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Elisa Mentula

PURCHASING PROCESS OF INDUSTRIAL SOLUTIONS – ADDED VALUE, DIFFICULTIES AND GOOD PRACTICES

Master's thesis 2015

Examiner: Professor Jukka Hallikas
2nd Examiner: Associate Professor Katrina Lintukangas

ABSTRACT

Author: Elisa Mentula

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Purpose of this study is to clarify the industrial solutions purchasing process from purchaser companies' point of view. Also customer's view on value generating aspects and difficulties in purchases will be discussed as well as different purchasing entities where customers have ended up in their solution purchases. Current solution literature is mainly concentrated in supplier views and customer perspective has been left without adequate attention. However, knowledge of the customer and the identification of customer need are at the core of a successful solution business. The focus of this thesis is on Finnish companies' solution purchases that have been realized during last five years. Industrial solutions in this case are factories or other large industrial plants. Industrial solutions' purchasing process will be opened all the way from discovering the need until the start-up of the plant. Of interest is the customer experience of the success of the acquisition and the purchaser's view on good practices allowing a successful procurement project.

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Avainsanat: ratkaisujen hankinta, ratkaisuliiketoiminta, integroidut ratkaisut, teollisuuden kokonaisratkaisut, hankintaprosessi, hankintakokonaisuudet, asiakasnäkökulma, arvonluonti, tapaustutkimus

Tämän tutkielman tarkoituksena on selventää teollisten kokonaisratkaisujen hankintaa hankkivan yrityksen näkökulmasta. Käsitellään myös sitä, millaisista tekijöistä asiakas kokee saavansa lisäarvoa ja millaisia ongelmakohtia asiakkaat ovat havainneet omien hankintojensa yhteydessä. Verrataan myös erilaisia hankintakokonaisuuksia, joihin kohdeyritykset ovat ratkaisuhankinnoissaan päätyneet. Kirjallisuus ratkaisuhankinnan alueella on keskittynyt lähinnä toimittajan näkemyksiin, ja hankkijayritysten näkökulmat ovat jääneet vaille riittävää huomiota. Asiakkaan tunteminen ja tämän tarpeen identifioiminen ovat kuitenkin onnistuneen ratkaisuliiketoiminnan ytimessä. Tutkielman kohteena olevat kokonaisratkaisut ovat Suomalaisten teollisuusyritysten tehtaita tai muita suuria laitoshankkeita jotka ovat toteutuneet viimeisen viiden vuoden aikana. Selvitetään näiden teollisten kokonaisratkaisujen hankintaprosessin kulkua aina hankintatarpeen havaitsemisesta laitoksen käynnistämiseen saakka. Kiinnostuksen kohteena on asiakkaan kokemus hankinnan onnistumisesta ja asiakkaan näkemys siitä, millaisia käytäntöjä onnistuneeseen hankintaan liittyy.

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Writing the thesis completed my studies in Lappeenranta and I was lucky to get a chance to write it in connection to a research of Vaasa University. I want to thank Jesse Heimonen from Vaasa for assistance, advice and for giving great perspectives and base for my work related to collection of the data. I also want to thank all the interviewees who participated in this study and gave me some of their valuable time. Thank you also for my LUT-supervisors Jukka Hallikas and Katrina Lintukangas for their contribution.

Finally and mostly, I want to express the greatest gratitude to my loving family and especially Patrick for supporting me and giving me great and priceless advice during this project. Thank you for being there for me.

Now it is time to look for new opportunities.

"God gives every bird a worm, but he does not throw it into the nest." – Swedish Proverb

Elisa Mentula

Helsinki, 17.8.2015

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Purchasing: “The management of a company’s external resources in such a way that the supply of all goods and services and capabilities, knowledge, which are necessary for running, maintaining and managing the company’s primary and support activities in secured at the most favourable conditions” (van Weele, 2014, p. 12). *Purchasing* is a narrower term compared to *procurement*. It refers to a process of ordering and receipting of goods (Purchasing Insight Ltd, 2015).

Integrated solution: Integrated solutions are combinations of products and services. The value of solution is formed in combining of the components, and the ultimate outcome should be greater than the sum of its parts. Solutions need to be fitted specially for each customer’s needs and finding this need requires more co-operation than in traditional business partnerships, where only products or services are traded. Supplier takes care of everything. In ideal case, customer/purchaser will get the keys for a ready, functioning product; house, factory etc. which is ready to use (also referred to as a **turnkey project**).

Industrial solution: Integrated solution that appears in industrial circumstances.

Integrating: Combining products and services together so that they will form one new “product”= solution.

Purchaser = customer: Company which is acquiring a solution from a solution supplier.

1 INTRODUCTION

"And what the customers buy and consider value is never a product; it is always utility, that is, what product or service does for them. " [1]

In this day and age, industrial companies have a lot of challenges in different fields; Tightening international competition and decreasing margins represent just few examples. These challenges have forced companies to utilize different perspectives and insights as well as to seek new business opportunities. A specifically noteworthy new approach for industrial companies relates to moving towards solution business. (Bonnemeier, et al., 2010; Wise & Baumgartner, 1999)

There seems to exist a distinguish gap in the current research as mentioned by Tuli, et al. (2007): *"What is customer solution? … Notably, there is little evidence to suggest that this view reflects or is informed by how customers think about solutions. This is noteworthy because the purpose of a solution is to address a customer's business needs."* As well as stated by Hallikas, et al. in the area of complex services: *"…Given the lack of systematic empirical studies on customer value creation in complex service offerings".* Thus, this study aims to contribute to the existing research by analysing and examining solution purchases specifically from customer's point of view.

In this study, an industrial (or integrated) solution is defined as a combination of products and services. The actual value of a solution is formed through combining several components while the ultimate outcome should be greater than the sum of its parts. Solutions need to be fitted specially for each customer's needs, which requires to solve out and list the customer's needs first. This phase tends to necessitate more cooperation compared to traditional business partnerships, where only products or services are traded per se. It is hard for the suppliers to know

[1] (Drucker, 1995)

where the purchasers see the value, says Brady (2005). To improve the offerings, suppliers need to get more information about their customers' opinions of where the value is created in the process (Wise & Baumgartner, 1999). Solution business should be concerned as a new large opportunity that may offer advantages for both, the seller and the buyer sides. Solution supplier can reach more prominent market potential and create longer business relationships, whereas the procurer is able to intensify its operations by moving activities to one key supplier instead of varying out them itself or using multiple separate suppliers. By this way the procuring companies are able to concentrate on their own core businesses. Hence, from a customer point of view, solutions are sophisticated forms of outsourcing. (Galbraith, 2002)

Nevertheless, the concept of solutions still stands for a challenging theme for industrial companies to be understood and fully exploited from both suppliers' and purchasers' points of views. Often creating partnerships in the context of solutions is seen to be fairly complicated, risky and time consuming (e.g. Davies, et al., 2006; Lindberg & Nordin, 2008; Angdal, et al., 2007; Hallikas, et al., 2014; Stremersch, et al., 2001; Brady, et al., 2005). Another factor that prevents different partners to gain advantage from these partnerships is that suppliers still have not comprehended how their customers experience the possibilities and challenges of integrated solutions (e.g. Tuli, et al., 2007; Nordin & Kowalkowski, 2010; Kujala, et al. 2010). Illuminating the solutions purchasing process from customer perspective as well represents one of the main goals of this study. In this respect this research also attempts to explore the differences between various solutions procurement practices. This occurs by taking a wider look in solution purchases as a whole both terminologically and conceptually but also in the more detailed level by studying how the companies have separated their solution purchases into the smaller components. This research also attempts to clarify what are the main complexities and challenges from purchaser's perspective in terms of implementing and exploiting the potential derived from integrated solutions. Practices held as most workable and potential are presented on the basis of interviews of purchasing professionals working in six industrial case-companies.

1.1 Background of the thesis

I was participating in a project REBUS (=towards relational business practices) as a research assistant for University of Vaasa. REBUS seeks to find ways to move towards more relational practices among industrial businesses. REBUS is a Tekes -funded project and it includes a variety of different research directions. I was taking part in a research section which investigates purchasing practices of industrial companies. My role as a research assistant was to collect data by introducing six professionals from industrial firms that have lately acquired an integrated solution. These six cases were logistics centres for inbound and outbound of goods and materials, or factories including logistic sections. To get a slightly opposite view to purchasers' opinions and outlooks, I also interviewed an industrial equipment supplier on their visions especially concerning business relationship issues occurring in relation to co-operation of the supplier and purchaser.

1.2 Research problem and limitations

The aim of the thesis is to broaden a vision of integrated solutions' purchasing process practices and visions among Finnish industrial companies. The object of investigation is companies' procurement management and the way how they perceive solutions' purchasing: Regarding the process and what they feel are the best practices on the area. The focus is thus in strategic purchasing, on the purchasing companies' point of view. Operational buying is left outside the study. Research questions are handling the purchasing process and value creation in solution business:

What are the parts of industrial solutions purchasing process?
What are the possibilities while purchasing integrated solutions and what are the difficulties? How to solve them?
How is the value created in solution business?

1.3 Theoretical framework

Theoretical framework of the thesis is illustrated in figure 1. Main topic that is presented throughout the thesis is industrial solutions purchasing. The industrial solutions purchasing process and typical parts of it will be investigated. Also possible difficulties which are reflected in different stages throughout the process will be gone through. Added value of industrial solution purchases will be discussed in several different solutions purchasing basis. For example; what are the value denominations from the customer point of view and how do the parties see the possibly achievable value elements in solution business area. Solution purchases will also be divided in different parts. Particular topic is mainly discussed in empirical part of the research and debate on purchased solution entities is formed on case-interviews. The end result of the reflection will be provision of good practices in a field of industrial solution purchasing.

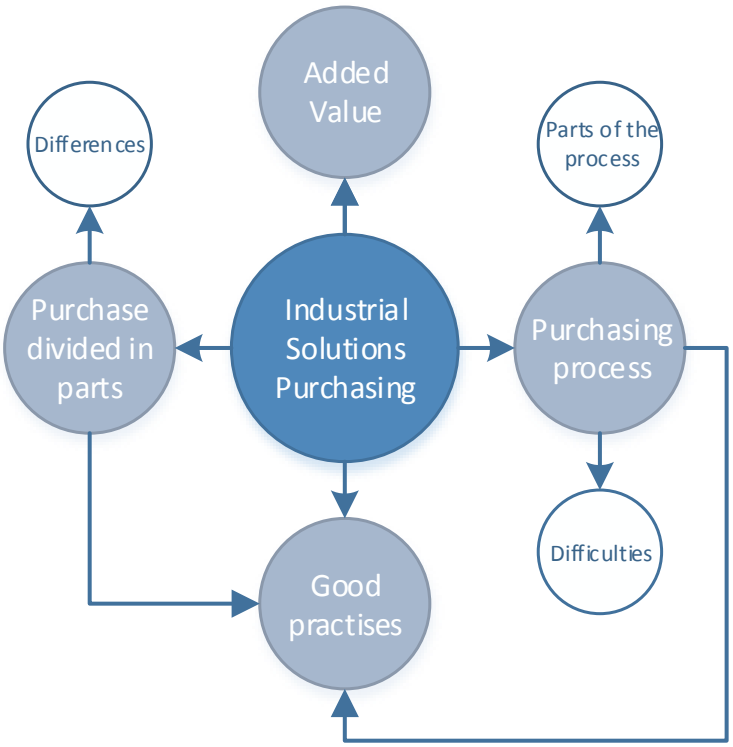

Figure 1 Theoretical framework

1.4 Structure of the thesis

The thesis begins with an overview on the background of the topic and research design, methodology and data collection. Research process will be opened by offering a research process graph and by clarifying different process parts step by step starting from specifying the topic and ending up in analyzing the collected data and writing the report. Theoretical framework offers a clarifying view of perspectives which will be of interest. Also reliability and validity of the research will be presented in this chapter.

After discussing research process and methods, the focus gets to the main subject, industrial integrated solutions purchasing. An overview of existing literature concerning integrated solutions and integrated solutions purchasing will be introduced first. The concept will be opened by defining integrated solutions, finding difficulties and risks behind solution purchases as well as possibilities and added value behind an opportunity of solutions purchases. This chapter will also slightly go through some advantages what the suppliers would achieve by moving toward integrated solutions in their offerings.

3rd chapter is about purchasing process, first concentrating on basic purchasing process offered by van Weele (2014). Basic purchasing process and its parts will then be reflected to integrated solution purchase processes which are broader in scope. Diverse parts of integrated solution purchasing process have been collected from existing theory.

4th chapter commences to cope with the empirical data. Purchasing process synthesis will be built according to the case-interviews. Expressed purchasing processes will be compared to the ones found out in theoretical literature and similarities and differences found among the processes will be presented. The interest will also be on purchased entities; how have the companies decided to divide the purchases in parts. Supplier view is also noticed in empirical discussion by offering some insights on relationship value provided by industrial supplier.

End result of the research will be presented in conclusions –chapter where good practices emerged through the research process and case interviews have been collected. Research questions will be gone through and finally, suggestions for future research are presented.

1.5 Research methodology and research process

Research methodology can be seen below this chapter in table 1. A qualitative approach was selected for the research since the aim was not to place the answers in a certain form. This is also why open interviews were decided to carry out. There usually exist many differing points and interesting in interviewees' views which may provide an interesting start to continuing conversations. In-depth interviews offer a perfect platform for this kind of reflective discussion. Questionnaire or other quantitative method was not appropriate because it would have made the process too inflexible already because of a dissenting nature of solution purchases. The results of this study cannot be generalized as such, which is not even the persistence of qualitative research, but the main purpose of the study is to give a decent view over current situation of integrated solutions' purchasing practices in industrial environment in Finland.

