

LAPPEENRANTA UNIVERSITY OF TECHNOLOGY

School of Business and Management

Master's Programme in International Marketing Management (MIMM)

**MASTER'S THESIS**

CUSTOMER PERCEIVED VALUE OF THE INTELLIGENT EQUIPMENT MANAGEMENT  
SOLUTION IN CONSTRUCTION INDUSTRY

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2016

## ABSTRACT

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Title:	Customer perceived value of the intelligent equipment management solution in construction industry
Faculty:	School of Business and Management
Master's Programme:	International Marketing Management
Year:	2017
Master's Thesis:	Lappeenranta University of Technology, 81 pages, 5 figures, 5 tables, 1 appendix
Examiners:	Professor Sanna-Katriina Asikainen Associate Professor Joonas Keränen
Keywords:	customer perceived value, business intelligence solutions, value proposition, value creating elements, value creating attributes, value map

During past decades, the customer perceived value has been widely examined. Nevertheless, customer perceived value in the context of construction industry has barely been examined among academics. Therefore, the aim of the thesis is to examine how customers and sales representatives perceive the value of the intelligent equipment management solutions in construction industry and if there are any similarities or differences in perceptions. The empirical part is executed as an embedded single case study through interviewing five sales representatives and five case customers of intelligent equipment management solution supplier from the Finnish construction industry. Based on previous literature of customer perceived value, benefits, sacrifices and value creating elements were fairly similar with any solution, business intelligence solutions and in solutions in construction industry. The findings of the thesis indicate that perceived benefits of customers' and sales representatives' of intelligent equipment management solution supplier were fairly similar, however the perceived sacrifices vary. The most remarkable finding was the leverage and influence of internal implementation on customer perceived value. All interviewed customers had faced struggling with internal implementation of intelligent equipment management solution and customers, who currently were struggling with internal implementation, were not satisfied with the solution. The findings suggest that customer perceived value in the context of construction industry requires more support and communication, especially in internal implementation, than previous literature states.

## TIIVISTELMÄ

Tekijä:	Suvi Hörkkö
Otsikko:	Asiakkaiden kokema arvo älykkästä kaluston hallinta ratkaisusta rakennusalalla
Tiedekunta:	School of Business and Management
Maisteriohjelma:	Kansainvälinen markkinointi
Vuosi:	2017
Pro Gradu-tutkielma:	Lappeenrannan teknillinen yliopisto, 81 sivua, 5 kuvaa, 5 taulukkoa, 1 liite
Tarkastajat:	Professori Sanna-Katriina Asikainen Tutkijaopettaja Joonas Keränen
Hakusanat:	asiakkaiden kokema arvo, liiketoimintatiedon hallinta ratkaisu, arvolupaus, arvon muodostus, arvoajurit, arvokartta

Viime vuosikymmenien aikana asiakkaiden kokemaa arvoa on tutkittu laajasti. Tutkijat eivät kuitenkaan ole juuri käsitelleet asiakkaiden kokemaa arvoa rakennusalan kontekstissa. Näin ollen, tämän Pro Gradu –tutkielman tavoite on tutkia miten asiakkaat ja myyntiedustajat kokevat älykkäiden kalustonhallinta ratkaisuiden arvon rakennusteollisuuden kontekstissa ja onko kokemusten välillä samankaltaisuuksia tai eroja. Empiria on toteutettu suljettuna yhden case-yrityksen tutkimuksena, haastatteleamalla älykkään kalustonhallinta ratkaisun viittä myyntiedustajaa sekä viittä asiakasta, jotka työskentelevät rakennusalalla Suomessa. Pohjautuen aiempaan kirjallisuuteen asiakkaiden kokemasta arvosta hyödyt, haitat sekä arvonmuodostajat olivat melko samat ratkaisu kirjallisuudessa yleensä, liiketoimintatiedon hallinta ratkaisussa kuin rakennusteollisuuden ratkaisuisissa. Tutkielman tulokset osoittavat, että asiakkaiden ja myyntiedustajien kokemat hyödyt älykkästä kalustonhallintaratkaisusta olivat melko samanlaiset, vaikkakin koetut haitat vaihtelivat. Merkittävin löytö oli sisäisen implementoinnin vipuvoima ja merkitys asiakkaiden kokemuksessa arvosta. Kaikki haastatellut asiakkaat oli kokeneet haasteita älykkään kalustonhallintaratkaisun sisäisen implementoinnin kanssa. Asiakkaat, joilla haastattelun hetkellä oli haasteita sisäisen implementoinnin kanssa, eivät olleet tyytyväisiä ratkaisuun. Tulosten mukaan asiakkaiden kokema arvo rakennusteollisuuden kontekstissa vaatii enemmän tukea ja kommunikointia erityisesti sisäisessä implementoinnissa kuin aiempi kirjallisuus antaa ymmärtää.

## **ACKNOWLEDGEMENTS**

One journey has come to an end. Even though I am truly delighted about accomplishment with thesis, I have to admit that finishing one important chapter of my life causes a bit mixed feelings. Past years at LUT have been more than words could even describe. I want to thank everyone who has been sharing these years with me and made my years in university memorable, thank you! Special thanks goes to my dearest girls, who have been sharing every laugh and struggle with me since very first days at LUT. I reckon, degree was not the only everlasting thing LUT gave me.

Now, it is my time to address my greatest thanks to all guidance and help I have received during thesis project. First, I want to thank Joonas Keränen for interest towards my thesis project. All help and guidance I have received has been irreplaceable. Moreover, my gratitude goes to case company, who made this project possible. Thank you for finding time from your busy schedules on supporting and mentoring me during thesis project.

Thereafter, I indicate my warm thanks to all ten interviewees who decided to invest their time on this project and share their perspectives. It actually surprised me how willing all interviewees were to share their perceptions and opinions about researcher topic. I truly wish the findings of my thesis would be implemented on your utility.

Final thanks goes to my friends and family, who made this possible with their constant support, caring and understanding. Very special thanks goes to my loved one, who has been there when I have been struggling. Thank you for believing in me when I don't.

They say, when one journey ends, the other one begins. Although I feel little sad ending this journey, I have to admit that I cannot wait what future holds and I am more than ready for new challenges.

Lappeenranta, 15.5.2017

Suvi Hörkkö

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## 1. INTRODUCTION

### 1.1. Background of the study

Every organisation considers how their customer perceive value of their offering. If not, they hardly can assume that they would understand their customer needs, values and desires. Understanding customer perceived value has been in interest of academic and organizations for decades and thus, it has been examined from many perspectives (Macdonald et al., 2011). Nevertheless, there remains broad uncertainty considering customer perceived value in context of intelligent equipment management solution in construction industry as topic is barely examined.

Equipment management has risen as an attracting topic in construction industry, which is currently on everyone's mouth (Peiffer, 2017). Due to digitalization even in more traditional industries, like construction, are desired to take step towards serve their customer better and more comprehensively. Construction industry, mostly considered as product-focused industry, has diffuse their business on intelligent equipment management solutions. When seizing completely novel market it is reasonable to discover what kind of value customer perceived of intelligent equipment management solution solutions. Organizations in construction industry are highly interested about customer perceived value of intelligent equipment solutions as the topic is novel and the market does not have plenty of competition yet. Thus, organizations have increasing will to understand customer perceived needs, benefits, sacrifices and desires of intelligent equipment management solutions.

In order to understand are sales representatives and supplier representatives perceived values of supplier company offering same companies in construction industry requires wider aspect on perceived customer of intelligent equipment management. Thus it is relevant to examine how sales representatives of supplier company perceive value of intelligent equipment solutions in construction industry. Perception of sales representatives influences radically on perception of customer. Mainela & Ulkuniemi (2013) stated that reason for that is that supplier company representatives are the basis of customer perceived value as they are one creating the value. Thus examining perceived value of customers and supplier representatives about intelligent equipment management solution is justified. Comparing presents are perceptions parallel and does supplier company understand customer perceived value of equipment management solution in context of construction industry.

Business intelligence solutions are more complex than product or services. Thus, it is presumable that complexity of intelligent equipment management solutions influences also on customer perceived value. Hence, customer perceived value of intelligent equipment management solutions leaves wide uncertainty in academic literature. Thus it is relevant to provide novel aspect for customer perceived value by intelligent equipment management solution in the context of construction industry.

The intelligent equipment management solutions are recognised as highly substantive for literature of customer perceived value as its currently novel and attracting topic, which has remained barely unexamined. Although the topic is novel in construction industry, many of product-focused companies have made investment on intelligent equipment management solutions as customers in construction industry has need and competition is just beginning in market. Meanwhile academics aim to understand customer perceived value of equipment management solution in context of construction industry, managers of in construction industry work to try to understand what customer value, need and desire from intelligent equipment management solutions. As the topic is attractive organizations in construction industry requires recommendations based on empirical studies what kind of value customer perceive from intelligent equipment management solutions. Information has serious impact on gaining competitive advantage.

## **1.2. The goal of the research and research questions**

Yet barely any academic literature of customer perceived value has not examined customer perceived value in context of intelligent equipment management solution in construction industry. This research will substantiate existing academic literature of customer perceived value of solutions and business intelligence solutions and customer perceived value in construction industry. The purpose of this study is to examine perceived value of customers' and sales representatives' of the equipment management solution in construction industry and thus deliver valuable information for academic and managers.

Equipment management in construction industry is currently a hot topic, which offers new business opportunities for industry to seize on (Peiffer, 2017). Intelligent and digital equipment management solutions are relatively novel in construction industry and thus the perceived value of intelligent equipment management solutions has not been widely researched. In fact, customer perceived value of intelligent equipment management solutions leaves wide uncertainty in literature.

The purpose of this research is to provide novel information and understanding for academics and managers about customer perceived value of the intelligent equipment management solution and compare is there any differences in perceived value within perceptions of customers and representatives. Firstly, research aims to achieve further comprehension of equipment management needs according customer and supplier company representatives in order to understand what customers need from equipment management. Secondly, case company's intelligent equipment management solution calls for wider understanding of customer perceived value. As the perceived value is combination of benefits and sacrifices both aspects will be discussed in the point of view of customer and supplier company representatives (Woodall, 2013). To understand perceived benefits of the intelligent equipment management solutions more comprehensive the solution gain creators and pain relievers will be including on research (Osterwalder et. al., 2014).

