. When these are at high level, the result is increased knowledge transfer (explicit and tacit knowledge) between the actors leading to better NPD performance.

Hultman and Axelsson's (2007: 633) case studies indicate that when technological transparency increases it causes concerns about the legal issues and the risk related to the flows of sensitive information (e.g. CAD-files or evaluation spreadsheets). The findings indicate that the liability problems can be prevented by restricting transparency. For example, providing access to certain information for some actors and restricting access for others in the extranet.

Johnsen (2009: 193) and Sjoerdsma & van Weele (2015: 193–200) reveal that previous researches show that supplier involvement in NPD can improve performance such as reduced development and product costs, improved product quality, and shorter product introduction time. Similarly, Jayaram's (2008: 3725–3729) study indicates that supplier involvement in NPD can bring improvements in terms of product costs, the quality of conformance and design, and new product introduction time. Moreover, the study reveals that information sharing and communication (e.g. communicating with the key suppliers and sharing design information) can have stronger effects on new product introduction time in unstable and dynamic markets rather than stable markets. According to the case studies of van Echtelt et al. (2008: 196–197), supplier involvement in NPD provides short-term as well as long-term benefits. Short-term benefits refer to the better technical performance of products, lower product and product development costs and shorter new product introduction time whereas long-term benefits refer to more effective / efficient collaboration in the future, the alignment of a technology roadmap, access to supplier's technology and the usage of developed solutions for other projects. However, these kinds of

long-term benefits may not be received if the managers are concentrating only on operational activities and therefore are not able to get the long-term learning and technological benefits.

For the supplier's perspective, Smals and Smits (2012: 160–162) have found out that supplier involvement in NPD provides direct and indirect value to the supplier. Direct value is realized in terms of financial benefits from sales volumes and product development services. Indirect value in the future refers to the reputation of doing business with a high-end company as well as increased technological knowledge and product designs which can bring benefits to other customer relationships. However, indirect value may not be realized if the supplier is unable to use its customer-specific investments for other customer relationships. In addition, Sjoerdsma and van Weele (2015: 201) case studies reveal that supplier's poor capabilities and different organizational cultures can delay the NPD project and increase costs even when the relationship quality is at the high level.

2.3.5 Strategic transparency

Strategic transparency can be seen as the fifth type of transparency in addition to Hultman and Axelsson's (2007) four transparency types. Frazier, Maltz, Antia and Rindfleisch (2009: 32) presents that shared strategic information can be external or internal which both have effects on companies' long-term decision making. External strategic information consists of information within the organization about its customers and competitors whereas internal strategic information consists of information within the organization about its future actions. Table 7 below introduces previous studies related to strategic transparency.

Table 7. Empirical studies on strategic transparency.

Author & year	Research methods & data	Transparency types	Antecedents	Benefits	Sacrifices (costs, risks)
Klein & Rai (2009)	Survey of 91 buyer-supplier logistics relationships in the US (N=233); quantitative; structural equation modeling	Cost, Supply, Organizational, Strategic	Strategic information flows require trust, buyer dependence and buyer IT customization.	Sharing strategic information can have positive effects on both parties' financial performance (improved management of assets, reduced costs of operations, and enhanced productivity) and operational performance (improved planning, control, and flexibility of resources).	N/A
Frazier et al. (2009)	Survey of distributors in medical equipment, industrial equipment and industrial supplies industries in the US (N=479); quantitative; regression analysis	Strategic	Sharing of strategic information requires dependence asymmetry favoring distributor and relationship-specific investments. Furthermore, trust is required to share ISI and product-market familiarity enhances to share ESI.	N/A	N/A

According to the empirical results of Frazier et al. (2009: 38–40), sharing strategic information between the supplier and the distributor requires dependence asymmetry favoring distributor and both parties' relationship-specific investments. Furthermore, trust is required to share internal strategic information and product-market familiarity enhances to share external strategic information. Klein and Rai (2009: 749–751) present that sharing strategic / competitive information (e.g. competitive positioning and planned actions on markets) as well as production-related and financial information in the logistics provider's and its customer relationship requires trust, customer's dependence on its supplier and customer's IT customization. They argue that when the customer has a high level of dependence on its supplier they are more willing to share strategic information, because they have a need to integrate supplier's resources and capabilities more closely.

Klein and Rai's (2009: 749–750) empirical results reveal that sharing strategic information (including production-related and financial information) can have positive effects on both parties' financial performance (improved asset management, reduced operational costs, and improved productivity) as well as operational performance (improved planning and flexibility, and increased resource control).

2.4 Value in the buyer-supplier relationships

The viewpoint in buyer-supplier relationships moves from costs to value when the necessary conditions for transparency in a buyer-supplier relationship have been reached. For example, the development potential for mutually beneficial outcomes has been identified, the opportunity costs have been calculated and the items for information sharing have been discussed in the relationship (Lamming et al. 2005: 560). In this part, the different aspects of value in buyer-supplier relationships are introduced in order to understand and analyze the value co-creating effects of transparency in buyer-supplier relationships.

2.4.1 Different viewpoints for value creation

Bowman and Ambrosini (2000: 4) describe that value creation consists of two components: exchange value (price paid by the customer) and perceived use value (the usefulness of the product for the customer). Lepak, Smith and Taylor (2007: 181–182) broaden this definition and describe that the exchange value is either the realized monetary amount when the exchange of product, good, service, or new task occur or the amount of the seller's payment for the use value of the focal task, job, product, or service. Respectively, use value refers to the user's need related to the specific quality of product, service, or new job. Furthermore, there are two important economic conditions for long term value creation. Firstly, the provider's costs (e.g. money, effort, time) of the created value must be lower than the exchanged monetary amount. Secondly, the exchanged monetary amount is based on the user's perceived performance differences between the new and the alternative product, service or task.

Möller (2006: 915) presents that value creation in business-to-business context includes relational value and exchange value. Relational value relates to the value which is created through the activities that are interrelated between the customer and the supplier whereas exchange value occurs when the supplier uses its activities to create an offering which the

customer consumes. In the exchange value, the customer received the benefits of the offering by using its activities, competences and resources. Lastly, the value from the customer's viewpoint is the trade-off between benefits and sacrifices perceived by the customer. Contradict to that viewpoint, Vargo and Lusch (2004: 7, 2008a: 256–257) present the service-dominant logic (SDL) viewpoint. It changes the viewpoint from the tangible output and separate transactions towards services as the main processes for value creation during interaction with the customer. The goods are seen only as a distribution mechanism in value creation processes. They argue that the customer determines and perceives value as “value in use”. Therefore, suppliers cannot create value as embedded in the products and services which the customer destroys when using them. Moreover, suppliers can only make promises that their offering has potential value for the customer.

Ford (2011: 232–236) describes the differences between the SDL and Industrial Marketing & Purchasing (IMP) Group's viewpoints of value and points out that IMP Group understand value as the actor's perception related to its specific problems and the realized benefits of solving them. Similarly with the SDL logic, he suggests that the actors perceive value in the business interactions but also in the long-term business relationships. Moreover, there is always trade-off to be made between the short-term episodic value and the long-term relationship value as well as between the relationships. He argues that episodic value can be realized within a particular interaction episode based on the actors' specific problems and the ability to solve these. Furthermore, relationship value can be realized based on the relationship's future potential to solve the actor's problems and the problem solving capability of this particular relationship compared with the other relationships.

Value in buyer-supplier relationships has been conceptualized as the factors which create value beyond products and services (Corsaro 2014: 986). This has related mostly to the best mix of benefits and sacrifices that provide the relationship value. For example, Walter, Ritter and Gemünden (2001: 366–368) states the supplier's viewpoint of value and present

that suppliers can perceive relationship value (a trade-off between benefits and sacrifices) directly through higher volume, profit, and reliable customer relationship as well as indirectly through innovation development, valuable market reference and market information. Later, Ritter and Walter (2012: 137–142) study customer-perceived relationship value and argue that it is driven by direct, operation-based functions (financial / payment, quality, volume and the safeguard of the operations) which enhance the operational processes and operational excellence of the customer and have direct effect on customer's profitability. They also present that supplier involvement through indirect, change-related functions (technical / market-based information, access to market actors, innovation development and employees' motivation) can have negative impact on relationship value if the innovativeness of the customer is at the low level. Therefore, it is important that suppliers know the level of customers' innovativeness so that they can increase the customer's perceived value also through indirect, change-related functions where the impact on profitability occurs later in the business relationship.

Uлага and Eggert (2006: 131) have conceptualized the relationship value as nine key differentiators: delivery performance, product quality and costs related to supplier's offering; interaction, service and acquisition costs related to the sourcing process; and product introduction time, supplier's knowledge and operational costs related to customer's operations. Terpend et al. (2008: 40.) have reviewed the researches about relationship value over the past 20 years (151 journal articles) and categorize it into integration-based value (cooperation improvement, activity coordination, risk / opportunism reduction, knowledge acquisition / transfer), supplier capability-based value (continuous improvement, technology acquisition, new product development, global capability) and operational performance-based value (cost, quality, speed / lead time, flexibility, agility, delivery, inventory) which together forms the financial outcomes. They argue that operational performance-based value factors will remain important but capability-based and integration-based value factors will be more important in the future.

Corsaro and Snehota (2010: 987) argue that the relationship value assessments cannot be based only on the specific mix of criteria because the perceptions of value vary between the actors and these are dependent on each other resulting in continual change. Corsaro (2014: 986) argue that previous studies seem to offer the very simplified view of value in business relationships. However, they state that there is a recent viewpoint where value is not understood as embedded in the provider's offering, but is realized during the use of the offering (e.g. Vargo and Lusch 2008a: 256). Galvagno and Dalli (2014: 657–658) argue that business market and network theories could be useful approaches to broaden the service-dominant logic (SDL) concept by concentrating on long-term relationships and the specific context where value co-creation happens.

2.4.2 Value co-creation

Vargo and Lusch (2008b: 7) have developed the SDL concept and argues that the customer is always the value co-creator and because of that value creation happens only when suppliers and customers collaboratively (interactively) create value which is phenomenologically and uniquely evaluated based on its benefits. They also state that all exchange can be considered actor-to-actor (or B2B) in dynamic and networked service ecosystems because the actors are co-creating value through technology, institutions and language (Vargo and Lusch 2011: 182). Furthermore, Echeverri and Skålen (2011: 364) find that value can be also co-destroyed at the provider-customer interface based on their empirical research.

Value co-creation highlight the relationships development based on interaction (Prahalad and Ramaswamy 2004: 7; Payne, Storbacka & Frow 2008: 83). According to Grönroos (2011b: 240) value for the customer is realized based on the interaction within the relationship and are not related only to the tangible resources (i.e. products). Prahalad and Ramaswamy (2004: 9–11) introduce the DART model for value co-creation where dialog, access, risk-benefits, and transparency need to be aligned in order to better engage customers as collaborators. In the model, dialog helps to develop a shared solution where

the customer acts as a joint problem solver. Then meaningful dialog requires the access and transparency of information which leads to the assessment of the risks and benefits. However, this model is developed mainly for the Business-To-Consumer (B2C) context without considering the special characteristics of buyer-supplier relationships in the B2B context.

Payne et al. (2008: 85–91) introduce the process-based value co-creation framework with both B2C and B2B viewpoints. In this framework, different tasks, procedures, activities, mechanisms, and interactions in three central processes (customer, supplier and encounter) support value co-creation. Furthermore, these processes enhance learning in the relationship which has an effect on future value co-creation. The customer's value-creating processes help the customer to manage the business activities and the relationships with its suppliers whereas the supplier's value-creating processes support the supplier's co-creation with the customer. The supplier's value-creating processes also help the suppliers to understand customer's processes so that the supplier can better integrate its processes with the customer's processes. Lastly, the encounter processes contain the exchange activities where the actors change their resources (e.g. products, work, information, time, money) as well as the collaboration activities where the actors work together.

Grönroos (2011a: 280) criticizes SDL's viewpoint of value to be too simple to theory development or decision making in practice. Therefore, he provides a developed viewpoint where the customer's and the supplier's different value co-creation roles are explained more detailed. Based on that developed viewpoint, value co-creation can occur only during direct interaction when supplier's and customers' processes are fully integrated and coordinated, otherwise the supplier can only produce the potential value for the customer (i.e. potential value in use) (Grönroos & Voima 2013: 145).

Saarijärvi, Kannan and Kuusela (2013: 7, 10–12) criticize that the value co-creation concept lacks practical relevance to demonstrate how value co-creation can actually lead to

improved performance. They combine the different approaches for value co-creation and develop the framework for value co-creation by dividing it into three elements (“value”, “co” and “creation”). At first in the “value” element, value has to be explained for whom value is co-created and what type of value is co-created. Then in the “co” element, it is important to know which actors take part in the value co-creation, and especially what kinds of resources are used in the value co-creation process. Lastly in the “creation” element, it is crucial to describe and understand the different “co-processes” where the resources can be integrated for creating value to the specific actors and to fully understand the value co-creation mechanisms.

Jaakkola and Hakanen (2013: 49–50) combine the different value co-creation approaches with IMP Group’s Actors-Resources-Activities (ARA) framework. They conceptualized the value co-creation in B2B context as collaborative and continuous process with three different levels: actor, relationship and network. At the actor level, actors execute activities when they provide and receive resources as well as perceive benefits and sacrifices (i.e. actor’s value creation processes). At the relationship level, value co-creation occurs when actors interact and collaborate whereas at the network level it occurs through resource integration resulting in a big resource combination based on actors’ activity patterns in the network.

2.4.3 Value capture

Value capture (or value appropriation) refers to the relative share that each actor is able to capture from the total net value (i.e. outcomes minus inputs) that is mutually created with the other actor (Wagner, Eggert & Lindemann 2010: 841). Therefore, when the other actor captures a larger share of the created total value it reduces another actor’s share of this co-created value. Furthermore, an individual company can capture more value based on the excellent value creation activities with the other actors, the excellent value capturing possibilities, or using both options at the same time.

Cox (2004b: 412–413) argue that the problems in the buyer-supplier transactions can occur when both actors have the similar targets for value capture (i.e. profits) but have different commercial and operational targets. For example, the customer always tries to capture value from supply activities operationally by increasing quality, delivery accuracy and performance as well as commercially by reducing the total costs of ownership. Respectively, the supplier is trying to capture value from supply activities operationally by delivering products and / or services in order to increase the possible revenue from the customer and commercially by having as high prices (or margins) as possible with the given functional level of the delivered products and / or services. These differences lead to conflicts and tensions in a relationship when the best outcome to other actor decreases another's possibilities to receive the best outcome.

Cox (2004b: 415–417) describes nine different outcomes that can happen in the exchange between the actors in buyer-supplier relationships. Only one of these outcomes can be a true win-win outcome where the customer and the supplier can completely achieve their value capture goals. However, this kind of mutually ideal outcome is not possible in practice because the actors have different operational and commercial goals. There can still be many mutually beneficial win-win situations where the actors can achieve at least some of their goals although the other actor captures more value. Furthermore, there are possibilities for the other actor to use its strong power positions to capture value from win-lose situations with the short term relationships if the other actor wants to operate in this way. Moreover, the risk of actors' power positions to move against them should be acceptable in these kinds of win-lose situations. For example, there can be situation where the supplier has a strategy to push its competitors away, or it aims to form a brand association with some leading-edge customer to gain profits from the higher prices with the other customers.

2.5 Synthesis of the theoretical background

This part synthesizes the theoretical background of this study and presents a framework that can be used as a basis for empirical study. At first, each part of the theoretical background is summarized and analyzed. Then these are combined together by synthesizing them into a framework for value co-creation through relationship transparency. In addition, the needed hypotheses for empirical study are developed. The analysis and conclusions are based on the author's own interpretation.

2.5.1 Supply chain collaboration

Previous studies indicate that close collaborative relationships between the actors within the supply chain are desirable because these provide many different benefits for the actors. However, there is also criticism that close collaboration is not always the best way and there is a need to find an appropriate way to manage different supplier relationships in the specific situations (Cox 2004a: 349). In some situations it can be beneficial to have a close collaborative relationship whereas in the other situations an arm's length market-based relationship can be better.

When a collaborative relationship is chosen, it requires joint activities between the partners as well as relationship with the high level of trust and commitment. Based on the previous studies, information sharing is usually understood as one of the most important collaborative activities along with the relationship-specific investments. Successful collaboration usually results in improved operational and financial performance (e.g. Min et al. 2006: 250; Das et al. 2006: 572–573; Cao & Zhang 2011: 175–177). However, there are also risks to the increased costs of coordination and inflexibilities as well as the lack of improved business or performance for suppliers (Das et al. 2006: 576–579; Nyaga et al. 2010: 109–110).

2.5.2 Interaction and relationship integration

As Gadde and Snehota (2000: 315) argue, that the most of the potential benefits from suppliers can be acquired through close relationship integration which requires the activity coordination, interpersonal interactions, and the mutual resource adaptations. All of these cause costs for both companies but these can provide the greater benefits if used in a suitable customer or supplier relationship.

Usually, integration can be viewed through three dimensions: relational capital (or social capital), relationship structures and relationship-specific investments (Vesalainen & Kohtamäki (2015: 108). These dimensions form various configurations where the dimensions may be simultaneously present in the relationship. For example, relationship structures (e.g. the organizational routines and IT systems) can create the platform for interactions between companies as well as with the relational capital it can create improvements in relationship performance (Kohtamäki et al. 2012: 1306). Respectively, relationship-specific investments (e.g. allocated resources to the specific relationship which are difficult to use in the other relationship) can improve operational performance. Relationship-specific investments can also lead to the long-term commitment and enhance information sharing in the relationships which lead to the more valuable resources within the relationship (Laaksonen et al. 2008: 916). Lastly, relational capital (e.g. trust) can improve operational performance based on its ability to improve interactions, and knowledge creation and sharing (Kohtamäki et al. 2012: 1306). However, the very high level of social capital can also have negative effects such as the risk of opportunism, the loss of objectivity, resource misallocation and negative dependences (Villena et al. 2011: 572; Day et al. 2013: 160–161).

As integration refers to the relationship's depth, interaction is seen as the main process that occurs within the relationship (Vesalainen and Kohtamäki 2015: 108). Interaction can be seen to contain material, human and financial aspects as well as actor, activity and resource elements which can change and transform during interaction (Ford et al. 2010: 88). In the

value creation (or value-in-use) perspective, interaction allows the supplier to work together with the customer in order to have direct effects on the outcomes of customer's value-creating processes and therefore co-create value during interaction (Grönroos 2011b: 244). However, this kind of value co-creation during interaction depends on the quality of the interaction such as the supplier's ability to use the interaction in the most beneficial way.

2.5.3 Relationship transparency

Relationship transparency refers to the two-way exchange of sensitive information in collaborative, long-term relationships (Cox 2004a: 349–353; Lamming et al. (2004: 293–294). Based on the literature study, transparency has five different types with the related concepts such as cost transparency (incl. open-book accounting), supply transparency (incl. supply chain visibility), technological transparency (incl. supplier involvement in NPD), organizational transparency, and strategic transparency.