Table 1 Research methodology

Approach	Qualitative
Strategy	Case study
Data collection	In-depth interviews
Data analysis	Qualitative content analysis

The research process in this research project is illustrated below. At first the research topic was formulated on the basis of instructions that were given for the research project that I was taking part in as a research assistant. After getting the loose frames for in-depth interviews, I started to focus on the more accurate topic of my own thesis. Final topic was drawn up during the interview process and during the discussions with a supervisor from University of Vaasa and my own thesis supervisors at Lappeenranta University of Technology. Literature review was completed before starting the interviews which helped to understand the subject of

integrated industrial solutions on theory basis. Literature review also offered some topics that should be handled in the upcoming interviews. Data collection plan was made on the basis of literature review and in accordance to the interest of REBUS-project. Finding the appropriate interviewees was carried out by using mainly internet sources and search engines. Possible companies' names were given by the research team from University of Vaasa, and my responsibility was to find out who is the correct person to answer the questions. It was challenging to locate a person who was concisions of the whole purchasing process from the start kick until completion and usage monitoring. At the end of the interviewee survey, six appropriate participants were found and six interviews agreed. After the interviews of purchasing professionals, also a supplier view was appended. Industrial supplier was interviewed by using open interview as well. The questions for supplier were handling cooperation and value creation in supplier-purchaser interaction.

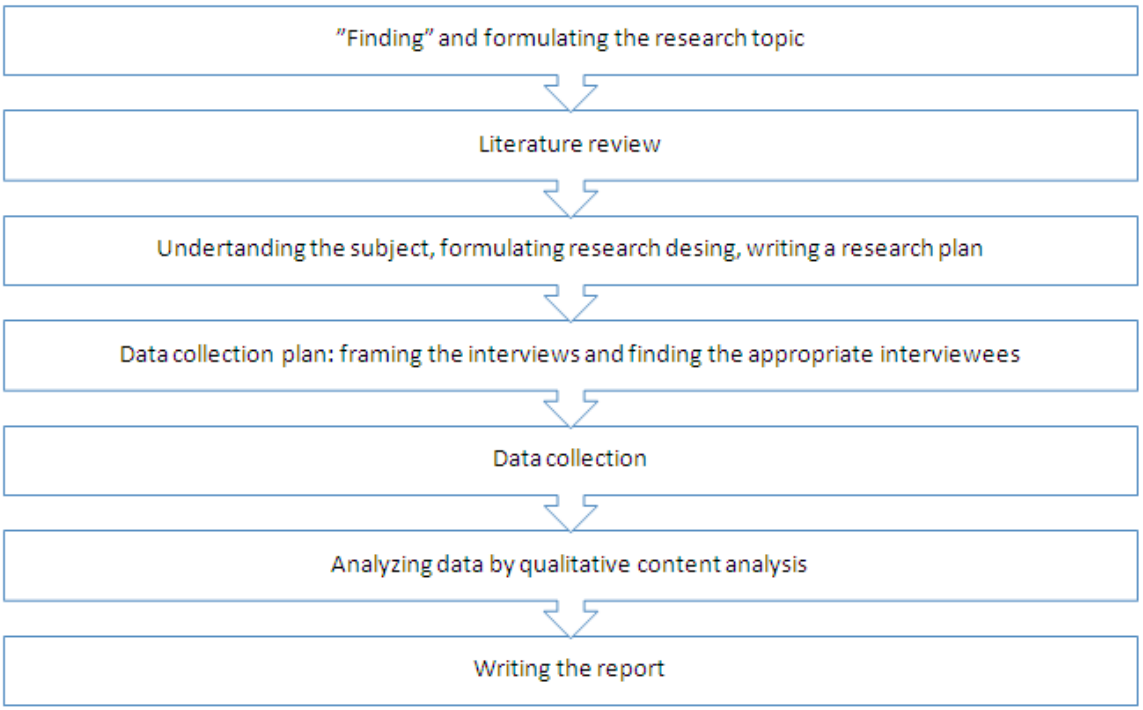

Figure 2 Research process (adapted from Saunders, et al. 2009, p.10)

1.6 Data collection and analysis

Data collection was mainly done in connection to a research of University of Vaasa. This thesis is distantly a part of large research project REBUS “Towards relational business practices” where the collected data were exploited. The questions were handling industrial plant’s purchasing process all the way from the appearance of purchasing need to purchasing decision, choosing the suppliers and evaluating the results of the process.

The research data were collected by in-depth interviews. In in-depth interviews, the interviewees are expressing their meanings by words, which also is the basis of qualitative research. Interviews were made at the interviewees’ workplace. In 3 cases, the location was actually the industrial facility that was the object of interest. One of the interviews was done as a telephone interview. All the interviews were recorded and transcribed. Also interviewees’ non-verbal expressions were described (excl. one phone interview) immediately after the interviews by taking notes. For data analysis I used qualitative analyse method, content analysis.

Data were analysed quickly after the interviews by using qualitative content analysis. It can, in general terms, be described as identifying, organizing and classifying the content (Patton, 2015, p. 551). While using content analysis, it is important to analyse the data as soon as possible, after the interviews. That helps to remember all the important small things appeared in the interviews. In content analysis, the main thing is to build a coding frame. First, the interesting and essential material is selected from the data. This is categorized and organized in rational entities. Coding frame is the result of developing main categories from the data and creating possible sub-categories under main categories. Creating a frame makes qualitative data analysis systematic. The data are simplified and summarized in a frame table, maintaining all the significant information. The aim of summarizing is to increase the value of achieved information. In addition, a large amount of collected data is fragmented. By using the coding frame, I am seeking to clarify the data to enable conclusions drawing. (Flick, 2014, pp. 429-430; Tuomi & Sarajärvi, 2009, pp. 109-110; Saunders, et al., 2009, p. 588)

1.7 Case research

Case study is a research method where empirical investigation is needed to get an impression of a particular phenomenon, say Saunders, et al. (2009, p. 588). The aim is to describe certain companies' situation: In this particular research, their way to carry out the industrial solutions' purchases.

The research data are consisting of six different purchaser cases and one supplier case. Amount of six was enough to find out how the companies act on this certain area, the cases were quite similar and six in-depth interviews provided enough information to understand the phenomenon. As stated by Patton (2015, p. 313) the information richness is more related to the validity, meaningfulness and insights than with the sample size. The size of the sample can be flexible, as it was in this case. The saturation was achieved during six interviews. The extent of the interviews and the scope of the topic solved the final amount. Case-companies are more or less large industrial companies from a variety of industries. Turnovers of the case-companies differ from 15 million Euros up to many billions of Euros per year. All of these companies have lately purchased a big industrial plant which was the starting point when searching suitable case-companies. In four of the cases, purchased plant was purely an inbound/outbound freight centre. The other two cases were factories, but also including logistic sections. Industrial equipment supplier view was added to build a slightly different perspective on this study and to give some response on purchaser's opinions and conception. (Lee & Lings, 2008, p. 89)

1.8 Reliability and validity of the study

Reliability of the study may be explored in many different aspects. Reliability is closely linked to empirical data of the study; how are they collected, processed and analysed, for example. It is important that the chosen measurements are used and that the interview situation, interviewer or any other things are not affecting on the outcome of the research. The results need to be consistent (Eriksson & Kovalainen, 2008, p. 292). The starting point for this thesis was very decent since

there was a possibility to discuss the data collection methods and interview situation with professors and a couple of researchers. Significant advice and good knowledge and experience were exploitable.

Reliability of the study will rise if two or more measurements are producing the same result. This may happen for example while two researchers end up in same results while using same research data. In brief, reliability is measuring the trustworthiness of research data and data analysis. (Puusa & Juuti, 2011, pp. 154-156) This may be seen most clearly in research results made by other researchers while compared to this study. There are lots of similarities in particular with research results of Lindberg & Nordin (2008) and the results of this research. This indicates good reproducibility which refers to a good reliability of the study. In this research, data are collected by using the same method in every interview. Data collection was made by one person, and same questions were used in every interview. Questions were built so that they would be easy to understand. Also the interviewees were carefully chosen so that every one of them had quite similar statuses in each integrated solution purchasing process. Despite this, the interviewees had slightly different responsibilities and roles in these case purchases. This might slightly affect for research-cases comparability to each other.

Validity of the study tells about the research competency. The chosen phenomenon needs to be measured without bias and without moving to sideways. Research questions and the interview questions were identified carefully before beginning the interviews, which leads to the validity and helped the interviewers not to slip sideways. The research needs to be made carefully and the results and conclusions need to be accurate. Validity can be equated with creditability. While the research is valid, interviewees' answers are not modified and their perceptions are reflected without any formulations or interviewee's own subjective influence. To help this, each of the interviews was recorded. (Eriksson & Kovalainen, 2008, p. 292)

2 LITERATURE REVIEW

Companies are nowadays practically forced to transform their processes from traditional product or service –based offering toward more comprehensive offerings. Customers are willing to “get it all” from the same supplier while suppliers are enjoying the vast benefits if they can respond to customers call and serve them a whole customized solution that solves their problems comprehensively. When taken even further, this logic may enhance a solution provider’s potential to customize these total solutions according to a customer’s needs thus creating even more added value from both side’s points of views.

On the other hand there seems to appear some resistance towards big purchasing entities among some purchasers as can be noticed later when the outcomes of this study will be revealed. Purchasers may regard solution purchasing as a complex and challenging process. Reasons behind the resistance are, for instance, related to lack in transparency. Sometimes there is knowledge missing on the concepts and opportunities of the total solutions as a whole, which of course affects negatively when the effective exploitation of these solutions is considered. Also as supplier relationships in solutions business are very crucial it was often seen very resource taking to keep up good supplier relationships.

Dunn & Thomas (1994) have gone through the development of business relations. They have gathered detailed observations regarding relationship development. Based on these notes, some of the most essential stages including more detailed descriptions of the relationship development process are summarized in Figure 1. As can be seen from this figure the companies’ attention was purely in a product per se and the focus lied strongly on one-off transactions in the beginning of the development process. Interestingly, this sort of approach was challenged already in the 1960s by offering augmented products and additional services to broaden the company offering.

Furthermore, business solution-thinking was raised during the 1980s while corporate buyers started to demand more than just product-based solutions. Business

solutions included multiple product solutions which were connected to each other in order to resolve broader business problems. The most sophisticated form of relations is partnership solution which includes multiple solutions that are linked across the company. Solutions are meant to impact the entire enterprise by focusing on their strategic entities. While moving towards more complex solutions, the company also has to change its buyer-seller interaction from transactional to relational relationship, mention Penttinen and Palmer (2007) which is well in line with Dunn & Thomas's (1994) findings found from last development phases from the Figure 1. Buying practices' development in request of business relations' development can also be seen in Figure 1. Purchasing evaluates from transactional single-transaction buying until it's most advanced, program form. According to Dunn & Thomas (1994) partnership solutions are acquired on a program by companies' top management.

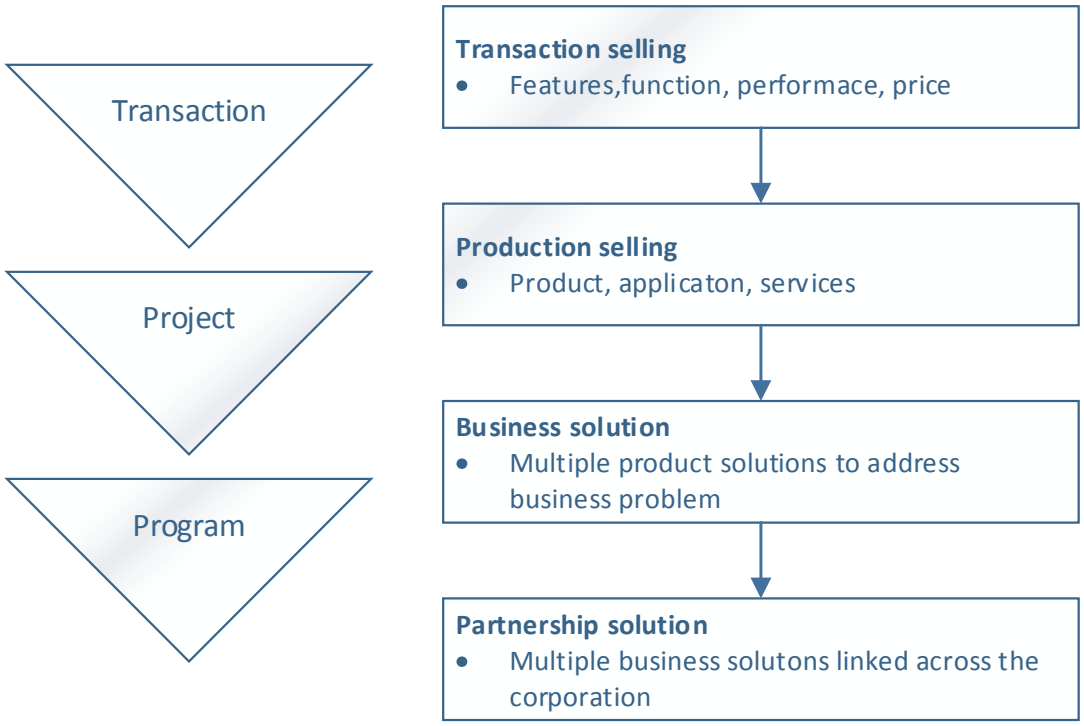

Figure 3 Relationship stages. Adapted from Dunn & Thomas (1994)

2.1 The idea behind moving to solutions business

Outsourcing is a buoyant and ongoing trend among large businesses. According to Davies, et al., (2006), outsourcing has been the phenomenon behind growing interest in moving to solution business. Parts of operation as well as services are often outsourced to get more resources used for companies' core activities. The transition towards integrated solutions can be seen to have begun in the 1980s. Restrictions on public offerings led governments to call private sector actors for long-term contracts regarding the financing, construction and operations. The first integrated solution –projects can be considered to have been so called BOT (build-operate-transfer) –deliveries. The main idea behind was to force the suppliers to position themselves as an owner of the project. BOT –deliveries were mostly carried out by government. (Brady, et al., 2005)

Cova & Salle (2007) have examined the reasons deeper on the background of moving towards integrated solutions. Four large factors that explain the rise of demand can be found. However, these factors also simultaneously foster companies to offer integrated solutions. First of all, globalization has had remarkable influence on this business area as it puts a lot of pressure on prices and has resulted in fast commoditization of products and services. While everyone has an easy access to internet sources and people can compare the prices and companies from all over the world, there are no longer as geographically restricted business areas as there used to be. In some countries, deregulation of the markets has strongly effected on the appearance of solution businesses as well. Globalization spreads these kinds of opened opportunities available everywhere. Deregulation has brought opportunities for such contracts as type BOT which were introduced earlier. Third factor mentioned by Cova and Salle is the behavior of firms. By this they refer to a growing interest for outsourcing non-core activities and focusing on their strategic abilities, which was also highlighted as a key factor behind solution business by Davies, et al., (2006). Fourth factor offered by Cova and Salle is the massive evaluation of information technology, which makes it possible to have remote service support easily and even preferably. Also interactivity with customers by using different platforms can be carried out much easier. Agndal, et al.