Thirdly, in order to gain deeper understanding what could be done better with customer perceived value of the business intelligence solution, the desired customer perceived value of the business intelligence solution will be discussed. Thus the desired gain creators and pain reliever will be examining on perception of equipment management. Finally, differences and similarities will be summarizing in order to conclude were there fit between perceptions of customers and supplier company representatives in perceived value of the solution. This research aims to answer research questions below;

***What kind of value customers perceive from intelligent equipment management solutions in construction industry?***

Main research question is divided into three related sub-questions, which elaborate the main research questions and help in responding to the main research question. Sub-questions reflect the empirical execution of research and helps to understand the theoretical part. Therefore, sub-questions are as follow:

- 1. What kind of equipment management needs customers perceive?*
- 2. What kind of benefits and sacrifices customers perceive from intelligent equipment management solutions?*
- 3. What kind of desired value customers perceive from intelligent equipment management solutions?*

### **1.3. Literature review**

In this chapter, earlier literature of customer perceived value of business intelligence solution is discussed briefly. The purpose of literature review is to give a holistic overview of what has already been discussed about the topic in research field. After this chapter, reader should have clear understanding on what has already been researched, and why earlier presented research gap is justified.

Customer perceived value is generated from customer perception of supplier company's offering and how it responds to customer needs and goals (Graf & Maas, 2008). On general level the value is described as comparison with quality and price. Although, one should not account quality as synonym of value as if the quality of offering is not valued by customer it stays just value (Chen & Hu, 2010). In marketing literature, the most used definition for customer perceived value is trade-off between benefits and sacrifices when purchasing or using services or products (Eggert and Ulaga 2002; Lindgreen & Wynstra 2005). According Woodall (2003) benefits can be divided on service quality, strategic benefits, practical benefits, economic benefits, personal benefits and emotional benefits. Woodall (2003) divides sacrifices on monetary sacrifices and non-monetary sacrifices and thereafter non-monetary sacrifices on time, effort and risk.

Perceived value is widely examined concept and it has been researched from many perspectives. For instance, Graf & Maas (2008) examined desired perceived value, which focuses more on not yet reached desires in supplier company offering. Sweeney and Soutar (2001) included expected and experience value as part of perceived value where the value is perceived before and after purchase decision. Both of these aspects are included in this research.

In order to observe customer perceived value more closely Osterwalder et. al. (2014) presented their value proposition canvas. Value proposition canvas includes customer profile, value map and the fit. This research concentrate on the value map as it offers answers for the question of how supplier company's offering is providing value for customer. Value map divides customer perceived value on the offering of the supplier company, pain relievers and gain creators. Pain relievers define how the offering of a company is killing pains of customer and gain creators how the supplier company's offering is gaining benefits for customer.

The previous definitions and value maps of customer perceived value offer great base for customer perceived value of solution. Earlier studies on research field focus mainly on perceived value of solutions. The value creating activities and attribute of customer perceived value of solution were

discussed by Mylan (2015), Osterwalder and Pigneur (2010), Prior (2013), Stremersch et al. (2001). Stremersch (2001) stated that the most important value creating attributes of solution are improved performance and reduced costs. Mylan discovered that in order to provide significant value for customer, solutions should be easy-to-use, time-saving, low-risk and cost-effective. Osterwalder and Pigneur (2010) create value proposition building block, which describes how solution can deliver value for customer. Value proposition describes how the offering of the supplier company respond on customer needs and required problems. Osterwalder and Pigneur (2010) examined that value proposition elements creating value for customer are newness, performance, customization, “getting job done”, design, brand, price, cost reduction, risk reduction, accessibility and usability.

Like stated, customer perceived value of solution is quite multidimensional. Thus, there are many other features, which has an impact on customer perceived value of solution. For instance, Lusch et al. (2007) stated that solutions related on core products are providing more value. Hansen et al. (2008) emphasized the meaning of reputation becomes highly important with multifaceted solutions, which are intangible and value is harder to deliver for customer.

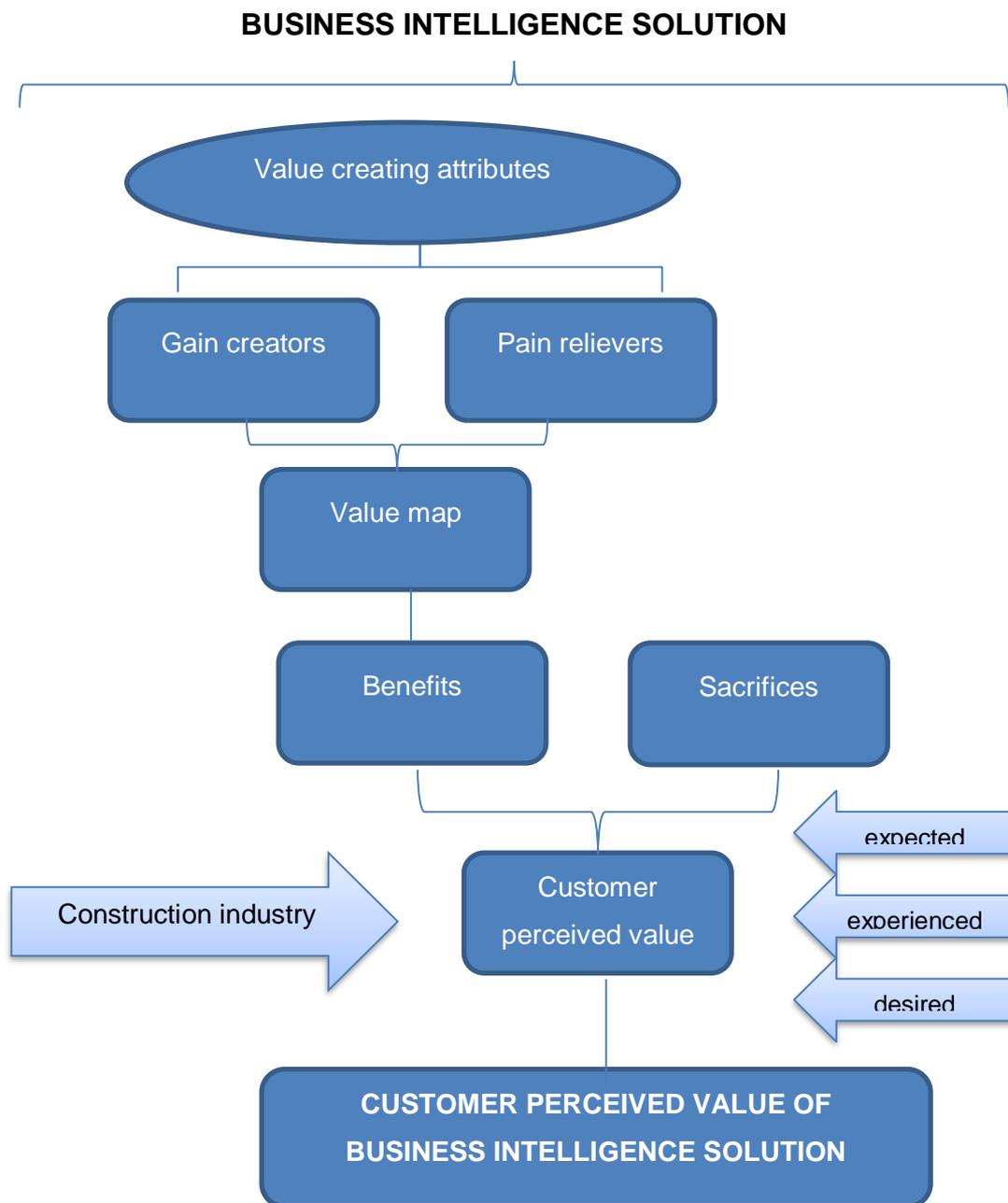
In addition, also the relationship with customer and performance of sales representatives was raised as important influencers on customer perceived value. Hakanen and Jaakkola (2012) and Jaakkola and Hakanen (2013) stated that service relationship is one of the most important factors affecting customer perceived value whereas representatives of supplier company are likewise. In fact, marketing researchers argue that supplier company’s employees are providers of the value, which is why they have one of the biggest influence on customer perceived value (Grönroos & Ravald, 2011). Human resources of supplier company are in grand role on value delivering as they are last-handedly responsible of all employees and their capability to deliver value with the solution for customer (Hansen et al., 2008).

Current academic literature has not widely examined customer perceived value of business intelligence solutions. Business intelligence solution assist customers to obtain needed information easily and efficiently and thus, improve performance of customer. BI solution enables customer quickly to understand complex and large information masses, which might be hard to handle without solution. Thus, BI solutions aims to provide better efficiency and is commonly easy to access. (Hocevar & Jaklic, 2010). Thompson (2006) found that BI solutions provide for customers quick and accurate report of required information, better decision-making, increased satisfaction, more revenues, increased cost from IT and other increased costs.

The concept of equipment management is fairly new in construction industry and not yet emphasized to a greater extent. However, equipment management is a growing field, which has great potential in Finnish construction industry markets. Furthermore, there are not sufficiently amount of previous literature about perceived value of equipment management solution. Dulaimi (2005) published one of seldom researches about customer perceived value of customer in construction industry. Dulaimi (2005) noticed that construction industry lacks understanding and orientation of customer as it has been product- and project-oriented industry for long. Correspondingly Barry & Terry (2008) stated that construction industry would require closer relationships with customer and ability to recognize customer value excessively more as industry includes lot of personal interaction, long processes and challenging environment. However, the situation has improved as growing competitiveness and increased customer expectations have become key feature in construction industry (Raftery et al., 1998). Dulaim (2005) states that companies delivering innovations has more pressures to be more proactive with customer and being customer orientate, which requires commitment of whole supplier company.

#### **1.4. Theoretical framework**

The theoretical framework defines theoretical perspectives and how perspectives are linked to the topic of thesis. The purpose is to express most important research concepts and the relationships between concepts including independent and dependent variables. The framework illustrates how the customer perceived value of business intelligence solution is build according present academic literature. Firstly, customer perceived value of business intelligence solution is divided on business intelligence solution and customer perceived value. This research focus is on customer perceived value, which is sum of expected and experienced values. Fundamentally, the customer perceived value is combination of benefits and sacrifices (2003). In order to gain deeper, understanding of benefits the value map of Osterwalder et. al. (2014) is present. Value map divides the business intelligence solution gain creator and pain reliever, which can be also desired.



**Figure 1.** Theoretical Framework: Customer perceived value of business intelligence solution

### **1.5. Delimitations**

The scope of this research limits on case company representatives and customers in Finnish construction industry. All customer companies have purchased the intelligent equipment management solution at least five months before interviewees. All interviewed customers were experienced with the intelligent equipment management solution and hence, it can be assumed that all customers have perceived value of intelligent equipment management solution.

For this research five customer companies were interviewed, which totalled fourteen interviewed customers, due to two group interviews of customer companies. In addition, the purpose of this study is to gain also internal perception about the customer perceived value in order to compare are the perception similar concerning customer perceived value of the solution within two groups. Hence, five case company representatives were interviewed to gain internal and external perception about the customer perceived value of the solution. The daily work of all interviewed case company representatives was closely related on the solution and in addition, they were all experienced with the solution.

The second delimitation is the choice of industry sector. In this research the chose industry sector is construction. Finally, the research is executed in Finland. Therefore, findings cannot be generalized in other countries than Finland. However, Nordic countries typically share same behavioural patterns and the structure of society is similar. Thus, the results might discretionary be regarded in Nordic countries. Still, it is important to notice that the results should not be generalized as the sample size is fairly small.