Previous studies on relationship transparency (presented in Chapter 2.3) indicate that typically transparency requires trust, commitment, information technology, relationship-specific investments and a long-term relationship. According to previous empirical studies, it can bring many benefits such as increase customer's perceived value (Eggert and Helm 2003: 106–107.), help the creation of valuable offering and eliminate waste (i.e. non-value adding activities) (Lamming et al. 2005: 558–561), help to solve problems in the flows of materials and product development (Hultman and Axelsson 2007: 633–634) as well as provide costs reductions in products and manufacturing processes (Kajüter and Kulmala 2005: 200; Suomala et al. 2010: 87–88; Agndal and Nilsson's 2010: 158; Alenius et al. 2015: 204).

However, it also has sacrifices (e.g. costs and risks) such as the very high level of transparency can decrease satisfaction and increase uncertainty if the actor does not know how it can use the new information (Eggert & Helm 2003: 106–107). Moreover, too much information from the customer can cause delivery problems to the supplier (Zhou & Benton

2007: 1361). Cost transparency can also be at too high level and be too costly to control certain tasks or be at too low level to control other tasks (Caglio & Ditillo 2012: 69–73). Furthermore, transparency contains the risk of opportunism such as information leakages to the competitors or it can be misused for the receiver's own good (Lamming et al. 2005: 558–561; Kajüter & Kulmala 2005: 200; Suomala et al. 2010: 91–93). These realized sacrifices indicate that transparency needs to be balanced rather than maximized in the specific buyer-supplier relationship in order to realize all of its value-creating effects.

2.5.4 Value co-creation in the buyer-supplier relationships

Lamming et al. (2005: 560) argue that the viewpoint in a buyer-supplier relationship moves from costs to value when the necessary conditions for transparent buyer-supplier relationships have been reached (e.g. identified development potential, calculated opportunity costs and discussed items for information sharing). Value in buyer-supplier relationships has usually understood as the trade-off between various benefits and sacrifices related to the specific value-creating factors (Corsaro 2014: 986). The relationship value can be categorized into the integration-based, supplier capability-based, and operational performance-based value factors which form the financial outcomes (Terpend et al. 2008: 40). However, only these kind of given factors may not be appropriate to evaluate relational outcomes because value perceptions vary between the actors and these are dependent on each other that lead to continual change (Corsaro and Snehota 2010: 987).

There is also a developing viewpoint where value is understood as “value in use”. Based on that viewpoint, the supplier cannot create value as embedded in the products and / or services but it can co-create value when it interacts with the customer (Vargo & Lusch 2008a: 257–258). This kind of interactive value co-creation means that the supplier works together with the customer where it can have direct effects on customer's value-creating processes (Grönroos 2011b: 243–245). Without the interactions, the supplier has only the ability to facilitate the customer's creation of value by providing potential value. Jaakkola and Hakanen (2013: 49–50) conceptualized the value co-creation in B2B context as

collaborative and continuous process at three different levels. Firstly, actors execute activities when they provide and receive resources in their value creation processes as well as perceive benefits and sacrifices. Secondly, value co-creation occurs within the relationship when actors interact and collaborate. Lastly, value co-creation occurs at the network level when the resources are integrated in a way that leads to a big resource combination based on actors' activity patterns in the network.

2.5.5 Framework for value co-creation through relationship transparency

Based on the summarized and analyzed theories, Figure 1 below presents a framework for value co-creation through relationship transparency. The framework combines the concepts of relationship interaction and integration with value co-creation. Furthermore, it adds relationship transparency as one of the important issues to these concepts.

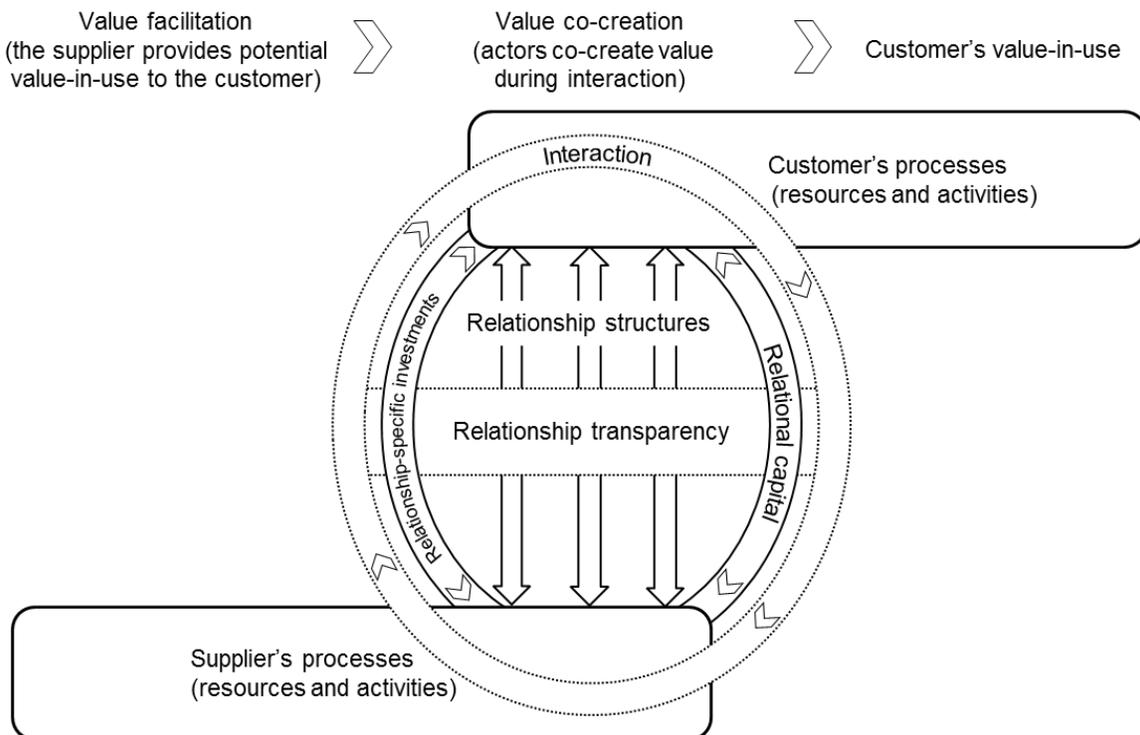


Figure 1. Framework for value co-creation through relationship transparency

Interaction in the framework is seen as the collaborative process within the relationship where actors have abilities to impact on another actor's processes and which has effects on the level of integration between the actors in terms of relational capital, relationship-specific investments and relationship structures. This viewpoint is based especially on the previous studies of Grönroos (2011b: 243), Ford & Mouzas (2013: 435–436) and Vesalainen & Kohtamäki (2015: 108). Furthermore, the framework adds relationship transparency as one additional aspect within the interaction. The framework suggests that the above mentioned relationship integration dimensions can have effects on the level of relationship transparency. This suggestion is tested empirically by the research question 2: *What are the antecedents for transparency in the buyer-supplier relationships?*

This suggestion is supported by the previous empirical studies which presents that relationship structures can create a forum for interactions and facilitate knowledge sharing (Kohtamäki et al. 2012: 1301). Furthermore, information technology has been presented to be one of the most important antecedents for transparency (e.g. Hultman & Axelsson 2007: 634; Caglio & Ditillo 2012: 69). Laaksonen et al. (2008: 916) argue that relationship-specific investments can result in the long-term commitment through annual contracts and increased information sharing (Laaksonen et al. 2008: 916). Furthermore, relationship-specific investments are seen to be an important antecedent for transparency (Walter 2003: 728; Johnsen 2009: 193; Frazier et al. 2009: 38–40; Möller et al. 2012: 126–129). Lastly, Kohtamäki et al. (2012: 1306) argue that relational capital can improve interactions as well as creation and sharing knowledge. In addition, trust is one of the most common antecedents for transparency (Lamming et al. 2001: 6; Walter 2003: 728; Hultman & Axelsson 2007: 634; Kajüter & Kulmala 2005: 200; Akkermans et al. 2004: 448; Barratt & Oke 2007: 524; Squire et al. 2009: 472; Klein & Rai 2009: 38; Frazier et al. 2009: 749; Lee et al. 2014: 290) along with commitment (Kajüter & Kulmala 2005: 200; Barratt & Oke 2007: 524; Walter 2003: 728).

The framework applies Grönroos's (2011b: 243–244) as well as Jaakkola and Hakanen's (2013: 49–50) viewpoints on value co-creation. Based on these viewpoints, value co-creation happens only during interaction when supplier's and customer's processes occur simultaneously. This interactive collaboration allows the customer to impact on the supplier's processes and the supplier to impact on the customer's processes in a value creating way (i.e. create more benefits than sacrifices). Without the existence of interaction, the supplier can only provide the potential value for the customer by delivering the resources through arm's length transaction (i.e. value facilitation). Respectively, the customer creates value independently during the use of the purchased resources to execute activities within its processes whereby perceiving more benefits than sacrifices.

The framework suggests that the relationship transparency can have effects on the quality of interaction and therefore value co-creation (i.e. how well the actors can use the shared information during interaction in order to enhance value co-creation). In this research, value co-creation is viewed as a collaborative process where the customer and the supplier create value (i.e. both actors perceive more benefits than sacrifices) during interaction. These perceived benefits and sacrifices can vary significantly based on the actors' perceptions of the value-creating effects of transparency. However, the most of the value-creating effects can be related to integration-based, capability-based, operational performance-based and financial-based value factors following the categorization by Terpend et al. (2008: 40). Terpend et al. (2008: 40) categorizes value in the relationships mainly from customer's perspective whereas this research studies value from customer's and supplier's perspectives as value co-creation. This research also suggests that the different types of transparency (e.g. cost, supply, organizational, technological and strategic) can have various effects on value co-creation. This relates to the previous empirical findings that transparency needs to be balanced rather than maximized in the specific buyer-supplier relationship to avoid its risks (Eggert & Helm 2003: 103; Hultman & Axelsson 2007: 634). These suggestions relate to the research question 3: *How can transparency have effects on value co-creation in the buyer-supplier relationships?*

3 RESEARCH METHODS

This research was a multiple method research which uses quantitative and qualitative methods. Therefore, triangulation was used to ensure the validity of the research (i.e. research explored what was intended to explore) by combining the multiple sources of quantitative and qualitative data (Saunders et al. 2012: 180, 192–193). Furthermore, the reliability of the research (i.e. ensuring the repeatable and consistent findings) was taken into account by documenting and using the research methods appropriately. The research data from the interviews was recorded and transcribed with the basic level of transcription. In addition, the quality of the used literature was ensured by selecting the academic articles mostly from the top rated academic journals and rating the publication years.

The research strategy was a case study containing the lead company and its 24 most important suppliers. Empirical case study was chosen because it allows rich understanding about a topic or phenomenon within its context or some real-life situations and it can answer the questions such as why, what and how with using quantitative and/or qualitative research methods (Saunders et al. 2012: 179–180.). More specifically the research was an embedded single case study where different buyer-supplier relationships formed the multiple units of analysis. It was chosen because the subunits provide opportunities for an extensive analysis and enhance the insight into the single case (Yin 2014: 56). In this case, it allowed replicating the findings across different buyer-supplier relationships in the supply network. This study contained three embedded cases which are three different supplier groups (contract manufacturers, technology suppliers and subcontractors) in the supply network. The companies in the same supplier group have quite similar buyer-supplier relationships and therefore these formed an embedded case.

The primary research data was collected from semi-structured interviews. The secondary research data had been collected from the web-based structured questionnaires from the customer and its 24 suppliers. The data had been collected for the research project related to

the supply network performance measurement system carried out by the research group Networked Value Systems at the University of Vaasa. This research project was part of REBUS (Towards relational business practices) research program carried out by FIMECC (Finnish Metals and Engineering Competence Cluster). The author had participated in the development of web-based structured questionnaires as well as data collection and analysis. This secondary data was used to get the quantitative data about the current level of transparency between the lead company and its 24 suppliers. The web-based questionnaire contained questions about the level of transparency for the lead company and its suppliers in a scale 1–5. After that, the primary and qualitative research data about the antecedents for transparency as well as the effects of transparency on value co-creation were collected from the in-depth semi-structured interviews (14 interviews with duration of 45–75 min) for the key managers and supply professionals of the lead company and the upper management of eight important suppliers from three different supplier groups. Table 8 below presents the interviewees.

Table 8. The interviewees.

Lead company (N=6):	Suppliers (N=8):
Lead company - Vice President, Purchasing	Contract Manufacturer 1 - Business Director
Lead company - Vice President, R&D	Contract Manufacturer 2 - CEO
Lead company - Manager, Sourcing	Contract Manufacturer 3 - CFO & Deputy CEO
Lead company - Operational Buyer 1	Technology Supplier 1 - Sales Manager
Lead company - Operational Buyer 2	Technology Supplier 2 - CEO
Lead company - Strategic Buyer	Subcontractor 1 - CEO
	Subcontractor 2 - CEO
	Subcontractor 3 - CEO

In the interviews, the conversation was allowed to flow freely within the given themes. The interviews were conducted with using laddering and cognitive mapping -techniques. Laddering technique is based on means-end theory and it was originally developed to get the understanding about how consumers change the product attributes into meaningful

connections (Gutman 1982: 62–63). In the laddering technique, the interviewer uses a directed probing questions such as “Why is this important to you?” in order to describe the connections related to the interviewee’s perceptions about the attributes, consequences and values (Reunolds & Gutman 1988: 12–13). These directed probing questions (e.g. why) result in the ladder of answers which lead to the higher abstraction levels and can result in the various means-end chains of different length (Sørensen & Askegaard 2007: 65). In addition, causal mapping technique (also called cognitive mapping) was used with the laddering technique in order to form the graphical causal maps representing individual understanding about a particular issue. This technique helps to handle the large amount of qualitative information as well as can improve the interview process (Ahmad & Ali 2003: 3–4).

In this research, the interviewer used a series of directed probing questions such as what it causes, where it leads, what it effects and why until the interviewee cannot give the new answers anymore. The aim was to get a number of cause-effect chains of varying length which represents the antecedents for transparency as well as the value-creating effects of transparency. The graphical causal maps were formed during the interviews and later these were sent to the interviewee for review after the transcription of the interview and the clarification of the causal maps. All interviews were recorded and transcribed if the interviewee gave the permit (13/14 gave the permit). The interview guide in the Appendices presents the interview procedures in the more detailed way.

In the data analysis phase, the research data for the first research question was analyzed quantitatively by using descriptive statistics. The data analysis was done by using SAS Enterprise Guide software. For the second and third research questions, the qualitative analysis was conducted by analyzing causal maps. According to Clarke and Mackaness (2001: 154) causal map analysis can be conducted by analyzing the content of the maps (i.e. the meaning which they embody) and the complexity of configuration. In this study, the interviewees’ causal maps were compared in order to form the causal maps presenting

the most usual cause-effects chains related to value-creating effects of transparency and the antecedents for transparency. Table 9 below demonstrates how the data collection methods and data analysis procedures relate to research questions.

Table 9. Data collection and analysis related to research questions.

Research questions:	Data collection methods:	Data analysis procedures:
RQ1 What is the level of transparency in the supply network?	Secondary data had been collected from the customer and its 24 suppliers by using the web-based structured questionnaires	Descriptive statistics
RQ2 What are the antecedents for transparency in the buyer-supplier relationships?	14 semi-structured in-depth interviews with using laddering and causal mapping techniques	Causal map analysis
RQ3 How can transparency have effects on value co-creation in the buyer-supplier relationships?	14 semi-structured in-depth interviews with using laddering and causal mapping techniques	Causal map analysis

4 RESEARCH RESULTS

This chapter introduces the research results by following the order of the research questions. At first, the findings about the level of transparency in the supply network are introduced. Then the findings about the antecedents for transparency are presented. Lastly, the findings about the value-creating effects of transparency are described.

4.1 Level of transparency in the supply network

This part introduces the research results related to the first research question that deals with the level of transparency in the supply network. The objective of this research question is to describe the current levels of different transparency types in different buyer-supplier relationships in the supply network.

Table 10 and Figure 2 below indicate the levels of transparency types in the supply network. The results show that organizational transparency is at the highest level whereas cost transparency is at the lowest level in the supply network. Furthermore, supply, technological and strategic transparencies are at moderate level. Of these three types, technological transparency is at the highest followed by supply transparency.

Table 10. The levels of transparency types in the supply network.

Analysis Variable : Transparency								
Type	N Obs	Std Dev	Minimum	Maximum	Lower Q	Median	Mean	Upper Q
Cost / Price	24	0,602	1,1	3,6	1,7	2,1	2,2	2,5
Supply	24	0,525	1,8	3,8	2,8	3,0	2,9	3,3
Organizational	24	0,514	2,3	4,3	3,3	3,7	3,6	4,0
Technological	24	0,444	2,3	4,3	2,9	3,3	3,3	3,6
Strategic	24	0,509	1,9	4,0	2,5	2,9	2,8	3,1
Transparency	24	0,447	1,9	3,9	2,6	3,0	3,0	3,3

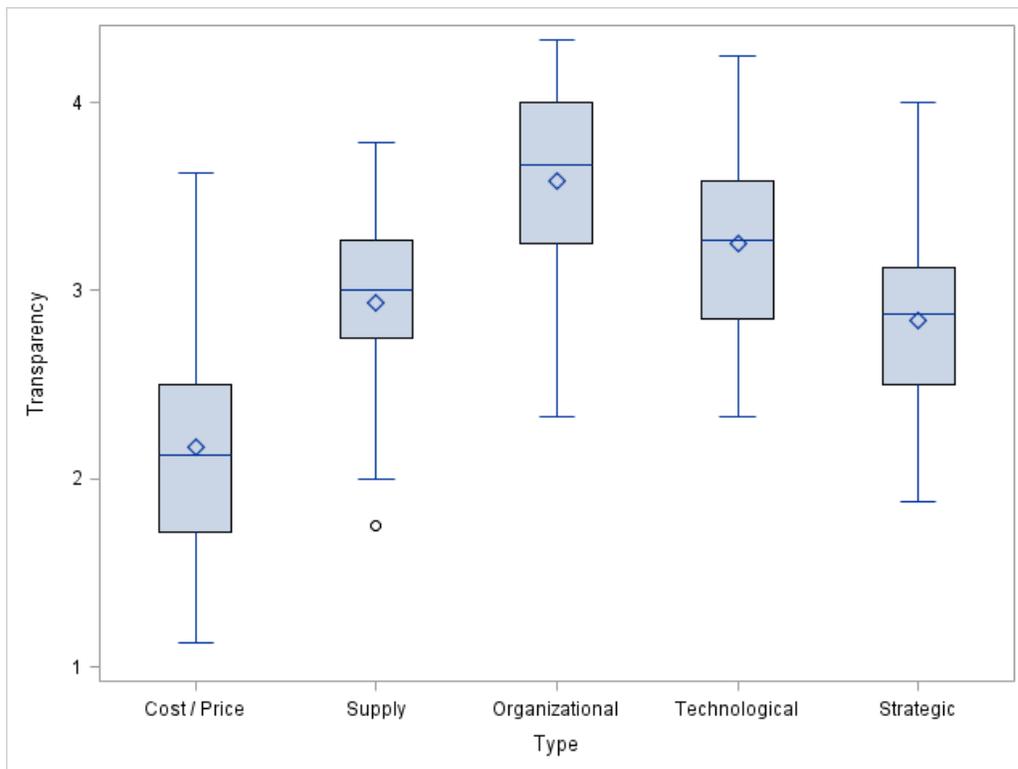
**Figure 2.** The levels of transparency types in the supply network.