(2007) see that the motivation behind moving to solution business has originally been willingness to reduce costs and administrative load of purchasing organization. Motivators also lie in desire to exploit supplier proficiency.

Davies, et al. (2006) mention some specific examples of integrated solutions: Solution may include operational services such as maintenance and training, possibly spare parts supplying and product fault reporting or diagnostic systems that are embedded with the physical product. These services are supporting continuous operating without breaks in production. As a second example Davies, et al. (2006) note consultancy. The customer might have a strategic or operational problem which is not solved by delivering tangible assets but by consulting how to use new technology, how to link it to their business processes and so on. Integrators may also for example want to get a new business plan or a business model to raise their earnings. Some solutions providers even offer vendor financing to lower the purchase price (in return the supplier is waiting for value sharing from the value generated during the solutions life cycle).

Artto, et al. (2008) have observed service types that are implemented in solutions during its lifetime. These may contain several sorts of consultancy services, design, planning et cetera, but a couple of them represent serious responsibility tasks. These parts are outsourcing, building, operating, transferring and asset sharing. These specific parts of integrated solutions are particularly challenging. Although it is widely recognized that solutions have brought new opportunities for businesses, companies still do not really know how they should react and how solutions should be conducted (Windahl & Lakemond, 2006).

According to multiple researchers (e.g. Windahl & Lakemond, 2006; Stremersch, et al., 2001, Pynnönen, et al., 2014; Eriksson, 2005) there has been a lot of interest towards solutions but the scope has been more in the area of solution providing. Very scarce research appears to be made concerning solution implementation from procurement side. It is noticeable that there is not much material about customer’s opinions concerning solutions. This is particularly interesting as it is the

customer whose interest needs to be identified and the customer whose problem needs to be solved. (Tuli, et al., 2007)

Stinnett, (2004, pp. 8, 109) has found this gap and took a look into customer's minds in his book *Think like your customer*. The first thing is to understand that the supplier needs to be conscious about the customer and its needs. Impressing with some facts about supplier's own company is not what the customers necessitate. It is essential to fully understand their business to be able to find out the goals to target. This is also an important point when building trust between the customer and seller. It is important to keep in mind, that the solution is not a thing that the customer actually gets the value from. It is the result of which corresponds to the customer's needs and solves the problem. What the customers actually want is not a solution but the results.

2.2 Defining integrated solutions

In existing theory base these customized solutions have been widely discussed, but mostly from the supplier point of view. Only few studies (e.g. Lindberg & Nordin, 2008) are focusing on solutions purchasers and their interest while integrating a solution. Several different definitions for solutions have been used within the existing literature while discussing integrated solutions.

Tuli, et al., (2007) have found that dominating definition for solution among the literature has been that integrated solution is a customized and integrated package of services and products. This combination needs to fulfil the customers' business needs. They have also identified a solution from the customers' point of view. Customers (purchasers) mostly see the solution as a sum of relational processes. These processes comprise a definition of customers' requirements, customizing, integrating the needed goods and services, deploying them and supporting customer also after the deployment. It could be shortly said that in customer's opinion a solution is *"finding out what a customer really needs"*.

Pekkarinen, et al. (2009) and Pekkarinen & Salminen (2013) define industrial solution as a complex offering which is delivering value for the customer. It is an ongo-

ing relational process and the most characterizing element of solution is close collaboration between the purchaser and supplier. The solution is created together and this way also the upcoming customer value is created in cooperation. According to the authors, solutions are mostly based on some physical element. They use a paper machine as an example. Also for example Sawhney (2006) and Storbacka (2011) have stated that in solutions business, products are seen as a platform for service-centric solutions. Sawhney (2006) challenges this traditional view by defining solutions to be a mind-set that does not begin from the product, but from an analyse that starts from defining a customer's problem and ends up in identifying a product and service that will solve the customer's dilemma. Mathieu (2001) also states that companies should move from services supporting the product to service supporting the client. Nordin & Kowalkowski (2010) have seen solutions as combinations of products and services that are customer-centric and start from defining the customer's needs at a certain moment. It is said that the supplier should focus more on these needs. However, Nordin & Kowalkowski (2010) argue that unlike often assumed in the existing literature, customers are not aware of their real needs even themselves. The most difficult area to be developed in integrated solutions offerings should probably be solving the paradox of customer needs. Another challenge alongside the discovery of a customer need is the fact that each clients' needs tend to be unique. For instance in research of Kujala, et al. (2010) the high-performing and under-performing solutions were separated by the observation of customers' needs. They mention it is sometimes required to get beyond the customers' expressed needs to find out the real ones and to find the best solution for the customer.

It the research of Brady, et al. (2005) they are focusing on value creation by solution offerings. They define solutions as value creating combinations of products and services that create unique benefits for the customers. They are highlighting the transition of risks and liabilities which are previously carried in-house but in solution business are moving to the solutions supplier. Kujala, et al. (2010) define the solution to be an offering which includes not only the project and service but also a project component and after-sales service component. Also Stremersch, et al. (2001) define solutions (they use a word full-service contract) as a package of

products and services which fully satisfies the customer's needs in a certain event or problem. They state that the strategy is clearly associated with the concepts of "bundling" and "systems selling". Also Davies, et al. (2007) mention systems selling by defining solutions to be "*the most recent development in the long-term evolution of systems selling.* Nordin & Kowalkowski (2010) compare integrated solutions to comprehensive services which they say are nowadays called "solutions". They serve a couple of terms that they see could be used to replace/alongside a term solutions. These are: functional products, delivery performance and full services. Adams and Yellen (1975) have dealt with the solution issue in terms of bundling. They have divided the products' and services' bundling strategies into three different groups by combinability: 1) Pure component, which means there is no bundling at all. The "unbundling"-strategy may serve the customers who are pursuing a high level of flexibility in their purchasing strategies. 2) Mixed bundling where the components are available separately or bundled and 3) pure bundling where the components are only available in bundled offer.

Davies, et al. (2007) argue that an integrated solution includes developing solution-ready components that may be not only combined once but also recombined at much lower cost than combining separate customized components to solutions. Davies et al. (2006) mention it important that customers buy the whole set to get rid of problems and that will guarantee fluent operating. Solutions need to include services and functions that cover the whole product (here a product may be used to refer goods or services) life cycle. These services should consist of designing, integrating, operating and financing the product, or the system. The logic of integrated solutions implies that the value will be created together with customer and supplier and that means the close cooperation and trust are needed in this kind of relationship (Lindberg & Nordin, 2008). Many of the important solution elements are consisting of high standard intangibles which make the purchasers' operations easier, more secure and so forth. A solution could for example come along by shortening the purchaser's product's time-to-market (Dunn & Thomas, 1994).

Stremersch, et al. (2001) approach the concept by comparing traditional industrial service providing and full-service contracts. Services have traditionally been pro-

vided in service hours. The price has been traditionally fixed price per hour while customers have concentrated on finding the cheapest price in particular quality range. Full-service contracts offer a solution in which the supplier guarantees the maximum level of downturn of the plant. They have calculated and maximized the usefulness of the maintenance actions on the level of total costs of the plant. Prior (2013) has equated solutions with business projects. He has found several similarities between them, for example that they both require development of customizing the components of product and service. These actions should achieve stakeholders' approval. They both take place in social context and necessitate good inter-organizational relationships between the buyer and the supplier company. Projects and solutions are temporary and arise from finding a problem that leads to address it by targeting specific resources.

Based on the multiple definitions of solutions analyzed in this chapter, it seems to be rather challenging to implement suitable solution-based business atmosphere with all its logics. Despite of this, solution business may offer a valuable way to develop traditions to improve the overall value of the process from the purchaser's view. To sum up these findings: The solution should create more value to the customer than if the same services and/or products were bought separately as Hallikas, et al. (2014) and Sawhney (2006) have mentioned.

Table 2 Integrated solution definitions in literature

Author	Definition for integrated solution
Tuli, et al. (2007)	Set of customer–supplier relational processes comprising (1) customer requirements definition, (2) customization and integration of goods and/or services and (3) their deployment, and (4) post deployment customer support, all of which are aimed at meeting customers' business needs.
Sawhney (2006)	An integrated combination of products and services customized for a set of customers that allows customers to achieve better outcomes than the sum of the individual components of the solution.
Nordin & Kowalkowski (2010)	Combinations of products and services that are customer-centric and start from defining the customer's needs at a certain moment.

Davies et al. (2007)	*"The most recent development in the long-term evolution of systems selling."*
Brady, et al. (2005)	Value creating combinations of products and services that create unique benefits for the customers. They are highlighting the transition of risks and liabilities which are previously carried in-house but in solution business are moving to the solutions supplier.
Kujala, et al. (2010)	An offering which includes not only the project and service but also a project component and after-sales service component.
Hallikas, et al. (2014)	*"Systemic offering may be more than a sum of its components."*
Pekkarinen, et al. (2009) **Pekkarinen & Salminen (2013)**	A solution is a complex offering which delivers value for the customer. Value is created in close co-operation with the customer and supplier. Solutions are mostly based on some physical element.
Stremersch et al. (2001)	"Based on the industrial service literature, we define full service as *"a comprehensive bundle of products and/or services, that fully satisfies the needs and wants of a customer related to a specific event or problem."*

2.3 Integrated solution as an option

Many researchers have identified several achievable advances from carrying out solutions practices. Specifically interesting is that the benefits can be achieved not only for the purchaser side, but they are also available for the solution supplier (Mikkonen, 2011; Stremersch, et al., 2001; Tuli, et al., 2007; Nordin & Kowalkowski, 2010; Prior, 2013).

Nowadays, when the businesses are getting more and more international, challenging and competitive, integrated solutions stand out as a practical way for companies to differentiate more as well as to seek new value creating opportunities. Solutions represent a sophisticated mode of outsourcing, which enable companies to put more effort on their core activities. For example Collins, et al. (1997) has discussed the topic in the context of automotive industry where companies have achieved good results by using integrated solution providers. While the supplier takes the responsibility and carries the main risk of the of the system integration, the purchaser is able to focus on current key issues such as competitiveness.

2.3.1 Difficulties and risks

Moving towards integrated solutions may seem quite complex and committing as far as companies are considered. Davies, et al. (2006) note that integrated solutions are ”a must” in these days even though it feels complicated to implement them in the beginning. They remind that the real winners will be those who have started early to follow the path towards totally integrated solutions. Thus, adapting solutions business is becoming almost mandatory, not least because of the shareholders’ demand. They are soon requiring integrated solutions practices since they become more aware of the possibilities regarding achieving better profits through integrated solutions. It should also be kept in mind that there is no single value in purchasing a solution itself. The value is created in the process in which the goals and needs are set in the first phase and the purchase will be fulfilled in the latter phase. (Stinnet, 2009, p. 30)

Hallikas et al. (2014) discuss about service purchasing and systemic value purchasing. They have discovered that authors often consider service bundling and integrating as a very central issue in literature when integrated solutions are discussed. Managers may regard these as rather negative phenomena because they seem to believe that it will destroy transparency in offerings and the costs related to them. Pekkarinen et al., (2009) emphasize that the larger amount of services will be linked to the solutions, the more challenging and complex the solutions change.

While interviewing purchasers from 18 industrial companies, Lindberg & Nordin (2008) found out that most of the interviewees felt purchasing integrated solutions as a very complicated task. This process was experienced to require lot of resources to keep up the supplier relationships. Once purchasing integrated solutions such as comprehensive services, compared to the individual services, the acquisition is expected to affect the overall plant performance. There is a need for strong participation on many organizational levels while purchasing solutions. The examples of these levels are purchasing, operational staff and maintenance departments as well as senior management level (Stremersch, et al., 2001). Many

researchers have pointed out that this co-operation between internal business units and departments is one of the main challenges in developing integrated solutions (Stremersch, et al., 2001; Windahl & Lakemond, 2006, Pekkarinen, et al., 2009).

It is very crucial to maintain good supplier relationships in addition to get benefits from solutions purchases. It has also been noticed that most of the procurement professionals see it too difficult to buy larger combinations, such as solutions, which eventually drives them to avoid solutions. Interviewees of Lindberg & Nordin's (2008) research have mentioned that in their opinion it is merely possible to outsource smaller projects. They regard it important to find out all the particles which the solutions consist of, which is not seen possible in large projects. According to Lindberg & Nordin (2008) many of the company representatives seemed to put a lot of effort in initial procurement. The respondents were discussing about difficulties in measuring soft factors such as creativity, flexibility and ability for collaboration. It was experienced that some matrixes and categorizing the factors might facilitate measuring but it has not been used in practice. As the pre-purchasing is often held problematic, simultaneously also the post-purchase evaluations may stand for a cause of concerns. The purchasers are seeking for effective ways to measure potential side effects of buying solutions. This sort of side effect might for example be the end customer's impression of the solution.

Some purchasers consider integrated solutions risky. Companies taking part in Lindberg & Nordin (2008) survey have mentioned that they would prefer to buy independent services rather than solutions. A reason behind this was unwillingness to get in an alliance with the supplier. It was seen expensive and companies did not want to get depended on some specific suppliers either. Hallikas, et al. (2014) have noticed the similar phenomenon in their research. Managers tended to avoid solutions because they saw the dependence risks to be bigger than possibly achieved benefits. Buying "unbundled services" was also seen as a good option by companies that are willing to stay flexible with their purchasing activities (Stremersch, et al., 2001). In this context also Agndal, et al. (2007) found in their empirical study that the companies were similarly sceptic towards solution

purchases since they saw it risky and costly. Their respondents saw the solution scope too large and intangible as well. One reason mentioned for avoiding solution purchases was difficulty of receiveing sufficient attention if something goes wrong. If the customer nor the supplier knew what the solution precisely included, it would be difficult to handle unexpected problems especially if some subcontractors were used by the supplier.