### **1.6. Research methodology**

A qualitative research is used in order to understand customer perceived value of business intelligence solution as phenomenon in its concept. Research uses exploratory case study method as the purpose of research is to gain deep understanding of explorative topic. Instead of finding reasons and results study aims to discover novel understanding and information on topic which is bounded compactly with context. Goal of the research methodology is to deliver deep understanding of customer perceived value by interviewing customer who are familiar with intelligent equipment management solution. In addition, customer perceived value of the intelligent equipment management solution will be compared on the perceived value of the supplier company representatives. Possible differences will also be discussed. The research methodology will be described more briefly in chapter 4.

### **1.7. Structure of the study**

The base of the thesis is combination of the two parts; theoretical part (chapter 2) and empirical part (chapters 3, 4 & 5). The first chapter of the research familiarizes reader to previous researches and the topic of this research. It also illustrates the research problem and questions and justifies the topic choice of the research. In the literature review the research gap is identified more clearly. The chapter is finished with theoretical framework, which illustrates the most important theoretical perspectives of the research.

The second chapter discusses thoroughly current academic literature of customer perceived value of intelligent equipment management solution in the construction industry. The chapter is divided into four sub-chapters; background of customer perceived value, value map of value proposition, customer perceived value in context of business intelligence solution and customer perceived value in construction industry.

The third chapter introduces the research methodology and interviewed group. After introducing the chosen case company, the fourth chapter presents finding of qualitative research. In chapter five the results are discussed thoroughly by using cross-group analysis and results are linked on theoretical chapter two. Finally, discussion, theoretical contributions and implications, limitations and proposition for future research are given in chapter six.

## **2. CUSTOMER PERCEIVED VALUE OF BUSINESS INTELLIGENCE SOLUTIONS IN THE CONSTRUCTION INDUSTRY**

In this chapter previous academic literature considering customer perceived value, customer perceived value of business intelligence solutions and customer perceived value in the construction industry will be presented. Firstly, this research deepens on background of customer perceived value in order to interpret the fundamental theory behind the phenomenon. Thereafter the chapter 2.2 will present Osterwalder et. al. (2014) value map of value proposition and how value is provided by supplier company's offering. Chapter 2.3 will present more precisely value creating attributes, elements and activities, which influence of customer perceived value of solution. Finally, chapter 2.4 disentangles customer perceived value in the chosen context of construction industry and its influence on

### **2.1. Previous literature of customer perceived value**

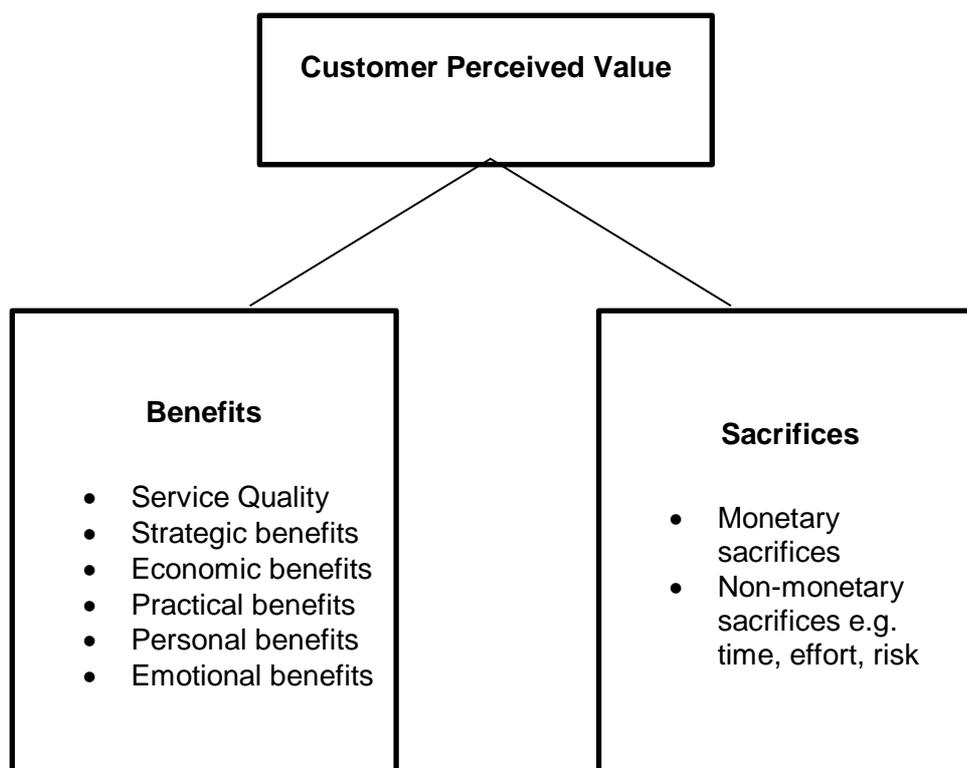
The customer perceived value has been widely researched in recent years (Macdonald et al., 2011). The customer perceived value is equivocal and broad description likewise the definition of it (Anderson and Narus, 1998). Fundamentally, the perceived value of customer can be observed from two different perspectives; customer perspective and supplier company perspective. Although in this research both, customers and supplier company representatives will be interviewed, the focus is on customer perspective, as the supplier company representatives also describe their perception about the customer perceived value of the solution. The value generates from the customer perception of supplier company's offering and how it fulfills needs and goals of the customer (Graf & Maas, 2008).

Blois (2003) defines value as comparison with quality and price (quality/price ratio in the sense of value-for-money). However, perceived value is different from perceived quality. All the products and services have quality but if customer does not value the quality, it stays just quality. If the quality is valued, it becomes value for customer (Chen & Hu, 2010). Hence, customer perceived value has more dimensions than quality has. Many researchers found quality as antecedent to customer value and customer value as an antecedent of customer satisfaction (Graf & Maas, 2008).

However, literature has generated more definitions of customer perceived value. Woodruff and Gardial (1996) define customer perceived value as a perception of customer whether he or she is accomplishing desire goal by using product or service. According Macdonald et al. (2011) how customer utilizes the product or service defines the value of it. As descriptions verify, the customer

perceived value is completely dependent on perception of customer and therefore it is important for supplier to understand customer goals and values (Ng & Yip, 2009). The most used definition of customer perceived value in marketing literature is between benefits and sacrifices, which customer purchases when purchasing or using solutions (Eggert and Ulaga 2002; Lindgreen and Wynstra 2005; Woodall, 2003).

Essentially, the customer perceived value is the combination of benefits and sacrifices. Both aspects, benefits and sacrifices, need to be considered when observing customer perceived value of the supplier company offering. According to Woodall (2003) benefits, which customer perceives as a value can be divided into service quality, strategic benefits, practical benefits, economic benefits, personal benefits and emotional benefits. In comparison Woodall (2003) divides sacrifices into monetary sacrifices and on non-monetary. Monetary sacrifices are financial costs, which are caused by invest in purchase or maintaining relationship with supplier company. Non-monetary sacrifices include time, effort and risk, which customer perceives (Huber et al., 2007; Lapierre, 2000; Woodall, 2003).



**Figure 2.** The customer perceived value frame work (based on Woodall (2003))

Many researches consider the customer perceived value as post-purchase definition ergo customer experienced value (Sweeny & Soutar 2001). However, the temporality of customer perceived value is important part of definition. The concept of the customer perceived value enables to compare expected, experience (realized) and desired benefits and sacrifices in different levels of buying process no matter if the customer is current or potential (Sweeny & Soutar 2001). Thus, expected value is definition for perception before the purchase. Zeithaml and Bitner (2003) defined expected value in service context as beliefs of customers about service, which function as standard. The customer expected value might differ widely from the customer experience value. Thus, it offers interesting aspect to perceive expectations meeting experiences.

The desired value focuses on unreached needs and desires of the customer and is more abstract on customer's part than perceived customer value. Desired value focuses more on value dimensions or consequences delivered from performance characteristics whereas customer perceived value is trade-off within benefits and sacrifices and focuses on concrete performance features ( Gale 1994; Graf & Maas, 2008; Zeithaml 1988). Desired value is future bound definition, which describes customer unsatisfied needs.

As a conclusion, customer perceived value is mostly considered as combination of benefits and sacrifices. (Eggert and Ulaga 2002; Lindgreen and Wynstra 2005; Woodall, 2003). Initially customer value is customer perceived is the goals or need of customers accomplished by company offering (Woodruff and Gardial,1996). However, customer perceived value is not an unattached concept. It has been verified that customer perceived value of the same offering varies depending on situation, varies depending on time and experience, varies depending on the type of product or service, which is under consideration, varies depending on existing competition and varies depending on characteristics of customer (Gale 1994; Graf & Maas, 2008; Zeithaml 1988). It is important to notice that customer perceived value can be expected, experienced or desired depending time of perception in the context of purchase situation (Sweeny and Soutar 2001). In addition, Hansen et. al. (2008) stated how customers perceive the value depends a lot is the company operating in B2B or B2C markets. In B2B markets, customers are considered to be more professional and rational. Therefore, customer perceived value is assumed to be more functional and harder to assess in business-to-business markets (Hansen et al., 2008).

### **2.1.1. Relationship related view of customer perceived value**

Relationship between customer and supplier company plays a significant role when customer perceives value (Hakanen and Jaakkola 2012; Jaakkola and Hakanen 2013). Human resources are responsible for all employees of the supplier company. Sales representatives are in contact with customer and are responsible to deliver value trustworthy. Hence, impact of human resources on customer perceived value is significant. Frontline employees need expertise on understanding, behavioural competence and “can do”-attitude in order to deliver value of solution for customer. If the frontline employees, who are in contact with customer, don't know the service well enough, doesn't have the behavioural competence or “can do”-attitude are the consequences most likely fatal for success of service. Hence, one of the greatest single factor influencing on customer perceived value is the human resources of supplier company (Neu & Brown, 2005).

Marketing literature argues that supplier company's employees are providers of value, and hence they are one of the biggest influencers on customer perceived value (Grönroos & Ravald, 2011). Thus supplier company representatives are the base of customer perceived value, as they are creating the relationship with the customer. Personalities of sales representatives have an influence on success of solution selling and how customer perceived (Mainela & Ulkuniemi, 2013). If the behavior of the sales representatives is customer orientated instead of sales orientated, it most likely increases positive outcome with customer perceived value (Guenzi et al., 2009).

The activities of supplier company representatives have an impact on customer perceived value. Prior (2013) categorized supplier representative activities as communication, planning, risk management and coordination. The first activity category is communication. Communication has significant positive contributor to customer perceived value. Regular communication is needed to ensure that understanding is mutual between supplier company and the customer. Communication is providing emotional, social and functional benefit through information exchange, which helps customer in purchase decision-making and relationship development. This requires from the supplier company efforts for information management and exceptions management. Information management point is to ensure that appropriate information is available and timed. Expectations management focuses more on attempts of supplier company to understand customer perspective, inform limitations of supplier company clearly and provide up-to-date information in situation of unexpected situation (Prior, 2013).