Table 11 and Figure 3 below show the level of cost transparency in different supplier groups from suppliers' and customer's viewpoints. Overall, the cost transparency is at a low level. The results show that the customer has very limited information related to technology suppliers' costs except one technology supplier whose costs are very transparent to the customer.

Table 11. The level of cost transparency in the supplier groups.

Group	N Obs	Variable	Std Dev	Minimum	Maximum	Lower Q	Median	Mean	Upper Q
Cont. Man. (S)	9	Cost / Price Transparency	0,668	1,6	3,3	1,8	2,5	2,4	3,0
Cont. Man. (C)	9		0,500	1,5	3,0	2,0	2,0	2,2	2,5
Tech. Sup. (S)	8		0,678	1,3	3,3	2,0	2,5	2,4	3,0
Tech. Sup. (C)	8		1,061	1,0	4,0	1,0	1,0	1,6	2,0
Subcont. (S)	7		0,661	1,3	3,0	1,5	2,3	2,3	2,8
Subcont. (C)	7		0,673	1,5	3,0	1,5	2,0	2,1	3,0

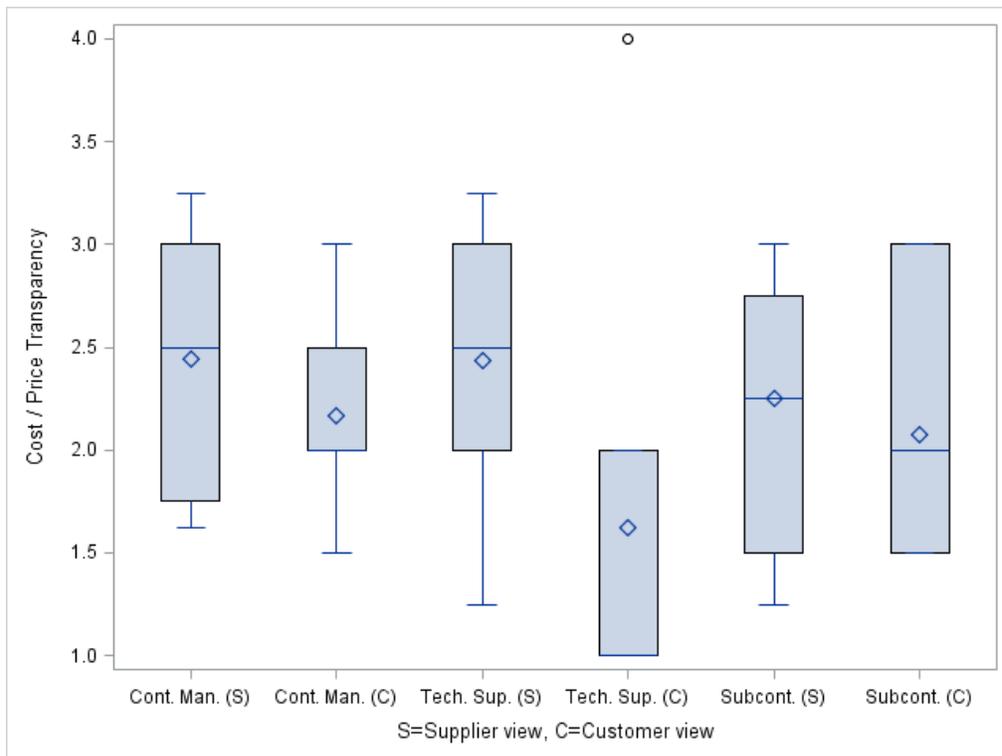


Figure 3. The level of cost transparency in the supplier groups.

Table 12 and Figure 4 below show the level of supply transparency in different supplier groups from suppliers' and customer's viewpoints. The results indicate that supply transparency in contract manufacturers perceived by the customer and the supplier is at a moderate level whereas in subcontractors it is at quite a low level. Furthermore, technology suppliers feel more informed about customer's supply activities than the other way.

Table 12. The level of supply transparency in the supplier groups.

Group	N Obs	Variable	Std Dev	Minimum	Maximum	Lower Q	Median	Mean	Upper Q
Cont. Man. (S)	9	Supply Transparency	0,651	2,0	4,0	2,7	2,8	3,0	3,7
Cont. Man. (C)	9		0,325	2,8	3,8	3,0	3,0	3,2	3,5
Tech. Sup. (S)	8		0,853	2,0	4,3	2,5	3,2	3,2	4,0
Tech. Sup. (C)	8		0,626	1,5	3,3	2,3	2,9	2,7	3,1
Subcont. (S)	7		0,535	2,0	3,3	2,3	3,0	2,9	3,3
Subcont. (C)	7		0,374	2,0	3,0	2,3	2,5	2,6	3,0

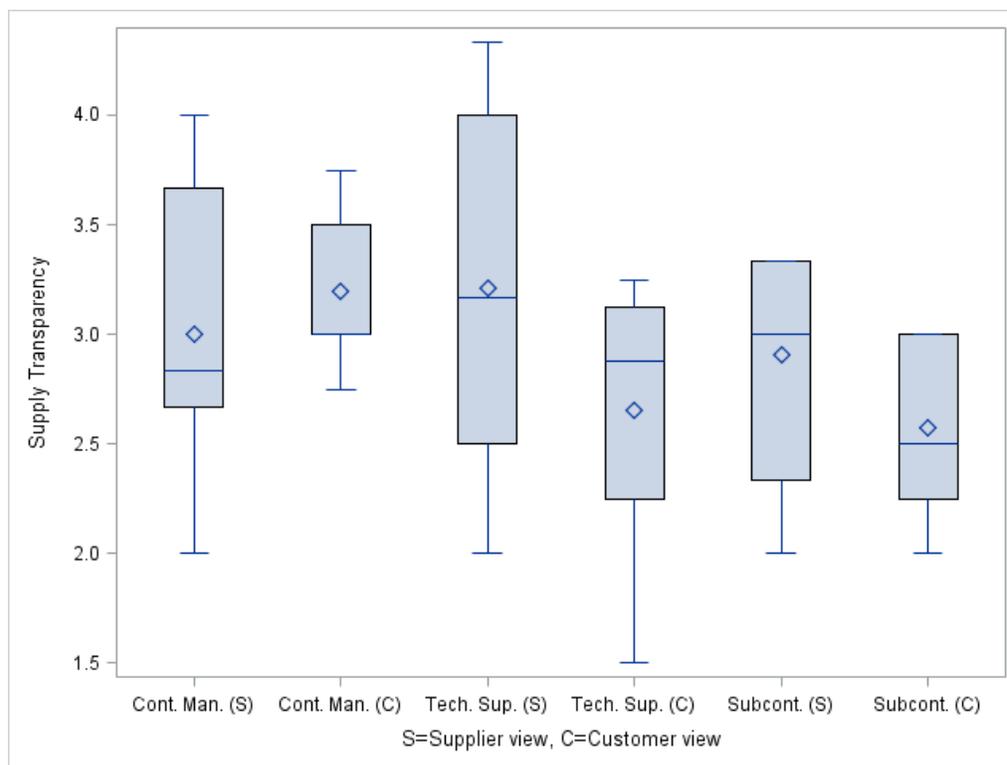


Figure 4. The level of supply transparency in the supplier groups.

Table 13 and Figure 5 below show the level of organizational transparency in different supplier groups from suppliers' and customer's viewpoints. The level of organizational transparency is rather high but it varies significantly. Especially technology suppliers' and subcontractors' perception about the transparency of customer's organization varies from the very low level (2,0) to the very high level (4,7).

Table 13. The level of organizational transparency in the supplier groups.

Group	N Obs	Variable	Std Dev	Minimum	Maximum	Lower Q	Median	Mean	Upper Q
Cont. Man. (S)	9	Organizational Transparency	0,706	2,0	4,3	3,0	3,3	3,2	3,3
Cont. Man. (C)	9		0,412	3,0	4,3	3,7	4,0	3,8	4,0
Tech. Sup. (S)	8		0,816	2,3	4,7	2,7	3,2	3,3	4,0
Tech. Sup. (C)	8		0,486	3,0	4,7	3,8	4,0	4,0	4,2
Subcont. (S)	7		0,957	2,0	4,7	2,3	3,3	3,2	4,0
Subcont. (C)	7		0,848	2,3	4,7	3,3	4,3	4,0	4,7

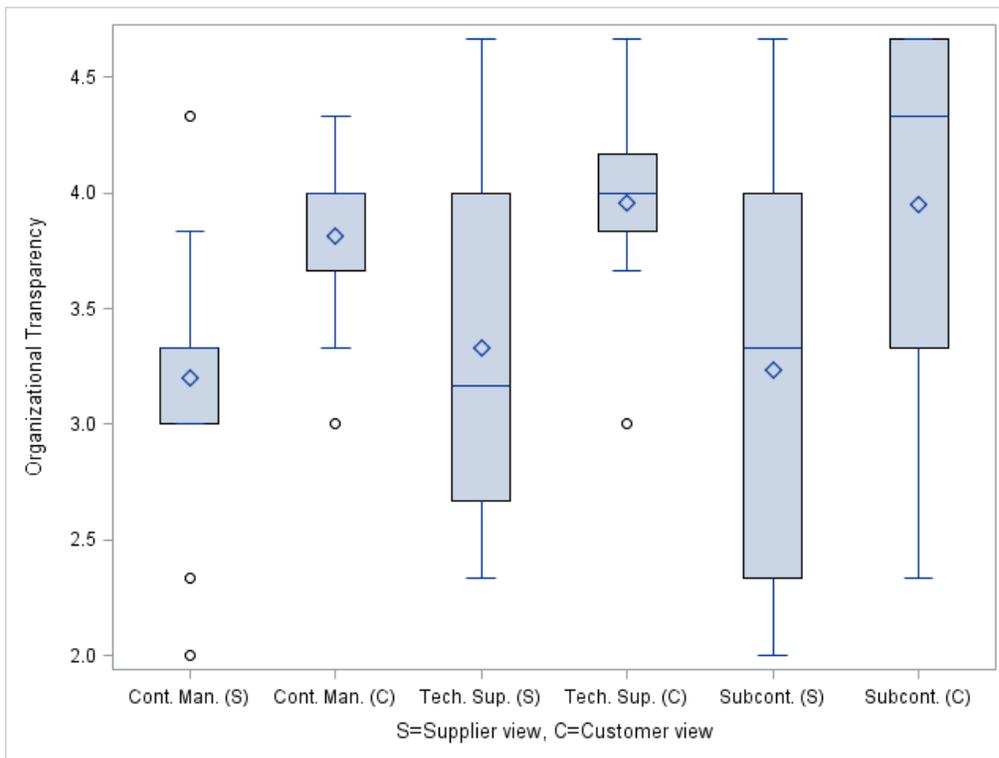


Figure 5. The level of organizational transparency in the supplier groups.

Table 14 and Figure 6 below show the level of technological transparency in different supplier groups from suppliers' and customer's viewpoints. Overall, technological transparency is at a moderate level. The results indicate that the customer has rather high transparency level of contract manufacturers' technologies whereas the suppliers' perceptions of transparency vary a lot from the very low level (1,7) to the extremely high level (5,0).

Table 14. The level of technological transparency in the supplier groups.

Group	N Obs	Variable	Std Dev	Minimum	Maximum	Lower Q	Median	Mean	Upper Q
Cont. Man. (S)	9	Technological Transparency	0,932	1,7	5,0	2,7	2,8	3,1	3,7
Cont. Man. (C)	9		0,453	2,8	4,3	3,5	3,8	3,6	4,0
Tech. Sup. (S)	8		0,589	2,3	4,0	3,2	3,5	3,5	4,0
Tech. Sup. (C)	8		0,265	2,8	3,5	3,0	3,3	3,2	3,3
Subcont. (S)	7		0,686	1,7	3,7	2,7	3,0	2,9	3,7
Subcont. (C)	7		0,345	2,8	3,5	2,8	3,3	3,2	3,5

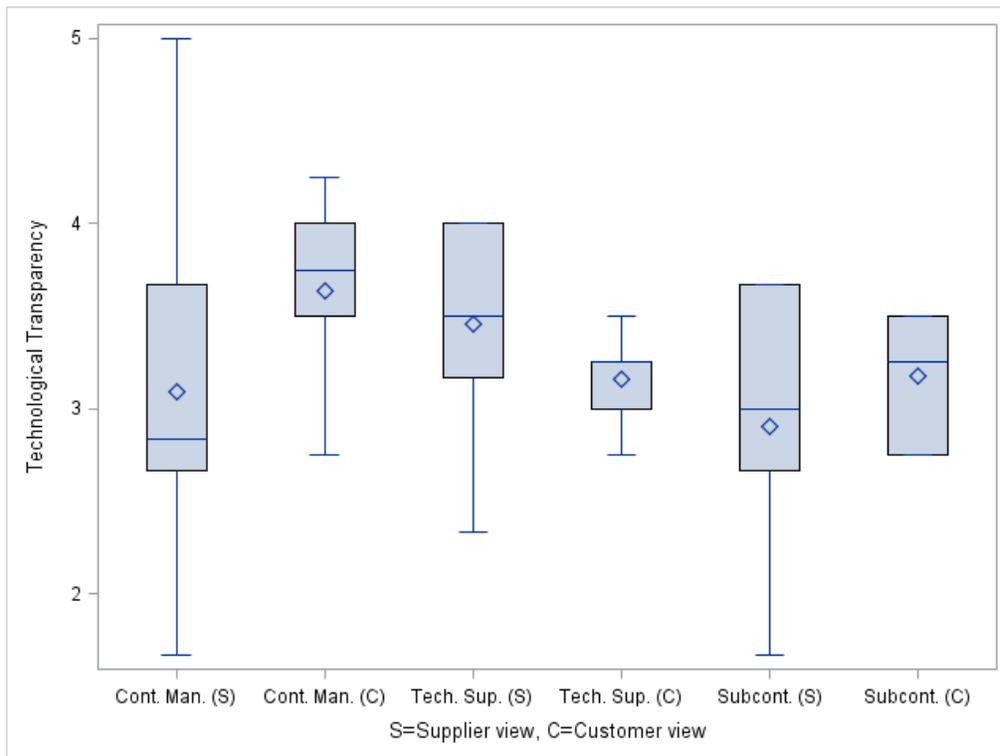


Figure 6. The level of technological transparency in the supplier groups.

Table 15 and Figure 7 shows the level of strategic transparency in different supplier groups from suppliers' and customer's viewpoints. The results indicate that the customer has the highest level of transparency on contract manufacturers' and subcontractors' strategic issues whereas suppliers' perceptions on customer's strategic issues are at the lower level. However, technology suppliers feel more informed about customer's strategic issues than the other way.

Table 15. The level of strategic transparency in the supplier groups.

Group	N Obs	Variable	Std Dev	Minimum	Maximum	Lower Q	Median	Mean	Upper Q
Cont. Man. (S)	9	Strategic Transparency	0,677	1,5	3,8	2,3	2,5	2,6	3,0
Cont. Man. (C)	9		0,651	2,3	3,8	2,5	3,5	3,1	3,8
Tech. Sup. (S)	8		0,691	2,3	4,0	2,5	2,9	3,1	3,8
Tech. Sup. (C)	8		0,641	2,0	4,0	2,3	2,8	2,8	3,0
Subcont. (S)	7		0,497	1,5	3,0	2,0	2,5	2,4	2,8
Subcont. (C)	7		0,787	2,3	4,3	2,3	3,0	3,1	3,8

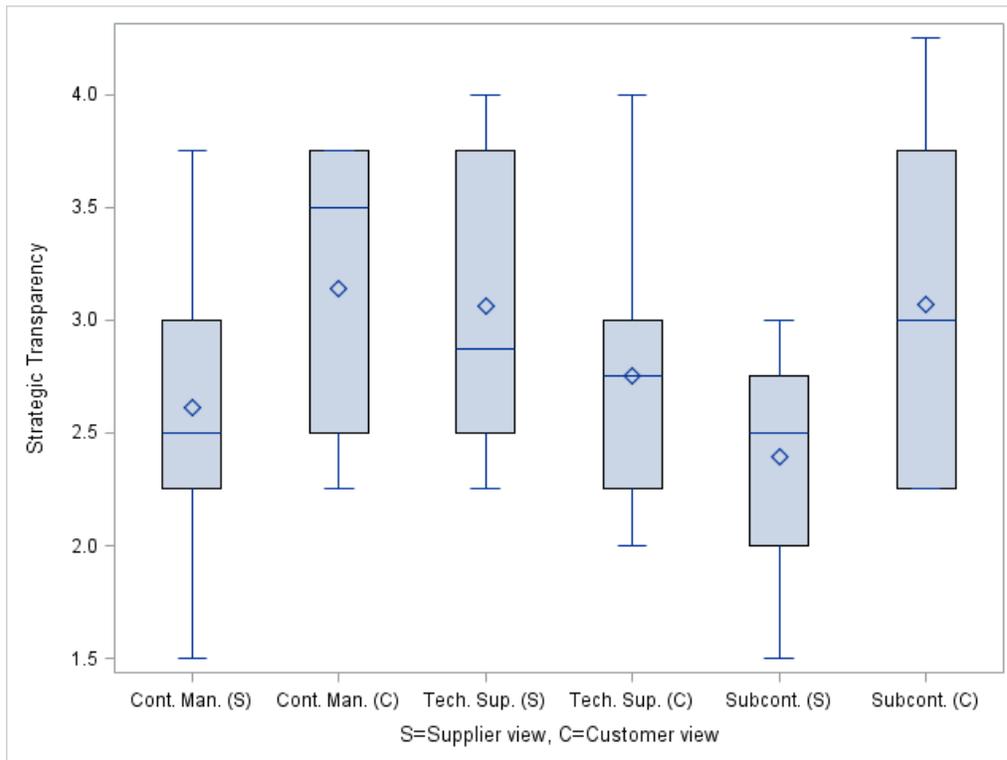


Figure 7. The level of strategic transparency in the supplier groups.

4.2 Antecedents for transparency in the buyer-supplier relationships

This part introduces the research results related to the second research question about the antecedents for transparency in the buyer-supplier relationships. The results from the interviews are presented in causal maps representing the interviewees' beliefs about the antecedents for transparency. The customer representatives' (N=6) and supplier representatives' (N=8) individual causal maps have been combined into one causal map because their causal beliefs did not vary significantly. The numbers inside the text area present how many interviewees have the same antecedent whereas the numbers between the text areas present how many interviewees have similar causal belief.