Stremersch, et al. (2001) determine that this is a totally new purchasing situation for most of the companies considering purchasing integrated solutions; A low level of experience and not being familiar with the situation may lead to high level of uncertainty. A solution acquisition is very complex because it usually covers many activities on the plant; for example all the maintenance activities may be under one supplier's responsibility. In addition to these solution contracts, the importance of the purchase is very high. An unexpected break in production process due to lack of, for example maintenance, may generate high additional costs. Anxiety over unexpected large breaks raises sceptical attitude towards solutions.

2.3.2 Added value

Lindberg & Nordin (2008) are focusing on SD (service dominant) –logic as a key value creator in their research. They focus on complex services, such as integrated solutions. According to them these kinds of combinations would require a procurement method that is in line with service-dominant logic. SD -logic has stood for a very common approach during the last years. It has been a trend opposite to product-centric logic. For example Vargo & Lusch (2011) have been messengers and supporters of service-dominant logic. Also in solutions business service and customer orientation may represent a very central factor. SD-logic can be described shortly through the following illustration: Company is creating services which can support customers in their own value creation processes. Value creation and thereby sales should not be the only thing in focus but that the value is co-created in interaction between the supplier and customer; in other words partners. Customers should not either be considered as isolated entities but also their networks should be respected. As an example Stinnet (2009, p. 7) mentions that to get a common goal, customer and supplier should focus as far as on customer's

customers. Talking about the resources, companies should focus more on intangible resources such as their knowledge and skills and also regard suppliers and customers as their resources instead of keeping them as targets. Lindberg and Nordin (2008) are criticizing this. Service offerings have turned even too intangible due to the raising interest in SD-logic. From their point of view, buyers seem to be interested in more tangible options. The authors call this service modification as *objectification.* Mostly the integrated solution offering process seems to begin with "finding the customer need" which they are not aware of even themselves. This objectification might be a useful way to start the process, hence, by collecting the needed solution from smaller particles. (Vargo & Lusch, 2011)

According to both Nordin & Kowalkowski (2010) and Tuli, et al. (2007) individuals are the greatest source of added value in solutions implementation process. This is due to the fact that solutions are service-dominant by their inherent nature. Value creation is done in customer's process via their use of service according to SD –view. This premise is based on the fact that a vast majority of exchange today happens on services, not any more on products (compared to goods-dominant view). Products still have an important role as a pillar of exchange and base for services. This logic is central in solutions business since solutions, after all, are product-service –combinations by their nature.

Prior (2013) highlights that albeit the current literature focuses on the services, resources and relationships as the main sources of value creation, the current literature does not take intangible significance into account particularly from emotional or from social point of view. The focus is vastly on intangible value elements in Prior's (2013) research. Dependent on the consumption experience, customers get various outcomes, including social, functional, emotional, epistemic and conditional value. The research identifies four supplier actions that are clearly seen to be considered as important value creators by customers. Respectively, clients are willing to find such features from their suppliers while they are carrying out their duties:

- Timing: minimizing the possible mistakes, making sure that the actions are made perfectly on time, seeing the needed resources and finding out the possible upcoming mistakes or concerns. Supplier representatives of specific actions are at the centre when you are looking at how customers can monitor the implementation of the solution in real time.
- Accuracy: Making sure that the utilized information reflects the essential elements realistically.
- Expediency: This requires alignment between the activity, the individual controlling the completion and the proposed recipient.
- Striving to create added value: willingness to take responsibilities of the case and attempt to complete the task by honour. Solution-centricity, supplier gives many possible alternative solutions.

Windahl & Lakemond (2006) are giving six important factors while improving integrated solutions towards more value-generating. It is important that the relationship between the counterparts is strong enough and that it is clearly known who the parties of the process are. The companies' position in the network and the network horizon are also important to be noticed. The consequences of the solutions to the internal actions needs to be found out and also how the solution will be affecting to companies' customers and their core actions.

The results of Prior's (2013) study seem to support the claim, that supplier's representatives' actions affect to their perceived value creation. At least from the customer's point of view these actions seem to be critical while creating value in delivering industrial solutions. The purchasers seem to perceive the activities in terms of *social, emotional and functional* actions. The findings of this study also reveal four categories of activity as important sources of value: communication, planning, risk management and coordination. These findings partly represent similar value denominations that Stinnett (2004, pp. 48-49) has determined. He has given eight major denominations of value and risks that are corresponding them. By these denomination factors, he means the value factors that customers are willing to get out of the purchased product or service solution. Value and risk are the two sides of a same coin. While there appears decrease in risk, there will be

increase in perceived value. Eight value denominations (Stinnett, 2004, pp. 50-57) are introduced below.

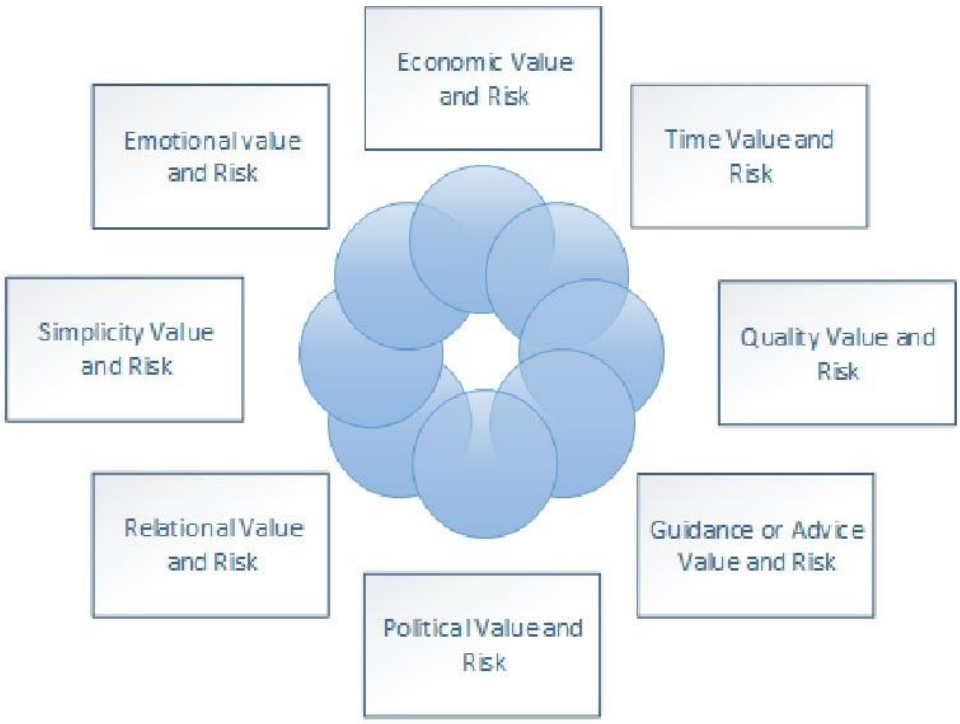

Figure 4 Value Denominations (adapted from Stinnett, 2009, p. 49)

Economic value and risk are possibly the most tangible value denomination. Customers are seeking to perceive economic value from the purchased solution. At the same time the economic risk should be as low as possible. This may be calculated for example by return-on investment –analysis. It would be valuable for the customer to get these analysis from the supplier based on their previous solution deliveries. “Time is money.” *Time value* and risk are referring to solutions’ effect for example on customer’s products time-to market or production cycle. Customers are also seeking for maximization in their in uptime and reducing downtime in the industrial plant. At the same time, customers need to be convinced, that speediness does not mean loss in quality, which is often default. *Quality value* and risk are the top-of-mind issue for almost all the companies nowadays. This is shown by the increasing interest in various quality indicators such as Six Sigma and quality certifications. Customers are seeking for reduces of mistakes and defects in manufacturing, billing and maintenance, for example. Quality is often seen as a synonym for reduced costs.

As shown in current research literature (e.g. Lindberg & Nordin, 2008), customer is seeking for solution that is exactly customized for their needs and solves their firm-specific problem. Customers are seeking for *advice value* from suppliers that would really understand their needs. As also noticed in researches, customers do not know even themselves what they need. Some customers are willing to get a supplier who will find out the best options for their needs and demonstrating it by using diagnostic approach. Advice and guidance will bring value and save time so much that some are willing to pay extra for the supplier. Of course the customer may also end up in purchasing from another solution supplier after getting the suitable options.

Political or image value is individually perceived denomination of value. It may be illustrated by using an example: Someone wants to use a certain grocery store chain since he/she thinks one's image is dependent on it. If he/she visited a discount store chain, one would experience a blow in the image. This is subjective and sounds even comical, but may be seen among all the humane decision-making. From this point of view, the purchased solution should then be seen politically acceptable and make a purchaser "look good". Customers are willing to acquire solutions that do not drive them to perceive any risk of negative changes in their political standing or image.

Relational value and risk are mostly perceived in long business relationship while the customer and supplier are already familiar to each other and have achieved a mutual trust. Relational value can be said to be repay of loyalty and commitment. According to Stinnett, creating personal contacts with more than just one person in the company is ideal for building trust between the co-operators. Relational risk of an internal conflict is always present while the customer may be siding with a supplier's competitor, but it works both ways. *Simplicity valu*e is created while a solution offers easiness for customer's operations saves time and helps to avoid mistakes. Simplicity also indicates less hassle, stress and headaches and appears to produce most of its value through time-savings. Occasionally the companies think that they may save their time and simplify their work by keeping the same old supplier since changing it to a new, probably better one, would apparently turn out to

be difficult. However, in many cases, at least some different options should be compared. In the long run the most suitable supplier is always the most valuable. Risk of simplicity is related to these inaccurate supplier selection decisions and only short-term thinking in supplier selections.

Emotional value is underlying behind all the other value denominations. For business people it may be hard to even admit the existence of this factor. But emotions are present in all the decision making situations. For example a need to feel safety is driving pursuit for economic value, as well as a need to feel successful. Advice value also serves customers, as all the people need to feel that safe and desire to avoid humiliation and failures.

By introducing these eight value denominations, I want to show what the purchasers are willing to achieve from the supplier and the supplied solution. The best supplier for a certain purchase would be the one who can offer the most value factors. These eight value denominations are just an example of commonly valuated features. Each purchaser may have their own special features to give emphasis on, and there then exists a lot wider scale of different value denominations.

Ahola, et al. (2008) have divided value creating benefits into two main categories: Long-term and short-term benefits. They have especially focused on concrete benefits for the customer buying a turnkey project. Short-term benefits are formed from five categories: Product related delivery efficiency, additional supporting services, access to resources and innovation related. Product related benefits are formed out from partitions such as product performance, reliability, consistency and quality. Also ability to product customization is seen as a product related benefit for the customer. Delivery efficiency factor includes delivery punctuality and flexibility, efficiency and suppliers' ability to solve problems in deliveries. Additional supporting services help the customer to get the most out of the supplied turnkey solution. These may include for example training programs organized by the supplier. Access to resources enables customer to get an access to resources that it could not have reached without the purchase. These include for example outsourcing of activities and customer information. Innovation factor refers to im-

provements in purchasers actions, for example in processes that are achieved through the turnkey-purchase project. Long-term benefits are formed mainly in relationship stage. Increasing trust, solidarity between the parties, mutual goals and reciprocal image are forming a base for contracts that are capable to create additional value for the customer. Innovative remarks during the project may also effect on customer value significantly by, for example intensifying the processes. Radical innovations may even create new business opportunities. When discussing of long-term benefits, Lindberg & Nordin (2008) in turn note that moving to solution business will significantly reduce companies' transactional costs which will get lower while the amount of suppliers gets smaller.

According to literature (e.g Ahola, et al.,2008; Windahl & Lakemond, 2006; Tuli, et al., 2007), industrial customers seem to appreciate more the added value achieved from the outcome over the cheap price of the solution. In contrast, research of Stremersch, et al. (2001) shows that while evaluating the full-service contract suppliers, the total plant cost was the most important evaluation criteria. Also empirical findings of Agndal, et al. (2007) support the fact that price is still the the most central evaluation criteria and the respondents of their study did not see any significant changes towards different thinking. A few respondents even mentioned that the pressure towards even higher cost pressures may be increasing.

2.4 Supplier view

If, in turn, sought for the benefits which can be reached by solutions supplier, many potential benefits as well advantages may be found. For B2B-manufacturer, moving to solution business is a possible channel to attain longer business relationships. Consequently, prolonged relationships and long-time business contracts enable creating cash flow for extended time periods. One example of cash flow creators in this context are service agreements which are commonly purchased in connection to solution purchases. Solutions are a base for organizational growing and solution business makes it easier to respond customer demand. It also smoothens bumps in economic cycles, for example by offering income possibilities

in time periods when traditional purchases from customers do not take place. (Pekkarinen, et al., 2009)

Mikkonen (2011) also introduces similar benefits in his doctoral thesis. He is concentrating on IT-sector and how to bundle services and products to create new value for customer. Mikkonen gives four benefits that the provider may get from *providing* integrated offerings. Customer potential will increase and integrating will bring economies of scale as well; while the services and products are integrated, there is a need for only one marketing project. In case the whole package was sold separately, the provider would need to have a variety of campaigns instead. The economies of scale can also be seen another way; while the provider already has its customers, it is a lot easier to provide new services to existing customers than new ones. Bundling also reduces customer churn.