The second activity category is planning. Planning includes specifying activities to achieve set goals. Planning offers secure for the both representatives as both parties are committing to activities through process. Planning of the supplier company can be solution specific or supplier company-level planning. Company-level planning focuses more on organizational approach in solution delivery and solution specific more specific plan for complex solution (Prior, 2013).

The risk management of the company includes identification, preparing and prioritization of problematic issues. It focuses on identifying and reducing that factors that threaten project's successful completion. Earlier planning and communication function should ensure sufficient risk management. According the study of Prior (2013) including elements of risk management are risk anticipation, problem solving and flexibility. In order to able to risk, anticipation company needs to understand the nature of solution and possible problems in it. After that, supplier company is able to minimize damages in event of unexpected situation. The problem solving involves defining needed actions in the event of unexpected situation. However, the flexibility is behind all risk management as it able supplier company to adapt new conditions as those emerge. (Prior, 2013).

According to Prior (2013) the fourth activity category is coordination. Coordination involves allocation of resources for example employees and budget within tasks. However, the coordination does not work by itself and because of this needs organizing function, which involves higher-level thinking. Supplier company should predict customer demand and resources needed for that. The difference between planning and coordination is that coordination is always happening in real time and planning is happening before actual coordination (Prior, 2013).

According to Hansen et al. (2008) it is hard to deliver value for customer in B2B markets. Because of harder value delivering and complex behavior of offerings, the reputation of supplier company is becoming more important in B2B-markets when customer perceives the value. The company reputation has significant role in how customer values the supplier company as reputation generates lot of images and bias (Hansen et al., 2008).

Hansen et al. (2008) argue that more intangible the offering is the more impact supplier company reputation has on customer perceived value. Company reputation is comprised as perform of company overall allure. On the other words supplier company reputation describes what market thoughts about company. Good reputation can be seen as an asset of the company, which gives trust for customer to collaborate with company (Hansen et al., 2008).

Hansen et al., (2008) study delivers reason to believe that supplier company reputation effects on customers perceived value. Good reputation might lead customer to trust that benefits received from supplier's offering are satisfying without knowing actual benefit. It can be stated that supplier company's good reputation increases customer satisfaction. As the reputation is highly connected to what market thinks about supplier company, customer might think that competitive market cannot be wrong about the reputation, which gives an extra boost for customer to trust on company and benefits how customer perceived value. Thus, reputation correlates with customer perceived value of solutions (Hansen et al., 2008).

Reputation has different dimensions, which relates it on customer perceived value. First dimension is to build perception for customer that offered solution is better than competitors one. Second reputation dimension is including innovation and solution excellence, which are related on how customer perceives the value. These two aspects need to produce through high standards, norms and ethics in order to deliver value (Hansen et al., 2008).

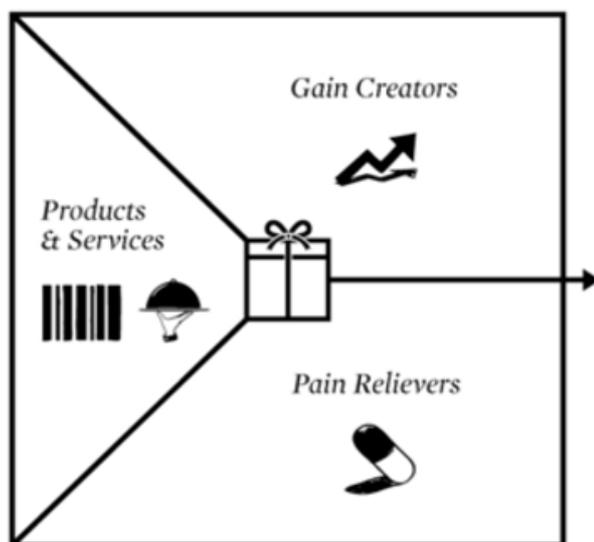
The value must be provided through excellent leadership and governance. The reputation of high standard workplace is one outcome of this. If supplier company has reputation of high standard workplace, employees are more likely able to provide continuously excellent services (Hansen et al., 2008). Overall, multiple dimensions of reputation are affecting on customer perceived value. Nevertheless, in the real life customers does not remember all dimensions of the reputation. The overall image of reputation might be subjective and in best scenario, it reduces uncertainty about quality of intangible services. Therefore, the goal for managers is not to define every dimension of reputation. More important is to define what supplier company should be known for and what how customers should see the supplier company and to take required steps according (Hansen et al., 2008)

## **2.2. Value map of value proposition**

Osterwalder et. al. (2014) presented in their research the value proposition design canvas, which is tool helping supplier company to provide value for their customer. Value proposition defines relationship with supplier company offering, total costs, fulfilled needs and performance of offering (Payne, 2006), which links strongly on perceived value theories present earlier. The value proposition canvas consists two sides; customer profile and value map (Figure 3). Customer profile is a tool for customer understanding. The value map provides answers on how value is provided for

customer by customer solution. There is a fit between these sides, which provides understanding on how these two aspects are meeting each other. This research focuses on value map as the main purpose of research is to examine how the intelligent equipment management solution is providing value for customer.

According Osterwalder et. al. (2014) the value map includes features of value proposition in structured way. The value map divides supplier company's value proposition on supplier company's offering, pain relievers and gain creators. Generally, the value proposition is created around the supplier company offering. Pain relievers define how the offering of customer is relieving problems and challenges of customer. However, it is important to notice that pain relievers are not sacrifices and thus, the value map theory differs for instance framework of Woodall (2003), which divided customer perceived value on sacrifices and benefits. Gain creators define how the offering of the supplier company is offering gains for customer. In this research company offering is limited on single solution, the intelligent equipment management solution.



**Figure 3.** Value map of value proposition design canvas (Based on Osterwalder et. al. (2014)).

Firstly, value map focuses on supplier company's products and services in this particular situation. Products and services are the offering of the supplier company. The value proposition is built on around supplier company's products and services. This offering assist customers complete their functional, social or emotional jobs. However, it is important to be aware that products or service do not build value alone. As though with customer jobs not all products and services have same priority for customer (Osterwalder et. al., 2014).

Pain relievers define how supplier company's offering kills pains of customer. Pain relievers present how customer can reduce or even eliminate sacrifices they have received before, after or during complementation of job. It is important to notices that great value proposition is always focusing on pain, which matters and are extreme for customers. Thus, some pain relievers are more valuable for customers than others. The more essential pain reliever is the more value it delivers to customer (Osterwalder et. al., 2014).

The gain creators define how supplier company's offering assist customer to achieve gains. The gain creator present how supplier company can produce benefit, which customer needs, expects, desires or is surprised by. As though with pain relievers, gain creators should matter for customer and where supplier company's offering can change things. Thus, some gain creators are essential for customer and some just nice to have (Osterwalder et. al., 2014).

Both gain creators and pain relievers create value for customer. However, these elements are controlled and managed by supplier company. Thus, it is important to know and understand customers in order to offer gain creators and pain relievers, which are relevant and significant for customer. In order to provide significant value, supplier company needs to provide gain creators and pain relievers, which matter for customer and address those well (Osterwalder et. al., 2014).

### **2.3. Customer perceived value in the context of business intelligence solutions**

There is wide uncertainty in academic literature considering customer perceived value of business intelligence solutions and thus the literature of customer perceived value is mainly based on solutions. In this chapter customer perceived value of solutions will be discussed generally in order to understand unexamined topic more comprehensively. Thereafter, existing literature about customer perceived value of business intelligence solutions will be discussed.

#### **2.3.1. *Understanding customer perceived value of solutions***

Customer perceived value of solutions has been widely examined among academics. Academic literature basis on notion that the solution itself provides more value to customers in comparison what individual component would offer (Evanschitzky et al., 2011). In general, solutions are not just combinations of services and products and thus, customers expect from solutions customization, deployment and post-deployment from solutions (Tuli et al., 2007). Customer expect that solutions will fulfill customers' relational and collective goals, improves customers' productivity and operations (Tuli et al.,2007; Ulaga & Reinartz, 2011).

Stremersch et al. (2001) stated that instead of focusing on single functions of solutions, customer perceives as the most important attributes of solution improved performance and reduced costs, which why in optimal situation offered solution should be able to deliver both. These attributes have an impact on perceived value of solution and also on acceptance of novel solution. Tuli et al. (2007) stated that in order to provide significant value for customer with solution, supplier company needs to understand customer's desires, needs and context of business. If the supplier company has clear understanding of customer needs and goals, there should not be any difference between company intended value and customer perceived value of solution. (Alam & Perry, 2002; Prior, 2013).

According to Prior (2013) complex industrial solution should be consider through social, emotional and functional aspects when observing customer perceived value. According to consumer behavior literature, depending on user experience of solution customer receives different outcome like emotional, social, functional, conditional and epistemic value. Emotional value forms after the consumer receives positive emotions about solution as joy or satisfaction. Social value arises when solution is experienced as improvement of the customer's social status. Functional value encompasses the ability of the solution to fulfill needs or solve problem through needed attributes. Conditional value is customer perceived opportunity cost what customer faces if the competitors solution is available and purchase intention is the same. Epistemic value is quite similar as conditional value although it focuses more on the ability of competitor's option to arise curiosity of customer and satisfy the desire. (Prior, 2013).

Mylan (2015) examine that in order to provide significant value for customer, solution needs to be easy-use, time-saving, low-risk and cost-effective for customer. Mylan (2015) added that novel solutions are adopted more easily if those are aligning with supplier company's current practices or even linked straight to existing practices. Tuli et al. (2007) stated that solution should assist to solve problems and satisfying needs of customer. In addition, from customer perspective solutions should reduce risk, share responsibility, reducing costs, improved performance and functional processes and make customer job easier (Miller et al., 2002). Although, all listed are value creating values the importance of factors is depending on customer, customer preferences and solution to be offered (Antikainen, 2016).

Osterwalder and Pigneur (2010) developed nine-step building block for their famous business model canvas. One of the building blocks was value proposition, which defines how solution can create value for customer. Osterwalder and Pigneur (2010) described that value proposition is the reason why customer chooses the specific company. Value proposition describes how a solution fulfills

customer needs and solve required problems. However, which value proposition customer prefer depends on customer, customer needs and context of the business. Thus value proposition is the bundle of benefits that solution offers to customer. Value proposed might be either quantitative (e.g. price) or qualitative (e.g. design). In the context of solution Osterwalder and Pigneur (2010) consider that value proposition elements of were newness, performance, customization, “getting job done”, design, brand, price, cost reduction, risk reduction, accessibility and usability.