Figure 8 below indicates the causal map of cost transparency which shows that the trust (9/14) is the most usual antecedent for cost transparency. Related to trust, the interviewees believe that the contracts that secure the information (5/14) as well as transparent organizational culture (4/14) are other usual antecedents for cost transparency. Moreover, these two antecedents usually precede trust. Furthermore, cost accounting systems (4/14) and clear cost calculation methods (4/14) are also usual antecedents for cost transparency.

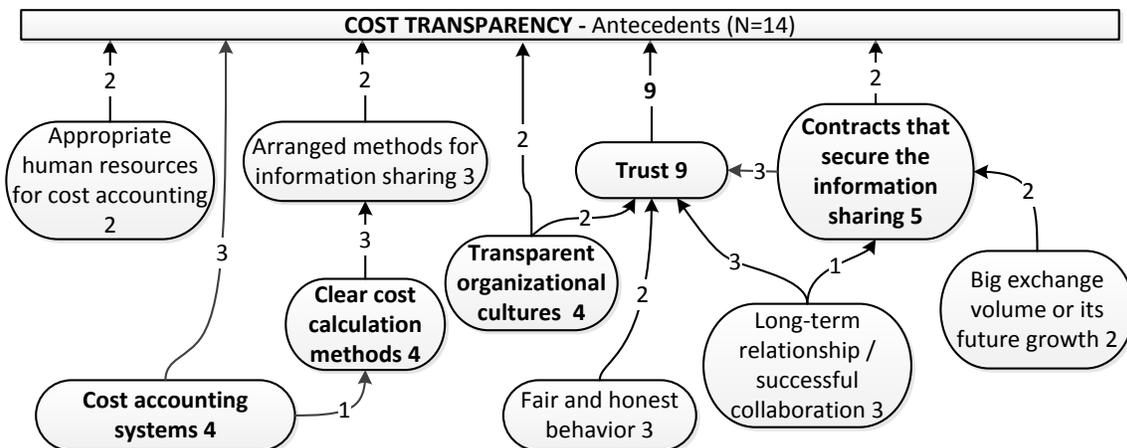


Figure 8. Antecedents for cost transparency.

The most usual antecedent for supply transparency is Information Technology (IT) - systems for information sharing (7/14) as Figure 9 below indicates. The interviewees also believe that trust (4/14) is another important antecedent for supply transparency. The arranged methods for information sharing (4/14) are also a quite usual antecedent that precedes the clear processes for information sharing (4/14). Some of the interviewees also believe that there is a need to have willingness to share, receive and use information (4/14).

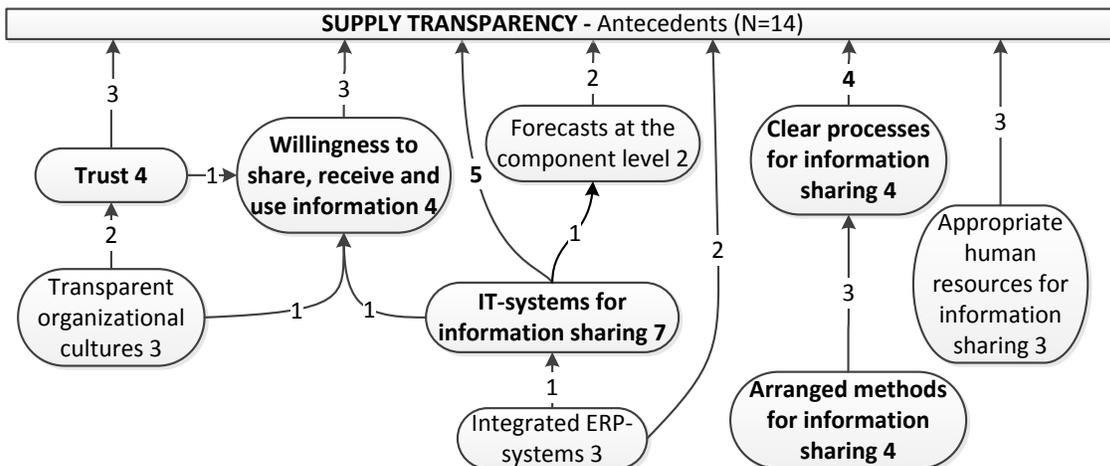


Figure 9. Antecedents for supply transparency.

Antecedents for organizational transparency are quite clear for all interviewees as the causal map in Figure 10 below indicates. The most of the interviewees believe that arranged methods for information sharing (9/14) are the needed antecedent for organizational transparency. Some of the interviewees also believe that IT-systems for information sharing (4/14) and clear organizational structures (4/14) are needed.

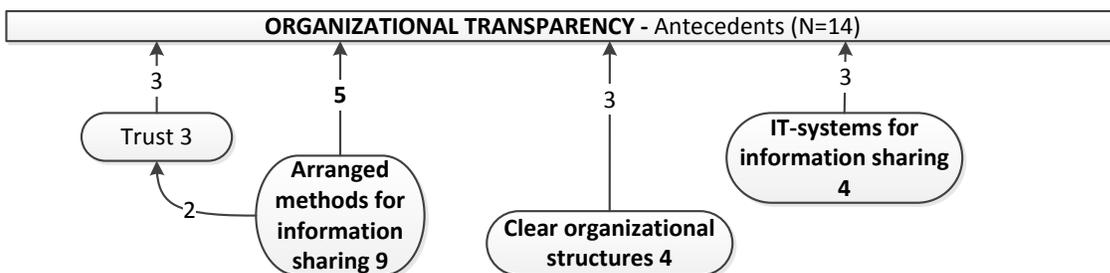


Figure 10. Antecedents for organizational transparency.

Figure 11 below demonstrates the causal map of technological transparency. The most usual antecedents for technological transparency are trust (9/14) along with contracts that secure the information sharing (7/14) and arranged methods for product development (5/14).

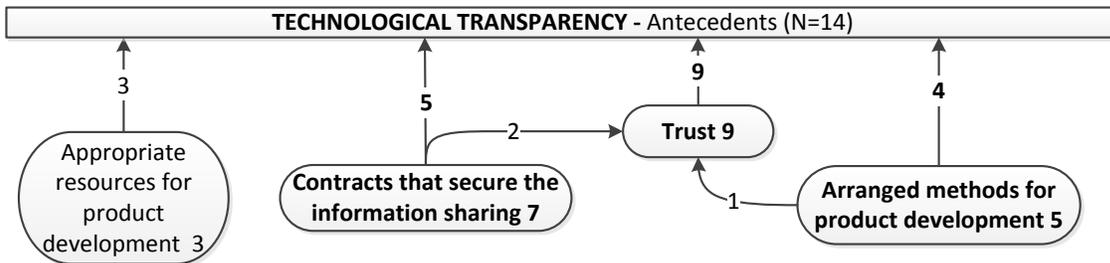


Figure 11. Antecedents for technological transparency.

Antecedents for strategic transparency are usually believed to be regular strategic discussions between the parties (9/14) that require concrete strategies for both parties (4/14) as Figure 12 below demonstrates. Another usual antecedents are trust (7/14) and strategically important supplier or customer (4/14).

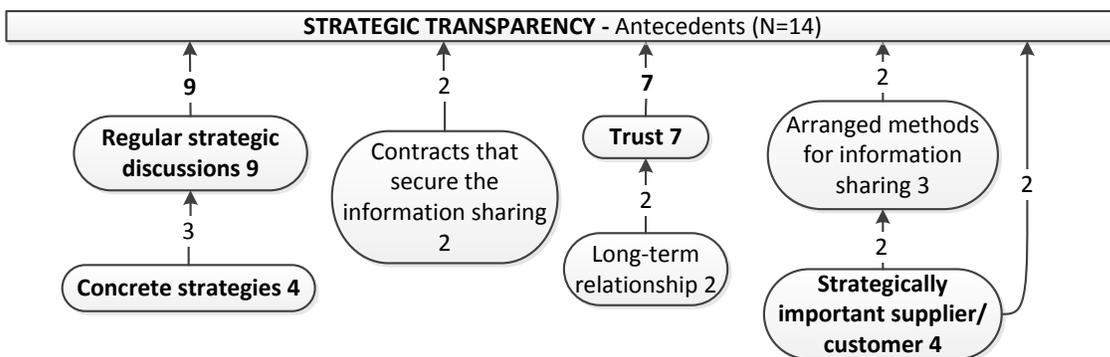


Figure 12. Antecedents for strategic transparency.

Lastly, the causal map in Figure 13 below combines these previous five different causal maps into one causal map presenting antecedents for transparency in general. The results indicate that the most usual antecedents for transparency are trust (32/70) and the arranged

methods for information sharing (24/70). Furthermore, contracts that secure the information sharing (14/70) and transparent organizational cultures (10/70) are common which are also believe to precede trust along with the successful long-term collaboration (5/70). Usually, the interviewees also believe that appropriate human resources for information sharing (8/70), IT-systems for information sharing (11/70) and regular strategic discussions (9/70) are needed in order to receive relationship transparency.

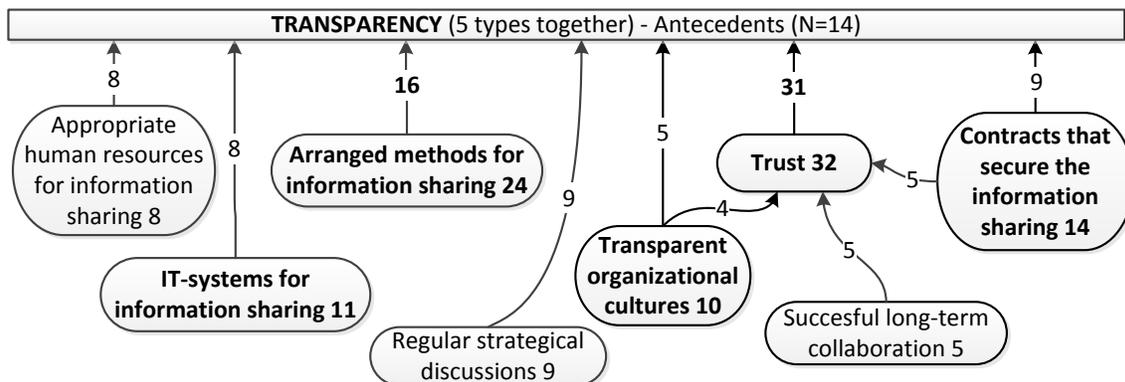


Figure 13. Antecedents for transparency.

4.3 Value-creating effects of transparency in the buyer-supplier relationships

This part introduces the research results related to the third research question about the value-creating effects of transparency in the buyer-supplier relationships. The results from the interviews are presented in causal maps representing the interviewees' beliefs about the benefits and sacrifices of transparency. Similar than with the antecedents for transparency, customer's representatives (N=6) and supplier's representatives (N=8) individual causal maps are combined into one causal map because their beliefs did not have major differences. The numbers inside the text area demonstrate the amount of the interviewees which believe the same effect whereas the numbers between the text areas demonstrate how many interviewees have similar causal belief. The value-creating effects are presented by following with the Terpend et al. (2008: 40.) categorization of relationship value but it is extended so that the customer's and supplier's perspectives are taken into account.

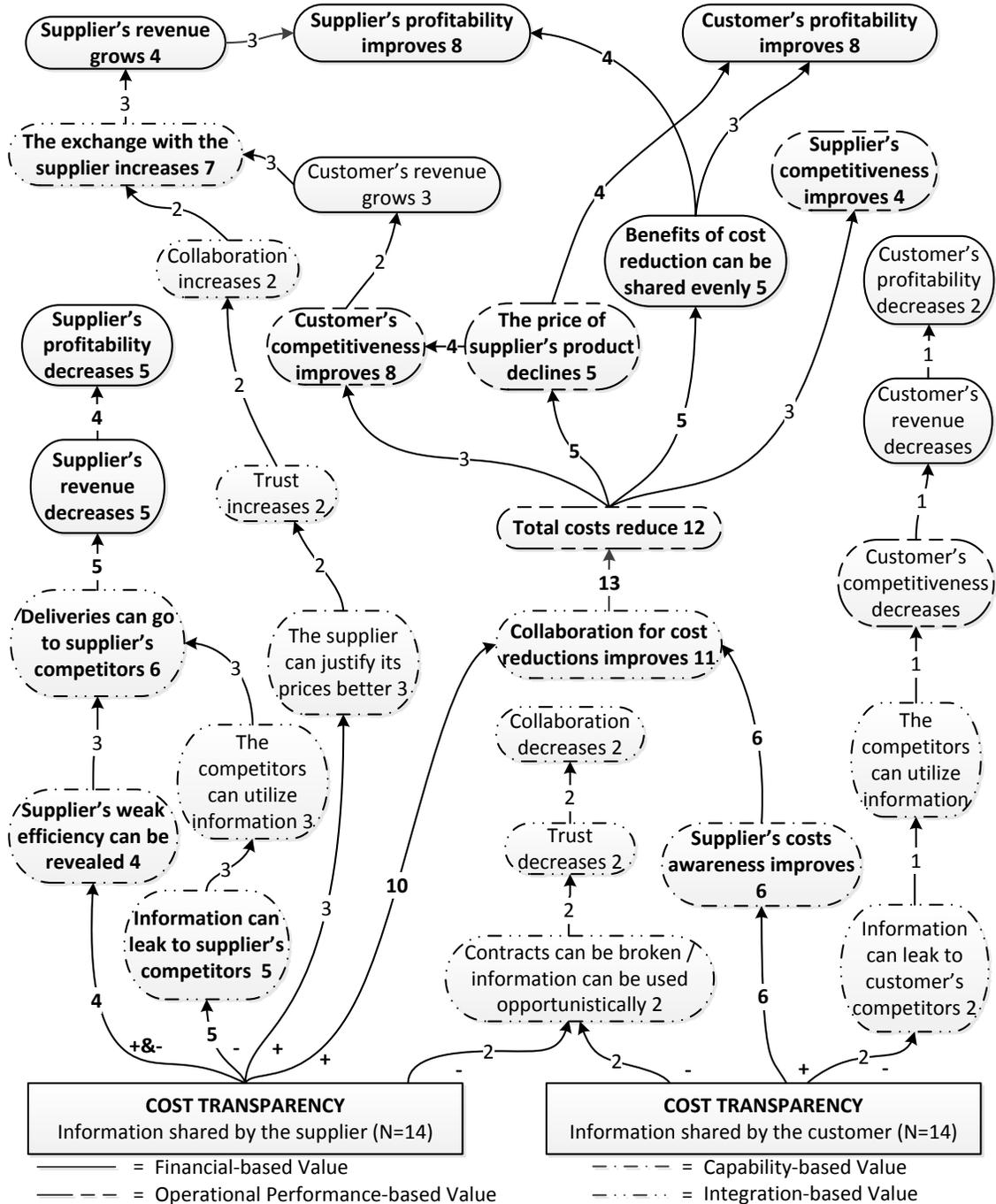


Figure 14. Value-creating effects of cost transparency.

The causal map in Figure 14 above indicates that transparent cost information shared by the customer leads to benefits such as supplier’s improved costs awareness (6/14) which then

improves collaboration for cost reductions (11/14) and results in total cost reductions (12/14). Similarly, transparent cost information shared by the supplier leads to improved collaboration for cost reductions. For example, the interviewees believe that it allows the customer to help and direct the supplier to reduce costs. These benefits create capability-based value in terms of supplier's improved costs awareness and integration-based value in terms of improved collaboration for cost reductions which then leads to operational performance-based value as total costs reduce.

The interviewees usually believe that reduced total costs lead to the declining price of supplier's product (5/14) which has positive effects on customer's profitability (8/14). Reduced total costs improve especially customer's competitiveness (8/14) that also increases the exchange with the supplier (7/14) through customer's growing revenue (3/14). The increased exchange leads to supplier's revenue growth (4/14) and lastly to supplier's improved profitability (8/14). Furthermore, both parties can improve profitability by sharing the benefits of cost reduction activities evenly (5/14). These benefits relate to operational performance-based value (e.g. reduced costs and improved competitiveness) that leads to financial-based value in terms of increased revenue and improved profitability. In addition, cost transparency helps the parties to capture the created value evenly so that both parties' profitability improves.

The causal map indicates that the sacrifices of cost transparency are believed to happen more often to the supplier than to the customer. The interviewees usually believe that when the supplier shares cost information transparently, this information can leak to supplier's competitors (5/14) or supplier's weak efficiency can be revealed (4/14) causing the situation where the deliveries go to supplier's competitors (6/14). Furthermore, this decreases supplier's revenue (5/14) which then decreases supplier's profitability (5/14). These negative effects destroy integration-based value when information can leak or the deliveries can go to supplier's competitors which then destroys financial-based value (supplier's decreased revenue and profitability).

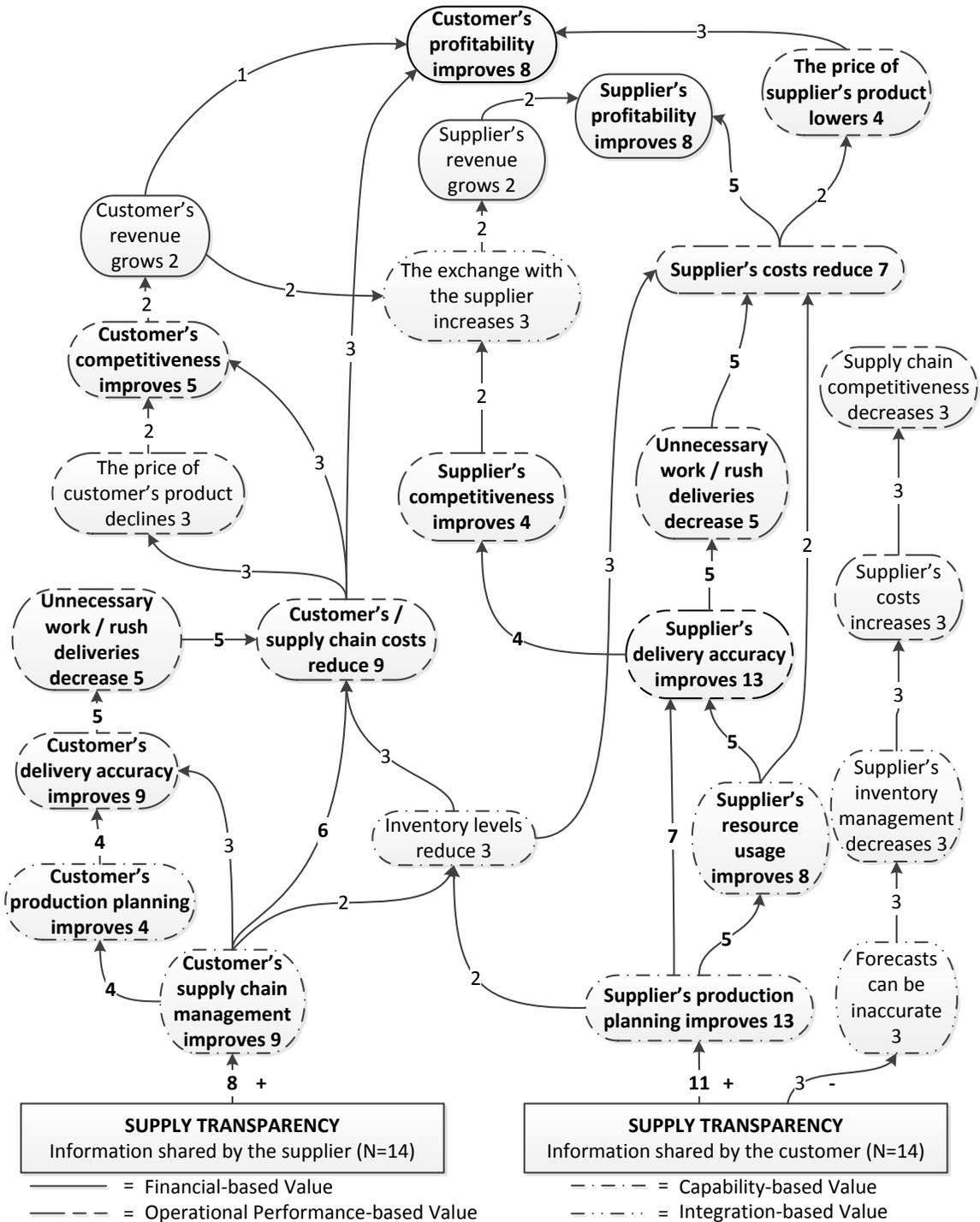


Figure 15. Value-creating effects of supply transparency.