Possible benefits could also be approached by exploring theoretical revenue models. According to Bonnemeier, et al. (2010), traditional revenue model's performance parameters are formed from suppliers' amount of work, materials and labour. Value is proposed in a form of a product or service. In innovative value revenue model, performance parameters are formed from usage time, intensity, availability, quality and cost savings, for example. Value parameters already are quite differing dependent on the viewpoint. In innovative revenue model, the value proposition consists of suppliers' input and output for the customer. In traditional model, the price is formed according to suppliers' costs, while in innovative model the price is composed in accordance with the customer value. According to Bonnemeier, et al. (2010), while moving to solution offerings the supplier must see that the revenue model should to be fixed from traditional to innovative. This is because to be able to create customer value as well as to be able to operate in the markets. Also company organization needs to be organized towards customer-centric by examining company strategy, structure, personnel and rewards as well as processes. The pricing resources, mechanisms and routines should to be flexible to enable companies to respond competitor actions effectively and match the prices with individual customer value. Selling solutions is much more cost-intensive than traditional product-service supplying. (Cova & Salle, 2009)

Sawhney (2006) has offered a possible option which, in addition, requires sophisticated business relationships. It shows how the supplier can manage in sharing the value. Sawhney suggests that the solutions supplier and purchaser may share the benefits by notifying the share-out already in solutions' pricing. This becomes certainly challenging at least from the customer point of view and the importance of trust emphasises. Concerning solutions selling, Guenzi, et al. (2009) mention that a selling orientation negatively affects synergistic solutions which means it is decreasing customer trust. The authors have noticed that team selling has a positive impact on the attainment of synergistic solutions, thereby fostering customer trust. These are the same points that Stinnett (2004, p. 7) is writing about. In his book he mentions, that the customer can anticipate it from miles away, if the only goal of the supplier is to make profit. It could be said that while moving to solution business as a supplier, company should be well aware of the fact that their interest in the business area needs to be real. The supplier has to be willing to participate its customer's actions, to be interested in their operations and businesses, as well as to be interested *in customer's customers.* Ahola, et al. (2008) also refer to importance of trust to be successful in turnkey projects. They point out that if the purchaser only trusts the tendering method, where the price is the key complement, long term value creation may be ruined. Competitive tendering based on price will bring short-term value but continuity in exchange between the business parties and trust is required to achieve long-term benefits.

Wise and Baumgartner (1999) highlight the importance of understanding the customer, in their words: "*going downstream*". In their opinion, manufacturer's role as a producer and goods seller has become less attractive for a good reason: Demand of products has festered throughout the economy. According to the authors, profits are today located elsewhere. Suppliers should focus more on the customer and move towards services. To get benefits and to capture value, suppliers should expand their vision on value chain and move their focus on developing customer loyalty and look the value chain from customer point of view. Adamson, et al., (2012) are reviving suppliers by saying that solutions couldn't be sold anymore. The development of customer's purchasing processes have turned the view from solutions selling into solution purhcasing. Sales conversations have turned into

implementation conversations which require good knowledge of the partner. It also means that more focus should be put on marketing actions since the decision is often done by customer before even taking contact to the supplier. The authors are of the opinion that instead of selling solutions, selling insights would be more current in the present business circumstances.

3 PURCHASING PROCESS

Van Weele (2014, p. 8) has created a process model of a basic purchase. His depiction includes all the steps that are needed to get the wanted object; service or a product, from the supplier to its final destination. The process is illustrated in figure 5. Specifications for the wanted and required acquisition need to be done first. This part includes definitions of required quality, quantities and other describing factors of the service or product to be bought. Suitable suppliers should to be found from the existing market. All the companies have their own routines and measures to select the most suitable supplier from the group. Supplier selection is a critical phase since supplier performance and involvement effect on, for example companies' manufacturing performance. Vonderembse & Tracey (1999) suggest using versatile evaluation criteria that gives the broadest possible criteria of the suppliers. This may include for example product quality, performance and delivery reliability as well as a number of other criteria specific for the purchaser and the purchase.

While the best possible supplier is selected, negotiations need to be prepared and conducted. This phase seeks for establishment of an agreement with the supplier. Agreement then leads to a legal contract between the purchaser and supplier. After making a contract, the purchasing process continues with placing an order to the selected supplier. The next step may also be creating efficient routines for ordering and creating a framework for other purchase handling routines. Expedition and evaluation is then done to secure the supply and to control the progress. Follow-up phase includes keeping all the product and supplier files updated and evaluating the success of the purchase done. All these purchase process activities are closely related to each other. (van Weele, 2014, p. 8)

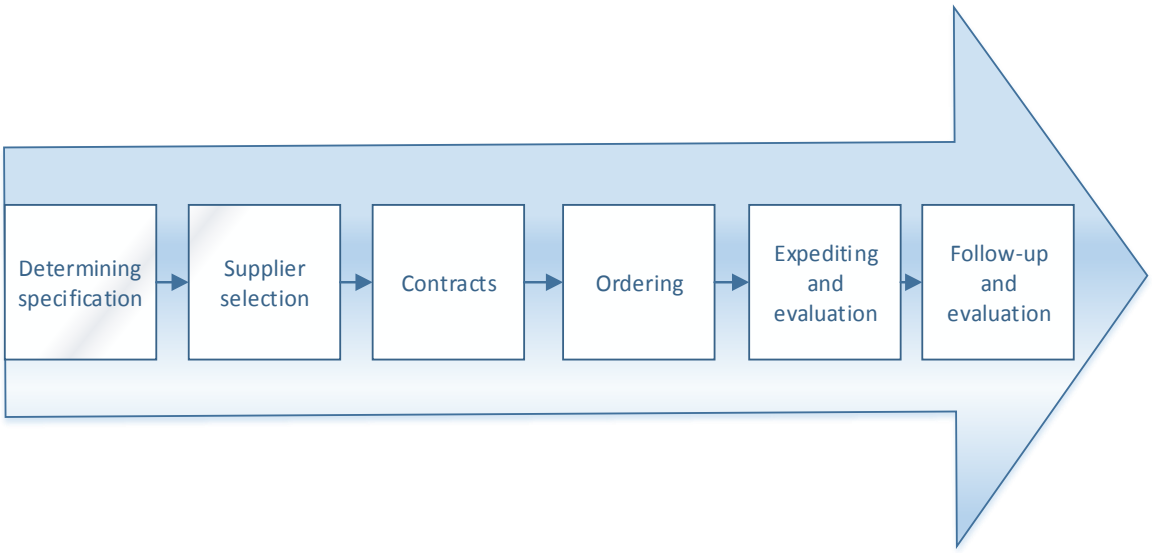

Figure 5 Purchasing process model according to Van Weele (2014, p. 8)

While getting into more complex integrated solutions -purchases, some wider parts should to be added in the process. Purchasing process commences from getting an invitation from an internal customer. This may be for example logistics or sales department or any other part of the organization that has become aware of new requirements. This process may also be called procurement process (which is a term mostly used to describe purchasing more extensively). For most of the companies purchasing industrial solution, this is completely new purchasing situation. When having only a little experience, and being not conversant with the solution purchase, uncertainty may rise, mention Adams & Yellen (1975). Solution purchasing is very intricate, since solution includes many parts; from project consultancy and building all the way to maintenance services. The importance of these contracts is significant and critical to the customer.

Adams & Yellen (1975) have been classifying different bundling strategies and taken a look on how different strategies effect on solutions purchasing processes and purchasing criteria as a part of the process. While purchasing large entities compared to simple, individual products or services, the effect of the purchase will be evaluated on overall corporate performance point of view. While doing such evaluations, many kind of expertise is needed. Expertise is needed not only from the purchasing department, but also from higher management, operative person-

nel and service department. Integrated solutions purchase decisions are comprehensively done in companies' decision making units due to the fact that these purchases have high value, are high in complexity and usually involve long term mutual commitment. Decision making process, which precedes the actual purchasing process, takes about a year in average. (Stremersch, et al., 2001)

The parts of integrated solutions' purchasing process have been identified in Lindberg & Nordin's (2008) research. According to them the process usually starts by identifying the need. This is seen as a very challenging part because in most cases customers do not know the actual need themselves and suppliers find it vastly challenging to get access on customer information and to help them determine their need (Finne, et al., 2014). Suppliers need to position themselves as more than a seller; they need to be a valuable partner to the customer. In the opinion of Stinnett (2004, p. 7) in some cases, if the supplier representative is very experienced, he/she may even know the customer's needs better than the customer itself. Also Adamson, et al. (2012) are in favour of this perspective. If a supplier has been working on this particular business area for a long time, it might be very familiar to him/her compared to newer employee from purchaser side. Suppliers and customers should find a common goal: *How to serve customer's customers the best possible way?*

The second part of the process (Lindberg & Nordin, 2008) is developing a specification of the needed product and/or service. This needs to be done in detail and according to the authors it appears to be a tremendously challenging part of the process. The real need for the acquisition should be ensured and after this it should be examined, what a fulfilment of the needs requires. For example a dialogue inside the organization might be useful to identify the needs and wishes in detail within the organization. The second part is followed by selecting the best possible supplier. Stremersch, et al. (2001) have found nine characteristics that are typical while evaluating supplier criteria. These attributes have been collected in a research that was directed to industrial maintenance companies and concerning full-service maintenance contracts. The evaluation criterion was concerning the depth of the contract; is the desired cooperation on a strategic level, on opera-

tional level or tactical level? Other aspects were concerning the scope of the contract; is there going to be one contractor or possibly more contractors that are taking care of the maintenance and coordination? Furthermore the purchaser would need to be aware of which kind of installations there is going to be and how many subcontractors would be allowed. Suppliers are increasingly relying on partners while delivering and developing integrated solutions (Windahl & Lakemond, 2006). The purchaser decision-making also includes knowledge sharing: What kind of information will be changed; is it crucial or more general, highly detailed or simple? Supplier's references should also be of purchaser's great interest: What are the supplier's reputations; what kind of references does the supplier have? Stinnet (2009, p. 57) mentions that customer reputation may well be the most important criteria while purchasing such large solutions. In addition he mentions economic criterion; the purchaser should take into account what is the solution's influence on total costs, on performance and on maintenance costs. Supplier selection should be controlled by formal processes. Thereafter the contract will be implemented; several efforts will be put into evaluation and implementation also needs to be controlled afterwards. (Lindberg & Nordin, 2008)

Samli, et al. (1992) have approached the purchasing process by using time span and service type. According to them the industrial purchasing process starts from "presale", this may for example include a trial period or demonstration that will raise the desire for purchasing. The second part of the process is choosing the additional services that are relevant to purchase decision. These services are usually considered to be installation and training services but they can vary a lot depending on the core product. Third stage of a process is "post-sale". This comprises parts which are keeping the purchaser satisfied with the product. According to the authors, post-phase should include such services that guarantee the customer's trouble-free operating; for instance regular maintenance and inspecting. Purchasing process may also be examined through a larger scale by dividing different sub-processes. Van Weele (2014, p. 9) has divided three sub-processes that appear inside the main purchasing process. In this model the process starts straight from the purchase of a service or combination of a service and a possibly agreement of a contract. On this view the whole process is starting from the side

of a customer. The second sub-process is ordering the service which is typically a support service for maintaining the purchased product. This service is in line with the possible contract written in the first phase. The third process is an expedition process in which the supplier delivers the service to the customer.

Co-operation during the purchasing process, moving the whole process and offering of improvement possibilities to supplier are key elements in integrated purchasing, according to current literature (e.g. Hallikas, et al., 2014). Nowadays, it should not be thought that there is one who produces the value and one who uses it, or destroys it. Value is generated interactively and both parties bring their own unique resources in it. It is commonly assumed that integrated solutions provider should operate reciprocally. In practise this means that the supplier operates as agreed in purchasing contract, and on time. (Vargo & Lusch, 2008)

4 CASE

In this part of the research companies' practices in solution purchasing area will be examined. How are the purchases planned and how are they realized: How long does it take to get from the start until the plant is ready for use? The interest is on how the companies implement large purchases, and how these company specific purchasing processes differ from each other. This is associated, for example, with the measurement of success, tendering of suppliers, valuing the different characteristics of supplied items and different purchasing entities. Also of interest is how the interviewed industrial purchasing experts experience the possibilities in purchasing of integrated solutions in Finland and what their opinions of such a way of purchasing are.

Data collection was carried out for Vaasa University as a part of a project REBUS. The aim of this particular section of the project is to increase awareness of relational practices in industrial companies' purchasing traditions. The starting point was to find professionals from Finnish industrial companies which have lately purchased an industrial solution. Six case-companies and their representatives are introduced in table 3 and table 4. Industrial solutions here are comprised to be factories or comparable large industrial facilities. The target was to find out in which kind of components the companies have chosen to purchase: The whole factory from the same supplier or some smaller parts using several suppliers? Aim was also in discovering what kind of purchasing practices the companies are using: Basically how do their purchase processes resemble. Purchasing process synthesis was then carried out from the interviews to clarify the results and to find the possible similarities and differences in companies' purchasing processes, methods and practices.

Table 3 Case- companies, facts

	Case1	Case2	Case3	Case4	Case5	Case6
Company turn-over, m€	300	2000	1000	15	50	8000
Employees	1500	-	4000	230	270	40000
Type of pur-chase	inbound-outbound centre	inbound-outbound centre	industrial factory	inbound-outbound centre	industrial factory	inbound-outbound centre
Field area , m2	20 000	38 000	21 000	7 000	10 000	70 000
Project dura-tion, years	3,5	3	2	1	2	3,5
Project value, m€	50	10	100	-	20	150

Case1 is an inbound/outbound freight centre. Case-company turnover is 300 million Euros and number of employees is 1500. The area of purchased logistics centre is 20 000 square meters and the total value of the project is 50 million Euros. This investment included the land area, new building as well as all the necessary equipment. This case would be characterized more as procurement while the process includes an inner customer and vast strategic planning. Duration of the project was about four years which one of the most long-lasting projects among these six cases with an average duration of 2, 5 years. This project was a part of reforming of activities and the investment was purely compensatory replacing an old one. Company representative involved in the interview was logistics chief who positioned himself, in this particular project, as a logistics process owner alongside his usual operational activities.

Case 2 is also inbound/outbound centre but the main focus in the project was in automation. Company had its own premises already but they needed to be automated and modernised. Company representative announced the investment was done to reply in company's new vision and to add efficiency in its operations. The

size of the built area was approximately 38 000 square meters. Case-company turnover is nearly 2000 million Euros and total value of this investment was 10 million Euros. Project lasts altogether three years and was not yet completely finished during the time of the interviews but that only affected on answers concerning measuring the project success. Number of company employees was not available. Company representative in this case was the purchasing manager who had worked as a project team member on this specific project.

Case 3 is an industrial factory which was built to meet new strict requirements in the company's specific business area. Case-company turnover is 1 milliard Euros and number of employees is 4000. The project lasted about two years and the value of the investment was 100 million Euros. This factory was built in already existing premises so procurement related to equipment and production lines excluding the building construction which is typical for these kinds of solutions and seen in four of the cases. Field area size was not available. Interviewee attending from case-company 3 was a supply chain manager who also worked as a project owner in this procurement project.