Newness stands for on novel needs, which customer have not perceived before as there was not corresponding solution. In general, newness is typically related on technology. Performance Osterwalder and Pigneur (2010) is traditional way to create value. Performance signifies the quality of solution, which is delivering value for customer. At times, delivering high performing solutions was considered as only way to deliver value for customer as companies thought that customer perceived value is synonym with quality. However, thinking model is not valuable anymore. Although increasing performance is still generally perceived as positive, it is not necessarily always the case. The demand for performance can differ depending on customer. Some of the customers might be more price-sensitive or utilization of solution might differ (Osterwalder & Pigneur, 2010).

Customization as a value-creating element is tailoring solutions to needs of customer segment. By customization supplier company is able to respond customers differing needs more precise. However, customization does not always provide significant value for customer even with solutions. Before any actions, supplier company needs to analyze benefits and sacrifices of customization. When considering customization price/quality ratio needs to be considered as part of value (Blois, 2003). For instance, is the perceived quality of the offering in balance with payment or sacrifice for customer. Thus, supplier company needs to consider the scope of customization. For instance, should customization execute for small or large segment, or maybe even for single key customers (Osterwalder & Pigneur, 2010).

“Getting job done” as value-creating element by Osterwalder and Pigneur (2010) offers for customer a possibility to make work easier with solution. Design, as value-creating element, is sometime difficult to measure. For example, solution might stand out if the design is exquisite. Next found value creating element was brand as customers might find value by using specific brand. After brand Osterwalder and Pigneur (2010) mentioned price as value- creating element. Offering same value with lower price is typical method to provide value for more price-sensitive customer. Continuing with the same topic the next value-creating element mentioned, was cost-reduction. Depending on

customer, some customers prefer money-related qualitative value, for instance cost reduction and price. Especially if the markets where customer operates is highly competitive the money-related values are generally more important (Osterwalder & Pigneur, 2010).

Along with cost reduction, the risk reduction is other important element providing value for customer. Customers are not typically fancying to have high-risk solutions. Thus, many customer outsources its operation, which are not supplier company's core competence for other providers. For instance, if solutions are not in the core business of customer the less risk customer needs to take if solution is outsourced. When customer is sharing the risk, the risk distinctly decreased, and the only risk customer needs to take is purchase (Osterwalder & Pigneur, 2010).

Accessibility as another value creating element, is the way to create value for customer if it enables solution available for customers who did not have access previously. Finally, the last value-creating element in Osterwalder and Pigneur (2010) business model canvas mentioned was usability. Usability of solution indicates on customer comfort to use solution, which has an impact on willingness to use a solution (Osterwalder & Pigneur, 2010).

Value Proposition	Newness
	Performace
	Customization
	"Getting job done"
	Design
	Brand
	Price
	Cost reduction
	Risk reduction
	Accessibility
	Usability

**Figure 4.** Value proposition elements (based on Osterwalder & Pigneur (2010))

Acceptance of novel solutions is faster and easier depending on the amount of value it delivers to customer. Lusch et al. (2007) discovered that solution, which is related to core products of supplier company is providing more value compared on ones, which are not. If supplier company is releasing solutions that are not linked on their core products, company might drift off to a situation where it competes against companies who are focusing only on solution.

However, the acceptance of novel solution is not always unproblematic. The most challenging part in accepting novel solution is change of mind-set internally in supplier company and externally with customer (Brady et al., 2005). Struggles with acceptance might cause counteraction of change, which to some extent is always with when something new is implemented internally or externally. Although novel solution presumably rises competence of supplier company and impact on customer perceived value, the challenge is it requires change of multiple people, even all employees inside the supplier company (Brady et al., 2005).

### **2.3.2. Customer perceived value of business intelligence solutions**

In general definition of intelligent solutions remains uncertain in academic literature, although intelligent solutions have become main focus of attention of organizations widely throughout industries (Worden et al. 2003). Intelligent solution is new product, motion or condition of technology, which is able to adapt specific functions or is customized for particular circumstances (Worden et al. 2003). This research focuses especially on business intelligence solutions and systems. Current academic literature has not widely examined customer perceived value of business intelligence solutions (Hocevar & Jaklic, 2010). In order to understand chosen topic of thesis more comprehensively the features and perceived value of business intelligence solutions will be discussed briefly.

In order to define business intelligent solution, it is necessary first to understand what is business intelligence (BI). Williams (2011) described that business intelligences combines data management aspects, multiple technologies, information analysis, and presentation methods. Williams (2011) states that business intelligence is business-driven and structured approach to utilize information from business and improve supplier company's performance and profits.

The business intelligence solution can be individual application but usually it is combination of multiple application, where all components are closely related on each other. Usually BI solutions consist external and operational data sources, extract, transform and load processes, data warehouse and system for analysing and accessing data. The process of extract, transform and load process include collection of data, sorting data and transforming data as required to data warehouse (DW). The data warehouse is database for accessing data for all employees of customer, which is separated from operational systems. System for analysing and accessing data usually transforms data as an information (Hocevar & Jaklic, 2010). Also Sabherwal & Becerra-Fernandez (2011) found four capabilities of BI solutions; integration of information, organizational memory, creation and

presentation of information. All of capabilities according are enabled by specific technology. The data of organizational memory is base of other capabilities. Data of organizational memory might derive either from internal or external resources (Turban et.al, 2011).

Some of typical benefits provided by business intelligence solutions will be discussed. BI solution enables customer quickly to understand complex and large information masses, which might be hard to handle without solution. Thus, BI solutions aims to provide better efficiency and effectiveness for organization. Usually, BI solution also provide easy access for required information for all employees of customer and thus, increase transparency of information within organizations (Hocevar & Jaklic, 2010).

Business intelligence solution assist customers to obtain needed information easily and efficiently and thus, improve performance of customer. At the first sight it might appear interesting that all data available, managers meet difficulties obtaining basic business information. However, founding this basic information might take unbelievable much time, which is always out from productive work. Especially in recent years with fast evolution of required technology, the importance to obtain real-time data has even increased. Thus, many organization nowadays invoke on business intelligence solutions (Hocevar & Jaklic, 2010).

Many of perceived benefit of BI solution might be hard to define precisely. For instance, BI solutions might be positive influence on income by decreasing non-direct costs of supplier company although might be hard to detect. However, the most visible benefits of BI solutions usually are related on greater information, which become faster and easier to access. Thus, measuring benefit of BI solutions is quite challenging (Hocevar & Jaklic, 2010).

Thompson (2006) found six benefits, which BI solutions provide for customers (1) quick and accurate report of required information, (2) better decision-making, (3) increased satisfaction, (4) more revenues, (5) increased cost from IT and (6) other increased costs. Also Carver and Ritacco (2006) stated that BI solutions provide for customer decreased costs, increased revenues, better satisfaction, improved communication inside the supplier company and thus, improved decision making. In addition, most of Bi solutions able to customer to observe problems in their operations and also key success factors (Hocevar & Jaklic, 2010).

## **2.4. Customer perceived value in construction industry**

Especially for manufacturing companies understanding customer value has caused major problems, as industry has been highly product-oriented. However, recognizing and understanding customer value is highly important. According Barry & Terry (2008) industries including lot of personal interaction with customer, challenging environments, shared and long processes, solutions and professional services are requiring customer understanding, closer relationships and ability to recognize customer value excessively more. Construction industry includes many of above features thus, it is important to understand customer value more.

Construction industry mostly is project natured business where the projects are long and relationships are including considerably professional services. It is typical for construction industry to have complex solutions, which are combinations of products and services. Many of solutions are customized according customer preferences and require deep understanding of what customer value (Miles, Berens, Eppli & Weiss, 2000).

Unfortunately, there is not much literature about value creation in construction industry especially in B2B context. According Dulaimi (2005) construction industry lacks in customer understanding and orientation of customer. As overlooking construction, industry has understood importance of customer value but procurement and relationship with customer are outdated although positive changes been happened in recent years. According Dulaimi (2005) construction industry lacks in customer understanding and orientation.

In order to understand the customer companies in construction industry need to change focus from projects and products on developing relationship with customer. Keränen (2014) argue that supplier should increasingly focus on improvement of customer value and customer value creation process instead of focusing on perceived value of product or service. Kärnä et al. (2007, p. 9) stated that customer perceived value depends on interaction with supplier and customer. According Graf and Maas (2008, p. 10) the pre-purchase phase has a significant impact on customer value. Pre-purchase phase indicates anything what happens before purchase for example marketing and sales process.

As the power of customer has increased, also the pressure of providing better service and meeting the customer needs more specifically has multiplied in construction industry. Thus, growing competitiveness and increased customer expectations has become key features in construction industry (Raftery et al., 1998). Construction processes are mostly driven by specific needs of

customer. Hence, every project and process is unique, different and varies which makes it harder to understand the construction company's needs. According Dulaimi (2005) this can be inhibitor of development of the industry as the understanding customer needs to be deeper and constant in construction industry. (Dulaimi, 2005).

Dualaim (2005) study finds that companies in construction industries do not understand clear enough that being customer orientated company requires commitment and acceptance of whole company in order to elicit needed respond from customer side. Hence, study states that construction companies that are delivering new ideas and innovations have more pressures being proactive in customer orientation. Thus, it is necessary for these companies to recognize what customer oriented means. This especially requires a commitment of the managerial level for radical change to allow developing strategies and processes for customer orientation and alignment. However, situations in business environment changes as well as customer values thus construction companies should be able to also monitor any changes in business environment (Dulaimi, 2005)

The economic environment and financial situation of the world has been uncertain and influenced to construction more powerful industry than many other industries. This has compelled companies to decrease costs as set out goals in planned capital investment programmes are becoming stricter. These has lead in the situation where the customer requires same quality with lower price and the construction companies need to constantly search for innovative strategies to gain competitive advance (Harding, 2001). Obviously, this has put more pressure on companies in construction, which might see even decreasing customer understanding.

### 3. METHODOLOGY

The aim of the study is to discover what similarities and differences are there within case company representatives and customers perceived value of intelligent equipment management solution. The aim of the chapter is to declare the empirical structure of study, data analysis and justify chosen methodology and present how to chosen methodology has been used. Thereafter, chapter scrutinizes the validity and reliability of the research.

In the general empirical study is conducted either quantitative or qualitative methods. Quantitative research is likely based on statistics and its purpose is to find causalities and correlation from numerical data. Quantitative research is likely based on interpretive research and its purpose is to describe and understand a phenomenon (Metsämuuronen 2003). Further quantitative study has the objective is for in-depth understanding of real-life situation or phenomenon (Hirsjärvi, Remes and Sajavaara 2004). The basic characteristics of qualitative analysis include using researcher's perspective, positioning researcher and careful sampling (Eskola & Suonranta 2003).