Figure 15 above demonstrates the causal map of supply transparency. It indicates that transparent supply information shared by the customer leads to the benefits that can be realized by supplier's improved production planning (13/14) that leads to supplier's improved delivery accuracy (13/14) often through supplier's improved resource usage (8/14). The supplier's improved delivery accuracy leads to supplier's improved competitiveness (4/14) as well as decreased unnecessary work or rush orders (5/14) that reduced supplier's costs (7/14). Furthermore, supplier's reduced costs lead to supplier's improved profitability (8/14) and customer's improved profitability (8/14) through supplier's lower product prices (4/14). These benefits relate to capability-based value in terms of supplier's improved production planning and resource usage that then leads to operational performance-based value in terms of supplier's improved delivery accuracy, decreased unnecessary work or rush orders and competitiveness as well as reduced costs. Finally, financial-based value is created for both parties in terms of improved profitability.

The interviewees believe that transparent supply information shared by the supplier brings benefits such as customer's improved supply chain management (9/14) which leads to customer's improved production planning (4/14) which then improves delivery accuracy (9/14). Lastly these improvements lead to customer's or supply chain's reduced costs (9/14) when unnecessary work or rush deliveries decrease (5/14). The interviewees usually believed that reduced costs lead to improvements in customer's competitiveness (5/14) and customer's profitability (8/14). Some of the interviewees also believe that the exchange with the supplier increases (3/14) when supplier's and customer's competitiveness improves. Moreover, increased exchange is believed to result in supplier's improved profitability through customer's increased revenue (2/14). The benefits relate to capability-based value in terms of customer's improved supply chain management and production planning which leads to operational performance-based value in terms of customer's improved delivery accuracy, decreased unnecessary work or rush orders, reduced costs and improved competitiveness. The final outcome is the financial-based value in terms of customer's improved profitability.

The interviewees usually do not believe in any sacrifices of supply transparency. However, three of the interviewees believe that if the customer shares inaccurate forecasts (3/14), it causes problems in supplier's inventory management (3/14). This then leads to supplier's increased costs (3/14) and finally decreases the whole supply chain's competitiveness (3/14). These sacrifices destroy capability-based value (supplier's decreased inventory management) which then destroys operational performance-based value in terms of increased costs for the supplier and decreased competitiveness for the whole supply chain.

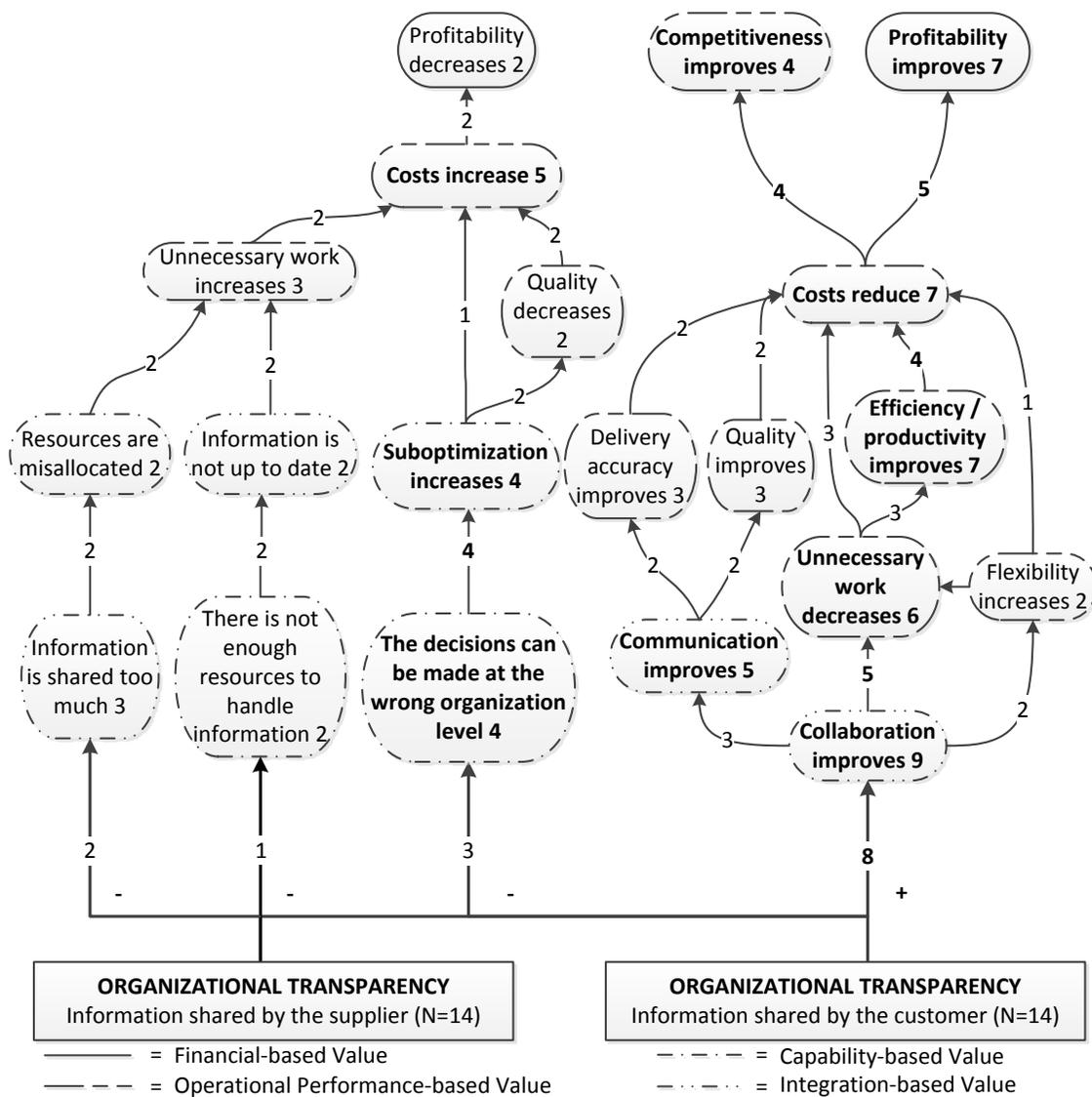


Figure 16. Value-creating effects of organizational transparency.

Figure 16 above indicates the causal map of organizational transparency. It indicates that the transparent organizational information shared by both parties brings similar benefits and some sacrifices. The benefits usually relate to improved collaboration (9/14) that leads to decreased unnecessary work (6/14). Moreover, this leads to cost reductions (7/14) through efficiency or productivity improvements (7/14). Furthermore, some of the interviewees believe that when collaboration improves, it improves communication and causes cost reductions through improved delivery accuracy (3/14) and quality (3/14). Finally, cost reductions lead to improved competitiveness (4/14) and profitability (7/14) for both parties. These benefits relate to integration-based value in terms of improved collaboration and communication which then leads to operational performance-based value in terms of cost reductions and competitiveness for both parties. Lastly, financial-based value is created in terms of improved profitability for both parties. However, many interviewees pointed out that these operational- and financial-based value-creating effects of organizational transparency are quite marginal.

The most usual sacrifice of organizational transparency for both parties is the situation where the decisions can be made at the wrong organizational level (4/14) causing increased suboptimization (4/14). Moreover, this leads to increased costs (5/14) and finally to decrease profitability (2/14). Furthermore, the interviewees believed that too much information (3/14) and the lack of appropriate resources (2/14) can lead to increased unnecessary work (3/14) and finally to increased costs. These negative effects especially destroy capability-based value (the decisions at the wrong organizational level, increased suboptimization) which then destroys operational performance-based value (increased costs) and finally financial-based value (decreased profitability).

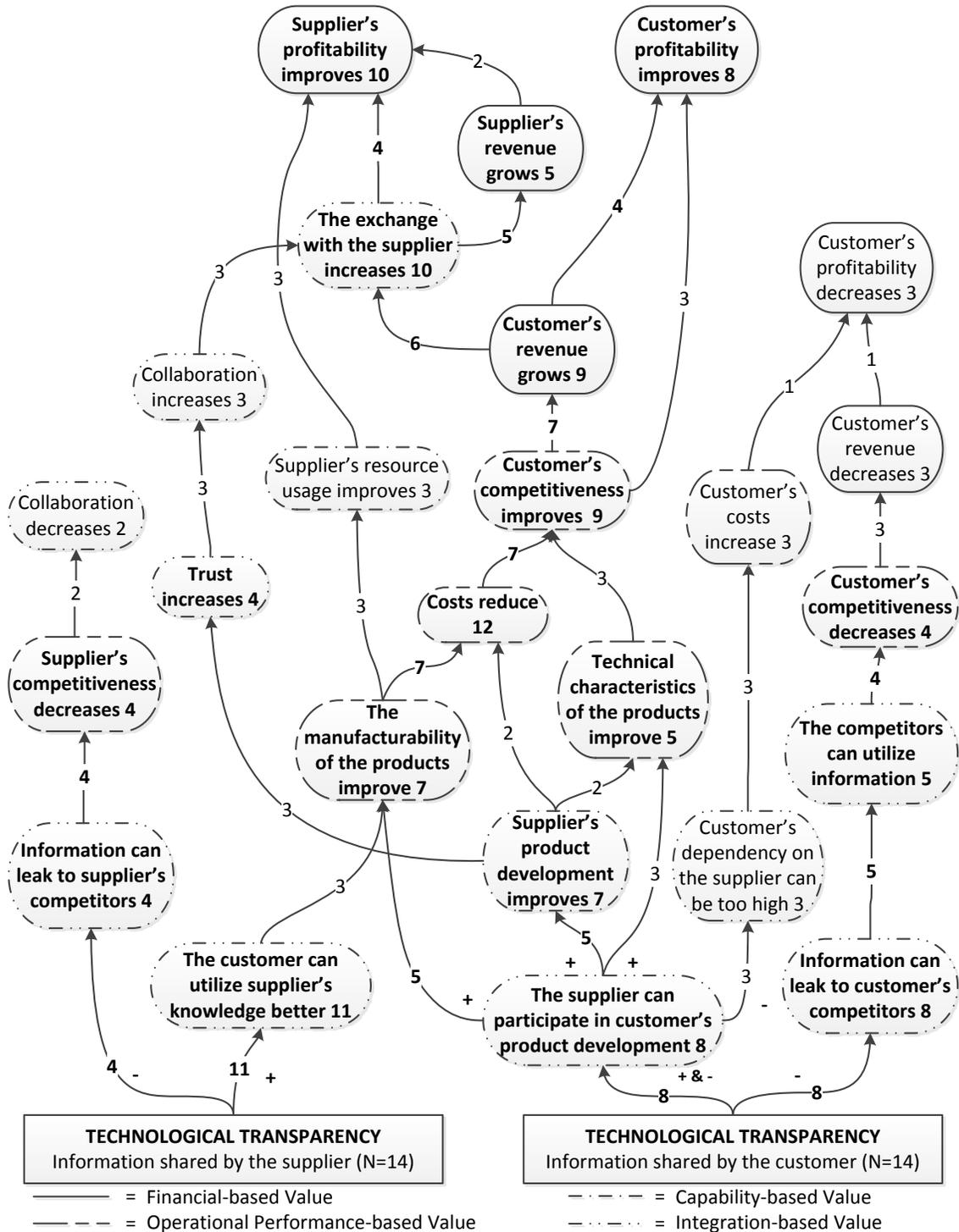


Figure 17. Value-creating effects of technological transparency.

Figure 17 above demonstrates the causal map of technological transparency. It indicates that transparent technological information shared by the customer allows the supplier to participate in customer's product development (8/14) that causes benefits but also some sacrifices. Sacrifices are believed to occur to the customer when it can have too high dependency on the supplier (3/14) causing customer's increased costs (3/14) and finally decrease customer's profitability (3/14). The benefits of supplier's participation relate to supplier's improved product development (7/14) that leads to improved technical characteristics of the products (5/14) and decreased costs (12/14) which both improve customer's competitiveness (9/14). Many interviewees also believe that the benefits of supplier's participation relate to the improved manufacturability of the products (7/14) that leads to decreased costs. Furthermore, the manufacturability of the products also improves through the customer's ability to utilize supplier's knowledge better (11/14) when the supplier shares technological information transparently.

At first, the above mentioned benefits relate to integration-based value when the supplier has ability to participate in the customer's product development and when the customer can utilize supplier's knowledge better. This then leads to operational performance-based value in terms of improved manufacturability and technical characteristics of the products as well as decreased costs and improved competitiveness for the customer. However, the created integration-based value can be destroyed for the customer's viewpoint if the dependency on the supplier is too high. Furthermore, this destroys operational performance-based value as customer's costs increase and financial-based value as customer's profitability decreases.

Similarly like in the previous causal maps, the interviewees usually believe that when customer's competitiveness improves, it also improves customer's profitability (8/14) and increases the exchange with the supplier (10/14) through customer's growing revenue (9/14). Exchange is also believed to increase when collaboration increases through increased collaboration (3/14) and increased trust (4/14) which are the results of supplier's improved product development. Furthermore, the increased exchange leads to supplier's

revenue growth (5/14) and finally to supplier's improved profitability (10/14). These results relate to operational performance-based value (e.g. improved competitiveness) which then leads to financial-based value in terms of increased revenue and improved profitability. In addition, capability-based value is created when supplier's product development improves which then leads to integration-based value in terms of increased trust, collaboration and the exchange with the supplier which then results financial-based value (growth revenue and improved profitability).

The interviewees believe that technological transparency causes more often sacrifices to the customer rather than to the supplier. For example, eight of the interviewees believe that information can leak to the customer's competitors whereas only four of the interviewees believe that the risks for information leak to the supplier's competitors are significant. The causes of these are that the competitors can utilize the information (5/14) that leads to customer's decreased competitiveness (4/14) and lastly customer's decreased profitability (3/14). Similarly, the negative results for the supplier are supplier's decreased competitiveness (4/14) and then decreased collaboration (2/14). These negative effects destroy integration-based value especially from the customer's viewpoint when the information can leak to the customer's competitors and the competitors can utilize the information which then destroys the operational performance-based value (customer's decreased competitiveness) and finally financial-based value (decreased revenue and profitability for the customer).

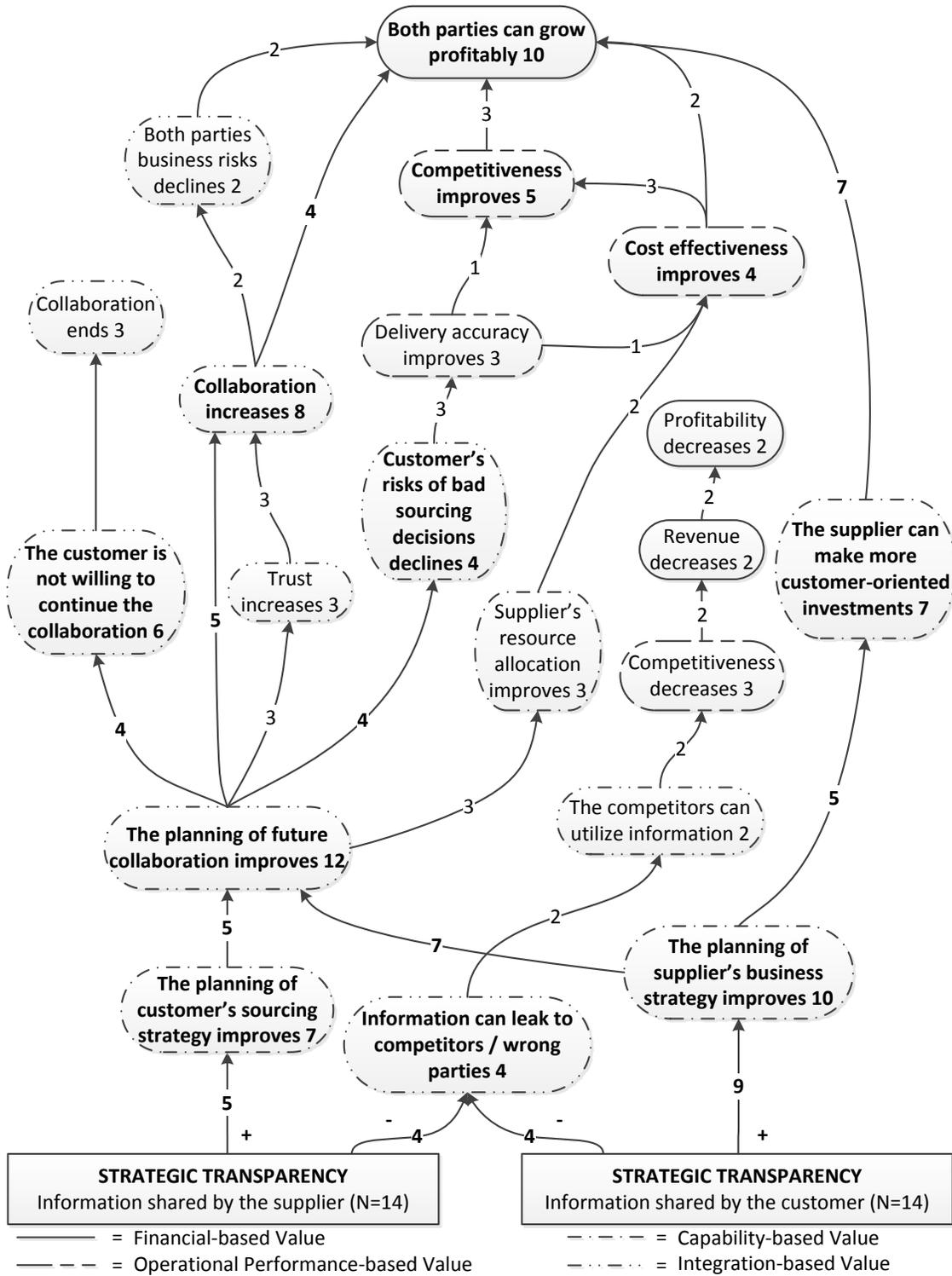


Figure 18. Value-creating effects of strategic transparency.