Case 4 is again an inbound/outbound freight centre which was built to cater for new business. In this case the building and its contents were all purchased for new needs and there were no existing equipment or premises. Case-company turnover is about 15 million Euros and it has 230 employees being the smallest company among these six case-companies. The area of the field is 7000 m2 and by lasting one year the project was the shortest one of the case projects. It could also be described more as a purchasing project than procurement hence not including much survey or strategic analyses. Project value was not available. In this case I interviewed a service manager who worked as a construction supervisor and counsellor in the particular project.

Case 5 is an industrial factory which has a freight centre in connection to the factory. The investment was a replacement for old facilities and aim was to automate a larger part of the operations and to make them more effective. Some of the old factory equipment and production lines were shifted from old premises but the

building a great part of the equipment, especially related to automation, was acquired as new. Company turnover is 50 million Euros and number of employees is 270. Project field area is 10 000 m2 and value of the investment about 20 million Euros. Duration of this project was 2 years. Interviewee was a company's technology manager and project leader and also responsible of some side-projects.

Case 6 is an inbound/outbound freight centre as well as 3 other of the cases. Growing customer needs required the company to build more facilities to serve the new demand. This case also included purchasing land area. Company turnover is about eight milliard Euros and personnel amount is 40 000 hence being the largest companies among the case-companies. Also the project was the largest in size, having an area of 70 000 square meters. Invested value was about 150 million Euros. Duration of the project was 3, 5 years. Concerning this project, I interviewed the construction manager who worked as a leader of the project.

Table 4 Interviewees description

	Interviewee's position in the company	**Position in the project**
Case1	Logistics chief	process owner
Case2	Purchasing manager	project team member
Case3	Supply chain manager	project owner
Case4	Service manager	expert and construction supervisor
Case5	Technology manager	project leader
Case6	Construction manager	project leader

+ Case-supplier is industrial supplier for equipment and has also its own purchasing activities. Supplier representative was a customer relationship manager of the company and taking care of key suppliers of the company. Customers of the company are international large companies from several European countries and the supplier has acquired a status of credit supplier in some of the companies. Sup-

plier was interviewed in matters concerning business relationships and where they see that the origin of the value in business relationships is.

4.1 Project organization

It is crucial to be capable to integrate as well as to release resources while starting solutions purchasing. Sometimes there even appears to be a need for special separated organization for people who are developing integrated solutions. For example in one of the case-companies, a certain organization was built for the solution procurement project. There were many of tens of people working merely for the solution project for a long period. Numerous companies used external consultants to help carrying out capacity specifications, process planning and technical as well as constructional planning. Windahl and Lakemond, (2006) stated in their research that a lot of commitment is required from top management to be successful in integrated solution business. Interviewees mention this as one of the most important thing to be taken into consideration as well. They have experienced it extremely important to have an overview over the whole project from the start till the end of the project. Some representative described this dominant position by using a word *integrator*. By being systematically aware of the process factors, it helps to avoid blind spots behind the different sub-projects and enables controlling of possible inaccuracies during the project lifetime. It was often mentioned that as well as the purchasing company had its own project organization, usually the supplier organizations had their own project teams or organizations for each project as well. This makes the communication concerning all the aspects of the project easier. Even though the project organization in each project appears to be different, all the projects always follow the corporate or company purchasing policy. Representatives mention that in the majority of cases, procurement process and actions are alike regardless the size of the purchase; whether it is a smaller every-day purchase or a large solution purchase. The scope of the purchase is significantly different, but all the same principles are in use.

4.2 Purchasing process according to the cases

In research of Lindberg & Nordin, (2008), the participants mention their observations of movement towards more formal purchasing processes during last years. Also Agndal, et al., (2007) have observed increase in formalities in sourcing practices. The reasons behind moving towards more formalized acquisition processes vary. Ethical aspects, effectiveness requirements and coherence demands of the global market may all appear in the background. Demanding formal processes also seeks to minimize the effect of personal relationships in purchasing decision. According to Lindberg & Nordin, (2008) research, service purchasing has been seen “informal” and dependent on personal relations. The authors still mention that this can be observed partially. According to case-company interviews, purchasing processes appeared to occur quite formal. It could be simplified that the larger the company and the solution purchase, the more formal the process. The purchasing processes of solutions followed the companies’ usual purchasing practices but the scope was larger while the purchases were larger. The big picture, solution, included many sub-processes and each of them was then following companies’ every day-purchasing practice.

Synthesis below has been made on the basis of the case-interviews (figure 6). Some intermediate steps of the process have been deliberately left in the process to show how the procurement actually progresses from the beginning until the end. But as we can see, the big outlines of the process seem fairly similar to purchasing process perceptions in theoretical findings presented previously.

Figure 6 Purchasing process synthesis on the basis of the cases

4.2.1 Initial procurement

Researchers have identified integrated solutions purchasing processes. One of process descriptions is illustrated by Lindberg & Nordin, (2008). In their synthesis the authors have recognized four main stages on the solutions purchasing process. The process starts from identifying the business need. Detection and identification of the need is usually done by internal customer. In some of the cases, the trigger for the project was a need coming from some sector of the company, i.e. from logistics department or from business development department. They have

noticed a lack of capacity and got aware that something needs to be done to remedy the situation. Some of the cases were, however, purely replacing investments. In practice it meant that old factory premises had come to an end and the whole facility needed a renewal to intensify the operative actions and to make the companies more profitable. According to research of Lindberg & Nordin, (2008), companies use a lot of effort in initial procurement, in practice seen as (figure 6) finding the business need, making pre-surveys and doing strategic planning. This also refers to process planning, technical- and equipment- as well as construction planning. These initial procurement steps derive practically a half of the whole process according to the synthesis. On the other hand, as an important remark I would mention that in some of the cases (2) this type of initial procurement stage was not mentioned at all.

In theoretical literature, finding the customer need was perceived as a vastly challenging phase of solution purchasing process. Empirical findings support this fact since the case-companies' purchasing organizations direct a lot of attention to definition of the needs. According to many interviewees, clear specifications are seen as important key elements. These specifications provide a lucid view of the upcoming project and serve the organization as a guideline throughout the purchasing project. Interviewees perceive this as an extremely critical point which determines the success of the whole project. *"It is not possible to start making some changes while the project is already running. Everything needs to be carried out properly before the real start kick",* states one of the interviewees.

After specifying the need, pre-survey of the possibilities was carried out in majority of the cases. This means the companies were making calculations of the possible solutions which meant mainly estimations on whether to purchase an entirely new property or to improve the existing in case there was one. Pre-survey phase may also include calculations on different purchasing methods: Should everything be purchased from one certain provider or should the company differentiate purchases in several parts? The majority of case-companies decided to build entire new premises. Some of the new premises were built to be of service to whole new business opportunities. Two of the companies decided to choose existing premises and to modify them to respond to novel needs by building new production lines

and by acquiring new equipment. While any special prerequisites concerning the equipment did not exist, using existing premises was felt as a possibility which enabled savings in time schedule as well as in monetary expenses.

After the need has been identified, the following part in Lindberg & Nordin, (2008) research is a detailed investigation of the services and products which are to be purchased. To find the most appropriate suppliers, every company has its different formal selection process. The case-companies used detailed investigation by doing various stages of planning. Strategic planning- phase included for example location determinations. Following types of questions were presented: Where could the employees be found easiest? Would some municipality participate in the project somehow? What is logistically the best place to build the new facilities? Location decisions were depended for example on company's export- and import activities. Proximity to seaports and airports may be substantial. Strategic planning also includes capacity planning, in which the aim is to make capacity forecasts for the coming years. *"It is no sense to build some enlargement right after the plant is ready*", said one of the interviewees. Capacity planning was done on the basis of past years' activities, for example by investigating product volume development and creating rolling sales forecasts. Moreover, strategic planning contained other future-oriented affairs. Case-companies were considering the future needs to be served as well as products which would be handled in the future. Outlines and structure of the procurement was being shaped on the basis of these reflections.

Project planning mostly started from building suitable project teams from the organization. However, at least a responsible person for each sub-project was needed. The project could be shared in several smaller sub-projects which makes organizing easier. Every sub-project should then have its own leader and the leaders may straightforwardly recognize what is occurring in each project. Then to obtain the comprehensive view of the project, sub-project leaders will report to one project *"owner*". This seemed to be a functional practice according to experienced purchasers. To mention some examples of possible sub-projects which were expressed in the interviews: quality, IT, personnel, storage and documentation. Project planning was followed by equipment and construction planning. These kinds of actions frequently need special knowledge and in several case companies, con-

sultancy from outside the company was utilized. Typically the companies wanted this phase to be readily planned before starting to plan the constructions and actual building. For example in automation factories the equipment has quite narrow height and space requirements which determine the size of a building. In some of the cases, the existing building was limiting supplier options in automation equipment tendering.

Decision making process, which precedes the actual purchasing process, takes about a year on average, say Stremersch, et al., (2001). While interviewing the professionals, this desicion making and pre-purchase phase took at least one year. In some of the cases it took even more than two years to build a base which was excellent enough to begin actual the purchasing process.

4.2.2 Competitive tendering/bidding and contracts

Utilization of appropriate evaluation criteria has become routine in industrial enterprises. The goal of supplier evaluation is to identify the most advantageous, as well as the weakest offer among available alternatives (Vonderembse & Tracey, 1999). All the case-companies have utilized evaluation criteria in their tendering process. Among case-companies, evaluation criterion included supplier references, price, production efficiency, resources and delivery speed. Purchasers are willing to say that soft criteria are more important while considering post-purchase phase. To name a few soft criteria; reputation, creativity and flexibility as well as ability to co-operate are mentioned in discussions. Also Stinnett (2009, p.57) mentions that in big purchases, where long-term cooperation is needed, the reputation and such things as character of people are essential. These may even be the most important tendering criteria.

Mikkonen, et al., (2008) assert that it should be the value rather than pure cost that drives decision making. This is an attractive way for people to think how everything should happen, but in practice it rarely goes this way. According to case-interviews, while the purchasers begin to search for an appropriate supplier, the first criterion in decision making is often associated with economic indicators. "*How much money we have? What is the most we can get with it?"* After processing of

financial affairs, the customer may start to focus on other supplier criteria. Unfortunately the money-related issues are often the gateway to be permeated before the customers may focus on other supplier criterion. Selection criteria also vary in different projects, but besides according to the cases I found out that the frequently used criteria still appears to be the price. Even though there were many rounds in the tendering, the price often settled the final, chosen supplier. While the costs are clearly a central factor behind the decisions, soft criteria are still not underestimated. The more standard the solution purchase is the less soft factors seem to affect the decision. This was furthermore noticed in Lindberg & Nordin, (2008) research. Strategically remarkable purchases require more evaluation criteria. The criteria are usually dependent on characteristics of the purchased solution. In some of the cases, while quality was an extremely important factor, price was not the main criterion. In these particular cases, also authority controlling had a remarkable role while making decisions. The practice was often to make a risk analysis by exploring suppliers' resources and references from similar projects which view was also represented in current theory literature.

While references seemed to be central issue in concerning suitable suppliers for solution deliveries, an interviewed supplier gives their opinion on use of references. In their opinion, references naturally build confidence in the supplier but some of the larger companies may use their position to benefit themselves. Occasionally it involves something extra from the purchaser to get a reference from the supplier. Different companies may also be treated differently by the same supplier. While the supplier has a reference from some large company, it does not automatically denote that this supplier would treat smaller companies similarly and with the same intensity. This stems from the fact that the need of references granted by smaller, less known companies is not so essential for the suppliers.

Tendering usually has many rounds in large purchases such as solutions. It normally begins from getting aware of all the possibly suitable suppliers, which are probably discovered by benchmarking similar projects in other companies. Alternative suppliers may also be found by examining companies' existing credit suppliers. In case-companies' purchasing processes, tendering rounds were followed by

negotiations and contract content refinement. In one of the cases the selected supplier needed to be changed afterwards and a replacing supplier was chosen from outside the tendering. Supplier selection may also be carried out by using different channels from outside the company. One example of company-external advice is consultancy services.

While comparing different options, prototypes were sometimes required. In big equipment purchases, also test drives were compulsory prior to the decision. Samli, et al., (1992) has determined test drives to be a part of presale-activities already. The idea is that companies would be marketing their equipment as well as services by offering test drives and trials. This was not seen as a common practice in case-companies where test drives took place on tendering phase or even later. These were seen to occur while suitable supplier options were already chosen but contracts were not agreed yet.

Stremersch, et al., (2001) offer evaluation attributes which would be most relevant while making full-service maintenance contracts. The cases of this research are not concerning only maintenance contracts, but maintenance is a part of all the case solutions. Supplier selection criteria and evaluation criteria in these sorts of wide solutions purchases can be set side by side. Stremersch et al.`s (2001) evaluation criteria includes the following nine attributes:

- Depth of the contract (strategic, tactical or operational partnership)
- Scope of the contract (how many suppliers does the customer want)
- Supplier reputation
- Detail of information (how much information is provided for the customer, including performance information+ activities)
- Influence on performance
- Influence on total costs
- Influence on maintenance costs

While exploring the evaluation criterion mentioned in case-interviews, some similarities can be found. Almost all of the six interviewees bring up supplier reputation

as a significant measurement while making supplier decisions. In these kinds of solutions with the total value of always at least tens of millions of Euros, it is very important that the suppliers have previous experience from the field. If something goes wrong, the cost will easily be so ample that the companies cannot afford any failures.

Other commonly used measures are financial indicators. Companies are making preliminary strategic planning that includes calculations of purchase's influence on total cost, performance and maintenance. Financial indicators were mainly used while choosing machinery and equipment suppliers. One interviewee mentioned the scope of the contract to be an important attribute. This was concerning constructions purchasing. The depth of the contract was not mentioned but was seen in the answers; the depth of the partnership usually included in the strategic planning –part and was, on several occasions, also a part of the company's broader strategy. Not concerning only this appropriate case but multiple cases.