In most cases, qualitative research is executed with interviews, observation, text analysis or observation. Interviews are assumed as most frequent way to gather information. The purpose of all interviews is to gather information structurally. Interview as research method can be classified into four sub categories; theme, structured, half-structured and open interview. The structured interview does not leave space for spontaneous discussion. Questions and order of the questions are formed beforehand whereas also answer options are given. Half-structured interview is same although it does not have answer options. In theme interview, the discussion areas have been decided beforehand and therefore leaves plenty of space for free discussion. Open discussion is not structured at all and remind significantly normal discussion situation (Eskola & Suoranta 2003).

At times, the qualitative research has gained criticism because of small sample sizes, which has conduct to subjective perspectives and emphasis the interpretation skills of researcher. However, qualitative research enables the in-depth feelings and motivations to be researched and thus allows different dimensions to research (McDaniel & Gates 2013).

To gain comprehensive perception of value of intelligent equipment management solution from customers and case company representatives, thesis research methodology is based on the qualitative methods. As this research purpose is to discover and understand customer perceived value, which varies depending of person researched, qualitative research method is the correct

decision. The purpose of the study is not just discovering specific customer perceived value but also gain in-depth comprehension of researched topic. The qualitative research method would not be able to elicit detailed information about personal values, motives and behaviour of customer. Therefore, the qualitative methodology is chosen by the research problem and the purpose of the study.

### **3.1. Embedded single case study**

The most frequent method of qualitative research is case study (Metsämuuronen 2003). According Yin (2003) case study is empirical examination which purpose is to discover a temporary phenomenon in the real-life context. Fundamentally, case study investigates and explains narrow unity. Yin (2003) presented four different designed of case studies; holistic and embedded single-cases and holistic and embedded multiple-cases. The case study design used in this research is the embedded single case research as research examines only single case but multiple units inside of the larger case.

According Sjoberg, Williams and Vaughan (1991) unit of the analysis might count as individual, organization, community, state or civilization. Yin (2003) states that embedded single case study includes more than one unit of analysis. In this study, there are two units; customers who has been using case company's intelligent equipment management solution at least for five months in the time of interview and company representatives, who are closely related on sales process of intelligent equipment management solution. In order to have qualified data researcher decided to choose customers and representatives, who are familiar with the solution and utilize it as part of daily work. The larger case above units is case company's equipment management solution. Embedded case study may provide in-depth analysis for larger case although it might also focus excessively on individual subunit and fail to combine that to larger case (Yin 2003).

Because of unexplored nature of data, the study does not have proposition and nor is there logical linking to collected data to it. However, the link from the data to the purpose of research is possible to make. The purpose of the study is to achieve comprehensive view of perceived value of intelligent equipment management solution, which has linked to interview data of customer and company representatives. However, before data can be linked to the purpose of study, data requires careful analysing according to data analysing criteria part (Yin 2003). In this study all data is linked on purpose of the study and based on theory part.

### **3.2. Data collection**

The empirical part is conducted by interviewing case company representatives and customers in order to achieve a comprehensive perception of customer value of intelligent equipment management solution in construction industry. Chosen customers are experienced in using intelligent equipment management solution. In addition, all interviewed company representatives are related on sales process of intelligent equipment management solution directly.

The data collection strategy used for this research is a half-structured theme interview, where all the interview questions are classified under themes. As the research, questions of the study are striving answers for questions “what” and “how”, half-structured interviews are suitable (Saunders et al. 2007). Use of half-structured interview method enabled open conversation in order to gain in-depth understanding of the case and concurrently reach answer to questions, which were linked to purpose of this study.

Themes and questions of interview were decided beforehand based on purpose of research and the discovered theory. The themes were consistent with interview questions however phrasing of question was adjusted depending on interviewee. In order fulfil the aim of the study with data all the interview questions were determined beforehand although all questions was left as open-ended in order to left space for flow of conversation. The interviewer let the conversation flow if needed and guided conversation whenever needed with predetermined questions. However, to gather reliable data it was necessary to ensure that all themes were discussed comprehensively. Most of interview questions were open-ended as it gave interviewees space to express their perceptions, expectations, experiences and feelings about the situation.

As all the interviewees were individual or individual in-group all interview situations were different and therefore interviewer observed that all and same questions should not be asked with everyone. Interviewees were chosen by based on familiarity with the solution (using experience at least five months by the time of interview) and managerial level in the company in order to have representatives from different level of organization. Most of customers and company representatives were all professionals of different areas and worked in different managerial level in companies, which also affect their knowledge, motives and behaviour. By phrasing questions differently to different interviewees manner more relevant result from data collection. All the interviews were conducted in Finnish language and after that translated in English.

The data collection for this research was executed in two phases. Firstly, customers who were already familiar and currently using equipment management solution were interviewed. Some of the interviews were executed as individual interviews and some of those were group interviews. Thereafter, the company representatives, who were closely related on intelligent equipment management solution within their daily job, were interviewed.

The literature of qualitative study does not determine the absolute amount of interviews. According Hirsjärvi & Hurme (2009) the adequate amount of interviewees has been achieved when the last interview does not bring any new information to data collection. Therefore, researcher uses own consideration when deciding the amount of interviews. The data collection of this research requires interviews of customers who has been using equipment management solutions at least five months in Finland. However, there was only certain amount of potential customer for interviews as the solutions is fairly novel for case company. The data includes six in-depth interviews of customers from different areas of profession and managerial. Two of selected customer interviews were group interviews and four were individual interviews. All the five interviews of case company representatives executed as individually. Interviewed case company representatives were mostly from different managerial level although everyone's daily job was closely related on intelligent equipment management solution.

Before interviews researcher of this study executed an extensive examination about intelligent equipment management solution of the case company by using material provided by the case company. Researcher attained on site analysis of intelligent equipment management solution in order to understand comprehensively selling process and in that matter to prepare on interviews with great back knowledge about solution. By examination and attending on selling process of intelligent equipment management solution researcher gained in-depth understanding of solution and were able to understand better customer and company representatives of solution

### **3.2.1. Customer interviews**

The empirical part consists five half-structured theme interviews of case company's customers, which are currently using the intelligent equipment management solution. Interviewed customer companies are all working in construction business although the core business was varying. Interviewed customer companies were all SME in Finland measured by amount of employees (Yrittäjät, 2017). Two of customer interviews were executed as group an interview and three were executed individually. Three of the customer interviews were arranged face-to-face. However, two

of interviews were arranged as conference calls since the physical distance was a limiting issue in some cases. Each interview was recorded and transcribed.

The customer interviews were conducted between February and March in 2017. During the interviews all the interviewed customers were already using an equipment management solution at least for five months. All the interviews lasted from 30 minutes to 100 minutes. Interviewed customers were professionals from different areas in the company and worked at different managerial levels. The researcher perceived that diverse perceptions of users will lead to the best possible result. Therefore, some interviewees' experiences were more perceived from a managerial level solution and some interviewees' experiences were more perceived from an actual user level.

Because of the different roles of the interviewees, some questions needed to be rephrased and some specified questions needed to be added in order to gain comprehensive answers to the required themes. Adjusting some of the interview questions depending on the role of the interviewee in the company proved to be a great means to gain deeper insights. It also became evident that knowledge about intelligent equipment management solutions was not equally divided and some interviewees did not have comprehensive knowledge about some themes.

<b>Customer companies</b>	<b>Size of company according turnover, employees and jobsites</b>	<b>Type of interview</b>	<b>Position of the interviewee/s</b>
Customer 1	7 million, 20 employees, 2 jobsites	Group interview	CEO, 3 x master craftsman, purchasing manager, foreman
Customer 2	13 million, 50 employees, 5-10 jobsites	Group interview	CEO, master craftsman, purchasing manager, financial manager, foreman
Customer 3	4 million, 60 employees, 10-20 jobsites	Individual interview	Master craftsman
Customer 4	1,5 million, 10 employees, 1-3 jobsites,	Individual interview	CEO
Customer 5	5,7million, 30 employees, 3-4 jobsites	Individual interview	Project manager

**Table 1.** The interviewed case company's customers

### **3.2.2. Case company representative interviews**

The empirical part consists of five half-structured theme interviews of case company representatives in Finland. All of interviews of customer representatives were executed individually and face-to-face. Company representative interviews were conducted between February and March in 2017. Each of interview was recorded and transcribed.

Interviewed company representatives were from different managerial level. However, all interview representatives daily work was closely related on sales and especially on sales of intelligent equipment management solution. All interview company representatives were experienced with sales approach of intelligent equipment management solution. Three interviewed representatives worked in a manager level position. In order to keep identity of interviewees confidential any specific information is not given for research. All interviews of case company Finland representatives lasted 30 minutes to 45 minutes.

Company representative	Position of the interview	Years in case company
Representative 1	Managerial level	10 years
Representative 2	Employee level	34 years
Representative 3	Employee level	12 years
Representative 4	Managerial level	1,5 years
Representative 5	Managerial level	8,5 years

**Table 2.** The interviewed case company's representatives

### 3.3. Data analysis

Analysing the data was followed by the framework of Tuomi and Sarajärvi (2009). After collection of data researcher decided according purpose of study and research questions what was relevant for data. After decision of relevance, the data was gone through carefully and chronologically by researcher and all relevant information were selected based on previous decision. All parts of data, which considered as valuable was separated from the data. After separation, relevant parts were categorized or themed according needs of equipment management and customer perceived value of intelligent equipment management solution. All outstanding factors, which were repeating within different interview groups, were marked. Thereafter outstanding factors were compared between interviewed groups in order to answer research questions. Finally, the analysis of the collected data was written. Carefully formatting themes and interview questions made analysing the data straight forward as themes already conducted what valuable according to purpose of research.

Customer perception of intelligent equipment management solution can convince as primary data although it was also important to involve company perception of perceived value of the intelligent equipment management solution. The company perception offers reflection how two groups perceive value when comparing differences or similarities between answers. The fundamental purpose of comparing similarities and differences is to discover which parts of perceived value of intelligent equipment management solution are at same with customers and representatives and which are not. Thereafter it is important to analyse which are the outstanding similarities and which are outstanding differences within groups. This could be conduct by analysing incidence and extent of factor inside of group. Afterwards also the advantage or the importance of factor should be done before it can be stated which factors are the similar and different in perceived value.

As perceived value is initially combination of benefits and sacrifices analysis examines for example, were the emphasis of most frequent benefits and sacrifices in line with customer perception of intelligent equipment management solution or did something deviant or surprising emerge from interviews (Woodall, 2003). Finally, analysis editorialise on how perceived value of intelligent equipment management solution could be improved according interviewed groups by introducing desired customer value by value map (Osterwalder et. al., 2014).

### **3.4. Reliability and validity**

Researches strive to produce immaculate data as purpose to have reliable and valid empirical study. However, every research is different and mistakes are hardly possible to avoid. Reliability indicates on objective results of study or are the results of study independent of the author of research. Validity refers to the capacity of research to measure factors what originally desired. However, reliability and validity as terms fit better in quantitative research as in qualitative it is much harder to state are demands fulfilled. The results of qualitative research are not recommended to take out of the context as the results base on subjective views.