Figure 18 above shows the causal map of strategic transparency. It indicates that transparent strategic information shared by the customer usually provides benefits such as improvements in the planning of supplier's business strategy (10/14) which results in more customer-oriented investments by the supplier (7/14) and lastly leads to profitable growth for both parties (10/14). When supplier's planning of business strategy improves, it is believed to help the planning of future collaboration (12/14). Similarly, when the supplier share strategic information transparently, it helps the planning of customer's sourcing strategy (7/14) which then helps the planning of future collaboration. These benefits relate to capability-based value in terms of improved strategic planning for both parties which then leads to integration-based value (the planning of future collaboration). Moreover, the capability-based value is also created as the supplier can make more customer-oriented investments which lead to financial-based value in terms of profitable growth for both parties.

The causal map indicates that improved planning of future collaboration usually causes positive effects such as profitable growth for both parties through increased collaboration (8/14). Some of the interviewees believe that improved planning of future collaboration leads to the decreased risks of customer's bad sourcing decisions that improve cost effectiveness (4/14) and competitiveness (5/14) resulting in profitable growth. These realized benefits relate to integration-based value in terms of increased collaboration and customer's decreased risks of bad sourcing decisions which then lead to financial-based value in terms of profitable growth for both parties.

Some of the interviewees believe that the improved planning of the future collaboration can have negative effect on the supplier if the customer is not willing to continue the collaboration in the future (6/14) causing the end of the collaboration (3/14). However, the value-destroying effect that the customer is not willing to continue the collaboration is quite neutral (i.e. do not create or destroys value) because the interviewees usually do not believe

this for only as a negative sacrifice but rather beneficial for both so that the parties know faster if their strategies do not fit together.

The causal map indicates that strategic transparency can cause sacrifices for both parties but only based on four interviewees' beliefs. The sacrifices relate to the leakage of information to the competitors or wrong parties (4/14) causing the situation where the competitors can utilize the information (2/14) that leads to decreased competitiveness (3/14) and lastly decreased revenue (2/14) and profitability (2/14) for the customer and/or the customer. These negative effects destroy integration-based value when the information can leak to the competitors or wrong parties. This then destroys operational performance-based value (decreased competitiveness) and then financial-based value in terms of decreased revenue and profitability.

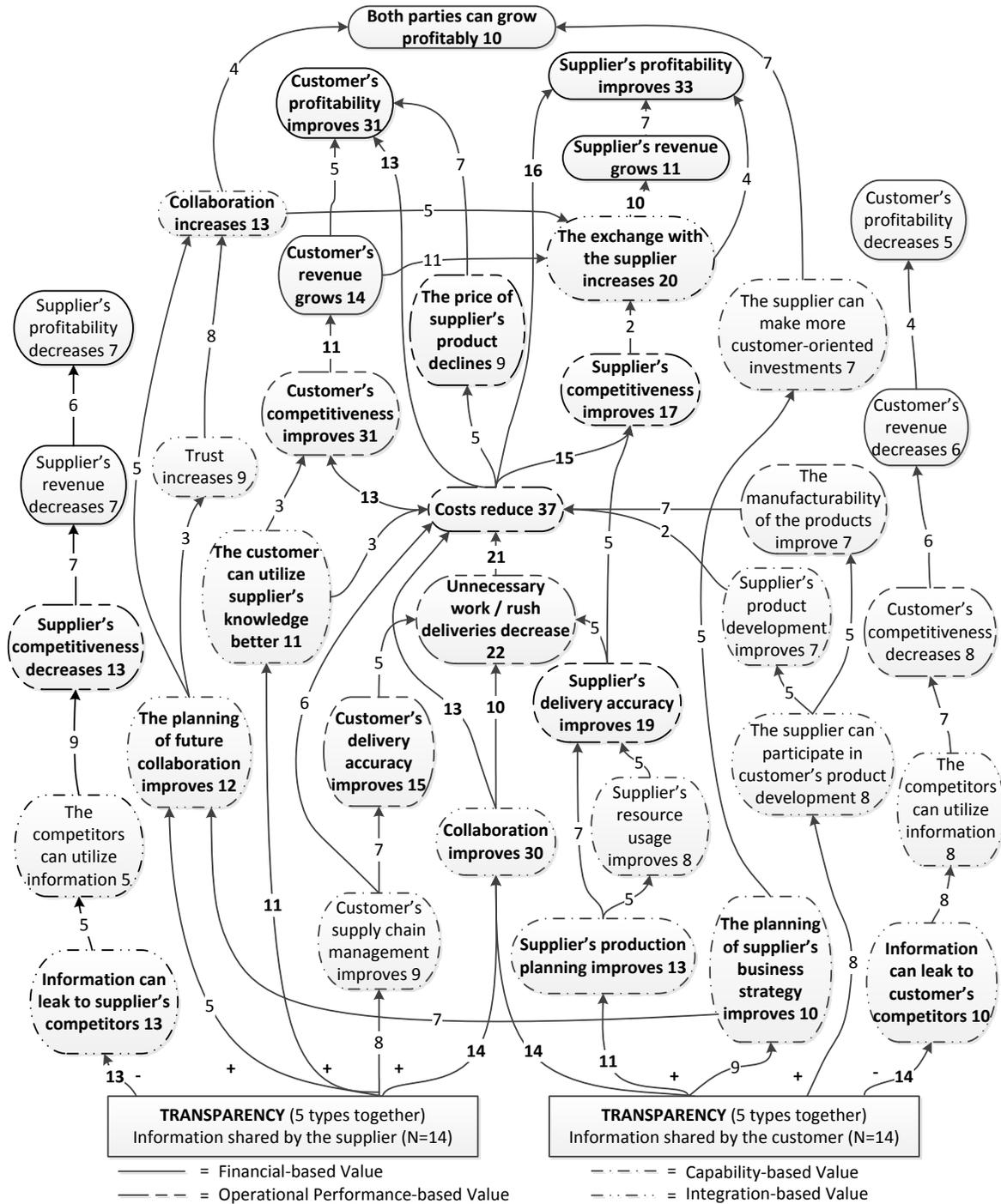


Figure 19. Value-creating effects of transparency.

Figure 19 above presents the causal map where different transparency types are combined. It indicates that most often the interviewees believe that the benefits of transparency relate to cost reductions. They usually believe that this happens especially when transparency improves collaboration which then decreases unnecessary work or rush deliveries. Transparency also improves supplier's production planning which leads to supplier's improved delivery accuracy as well as improves customer's supply chain management which leads to customer's improved delivery accuracy. Both of these improvements lead to decreased unnecessary work or rush deliveries and then cost reductions. Moreover, the supplier can participate in customer's product development that improve the manufacturability of the product and supplier's product development which both lead to cost reductions. Transparency also helps the customer to utilize supplier's knowledge better which decreases costs. These benefits relate to integration-based value in terms of improved collaboration as well as supplier's ability to participate in customer's product development and customer's ability to utilize supplier's knowledge better. Capability-based value is created when supplier's production planning and customer's supply chain management improve as well as when supplier's product development improves. These capability-based and integration-based value factors then lead to operational performance-based value such as improved manufacturability of the product, decreased unnecessary work or rush deliveries and especially cost reductions.

The cost reductions are usually believed to cause improved competitiveness and profitability for both parties. For example, customer's profitability is believed to improve through the declining price of supplier's product. Furthermore, customer's improved competitiveness is believed to grow customer's revenue that leads to customer's improved profitability but also the increased exchange with the supplier. Increased exchange is believed to grow supplier's revenue that leads to supplier's improved profitability. These benefits relate to operational performance-based value in terms of improved competitiveness and the declined price of supplier's product which then leads to financial-based value in terms of revenue growth and improved profitability.

The causal map also reveals that transparency brings strategic benefits when the customer share strategic information transparently that helps the planning of supplier's business strategy resulting in supplier's better ability to make customer-oriented investments. This is believed to cause profitable growth for both parties. The improved planning of supplier's business strategy is also believed to improve the planning of future collaboration. The improved planning of future collaboration leads to increased collaboration that also causes profitable growth for both parties. Collaboration is also believed to be increased through increased trust. These benefits relate to capability-based value in terms of improved strategic planning for both parties which then leads to integration-based value related to the improved planning of future collaboration as well as increased trust and collaboration. In addition, the capability-based value is created when the supplier can make more customer-oriented investments. Lastly, these value factors lead to financial-based value in terms of profitable growth for both parties.

The causal map also reveals that transparency causes sacrifices for both parties. Usually, the interviewees believe that the information leakages to the competitors cause the situation where the competitors can utilize the information leading to decreased competitiveness that then decreased revenue and finally decreased profitability. This kind of sacrifice is believed to happen more often for the supplier than the customer in general. These negative effects destroy integration-based value when the information can leak to the competitors which then destroy the operational performance-based value when competitiveness decreases. Finally, financial-based value is destroyed when revenue and profitability decrease.

5 DISCUSSION AND DEVELOPMENT SUGGESTIONS

This chapter provides the interpretations of the results presented in the previous result chapter by following the order of the research questions. It also presents the framework for value co-creation and value capture through relationship transparency and provides the development suggestions for the appropriate level of transparency.

5.1 Level of transparency in the supply network

The results for the first research question (*What is the level of transparency in the supply network?*) indicated that the customer had slightly higher transparency with contract manufacturers than with the other supplier groups. The reason for that can be that when the contract manufacturers provide the components and / or sub-assemblies with the collaborative long-term relationship, the suppliers see the customer as one of the most important customers for them. Therefore the suppliers are more willing to share information transparently. Respectively, the customer is more willing to share information transparently with these suppliers because these suppliers are strategically important partners and provide the highest amount of customer's annual purchasing volume (69 %). Respectively, transparency with subcontractors who provide basic machined metal components was usually at the lowest level. This indicates that these relationships are not seen as the most important by the customer. Usually, the customer assessed transparency at slightly higher level than the suppliers. This can be the results of customer's more powerful position over these two supplier groups forcing them to share more information. Transparency with the technology suppliers was usually between these other two supplier groups and the suppliers assessed transparency higher than the customer. That can be explained by technology suppliers' lack of interest and higher power position over the customer. These suppliers are mostly the part of the big global organization that provides their own high-tech components which has high switching costs in customer's end products causing the high level of dependency for the customer. It can be assumed that these

suppliers believe to keep the customer without allocating high amount of resources for the relationship.

The results also revealed that organizational transparency was at the highest level whereas cost transparency was at the lowest level in the supply network. The high level of organizational transparency can be explained by a small size of the suppliers whose organizations are easier to communicate to the customer. Furthermore, the customer assessment of the transparency of technology supplier's organization was also at the high level. This indicates that these big global organizations' organizational structures have been well developed which helps the information sharing. Usually, these suppliers assessed the transparency on customer's organization at much lower level that indicates the lack of clarification for customer's organizational structure and/or lack of information sharing about customer's organization and processes. Cost transparency was at the low level in each supplier groups and there seems to be lots of improvement opportunities. Furthermore, the results revealed that the customer had very limited information especially on technology suppliers' costs which can be the result of technology suppliers' lack of interest and higher power over the customer.

Supply, technological and strategic transparencies were all at moderate level. The highest was technological transparency, after that followed supply transparency and the lowest was strategic transparency. However, the level of these transparency types did not vary significantly between the supplier groups and it mostly followed the order where the contract manufacturers have the highest and the subcontractors have the lowest level of transparency. The order between supply and technological transparencies indicates that supply transparency is at the relative low level in the supply network as supply transparency can be assumed to be the higher because of its operative nature. For example, products can be delivered with fully transparent information sharing about the supply activities without any information sharing related to product development (i.e. technological transparency) or strategic issues (i.e. strategic transparency). Respectively,

when technological transparency is at high level with increased product development it can be expected that it requires more strategic discussions (i.e. strategic transparency) and eventually more strategic relationship. Therefore, strategic transparency seems to be at the appropriate level related to technological transparency in the supply network.

5.2 Antecedents for transparency in the buyer-supplier relationships

The results for the second research question (*What are the antecedents for transparency in the buyer-supplier relationships?*) indicated that transparency requires relationship integration with relational capital and relationship structures dimensions but not with relationship-specific investments dimension that previously have been argued to be an important antecedent for transparency (Walter 2003: 728; Johnsen 2009: 193; Frazier et al. 2009: 38–40; Möller et al. 2012: 126–129). The need for relationship capital related to the interviewees' beliefs that transparency requires trust between the parties. Trust is part of relational capital that is a form of social capital and which also contains open interaction and community as Kohtamäki et al. (2012: 1300) demonstrates. This finding is also supported by the previous empirical studies which presents that trust is the most important antecedent for transparency (Lamming et al. 2001: 6; Walter 2003: 728; Hultman & Axelsson 2007: 634; Kajüter & Kulmala 2005: 200; Akkermans et al. 2004: 448; Barratt & Oke 2007: 524; Squire et al. 2009: 472; Klein & Rai 2009: 38; Frazier et al. 2009: 749; Lee et al. 2014: 290). The interviewees usually believed that the contracts which secure the information sharing, successful long-term collaboration and transparent organizational cultures precede trust. It indicates that companies should focus on these three things in order to increase trust which then helps to increase transparency in the relationship.

The need for relationship structures related to the interviewees' beliefs that transparency usually requires the arranged methods and IT-systems for information sharing, regular strategic discussions and appropriate human resources for information sharing. These can be seen as part of relationship structures which are IT systems and organizational routines

which enhance interaction between the parties (e.g. development teams, relationship steering group, shared process descriptions and integrated IT systems) (Kohtamäki et al. 2012: 1300–1301). For example, the IT-systems for information sharing refer to the integrated IT systems. The information technology has also been presented to be an important antecedent for relationship transparency in previous studies (e.g. Hultman & Axelsson 2007: 634; Caglio & Ditillo 2012: 69). Furthermore, the IT systems for information sharing can be seen to precede the arranged methods for information sharing so that these arranged methods determine how to use these IT systems for information sharing in the relationship. Regular strategic discussions refer to the discussions made by the relationship steering group that manages the activities for relationship development. Lastly, appropriate human resources for information sharing relate to companies internal resources which are needed to form these kind of relational structures. It can also be seen to precede the arranged methods for information sharing, IT-systems and regular strategic discussions because these are not possible if companies do not have enough appropriate resources. Therefore, transparency needs allocated resources which costs have to be taken into account when increasing transparency.

The results also indicated that different types of transparency have different antecedents. For example, the interviewees believed that supply and organizational transparencies usually require the arranged methods and IT-systems for information sharing whereas trust was not seen as often the important antecedents for transparency. Therefore, the relationships should be integrated in a way that at least the relationship structures are at the high level. Respectively, the interviewees believed that especially cost, technological and strategic transparencies require trust. Moreover, cost transparency required a cost accounting system whereas strategic transparency required regular strategic discussions and concrete strategies for both parties. Furthermore, some of the interviewees believed that these transparency types require appropriate resources and arranged methods for information sharing. Therefore, these transparency types require the relationships where both the relational capital and the relationship structures are at the high level.

The costs of different transparency types can be lower for organizational transparency because it was mainly believed to require only the arranged methods for information sharing. Moreover, the costs of technological transparency can also be quite low because it was usually believed to require trust and the arranged methods for product development. However, cost and supply transparencies can cause significant costs if the IT-systems or cost accounting systems require the high amount of integration. In addition, strategic transparency can cause higher costs because it was believed to require managers' valuable time to conduct regular strategic discussion. Lastly, cost, technological and strategic transparencies can be more difficult to achieve because these were believed to require more integrated relationship and especially trust which can take more time to build.

5.3 Value-creating effects of transparency in the buyer-supplier relationships

The results for the third research question (*How can transparency have effects on value co-creation in the buyer-supplier relationships?*) indicated that transparency usually creates more benefits than sacrifices and therefore transparency enhances value co-creation in the buyer-supplier relationships. These results support the previous researches as they have demonstrated that transparency can bring many benefits but also has some sacrifices (eg. Eggert & Helm 2003: 106–107; Hultman & Axelsson 2007: 629–634). However, this research demonstrated the causal beliefs about how the value-creating effects of transparency occur for both parties in the buyer-supplier relationship.

Following with the Terpend et al. (2008: 40.) categorization of relationship value, usually the value-creating effects of transparency related to operational performance-based value factors in terms of cost reductions and improved delivery accuracy for both parties. Furthermore, integration-based value factors were also common and these relate to improved collaboration that leads to decreased unnecessary work and rush deliveries. Finally, these were believed to lead to cost reductions. Moreover, transparency was also believed to allow the supplier to participate in customer's product development that leads to

cost reductions. These findings support the previous empirical studies of transparency as they indicate that transparency increases customer's perceived value (Eggert & Helm 2003: 106–107.) and helps the creation of valuable offering and eliminate waste (i.e. non-value adding activities) (Lamming et al. 2005: 558–561) as well as provides costs reductions in products and manufacturing processes (Kajüter & Kulmala 2005: 200; Suomala et al. 2010: 87–88, Agndal & Nilsson's 2010: 158; Alenius et al. 2015: 204).

The results also indicated that usually integration-based value factors preceded the operational based value factors as Figure 20 below demonstrate. Similarly with integration-based value factors, capability-based value factors were believed to precede operational performance-based value factors. For example, customer's and supplier's delivery accuracies and costs reduce when supplier's production planning, supplier's resource usage and customer's supply chain management improve. Similarly, Hultman and Axelsson (2007: 633–634) argue that transparency helps to solve problems in the flows of materials and product development.

The results clearly indicated that operational performance-based value leads to financial-based value. For example, cost reductions improve customer's and supplier's profitability whereas competitiveness improves customer's revenue that was usually believed to improve the exchange with the supplier and then to improve supplier's revenue and profitability. The exchange with the supplier also increases when the collaboration increases through trust and the improved planning of future collaboration which all relate to integration-based value. These findings are supported by Das et al. (2006: 572–573) as they argue that improved manufacturing performance (cost reductions, improved quality and shorter lead times) leads to improved financial performance (improved profit and growth in market and sales).