The most used attribute while doing the supplier selection appeared to be price. It is always there even though the researchers nowadays seem to think it is not so important anymore and the purchasers are concentrating more and more also in other factors. Quality was mentioned to be very important factor as well. The purchasing companies were moreover putting a lot of effort to make sure that the suppliers have enough resources to perform the contract. One of the interviewees mentioned, that they had done an inquiry to ensure that the supplier has enough resources, but the complexity of the project still surprised the supplier and they could not finish it. Also supplier representative mentions that resource problems may arise easily at least while working with new partners. This is mostly dependent on different operation practices and poor information sharing which refers to misunderstandings. Suppliers may think that they are capable for inquired delivery but if they have no earlier experience on such, it may happen that their resources are not sufficient. When starting from very beginning with some new supplier, it may happen that there is loads of work to be performed in the beginning. In some cases it would be even more reasonable to pay some more for some old supplier to ensure desirable performance. It is said by one supplier that one usually feels it

already at the very beginning of co-operation if everything is not going fluently with the new partners. In these cases it is sometimes better to choose another business partner already. In opinion of supplier representative the companies that have had a long history together and that know the practices of each other from the earlier shared experiences, are the easiest ones to choose for co-operation over and again.

4.2.3 Visible actions and post-purchase phase

After the selection, the 3rd step in Lindberg & Nordin (2008) research was implementing the agreement. In practice, this means delivering the products and building the facilities. This part did not actually take a long time at all. Many of the interviewees told that when you get so far that the construction will be started, the project will be ready quite quickly. Of course this requires good preparations. One of the case-interviewees mentions that if he could change something in the way the project was carried out, he would plan it more carefully and more in detail. Some missing points in the plans backfired and repairs were surprisingly expensive.

The last phase of the process of Lindberg & Nordin (2008) is monitoring the process, in other words evaluating the results and operational development. I call this a post-purchase phase in which all the companies are evaluating the results and doing development of processes and activities. This phase also includes possible service contracts which are usually made with the equipment supplier. Traditionally the maintenance services have been arranged so, that the supplier offers service hours (Adams & Yellen, 1975). So there has been a fixed price for hour. Now the orientations seem to be more and more on service contracts that serve a maximum level of downturn. Case companies have made contracts with minimum downturn levels. The service provider agrees to keep these levels and deviations as otherwise there will appear sanctions for the provider. Interestingly, I found out that the companies seemed to trust much on the warranty services that equipment suppliers offered to them. Many of the interviewees said that the service will be arranged by the equipment manufacturer for the warranty period and after that many of them did not have a certain plan for the maintenance. Presumably the

manufacturer's warranty, however, does not cover all the possibly needed service functions.

Also according to Samli, et al. (1992) there is a post-sale part in the process where the aim is to keep the purchaser satisfied with the supplied solution. This part includes, for example, services that guarantee customer's trouble-free operations. This was actually not mentioned very important among the case-companies, which a bit surprising. It could be explained so that among the most cases the companies these activities were not believed to be even possible to be purchased in Finland. This view was also supported by many case interviewees. The purchasers mainly trusted on (at least) equipment suppliers' warranty services after the solution delivery, which the suppliers may experience problematic as it is not covering all potential problems. It should be taken into account whether the customer is allowed to have the maintenance after the warranty period has elapsed.

4.3 Solution purchases divided in parts

When starting the research, it was thought that there would be found some industrial factories which have been purchased as wholly integrated solutions. In other words, that there would be one sole company behind the whole solution delivery. However, after analyzing the interviews and discussions with the experts it was revealed that those actual solutions that first were under exploration did not exist in that form. Not at least in Finland or even in European Union as far as case companies` representatives` views were considered. Nevertheless, I ended up into such a conclusion that even the solutions in their purest form entail more than one supplier. Hence, I decided to discover in which kinds of parts these case solutions are purchased in. Figure 7 shows a synthesis of different parts that were purchased inside a solution purchase.

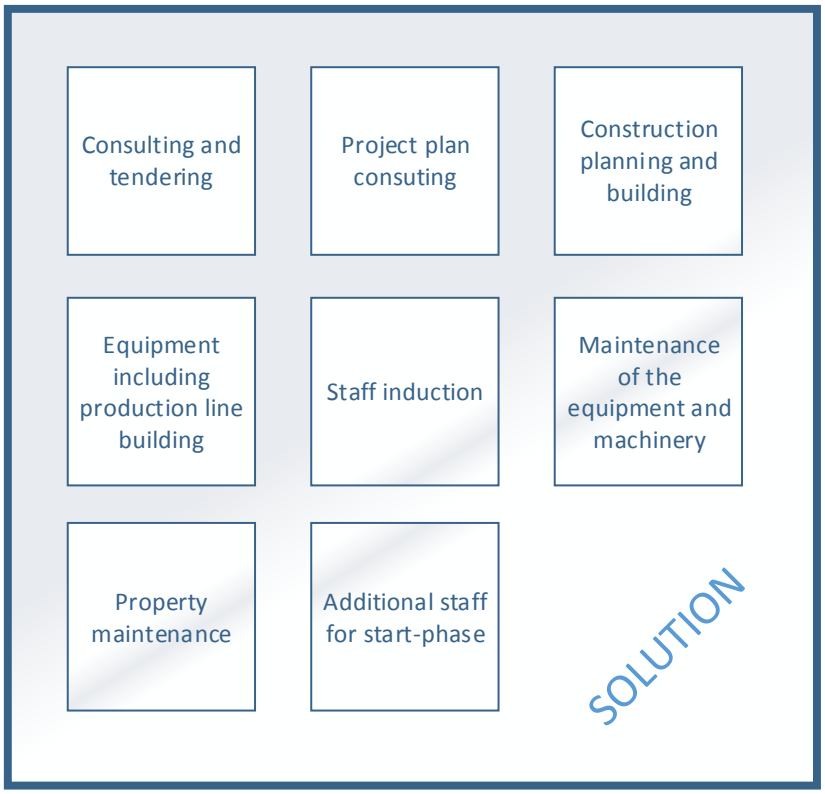

Figure 7 Industrial solution purchase divided into components

Normally the “status” that in the literature had been settled for a solution supplier was given for a purchaser company’s internal project organization. This organization was built to ensure that all the parts of the upcoming facilities are going to be built on time, that they will fit together and that all the suppliers and procurement teams are working seamlessly towards the common end result. The role of the project organization was also to keep everyone in the organization aware of the ongoing activities of the process and to take care of the organizational practices so that they will be updated with the new standards in relation to the solution.

Several different parts were purchased separately by different case-companies to form a solution package. Consulting was often utilized in solution purchases, mainly for various forms of planning. In four out of six cases, consulting was used in order to support own business. Consultancy was usually bought in early phases of the purchasing process to acquire additional knowledge and expertise in designing of the whole process, technical planning, construction planning and also for tendering of possible suppliers. Consulting was felt to be useful and to offer certain

security while the own organization did not have enough expertise on a certain area. Also lacking resources were mentioned as one reason to use outside consultancy. Project companies did not have enough personnel to move necessary people to work for the project when building up the new solution purchasing. Firms that chose not to use any outside consultancy mentioned their own professional experience compared to outside experience to be the main reason to choose a purely in-house project team. They had knowledge and experience of these kinds of purchases from the earlier projects and they felt that consultancy was, thus, not needed. Some of the case-companies had queried several consultants to offer different visions and alternative solutions. Any ready-made models or frames were not specified to the consultants but free hands were given to them to create different varieties of solutions.

Construction planning and building were mainly purchased as a turnkey-package both from the same supplier. In two of the cases, a suitable, existing building was found for the business and there occurred need for only little modifications. Usually the company had one main contractor or acted itself, typically by setting an internal unit as a coordinator or integrator of the project. This main contractor was first selected through a competitive process and then the main contractor chose its subcontractors. Main criterion for the construction companies were resources and exact expertise, price and quality, as well as functioning of the offered solution.

Equipment was all purchased from the same supplier in one case, but mainly every device was set under a competitive bidding and purchased from various suppliers. This was purely due to that all the needed equipment was not even assumed to be acquired from one supplier only. One of the case-companies had been willing to purchase all the equipment from one single supplier but the calculations showed it to be unprofitable as a whole. Some companies mentioned they have their long-term credit suppliers who they trust first in equipment purchases. Automation had a vast role in these cases and the purchasers felt that automation equipment suppliers mostly had the most experience of installations, set up and personnel orientation. Consequently, also the consulting was assumed to be carried out by the supplier. This is a complicated case from the suppliers` points of

views since they are probably not getting significant additional incomes from the consulting. Also equipment maintenance was usually not yet purchased but the companies trusted the suppliers` warranties to cover all the needed maintenance. This may be problematic because supplier warranty does not necessarily include all the equipment maintenance.

Property maintenance was entirely outsourced in the majority of the cases. Companies usually had one sole operator taking care of property maintenance, cleaning, up keeping and even waste disposal. It is beneficial while operating with one large operator; especially if the company has many different factory locations. Big operators usually have a nationwide network. It may also be financially beneficial to have a large contract; services are produced congruently and effectively anyplace. These agreements usually also cover service management and development. Two of the companies had chosen to outsource only a part of their property maintenance. They mentioned it is possible to perform needed property maintenance along with other work and to use own personnel for it. Additional staff was in many cases needed in the start-up phase in which the manpower resources are relatively scarce. These personnel were most likely purchased from staffing companies. This resulted in a slight downturn in production start-up phase, which was foreseen.

4.4 Solution supporters and non-supporters

In the current solutions literature, some anti-solution attitudes were noticed as well. For example in study of Lindberg & Nordin (2008) the interviewees mentioned that they would more likely buy separated services instead of integrated solutions because they did not want to end up in an alliance with one supplier. It was seen expensive to get into long-term alliance relationship and to get dependent on one certain supplier. In these six case studies the reason why not to purchase integrated solutions was not exactly scariness of ending up into alliance. It was, roughly speaking, suspicions of getting cheated while purchasing a package. This is linked to difficulties in solutions purchasing, while the transparency in integrated solutions is not good enough. An experienced purchaser says: *"…at least in the*

construction area, where the most turnkey –solutions are offered, you need to be very careful".

The companies had a plan of a solution, and they found component suppliers for it. Different cases had different component and different amount of suppliers, but in most of the cases the suppliers and the purchaser were strongly related by having a project team or project organization including members from all the parties. Mostly the biggest "solution in solution" was construction and building, which were commonly supplied from one, same supplier.

As said before, all the interviewees answered that such a solution including all the necessary pieces from building and planning all the way to equipment and maintenance services did not exist. Or at least they were not aware of it if some supplier offered such a comprehensive offering. While these kind of "perfect" solutions were not available, companies were trying to centralize purchases to reduce the amount of suppliers. For example the construction planning and construction including the material were mostly purchased from the same supplier. On the other way, many of the case-company representatives mentioned that if there would be a chance to purchase a solution that includes all, they would not do it. Why are they thinking so? Main reason for why not even considering a solution as an option was that the purchasers did not see it would not fully meet the needs of their required outcome. Requirements are easy to identify, but how are they interpreted, it is a core competence from purchasing company. "*Effective and efficient, high-quality processes may only be achieved through using our own know-how",* mentioned one of the interviewees. One of the interviewees said that they have seen cases where the turnkey-solution providers are searching for the cheapest material solutions. This might make the purchaser happy for a while, but many of the purchasers do not understand that the loss will arise later in operational costs. It is typical that the turnkey suppliers or constructors have not enough knowledge of end-users' needs. So the solutions are not sufficiently adapted for the needs. Such deficiencies will bring disadvantage for many years to come.

Not only negative attitudes towards solutions were presented, though. Couple of interviewees mentioned that they would have been ready to purchase all the equipment from a same supplier but the costs were too high. They thought it would have been a very easy and careless solution from purchaser point of view because one actor would take responsibility over many operations. On their opinion, the additional cost that appeared while moving the risk and responsibility for the solution provider, increased too much. According to calculations, one company had found out there came 1/3 more that in solution price tag while moving the risk to supplier.

4.5 Difficulties in solutions purchases

According to Sawhney (2006), one of the risks while moving to solutions business, is related to qualifications and competences of the supplier organization. Many of the interviewees mention this. Suppliers do not have enough expertise from their industry and needs of the particular business facilities. Depending on this, in many cases for example planning of activities could not have been thought to be outsourced to an outside party.

Interviewees mentioned many different difficulties in accordance to integrated solutions purchases. One of the most challenging phases was acquisition of different kind of reliable initial data. Companies needed to estimate the upcoming air consumption, electricity consumption, determine a required air ventilation and for example to determine the required height of the building. All these data were then dependent on the upcoming equipment. These data were mainly collected with the assistance of consultants, for example HPAC-experts. In case such a work was accelerated, corrections needed to be made afterwards which, of course, caused significant costs to the purchaser.

Numerous difficulties were also mentioned in connection to changing from old traditional operating models to new ones. In solution purchases which are compensatory in nature, it is usual that the whole operation model needs to be changed. Learning a new model requires time and resources, possibly studying and making mistakes to learn. Big and compact modern industrial facilities usually include a

massive amount of information technology and automation. It is good to realize the upcoming challenges already before the project start, this way also the personnel may be educated before the factory needs to be running.

One of the companies had problems with authorization procedure. People living near the upcoming facilities were complaining about everything. Attitude towards new things may sometimes prolong solution process. In another case the in-time completion of the building was very critical and delay would have led to major problems. In this kind of cases it is very important to ensure the authorization issues at an early stage. Some contractors had their own economic issues and it made purchaser think and worry about someone going to have a bankruptcy. Economic situation was good and purchasers got good offers with quite low prices. But even though Finland is a part of European Union, economic situation may change very quickly. Also another interviewee mentioned that they had some problems with contractors. Some of them had resource challenges. The resources that were promised in agreement were not available in practice. Therefore, the supplier network needs to be at the right level in terms of quality.