Qualitative research has certain pitfalls, which are not causing problem when it comes to quantitative research. As the qualitative research is subjective view of individual, it is also possible that interviewee does not understand question properly or not being honest. It is also possible that researcher modifies the answer towards desired results or trend. In addition, like Hansen (2008) earlier stated customer perceived value varies depending on situation, time and customer for instance. Thus, mistakes and misunderstandings may be caused by both parties of the interview (Hirsjärvi, Remes & Sajavaara, 1997, 213; Tuomi & Sarajärvi 2009).

This research strives to reliable and valid as possible and thus the research process has kept transparent and in clear format. The research avoids any impact of subjective views of researcher to effect on analysis how customers and representatives of case company perceive value of intelligent equipment management solution. In addition, validity of research was considered by careful choosing of valid research methodology, data collection and analysis. However, the results of this study is not recommended to take out of the context. Research provides insight of phenomenon, which has been researched within small sample group, and thus general use of research should be done with discrete.

## 4. FINDINGS

Obtained results from interviews of case company customers and representatives are presented and analysed in this chapter in order to examine customer value assessment of case company's intelligent equipment management solutions. Firstly, the case company and intelligent equipment management solution are presented and described. Thereafter, results of two groups about perceived value of intelligent equipment management solution are carried out. Chapter 4.2 focuses on customer needs for equipment management in construction industry and customer perceived value of case company's intelligent equipment management solution. The structure of chapter 4.3 is fairly same than chapter 4.2 although the point of view is company representatives.

### 4.1. Case presentation

The purpose of chapter is to offer overview to business of the case company and introduce case company's intelligent equipment management solution briefly in order to forward clear concept of the examined case. As the research is executed as confidential any names or exceedingly specific information will not be use in order to protect the identity of the case. Although the case company is global, this research is limited on case company's Finland subsidiary.

#### 4.1.1. Case company

Case company is global leading-edge tool, technology, software and service supplier in B2B construction industry. Case company strives to be global one-stop co-operator for construction industry. Company has expanded its business from tool and products supplier to software for design and consultancy, testing, training and repairs.

The customers are in the heart of case company's strategy. Therefore, two-thirds of case company employers work every day directly with customer within company's own direct sales teams. Case company does not co-operate with any retailer company rather focuses on working closely with customers onsite. Hence, case company has great opportunity to gain wider understanding what customer needs. As a matter of fact, case company is highly innovation driven and in addition of internal production company runs its own research and design labs. Along with innovativeness, efficiency and product development case company is well-known about its strong partnership and interaction within its customers. This research is examining subsidiary of case company Finland.

#### **4.1.2. Intelligent equipment management solution of case company**

Case company's intelligent equipment management solution is a tool for professionals to keep on track of assets and materials especially for customers who operate in multiple locations and sites. Solution promises to give an answer which equipment customer have, where, which are available and in which condition and who is an employee responsible for equipment. Although case company is known as product-focused company, solutions and services are in strategic focus of the case company at the present. The reason for alignment is case company's strong understanding towards construction industry and volition to remain innovative. In addition, the intelligent equipment management solution is related on company's core offering; equipment. Already Lusch et al. (2007) stated that solutions, which are relating on core products provide more value on customers compared ones, which are not.

Intelligent equipment management solution promises to increase productivity as equipment is easy to find due to transparent cloud-based software. The solution is combination of three elements; cloud-based software, hardware and variant deployment and support service. The software is made highly user-friendly and easy to use. Cloud-based software enables that all the equipment maybe efficiently recorded, registered and managed and due to all the information is always up-to-date and available for everyone. In addition, cloud-based software solution also includes mobile application, which enables that anyone in the company can manage equipment with the mobile phone application. The mobile application enables effective and convenient use as application is available for all employees at any time.

All desired equipment (not only equipment of case company brand) can be tag with active assets. Active assets include RFID, which is scan able with the mobile application or distinct hardware scanner. Scanner is not compulsory but it enables scanning multiple equipment. Along with the equipment management solution, it enables management of equipment groups and consumables. However, as active assets come with the license with variable quantity it is not profitable to mark all the equipment groups and/or consumables. Hence, solutions enable to keep on track equipment or consumables as a group when only one active asset is required for inventory.

Moreover, solution allows all required certificates, maintenance and training dates can be record, store and access effortlessly. If needed, solution automatically reminds user when required certification or maintenance has expired with any equipment and asset. Case company offers deployment and support services along in order to ensure that that deployment will run fluently. Case company offers services for analysing, marking and registering, setup and trainings

considering the solution. Structure of solution will be customised during deployment to correspond for needs of customer. Equipment can be allocated for responsibility of jobsite, storage, factory or individual person.

The intelligent equipment management solution is turnkey solution, which includes planning, implementing and training. Customer has an opportunity to communicate straight with sales representatives in order to customize solution suitable for customer. Same activity categories were mentioned also in Prior (2013) research. Value adding activity categories were communication, planning, the risk management and coordination (Prior, 2013). The purpose of activity categories is to offer customer complete solution, which would not require much effort from customer side.

The intelligent equipment management solutions start package is paid and compulsory. It includes creating account structure, training for use of software and hardware and for marking and registering of equipment, one day of marking of equipment. The solution implementation analysis is paid but not compulsory although highly recommended. It includes cost and profit analysis, testing use of solution with users, determination requirements and planning of implementation. The monthly payment depends on amount of active assets. Solutions has seven licence levels, where the smallest has 1-250 tags and the biggest has 10 000-20 000 tags. RFID tags come in two sizes and two qualities. All active assets are paid although the price depends on size and quality. Scanner for RFID tags is paid separate although it is facultative. For use of mobile application one needs smart phone with Android or iOS system.

#### **4.2. Customer perceived value of intelligent equipment management solution**

Firstly, chapter presents how customers generally perceive the value of equipment management in construction industry. Secondly, the chapter deepens on customer perceived value of the case company's intelligent equipment management solution. As the perceived value is fundamentally combination of benefits and sacrifices the chapter considers perceived benefits and sacrifices by customers. Because perceived value (benefits and sacrifices) can be observing before and after purchase, customers were asked about expected and experiences value in order to analyse have customer experienced expectations (Sweeny and Soutar, 2001). Finally, chapter presents customers' improvement suggestions regarding perceived value of customers of intelligent equipment management solution.

#### **4.2.1. Perceived value of equipment management**

All interviewed customer companies perceived equipment management as important in construction company. Interviewees agreed that optimized and productive use of equipment is base of improved performance. Customers valued highly important the knowledge about what equipment they have, where and in what condition. This information was perceived initial as if the company does not know are there required equipment, where equipment is and in what condition, customer cannot execute the daily job. Customer want equipment to be in efficient use, thus they can optimize the purchases of equipment and reducing cost.

The most common problem related on equipment management are what equipment customer has and where those are. Customers has concerns involving lost equipment. The searching of lost equipment was perceived time-consuming and costly as it takes lot of working time of employees. If the customer does not have knowledge which equipment they have it might occur as overlapping purchases and might cause significant problems.

*Somebody stole from our jobsite. Basically container was emptied thus we lost almost every possible equipment. At the same time, the other jobsite was beginning, hence no one did not notice that equipment was stolen. After a year, police called and ask has there been thieves in our jobsite. I said, that nothing has left from us. Afterwards I went to police station and there was case company equipment, which were ours. That was seriously embarrassing that there had been stolen equipment for EUR 15.000 and nobody even noticed (Customer #4).*

Interviewed customers perceived that it is highly important that equipment management solution is digital. Customers mentioned that real-time data about equipment is must and thus, online based system would be only effective option. Most of the customers thought that old-fashioned manual solution is not effective and functional. Three of interviewed customer companies have not used any kind of equipment management solution before and all equipment were memory-based by employees. None of interviewees were not satisfied on old system.

However, some customers moreover had doubts according digital equipment management solution. Some of the customers had concerns against attitudes and change counteraction because solution would involve all employees of company on use of equipment management. In that sense digital solution would take time and effort of management and therefore be risky if the implementation would not succeed.

*And then there is the use of computers and intelligent devices .. We have some employees, who are still not used those that much. You have to learn or implement new (Customer #3)*

Especially customers were concerned about older employees, which were not familiar with digital services and might be willing to use those. Although many of concerns were mentioned, some customers stated that they did not have any doubts against digital equipment management solution. Vice versa, they have already waited digital solution for equipment management for longer time.

#### **4.2.2. Perceived value of intelligent equipment management solution**

In this sub chapter perceived value of interviewed customer of the intelligent equipment management solution is cut into pieces. Perceived benefits will be viewed before the purchase (expected value) and after the purchase (experienced value) in order to state were expectations meeting experiences. Thereafter, the perceived sacrifices of interviewed customers will review. Likewise perceived benefits, perceived sacrifices will view before the purchase and after the purchase. Later on chapter five expected and experience values of customers will be compared on case company representatives' answers and possibly differences will be discussed.

The expected benefits of the intelligent equipment management solution before purchase were more or less same within interviewees. All interviewed customers were expecting mostly better management for equipment by achieving knowledge where equipment are and thereafter improved performance.

All customers were willing to know what equipment they have and especially in what location. Most of the customers were struggling where equipment are and many of customers were interested what was the condition of equipment. Customers describe that commonly there is broken tools in warehouse, which end up in new jobsite as broken. The knowledge about what equipment customer has, where those are and in what condition cumulates on improved performance.

Especially customers were willing reduce the time spent for searching of equipment. Customers had concerns about amount of employees working time wasted on searching of equipment and thus they expected saving time via solution. Customers were expecting that after purchases they would not spend immoderate time for searching of equipment and instead they would be able to use that time for productive work.

*Employees do not have to use immoderate time for searching of equipment and equipment are always in operational function, when one takes equipment for use from warehouse. Time spend for searching can spend for productive work (Customer #1)*

Some interviewees mentioned cost savings as expected benefit of the intelligent equipment management solution. Customers had concerns considering costs which were results of overlapping purchases, rents and repairs. However, none of the interviewees mentioned cost saving as reason why they end up to choose the intelligent equipment management solution.

*I just wanted to know what we have and where it is and nothing else. I did not think cost savings there (when purchasing the solution). It was not motivator (Customer #4)*

Customers mentioned as reasons for choosing the intelligent equipment management solution a knowledge about the location of the equipment, good relationship with sales representative or company and reputation of case company. Thus many of interviewed customers mentioned that they prefer sales representative as sales channel.

The most common experienced benefit after purchase were same than most common expected benefit before the purchase. Customers have perceived the efficient use of equipment and improved performance as most valuable benefit after purchases. Customers experienced highly beneficial decreased time for searching of equipment as with the intelligent equipment management solution the information about the location of equipment is easy to achieve. With the intelligent equipment management solution customers find equipment easily and thus will save working time of employees. Employees are able to use this time for productive work, not for searching missing equipment. Furthermore, customers were satisfied that it is more clear what equipment company has. Some customers stated that searching function is great and helps to find quickly does company have required equipment at all.