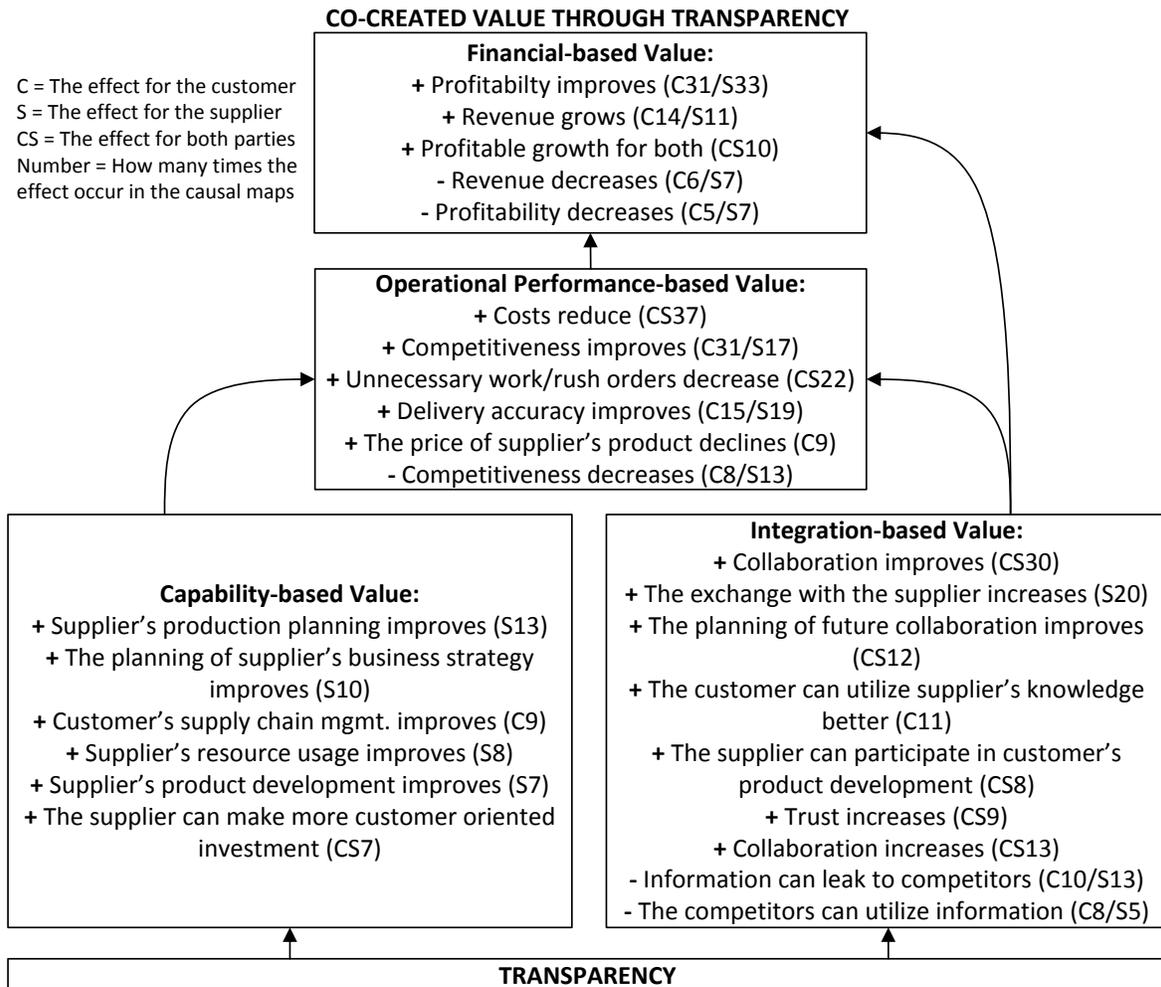


Figure 20. Co-created value through transparency in buyer-supplier relationships.

The results also indicated that the sacrifices (i.e. risks) for transparency usually relate to information leakages to competitors where the leakages for the supplier's competitors were believed to be more common. This usually leads to decreased competitiveness when the competitors are able to utilize the leaked information for their benefit. Lastly, decreased competitiveness leads to decreased revenue and profitability which was usually believed to occur more often for the supplier than for the customer. Similarly with these findings, previous researches argue that transparency causes the risks of information leakages to the competitors or it can be misused for the receiver's own good (Lamming et al. 2005: 558–561; Kajüter & Kulmala 2005: 200; Suomala et al. 2010: 91–93).

Table 16. Comparing the value-creating effects of different transparency types.

	Capability-based	Integration-based	Operational Performance-based	Financial-based
Cost Transparency	Supplier's costs awareness improves (+S6)	Collaboration for cost reductions improves (+CS11)	Total costs reduce (+CS12)	Profitability improves (+C8/+S8)
	Supplier's weak efficiency can be revealed (-S4)	Deliveries can go to supplier's competitors (-S6)	Competitiveness improves (+C8/+S4)	The benefits of cost reductions can be shared evenly (+CS5)
		Information can leak to competitors (-C2/-S5)	The price of supplier's product declines (+C5)	Revenue grows (+C3/+S4)
				Profitability decreases (-C2/-S5) Revenue decreases (-C1/-S5)
Supply Transparency	Customer's supply chain mgmt. improves (+C9)		Delivery accuracy improves (+C9/+S13)	Profitability improves (+C8/+S8)
	Supplier's resource usage improves (+S8)		Costs reduce (+C9/+S7)	
	Production planning improves (+C4/+S13)		Unnecessary work/rush orders decrease (+CS5)	
			Competitiveness improves (+C5/+S4) The price of supplier's product declines (+C4)	
Organizational Transparency	The decisions can be made at the wrong level (-CS4)	Collaboration increases (+CS9)	Costs reduce (+CS7)	Profitability improves (+CS7)
	Suboptimization increases (-CS4)	Communication improves (+CS5)	Efficiency/productivity improves (+CS7)	
			Unnecessary work decreases (+CS6)	
			Competitiveness improves (+CS4) Costs increase (-CS5)	
Technological Transparency	Supplier's product development improves (+S7)	The customer can utilize supplier's knowledge better (+C11)	Costs reduce (+CS12)	Profitability improves (+C8/+S10)
		The exchange with the supplier increases (+S10)	Competitiveness improves (+C9)	Revenue grows (+C9/+S5)
		The supplier can participate in customer's product development (+S8)	The manufacturability of the products improve (+CS7)	
		Trust increases (+CS4)	Technical characteristics of the products improve (+CS5)	
		Information can leak to competitors (-C8/-S4)	Competitiveness decreases (-C4/-S4)	
		The customer's competitors can utilize information (-C8)		
Strategic Transparency	The planning of supplier's business strategy improves (+S10)	The planning of future collaboration improves (+CS12)	Competitiveness improves (+CS5)	Both parties can grow profitably (+CS10)
	The supplier can make more customer oriented investment (+CS7)	Collaboration increases (+CS8)	Cost effectiveness improves (+CS4)	
	The planning of customer's sourcing strategy improves (+C7)	Customer's risks of bad sourcing decisions declines (+C4)		
		The customer is not willing to continue the collaboration (-S6) Information can leak to competitors (-CS4)		

C = The effect for the customer, S = The effect for the supplier, CS = The effect for both parties,
Number = How many times the effect occur in the causal maps

The results also indicated that different types of transparency had different value-creating effects as Table 16 above demonstrates. For example, the value-creating effects of all the other transparency types except supply transparency related to integration-based value. Moreover, supply transparency had only the positive value-creating effects without significant value-destroying effects such as risks. Therefore, supply transparency seems to be suitable also in the transactional relationships without the aims to increase collaboration and transparency in other areas. For example, the parties can improve their capabilities and operational performance by sharing transparent supply information during delivering the standardized product as efficiently as possible. However, this situation limits the value creation possibilities in the buyer-supplier relationships because it does not enhance integration-based value as other transparency types.

When the parties try to co-create value as much as possible in the buyer-supplier relationships, they have to aim for more collaborative relationships and use all five transparency types in a balanced way. The balanced way means that the negative effects such as the risks of transparency should be balanced in the relationship so that the benefits of transparency exceed its sacrifices for both parties' viewpoints. This suggestion is in line with the Eggert & Helm (2003: 103) and Hultman & Axelsson (2007: 634) which have proposed that transparency needs to be balanced rather than maximized in different buyer-supplier relationships. Table 16 indicates that the value-destroying effects were believed to happen more often to the supplier than to the customer in cost transparency whereas technological transparency caused the risks to the customer rather than to the supplier. Therefore, the level of transparency should be balanced in a way that the supplier provides transparent information on its costs whereas the customer should provide transparent information on its technology in order to share the risks of transparency and co-create value as much as possible. Lastly, companies should allocate their limited resources to only a few collaborative and strategic relationships and try to increase the level of transparency in the most important relationships because transparency requires allocated resources and causes costs.

5.4 Development suggestions

This chapter describes the framework for value co-creation and value capture through relationship transparency. It also provides the development suggestions for the appropriate level of transparency in the supply network with using the framework. The framework in Figure 21 below is based on the assumption that the levels of the transparency types should vary slightly in order to get a balance because each type of transparency has unique requirements as well as value-creating and value-destroying effects which need to take into account.

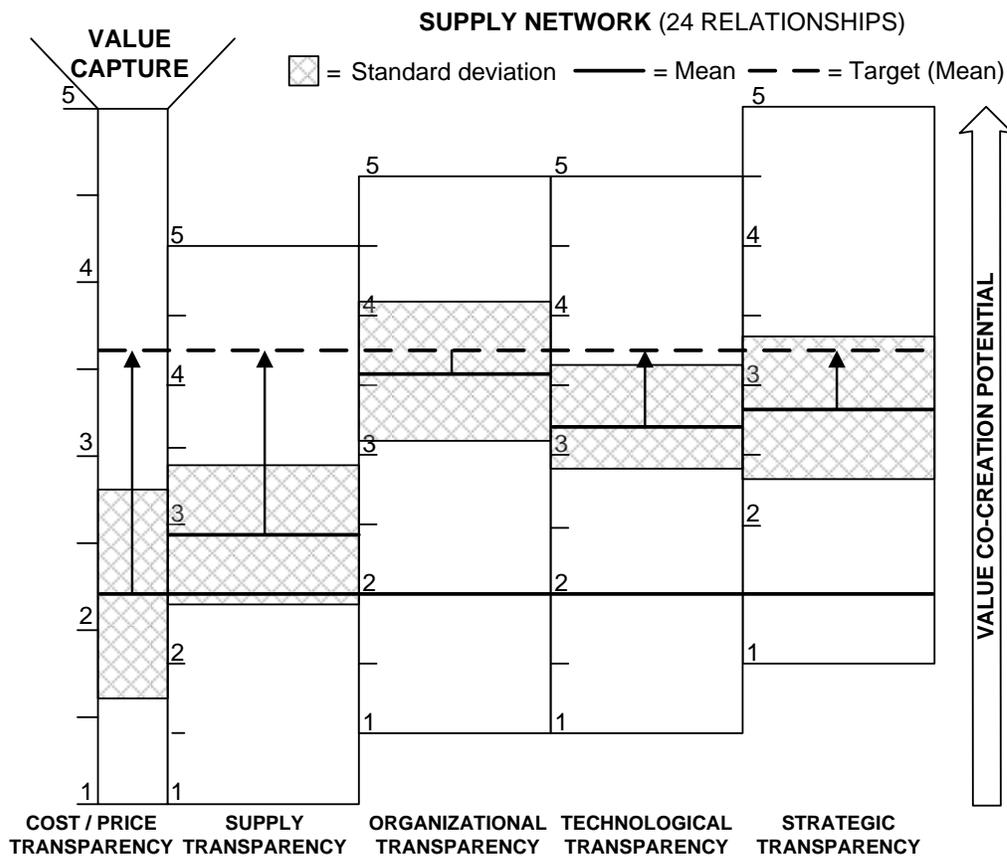


Figure 21. Framework for value co-creation and value capture through relationship transparency.

At first, cost transparency in the framework can be understood as an important factor for a collaborative buyer-supplier relationship and it closely relates to technological and strategic transparency. For example, cost transparency is needed for having cost reductions through product development collaboration (e.g. calculating the cost reductions between the old and the new solutions) or when the supplier makes customer specific investments (e.g. take into account the costs of new investment in the price negotiations). Moreover, cost transparency was believed to help sharing the benefits of cost reduction activities evenly (i.e. capture value) so that both parties' profitability improves. Therefore, cost transparency can determine the level that other transparency types should follow in order to co-create value and share it fairly. Supply transparency was usually believed to lead only to benefits. Therefore, it can be understood as the basic transparency type so that all buyer-supplier relationships should have the highest level of supply transparency as possible. However, it can cause significant costs if the IT-systems require the high amount of integration. Therefore, its costs should be taken into account when trying to increase its level.

Organizational and technological transparencies can be understood to relate to each other. For example, organizational transparency allows customer's and suppliers' representatives communication between different organizational levels in order to enhance product development. Therefore, if the supplier does not participate in customer's product development extensively, then the lower level of technological and organizational transparency is appropriate. Moreover, it can be assumed that the high level of organizational transparency is needed when the strategic transparency increases (i.e. more information on other parties' business processes for the help of strategic discussions).

Lastly, strategic transparency can be at the very high level only with the limited number of suppliers as it requires managers' valuable time to conduct regular strategic discussions. Therefore, strategic transparency starts from the higher level than other transparency types because there can be many transactional relationships without strategic discussions (i.e. strategic transparency) which still performs at the excellent level. For example, the

suppliers who deliver standard components with the excellent delivery accuracy require mostly the high level of supply transparency.

The current and target levels of transparency in Figure 21 demonstrate that cost transparency in the supply network seems to be the area which needs the most improvement efforts in order to decrease its gap for other transparency types. This usually requires trust but also the contracts that secure the information sharing and transparent organizational culture which both preceded trust. Furthermore, cost accounting systems and clear cost calculation methods have to be built which cause costs. Therefore, cost transparency is not appropriate or even possible to be at the very high level in every relationship and it should vary based on the importance of the relationship to both parties. For example, it is important to determine which products' or sub-assemblies' costs structures are the most beneficial to open (e.g. the items with the low change rate and high volume) and with whom suppliers (e.g. the strategic suppliers with the high amount of purchasing volume).

Another improvement area in the supply network is supply transparency. Previously supply transparency has been the main development area and the results from the questionnaire were a bit surprising as it was assessed to be only at the moderate level. For example, the supply network has used the web-based supply chain collaboration platform with the customer's Enterprise Resource Planning (ERP) -integration for the orders. However, the interviews with supplier representatives revealed that the reason for the moderate level of supply transparency relates to the useless forecasts shared by the customer (e.g. forecasts were not provided at the component level). However, customer's representatives demonstrated that the supplier has the possibility to transfer the forecast to the component level by using the specific spreadsheet that has been delivered to all suppliers. It seems that supplier's representatives have not been informed enough about this possibility. Therefore, customer's representatives should provide more information for the suppliers about how to use the forecast appropriately. Another option is to automatize the spreadsheet so that the suppliers can get the component level forecasts easier and faster from the weekly forecast.

Organizational transparency is at the highest level in the supply network and it seems to be suitable for the higher levels of technological and strategic transparencies. Technological and strategic transparencies have to be slightly improved in order to enhance value co-creation. However, the target levels of these transparency types should vary based on the supplier types (i.e. contract manufacturers, technology suppliers and subcontractors).

5.4.1 Appropriate level of transparency with the contract manufacturers

Figure 22 below presents the current and target levels of transparency with the contract manufacturers. Overall the transparency with the contract manufacturers should be at the highest level because these suppliers provide the highest amount of customer’s annual purchasing volume (69 %) and therefore can have the biggest effects on value co-creation in the supply network. The transparency can vary a bit between the suppliers but at least the mean level should be increased to the level presented in Figure 22 below.

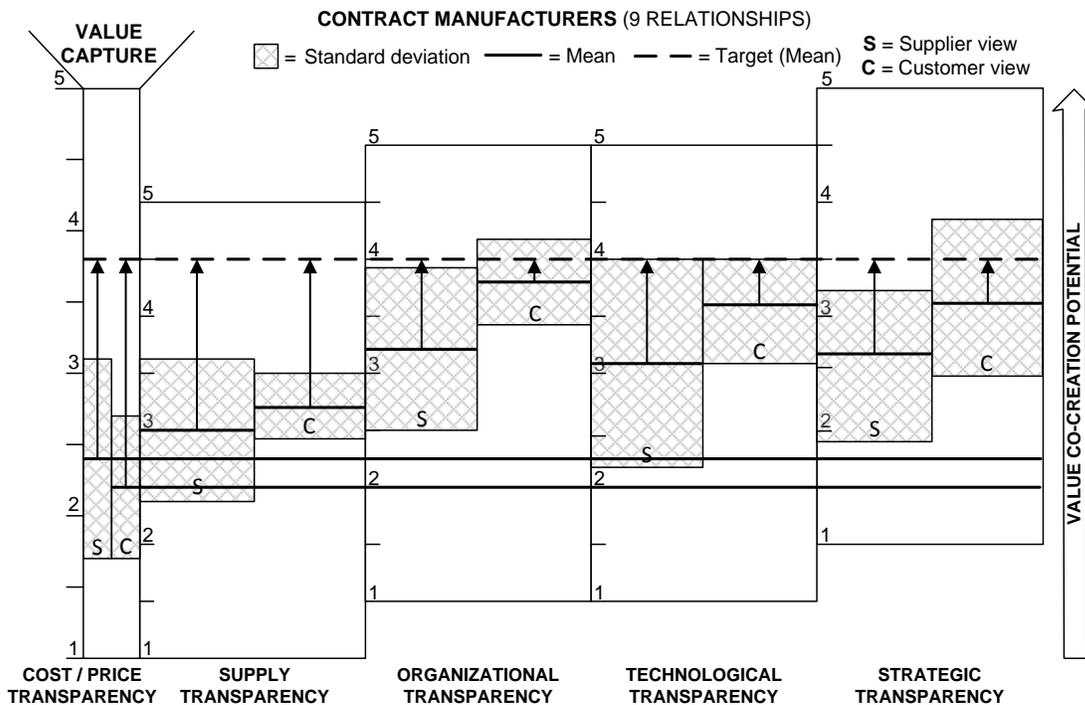


Figure 22. Appropriate level of transparency with contract manufacturers.

The biggest gap relates to cost transparency where especially the suppliers should provide more transparent information on their costs. For example, they should build the cost accounting systems and determine cost calculation methods with the customer. Respectively, the customer should provide more transparent information on its technology as well as its strategy and organization. For example, it could increase product development collaboration, have more strategic discussions and share more information about its purchasing organization with these suppliers. Moreover, both parties should provide as transparent supply information as possible. This requires especially IT-systems' integration but also the arranged methods for information sharing. For example, it is important to share the information and knowledge about how the parties can use the forecasts and web-based collaborative platform more effectively. The highest levels of cost, technological and strategic transparencies can be more appropriate with the contracts manufacturers than with the other suppliers. The reason for this is that these transparency types are the most difficult to achieve because these require more integrated relationship and especially trust which can be assumed to already developed at the high level during successful long-term collaboration.

5.4.2 Appropriate level of transparency with the technology suppliers

Figure 23 below demonstrated the current and target levels of transparency with the technology suppliers. Overall the transparency with the technology supplier should be at the high level but not as high as with the contracts manufacturers. The bigger size and power of these suppliers can slower the development of transparency. Therefore, the target level could be a slightly lower.