All the interviewees mentioned that while the project is large, it is extremely demanding to get everything work seamlessly together. There are many different factors such as suppliers, contractors and designers. The interviewees emphasize the important role of the project management. According to literature, managers have seen integrating as a negative thing, because they believe that it destroys the transparency in offering and the costs. In case-interviews this was seen as a central problem as well. At least in construction, when all the responsibilities have been given to a certain supplier, the transparency was seen as a problem. One of the interviewees mentioned that the purchaser needs to be very experienced to avoid the extra pricing in construction purchases. They had experiences of companies that buy the cheapest construction materials and still charging a premium-price of it. Some of the interviewees mentioned that they had calculated 1/3 cheaper price for the solution than they got from the supplier. They were trying to inquire for specifications that were not available so they decided to pack up the solution by themselves.

4.6 Valued elements

Often the difficulties appear when everything seems to be already clear and the signatures in purchasing contract are the only missing parts. This difficulty may involve, for example, that someone realizes that some of the important facts still needs to be agreed: the sharing of responsibilities or other essential point which the parties cannot agree. “Who pays the costs when things go wrong?” Two of the interviewees mentioned the importance of this that all the responsibilities need to be very clearly defined from the very beginning. Even the percentages of who pays for what if any problem occurs and the additional costs will arise.

While willing to move from basic offering to more complex solutions, Penttinen & Palmer (2007) advice companies to move from transactional interaction to more interactive relations. I could notice this in a way how the most experienced companies were striving to get in their relationships with suppliers. The purchasing company was continually in close interaction with the suppliers. They were arranging weekly status meetings between the purchaser and all the suppliers. Meetings were continued after the project was complicated by communication how the project was managed and how the practices could be improved to be even more efficient. This was seen beneficial for both the purchaser and supplier while thinking about future implementation in the following projects. Such information exchange between the operators increased confidence and trust.

Guenzi, et al. (2009) are focusing on sales personnel’s action on building trust. If the sales person interacts consistently with respect to customer orientation, it is more expected to get the trust of purchaser’s representatives. Focusing on concentrating on sales result only will reduced gain of trust. Seller companies should see the possible benefits that will be achieved by creating trust between the persons as well as the companies. They should refrain from the pursuit of profit for a moment and focus on customer needs 100-percentally.Of course we will never get rid of the fact that the objectives in business are always in producing profits. But it should, at least in solution cases, be set a bit backwards.

Interviewees mention that they cannot always trust in a word of suppliers. The biggest problem seems to appear on pricing and its transparency. Hallikas, et al.(2014) have noticed managers see the bundling of services as a negative thing because it destroys the transparency, both in offering and costs. This may be seen in interviewees' comments, even though the questions are not concerning services, purely. They do not trust in pricing and the risk what is transferred to the supplier is priced too high. One of the interviewees mentions that this is a real problem. The suppliers put a lot of extra price in their solutions (in this case concerning overall responsibility for the construction contract). *"You need to be very experienced in construction industry to see what you are really paying for".* The interviewee mentions that they have a feeling that the solution suppliers are trying to find the cheapest components, at the expense of quality, and still keeping the prices as they had premium quality. Another interviewee was disappointed while they had calculated the overcoming costs by themselves. They had find lot cheaper options to carry out the solutions themselves, by buying different parts of the solution separately. In this case the company decided to act as an integrator themselves, since they did not get any clear definition for differing price calculations.

The interviewees mention, that there seems to be a lot of "air" in the sellers' prices. This means, that they feel they pay of something they won't get. It seems that a lack of trust is the largest problem that limits the effectiveness in purchasing of industrial solutions. It would be important to get all the parties (mostly customer and supplier) to understand and accept that they are pushing for mutual benefits. The parties should be able to trust that none of them is trying to get benefit unilaterally. It is inconceivable, that even when the both parties are aware of the fact that cooperation has a major impact on the outcome. Not only financially, but also by other aspects such as accuracy and productivity.

Mikkonen et al. (2008) mention in their article, that the moving from cost-based thinking in providers end would probably easiest begin from concentrating more in taking partners more deeply into the value creation system of the provider. Would this be the way to solve the problem of lacking trust? Earlier the focus has been on

how to get the customers trust on the seller. Possibly this could be thought vice versa by considering ways how to make the sellers trust on their customers. By this I mean that the providers should take their customers as parts of their value creation process. It raises a question whether this could ever be possible and leads, again, to the importance of trust between the business parties.

From a supplier point of view we may get similar responses in accordance to trust between the supplier and purchaser. It may be possible that chemistry between key people is incompatible which makes operating impossible or at least complicates it. For example researches of Prior (2013) and Stinnett (2009, p. 7) support this aspect on value creating where intangible value assets should receive more attention. Supplier representative mentions that in their opinion the most important value creating aspects are trust Intangible value assets such as social issues may also be clearly seen on purchasers' actons. Many of the interviewees mention that there were already known people working on the project from the side of supplier organization. It made the information exchange easier while the contact persons were already known. According to the supplier: *"Companies that have had a long business relationship together and who know the practices et cetera are the best ones".* If there become new companies to co-operate with, it could easily occur that operating practices will not fit together seamlessly. It is extremely significant to have vast mutual trust between the partners, which also refers to another critical factor: supply reliability.

5 CONCLUSIONS

First observation when analyzing the current solutions literature was scarcity of research on the field of customer/ purchaser view as well as purchasing practises in solution business. Consequently it appeared to be worth further studying since customer needs and mutual understanding between the business parties is significantly critical in order to succeed in solution business. In summary, the essential aim of this thesis work was to broaden knowledge on solution purchaser's point of view regarding the solution business. It is carried out by offering observed, case-company -derived common practises in the area of industrial solution purchasing process as well as critical points affecting the purchase's success. Purchaser view is also disclosed by concentrating on the value creators in solution supplies from the customer point of view.

What are the parts of industrial solutions purchasing process?

All the purchasing processes seem to follow a rather similar development path as they tend to begin with the appearance of business need. This demand is usually noticed in companies' business departments such as logistics department or for example in purchasing department. Business need works as a premise for purchasing process' start. The appearance of a need is followed by the pre- survey of potential opportunities. Solutions suppliers are usually operating as an integrator of the whole project in the integrated solutions literature, but in practise it seems that this role is actually given to purchaser's internal project organization. It has the main responsibility to ensure that the project proceeds as planned and to keep all the parties aware of its progression through sufficient informing. One of the key challenges in solution business is related to evaluating how to make all the company business units and organization levels to operate seamlessly together. Thus, in this context a well-functioning project organization stands for the main factor as far as successful solutions integration is considered.

The initial planning phase usually requires the most of the time in the purchasing process. However, this phase is often held as the most critical part of the whole

process. Consequently advancing too rapidly without proper preparing procedures may be risky. In other words planning activities made in too rush may enable back-firing later during the process or after start-up, which usually creates large additional costs. It is beneficial to note that there occurs usually a need for external experts. In this kind of purchases, the need often appears in technical and construction design. Consultants may also be utilized for process planning and supplier bidding processes. Selection process includes many rounds and normally the price is the main decisive factor in the end. In case there are some special requirements, particularly with regard to the authorities, the significance of the price as a decisive factor will decrease. Companies use main contractors or work themselves as integrators for the project or project parts. There are typically many subcontractors under the authority of the chosen contractor. The average duration of these sorts of solutions purchasing processes is about two years and varies from one to four years depending on the available size and time in use. Sometimes it is necessary to hurry when the need arises later or even at the last moment. The controlling and post-procurement phase includes for instance measuring the plant performance, the success of the acquisition and the attainment of the objectives. This is especially important for the success of the possible future purchases. Solution purchases appear to comply with the companies' general purchasing policy and only occur in a larger scale.

What are the possibilities while purchasing integrated solutions and what are the difficulties? How to solve them?

It seems to be particularly challenging to find transparent and clear solution offerings from solution suppliers. In large projects, all the parts of the upcoming solution purchase need to be clarified, seen clearly and specified to be aware of what the solution consists of. Some purchasers felt themselves insecure regarding the aspect of solution pricing and its accuracy. Customers are looking for more value for their investment than solution suppliers often can deliver at the moment. Interestingly this leads to such outcome that most of the purchasers end up in integrating products and services themselves instead of acquiring the whole, already fin-

ished total solutions. Hence, purchasers seldom give preference for turnkey solutions or others similar ready solution packages.

One of the most obvious challenges and simultaneously most dominant cause of confusion on solution business area can be expressed as “how to find the customer’s actual need”. Customers and suppliers even less, are often not totally aware of the real needs that need to be fulfilled. One solution for this dilemma could be emphasizing such a view that focuses more on intangible resources such as knowledge and through regarding the business parties more as resources than targets. Unfortunately according to the study outcomes, quite often this is not the case at the moment. Furthermore, reciprocal actions and mutual trust are also seen as a basic base for closer co-operation and fostering companies towards closer understanding on their parties’ true needs. On the other hand resource lacks and challenges are often experienced in solution purchases. These may arise for example in economic affairs or employee affairs. Suppliers can gain experience in large supplies and they should become more and more aware of the flexibility that may be needed during the process. Resources need to be flexible ny their nature and suppliers should be ready for rapid movements during the projects lifetime.

It should be always kept in mind that the solutions purchase is a large investment that will be affecting to company activities for several years. While making purchasing decisions, a cheaper option may feel more attractive at that moment. However, in long-term this choice may bring additional costs compared to such an option that would have cost more in the initial stage of the process. Also if the solution does not work optimally as some exceptions, for instance in production are constantly made, plenty of additional costs may occur during the solution’s whole lifetime.

How is the value created in solution business?

There is a lot of variance in the levels of the value production. In these case-companies the created added value appears to be based mainly on the value derived from a product. In literature, advanced levels of value creation, such as rela-

tionship-based value, represent the forms that usually outline the base for solution success. Therefore can be summed up that there still clearly remains room for improvement among value generation models of these six case-companies.

Managers should remember that employees form one of the main assets of the company when moving towards solutions business. Companies could consider such an approach, in which the products would not be in the main focus. Instead, the services included in the solutions would be utilized more efficiently to fulfill the clients' needs. Consequently products would support services in this aim. This is in line with this study's findings as I noticed that some industrial suppliers shared similar experiences and thoughts in this context. To sum up these observations, the product should not be the sole objective offered by the supplier. Also a selling process is suggested to be restructured accordingly. Nowadays the selling- and purchasing process often begins from the need of a certain product, whether it is a computer or a whole industrial plant. This could be turned another way; what would be a process or service with which a customers could fulfill their needs and on the other hand, what are the products to be added to the process to facilitate a customer's ability to achieve the optimal outcome? The mission of the supplier should not be generating a profitable and functioning product but rather to enable and help the customers to maximize all their processes and actions as well as strategies linked to them. The true value is created in the process where the goals and needs that are placed for the purchase, will be fulfilled. Value creation is carried out in the customer's process via their use of service.

In summary, in order to be able to exploit solutions as well as possible and meanwhile to generate added value also from the services included in the solution, it is crucial to maintain good supplier relationships.

"We are similarly human beings serving each other through exchange for mutual wellbeing". **Value is always co-created.** [2]

[2] Philosopher Plato / Vargo & Lusch (2011)

5.1 Potential topics for further research

It would be interesting to have a further research from the same perspective but by studying more accurately certain topics such as for example customer needs. As many informative findings were discovered and various points were found out based on the outcomes of this study and since customer/ purchaser's view is rarely presented in current solution research, it would be worth conducting a quantitative questionnaire including the significant factors found in this research work. The questionnaire could be made with a large sample, probably combining interviewees from the same sector, but from different countries. One possible reason for the scarcity of larger solution investments could have something to do with the economical condition of the whole industry and/or companies. Thus, such a perspective that takes economical factors into account more dominantly could be worth further examining. Case-interviewees also mentioned that it is not yet possible to purchase the whole plant from the same supplier in Finland. It would have been fascinating to find out what is the situation in solution offerings in other countries. When taking this idea into deeper level, I would suggest conducting a similar study with all the case-companies operating in the same industry as now the case-companies represented different industries.

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APPENDIX 1 / 2

INTERVIEW QUESTIONS FOR PURCHASERS

1. *What was the triggering factor for this purchasing process?*
2. *How does the purchasing of new plant start?*
3. *How does it move ahead until the facilities are in use?*
4. *How to ensure there will be no production interruptions?*
5. *How are you developing operations in the plant?*
6. *What is particularly difficult in purchasing of such an entity? How could these difficulties be solved?*
7. *How do you feel you have succeeded in purchasing of this entity? Why?*
8. *How can the success be measured/ assessed?*
9. *What are the key factors that contribute to the success of the purchase?*
10. *Have you always purchased production facilities in this way? What has changed? Why has it changed?*
11. *How would you like to purchase in the future? What would be the ideal way? Is any supplier providing this kind of offering?*
12. *Is any supplier providing plant production on "turnkey" -basis? Would you be willing to purchase facilities this way? Why/ Why not?*
13. *What are the advantages that would be achieved by purchasing turnkey –solutions? What about the potential problems?*
14. *If you would not purchase a complete turnkey solution, what kind of sub-entities would you obtain?*
15. *Was this purchase (particular purchasing project) somehow differing from the other purchasing actions made in your company?*

SPECIFYING QUESTIONS

Identifying the need and determination of required capacity:

1. *What defuses the purchasing process design? / How did it start?*
2. *How to define the capacity requirements for new facilities? Sales forecasts/ sensitivity analyses? Who makes them?*

Manufacturing process design:

1. *How is the process design done? By whom? How? E-mails/ documentation etc.?*
2. *Do you use designers from outside your company? Who? /Why? What are the benefits? What are the problems?*
3. *How clearly do you define in advance, what you want from the designer? How was it realized?*
4. *How is the designer choice made if outside help is used?*
5. *How has the supplier described its service process?*
6. *What kinds of relations do you have on this operator?*

In case the company has purchased following services/ products: How does the purchase of --------- differ from the purchasing of process design discussed earlier?*

*Machinery and equipment

*Installing / assembly of a production line / machines

*Construction planning

*Construction

*Equipment maintenance

*Real estate management

*Development of the production process

APPENDIX 2 / 2

INTERVIEW QUESTIONS FOR SUPPLIER

1. *How do you see the purchasing process of your customers? Is it compatible with your selling process? What would you improve if they are not compatible?*
2. *How do you see your relationship with customers? Where do you see the biggest difficulties in cooperation and what do you feel is uncomplicated?*
3. *What brings value for you as a supplier in cooperating with your customers?*