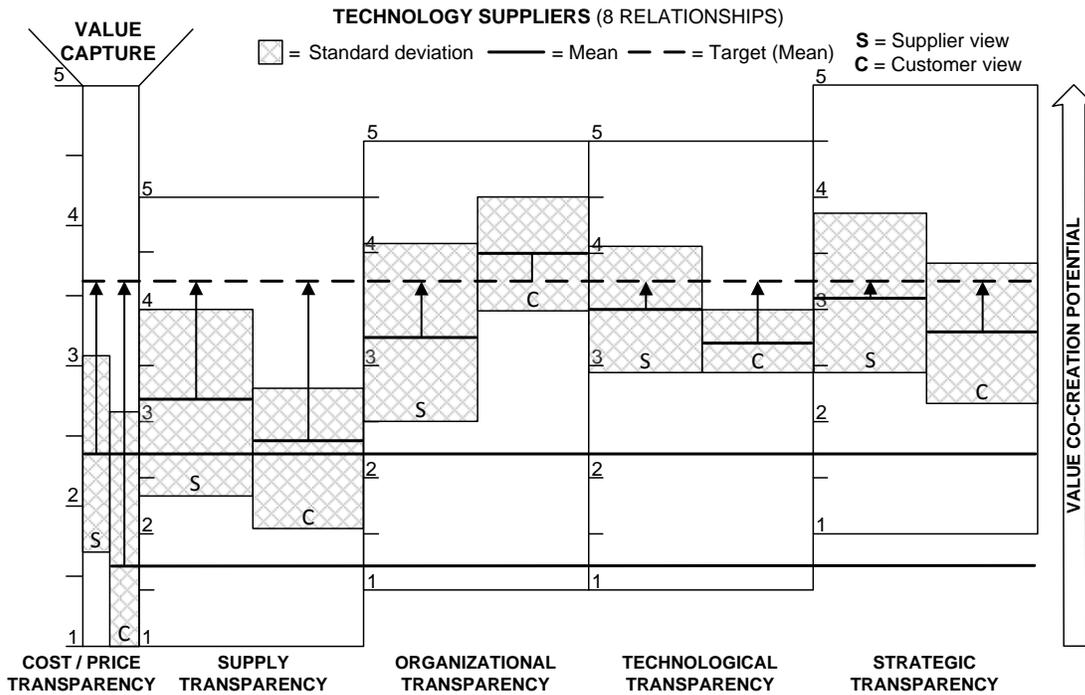


Figure 23. Appropriate level of transparency with technology suppliers.

Similar than with the contract manufacturers, the biggest gap relates to cost transparency where especially the suppliers should provide more transparent information on their costs. The development of cost transparency can be difficult as these suppliers are usually big global organizations and the customer is not very important for them. However, a good way could be to begin sharing of cost information that allows the comparisons between the old and the new mutually developed technological solution. This way cost transparency helps capturing the co-created value so that the benefits of the development can be shared precisely and fairly between the parties.

In the other transparency types, the customer usually shares more information and therefore technology suppliers should provide more information especially related to supply, technology and strategy for decreasing the gap to the target level. At first, the improvements should concentrate mostly on supply transparency so that the customer receives more transparent information on supplier’s supply activities (e.g. order tracking). Moreover, the supplier should share more technical information when sharing costs

information on its new technological solutions in order to demonstrate the reasons for cost reductions. Respectively, customer's representatives should provide more supply information for the suppliers about how to use the forecast appropriately in order to reach the target level. In addition, the customer should provide more information on its organization and for example clarify its organizational structure for these suppliers. In the future, there are better possibilities to begin the strategic discussions about the more intense and transparent product development with these big global organizations so that the gap of strategic transparency decreases.

5.4.3 Appropriate level of transparency with the subcontractors

Figure 24 below presents the current and target levels of transparency with the subcontractors. Overall the transparency with the subcontractors should be at the moderate level and slightly lower than with the other supplier groups because these relationships are not as important or strategic to the customer as with the relationship with other suppliers.

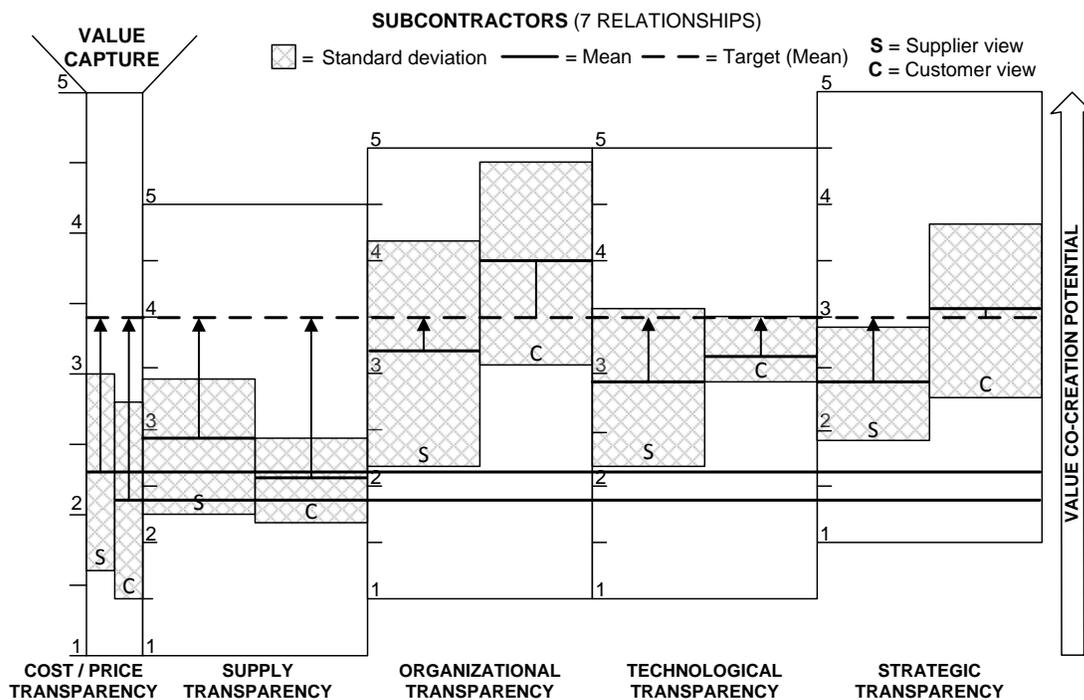


Figure 24. Appropriate level of transparency with subcontractors.

Similar with the other supplier groups, the biggest gap relates to cost transparency where the suppliers should slightly provide more information on their costs than the customer. It is very important to determine which products' cost structures are the most beneficial to open because these suppliers have the most transactional relationships and they usually compete of the customer's orders with each other. Furthermore, supply transparency requires major improvements from both ways. For example, the suppliers should provide more information of their capacity and allow the tracking of the orders from their processes whereas customer's representatives should ensure that the forecasts are shared and used appropriately.

Compared with the other supplier groups, the customer clearly shares more information with the other two supplier groups especially related to technology and strategy. It can be assumed that the type of exchange naturally limits the amount of technology and strategic transparency in the subcontractor group because these suppliers provide only standard machined components with limited amount of product development by the supplier. However, there is also a possibility to increase collaboration and the type of exchange (e.g. more demanding components or sub-assemblies) with some of these suppliers so that they move into the contract manufacturer group where the higher transparency is appropriate.

6 CONCLUSION

The main objective of this research was to make the development suggestions for the appropriate level of transparency in different buyer-supplier relationships in the supply network so that more value can be created and shared between the actors. Based on that main objective, the research problem was defined as follows: *What is the appropriate level of transparency in different buyer-supplier relationships in order to enhance value co-creation in the supply network?* The research problem was approached with three research questions concerning the level of transparency in the supply network, the antecedents for transparency in the buyer-supplier relationships and the effects of transparency on value co-creation in the buyer-supplier relationships.

The results for the first research question indicated that the level of transparency in the supply network varied based on the type of the relationship where the more collaborative relationships had the higher level of transparency. Moreover, the more powerful actor seemed to force the other to share more information. The research results also revealed that organizational transparency was at the highest level whereas cost transparency was at the lowest level in the supply network. Supply, technological and strategic transparencies were all at moderate level. The highest of these was technological transparency, followed by supply and strategic transparencies.

The results for the second research question indicated that the antecedents for transparency related to the arranged methods and the IT-systems for information sharing as well as appropriate human resources for information sharing and regular strategic discussions. The IT systems for information sharing could be understood to precede the arranged methods for information sharing so that these arranged methods determine how to use these IT systems effectively. All these requirements need allocated resources and therefore cause costs. Transparency also required trust between the parties where the contracts that secure the information sharing, the successful long-term collaboration and transparent

organizational cultures were believed to precede trust. These results supported the previous studies which have argued that information technology and trust are the most important antecedents (e.g. Hultman & Axelsson 2007: 634) but not the argument that relationship-specific investments are an important antecedent (e.g. Walter 2003: 728). The results also indicated that different types of transparency have different antecedents. For example, supply and organizational transparencies were not believed to require trust as often as cost, technological and strategic transparencies.

The results for the third research question indicated that transparency enhances value co-creation in the buyer-supplier relationships as it creates more benefits than sacrifices. The previous studies have argued that transparency increases customer's perceived value based on the quantitative study (Eggert & Helm 2003: 106–107.) whereas the findings of this qualitative study demonstrated the causal beliefs related to the value-creating effects of transparency on both parties. The results revealed that usually the value-creating effects of transparency related to integration-based value such as improved collaboration. Transparency also helped to create capability-based value such as supplier's improved production planning and customer's improved supply chain management. These findings supported the previous studies as they have indicated that transparency helps the creation of valuable offering and eliminates waste (Lamming et al. 2005: 558–561) as well as helps to solve problems in the material flow and product development (Hultman & Axelsson 2007: 633–634). Integration and capability-based value factors usually led to operational performance-based value such as cost reductions and improved delivery accuracy for both parties. Similarly, previous empirical studies have revealed that transparency leads to costs reductions in products and manufacturing processes (e.g. Kajüter & Kulmala 2005: 200). Finally, operational performance-based value was believed to lead to financial-based value.

The results also revealed that different types of transparency have different value-creating effects. For example, the value-creating effects of all the other transparency types except supply transparency related to integration-based value. Moreover, only supply transparency

had mainly the positive value-creating effects without significant value-destroying effects such as risks about information leakages to competitors. The findings about the negative effects of transparency have also been supported by the previous studies (e.g. Lamming et al. 2005: 558–561; Kajüter & Kulmala 2005: 200; Suomala et al. 2010: 91–93). Lastly, when the parties try to co-create value as much as possible in the buyer-supplier relationships, they have to aim for more collaborative relationships and use all five transparency types in a balanced way where both parties have the similar amount of risks.

In order to solve the research problem, the framework for value co-creation and value capture through relationship transparency was created. The framework helps managers to find the appropriate level of transparency in different buyer-supplier relationships where the risks of transparency are balanced and the target levels of different transparency types are determined in order to create and share more value between the actors. Also the type of the relationship has to be taken into account because the high level of transparency is not appropriate in all relationships as transparency causes costs. For the managerial purposes, the current and target levels of transparency were presented in the framework for three different supplier groups with the specific development suggestions. Moreover, the current and target levels of transparency will be provided for the 24 most important relationships so that the parties can begin to increase the transparency and reach the supplier group's target levels. In the future, it is important to assess the actual financial impacts of increased transparency in these relationships. This could be also an interesting area for further research. The framework is applicable at least to similar supply networks which provide low volume manufactured products with many different and variable items. However, there is a need for further research in order to broaden the applicability of the framework. The applicability of the framework should be tested in the supply network which has higher volume and more standardized products without many different and variable items.

Limitations of this research mainly concern the single case study research method that concentrates only on the specific phenomenon that is hard to generalize from a single case

to the wider population. Therefore there is a demand for further research. One area is the antecedents of transparency where quantitative study with the large number of respondents could provide support for the results of this qualitative study. For example, the quantitative study could relate to the relationship between transparency and relationship integration or the relationships between transparency and value creation. Another area relates to the transparency between the suppliers in the supply network. For this topic, there could be a study related to value-creating effects of transparency within the triads which are closely linked together in order to provide the bigger solution for the customer. Furthermore, the level of competition in the supply network and its effects on transparency could be interesting area for further research.

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APPENDICES

APPENDIX 1 Questionnaire for the customer



**MEASURING NETWORK PERFORMANCE
Questionnaire for the customer**

RELATIONSHIP (/INFORMATION) TRANSPARENCY

COST / PRICE TRANSPARENCY *

Assess how transparently these suppliers share the following information.
Scale: 1=Not at all transparent <--> 5=Extremely transparent

	Supplier's purchasing prices					Supplier's direct production costs				
	1	2	3	4	5	1	2	3	4	5
Company1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Company2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SUPPLY TRANSPARENCY *

Assess how transparently these suppliers share the following information.
Scale: 1=Not at all transparent <--> 5=Extremely transparent

	Supplier's production capacity					Supplier's buffer stock levels					Order tracking in supplier's processes					Information about supplier's purchasing sources				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Company1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Company2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

ORGANIZATIONAL TRANSPARENCY *

Assess how transparently these suppliers share the following information.
Scale: 1=Not at all transparent <--> 5=Extremely transparent

	Information about who knows what and who are responsible for things in the supplier's organization					Information about the changes in customer's organization					Information about customer's business processes and working practices				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Company1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Company2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

TECHNOLOGICAL TRANSPARENCY *

Assess how transparently these suppliers share the following information.
Scale: 1=Not at all transparent <--> 5=Extremely transparent

	Information about the features of supplier's products					Information about the changes of raw material or components by the supplier					Information about supplier's production technologies					Information about the ways how supplier could bring benefits to our product development				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Company1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Company2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

STRATEGIC TRANSPARENCY *

Assess how transparently these suppliers share the following information.
Scale: 1=Not at all transparent <--> 5=Extremely transparent

	Information about supplier's current business strategy					Information about supplier's competitive advantage					Information about the future directions of supplier's business strategy					Information about supplier's customer strategy				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Company1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Company2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX 2 Questionnaire for the supplier



Vaasan yliopisto
UNIVERSITY OF VAASA

MEASURING NETWORK PERFORMANCE Questionnaire for the supplier

RELATIONSHIP (/INFORMATION) TRANSPARENCY

Assess how transparently this customer shares the following information.

Cost transparency *

	1=Not transparent	2=Slightly transparent	3=Moderately transparent	4=Very transparent	5=Extremely transparent
The market prices of purchased products and services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The development of customer's production costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The development of purchasing prices in the supply network	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customer's profitability development based on the financial data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Supply transparency *

	1=Not transparent	2=Slightly transparent	3=Moderately transparent	4=Very transparent	5=Extremely transparent
The activity of customers / demand based on the offers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Production / delivery forecasts based on the orders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customer's warehouse level of the components	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Organizational transparency *

	1=Not transparent	2=Slightly transparent	3=Moderately transparent	4=Very transparent	5=Extremely transparent
Information about who knows what and who are responsible for things in the customer's organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about changes in customer's organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about customer's business processes and working practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Technological transparency *

	1=Not transparent	2=Slightly transparent	3=Moderately transparent	4=Very transparent	5=Extremely transparent
Information about the current features of customer's products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about the new and planned features of customer's products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about coming changes for the products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Strategic transparency *

	1=Not transparent	2=Slightly transparent	3=Moderately transparent	4=Very transparent	5=Extremely transparent
Information about customer's current business strategy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about customer's competitive advantage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about the future directions of customer's business strategy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about customer's current purchasing politics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX 3 Interview guide

INTERVIEW GUIDE**Semi-structured interview questions for the customer and the suppliers**

After each specific starting question, the interviewer uses a series of directed probing questions such as what it causes, where it leads, what it effects and why until the interviewee cannot give any more answers. The aim is to get a number of cause-effect chains of varying length which represents the value-creating effects of transparency (i.e. benefits versus sacrifices) as well as the requirements for transparency. Lastly, the graphical causal maps are formed during the interview and these are sent to the interviewee for review and possible modifications after the transcription. All interviews are recorded if the interviewee gives the permit.

COST TRANSPARENCY

A customer can share cost information related to the market prices of purchased products and services, the development of customer's production costs, the development of purchasing prices in the supply network and customer's profitability development based on the financial data, for instance.

1. What are the effects if a customer shares cost information transparently?

A supplier can share cost information related to supplier's purchasing prices and supplier's direct production costs, for instance.

- 2. What are the effects if a supplier shares cost information transparently?**
- 3. What are the requirements for sharing cost information transparently?**

SUPPLY TRANSPARENCY

A customer can share supply information related to the activity of customers / demand based on the offers, production / delivery forecasts based on the orders and customer's warehouse level of the components, for instance.

- 4. What are the effects if a customer shares supply information transparently?**

A supplier can share supply information related to supplier's production capacity, supplier's buffer stock levels, order tracking in supplier's processes and information about supplier's purchasing sources, for instance.

- 5. What are the effects if a supplier shares supply information transparently?**
- 6. What are the requirements for sharing supply information transparently?**

ORGANIZATIONAL TRANSPARENCY

A customer can share organizational information related to information about who knows what and who are responsible for things in the customer's organization, information about changes in customer's organization as well as information about customer's business processes and working practices, for instance.

- 7. What are the effects if a customer shares organizational information transparently?**

A supplier can share information related to information about who knows what and who are responsible for things in the supplier's organization, information about changes in supplier's organization as well as information about supplier's business processes and working practices, for instance.

- 8. What are the effects if a supplier shares organizational information transparently?**
- 9. What are the requirements for sharing organizational information transparently?**

TECHNOLOGICAL TRANSPARENCY

A customer can share technological information related to information about the current features of customer's products, information about the new and planned features of customer's products and information about coming changes for the products, for instance.

10. What are the effects if a customer shares technological information transparently?

A supplier can share technological information related to information about the features of supplier's products, information about the changes of raw material or components by the supplier, information about supplier's production technologies and information about the ways how a supplier could bring benefits to customer's product development, for instance.

11. What are the effects if a supplier shares technological information transparently?

12. What are the requirements for sharing technological information transparently?

STRATEGIC TRANSPARENCY

A customer can share strategic information related to information about customer's current business strategy, information about customer's competitive advantage, information about the future directions of customer's business strategy and information about customer's current purchasing politics, for instance.

13. What are the effects if a customer shares strategic information transparently?

A supplier can share strategic information related to information about supplier's current business strategy, information about supplier's competitive advantage, information about the future directions of supplier's business strategy, information about supplier's customer strategy, for instance.

14. What are the effects if a supplier shares strategic information transparently?

15. What are the requirements for sharing strategic information transparently?

TRANSPARENCY DEVELOPMENT IN THE SUPPLY NETWORK

Lastly, in the supplier's interviews:

16. What kind of transparency types are the most important for further developments in this specific buyer-supplier relationship?

Lastly, in the customer's interviews:

17. What kind of transparency types are the most important for further developments in different buyer-supplier relationships?