*I appreciate that one can search certain equipment and see instantly where all equipment is. It is precious information for master craftsmen .. I reckon that most important feature of solution is that equipment are effortless to find (Customer #2)*

User-friendliness or easy-to-use is feature which almost all interviewees mentioned as experienced benefit of the solution although the justification varied. Some customers said that the solution is not too technical and is easy to anyone to acquire how to use solution, however many customers had problems with using.

*It is not too technical although this mobile application. Anyone can learn to use that one (Customer #1)*

Many of interviewees were at same that mobile application is the one of the reason for user-friendliness. Customers thought that mobile application is easy to use. According customers they never do the transfers with software because it has perceived as arduous. Customer also experienced repair history beneficial. Customers were satisfied that they can now easily follow the repair history of equipment. The solution reports how often does equipment visit the repair and considering they can easily decide will they repair or scrap the equipment if required. Customers mentioned repair alerts as functional feature as they can easily follow for example calibrations of lasers. All interviewees mentioned that they were satisfied with implementation day and activities case company made in order to provide better value. Many of interviewees were also at the same that the training was enough as the solution was seen as easy to use.

Finally, all customers mentioned relationship for case company as experienced benefit. Customers described their relationship with case company as trustworthy and durable. Customers perceived the solution as positive change and most of customer add that it would even increase commitment towards company. Customers perceived as positive affair that case company aims to serve their customers better and develop their business further. Customers stated that it verifies the trust towards brand and increases positively company reputation.

In addition, it can be stated that company reputation was influencer on customer perceived value of the solution. All customers described customer as trustworthy and they perceive as positive affair that case company is providing solution for equipment management as they trust for reputation of company and the experiences with the solutions even verify the trust for reputation. Also some customers mentioned that they have not even considered competitors' solutions as they preferred the reputation of case company that high. Correspondingly they considered the solution of case company more innovative than competitors' ones.

When comparing expected and experienced benefits it can be stated that expected benefits were meeting experienced benefit with customers who were succeed with the implementation. Customers who has troubles with implementing solution stated that they have not met expected benefits. However, customers who had succeed generally well with implementation stated that they could manage their equipment better as they know what equipment they have, where those are and in what condition. Most customers stated that they were able to serve their customer better now like

they were expecting also before the purchase. Customers also meet expectations with reduced time for searching of equipment. However, most of customers were also expecting cost saving from the intelligent equipment management solution but none of the customer were reporting that they were actually experienced any cost saving with the solution.

The expected sacrifices before purchase of the intelligent equipment management solution were mostly concerning costs or use of solution. Customers had concerns about the implementation of the solution and especially how the older foreman would learn to use the solution. According one customer their employees were not really oriented for soft wares and mobile applications. Customers was especially concerned will employees use the solution when they are transferring equipment.

*The biggest concern was (or is) how we keep inventory as correct or how the equipment will transfer from jobsite to jobsite in order that transfers are documented to the solution. We have still challenges with that (Customer #1)*

In addition, customers described that they were concerned about licence limits tagged equipment before the purchase. For instance, customer 4 was willing to follow all mould equipment individually. However, customer had great amount of mould equipment and individual following would cost customer significantly more. Other customer was concerned as any price was not mentioned during the presentation of the solution. Also customers had concerns towards related equipment, which the solution would possibly require in order to be useful. However, few of customers mentioned that they did have any concerns beforehand as they trust for case company.

*I asked from master craftsman about their opinion and they were all supporting the intelligent equipment management solution, for sure. They see it the same way like I do that they are not willing to ask where equipment are rather they just need the information (Customer #4)*

As a reason for negative purchase decision customers mentioned situation where company would not have enough equipment. Also some customer mentioned that high price could prevent the purchase decision. However, after purchase none of the customers did not mentioned price of the solution as an issue.

The experienced sacrifices of the intelligent equipment management solution lead quite long and varying discussion. Two of the interviewed customers had serious problems with the solution and had not faced expected results yet. Hence, researcher firstly focuses on challenges, which prevent

these two customers to meet with the expected benefit. Researcher will address what were these preventing challenges, what did it causes to customer and which were reasons behind challenges.

The most communal and grave challenge, which customers faced was that all of employees were not using the solution. For instance, if only some customer does not report transfers with the solution immediately it instantly causes that the solution is not up-date. Naturally this causes problems if some employees are still using the solution and operating according. Customers perceive that the solution lost its relevance when it is not up-dated. Thus, customers preferably return to old equipment management methods like writing notes or calling.

Customers who were not met expectation of the intelligent solutions named few reasons behind it. They mentioned counteraction of change and attitude of employees as reasons for lack of use. Attitudes were problem especially in user level, where some of users found the solution as an extra process compared if they did not have any equipment management beforehand. The age and poor experiences with digital devices were increasing counteraction of change within users.

The other reason was internal implementation, which was still unfinished. Most of interviewed customers admit that they have not organized internal training considering use of solution for employees. Hence, only the management of customer company uses the solution. This has caused that solution is not up-dated as employees are not using it.

The other challenge which has prevent customers not meet the expected value with the solution is absence of tagging service. Tagging service is paid and compulsory, however some expectation has been done and the tagging service has been excluded from implementation. This has equalled that customer have not tagged all of equipment which has significantly delayed implementation of the service. In fact, customer 3 named absence of tagging service as a primary reason why customer has not meet the expected value of the intelligent equipment management solution.

The other major challenge customer faced was concerning inserts. Customers who still were not using solution stated that location of inserts is the major problem. Customers reclaim that it is not easy to find how many inserts they have in which location. They wish that insert would not see only by location rather as amount of inserts in certain location.

*We have actually noticed that almost all of our problems are results of inserts (Customer #1)*

At the moment all inserts are illustrated in own row, which results many sub rows. Customers has multiple insert clusters which is result for confusion. When all different inserts clusters are illustrated in their own row it is hard to track down how many insert you have in total in specific location. Customers stated that in rush it is hard to examine how many insert you have in which location.

Customers 4 mould equipment were placed under insert group where mould equipment are followed as group according the changing amounts in location. However, customers were not satisfied, because they do not completely understand point of insert groups which had led on situation where the customer has not implemented insert groups and thus, solution completely. They find transfers of mould equipment challenging as insert group.

Some customers mentioned challenges were mainly related to development of mobile application. Mobile application requires every time username and password. The application does not give user option to remember password or “keep me logged in”, which why customers need to type every time username and password when he or she wants to use application. This frustrates customers as in their opinion mobile application of the solution is the only application, which requires password every time you are willing to use it. Some customers mentioned log in as most challenging feature of the intelligent equipment management solution. In addition, customers reminded as that conditions of jobsite might be rough, which why solution should be take that as account.

*The intelligent equipment management solution is the only application, which requires a password. Typing password takes time and is frustrating. It is not all fun and games when you trying to type the password without cloves in minus 20 Celsius with my big and swollen fingers (Customer #2)*

The other experienced challenge considering mobile application was possibility for editing. Customers described some troubles with insert balance, when it cannot be modified with mobile application. For instance, some insert like bits, might break during jobsite when it would be important to modify the insert balance by the same token in order to keep application up-dated as employees easily forgot to fix balance when they are at office with laptop.

Customers relate that they would lust to add pictures with mobile application after the equipment has attached. Customers justify that taking pictures afterward is quite challenging as one has to take picture with smart phone and after transfer pictures from smart phone to laptop in order to change picture.

*Adding pictures afterwards is only possible with browser not via mobile application. First you have to take that picture, save that on computer and import that picture on equipment with browser version (Customer #5)*

Some of the expected sacrifices were experienced according customer although most of expectation were unnecessary. Almost all customers expected some sacrifices towards internal implementation. Customers were concerned will employees of customer company use the solution. In some cases, expectation met experience and employees were not using the solution. Hence, for these customers the solution was more or less useless. All customers mentioned that they have experienced some troubles with internal implementation because of training or counteraction of change. On the other hand, other expected sacrifices were not experienced and after all some customers even mentioned that they did not have any concerns as they trust for case company reputation.

#### **4.2.3. Desired value map**

Improve suggestions, which gain most support were considering insert groups, the internal implementation and required password of mobile application. As earlier stated many customers had struggles with insert groups. Basically many customers had struggles to understand how to use effectively insert groups. Many customers also experienced insert groups challenging as there might be fairly many insert groups.

Customers stated that they would like to view easily how many inserts one have in specific location. Customers hoped that account structure could be more clear over insert groups. Customer did not had many practical improvement suggestion although they experienced that scanning and transferring inserts was challenge for them. However, customer 4 suggest that case company could provide board where all the tag of insert group would be easy to place and read with scanner and thus transfer inserts effortlessly. Customer was struggling with significant amount of insert groups, which were challenging to manage.

The lack of internal implementation roused plenty of conversation. However, customers did not have many practical improvement suggestions on how to improve the internal implementation of customers. Actually many customers mentioned that they experience extra training as unnecessary. However, some customers stated that case company could support them more with internal implementation. Customers emphasized that it would be useful to know during sales process how valuable it is to train as many employees as possible in implementation day. Case company should be clear in communicating about the importance of internal implementation

*It might be worth to do the implementation day training for all employees (Customer #4)*

The other highly supported improvement suggestion was concerning required password of mobile application. As earlier discussed the login was experience as struggle according customers. Customers agree that it would be desired improvement if the user is not forced to type password every time when login. Customers suggest that mobile application could have “keep me as logged in -tap or “remember the password” -tap. Customer 2 argued that the most substantial reason why employees are not using solution is the required password.

*If (employees) experience it (the solution) challenging they will not use it (Customer #2)*

In addition, customers had other improvement suggestion regarding mobile application. Customers suggest that mobile application should allow balance correction. Customers suggest that mobile application should have “edit” or “add”- tap, which would enable adding or deleting balance of inserts. At the moment customers need to make notes how many inserts are missing instead of correction the balance straight via mobile application. The other supported improvement was adding picture with mobile application after wards. Customers said that in many cases they would have need to take a new picture from equipment.

*There should be editing feature .. for inserts, as we are breaking lambs and extension cords the insert balance should be able to fix. If one cannot do that with mobile application straight away and should write a note that remember to do this with laptop when you next time visiting office. Well that is also kind of challenging (Customer #1)*

Considering tagging service customers also suggest that tagging service should be compulsory. Customer 3 has not taken tagging service which has considerably slowed the implementation or blocked it totally as the equipment are still not tagged. If the tagging service would be compulsory the customer would not have choice to choose the cheaper option.

*When tagging is in our responsibility it is slowing the implementation .. You (case company) should consider do you sell only one package that the tagging is including someway. I do not know if there are stories that the case has reach fast the finish line when the tagging is done by customer company. If you (case company) present many different price options in comparison if you present only one package it might easier to accept (Customer #3)*

Finally, some of customers were dreaming about GPS-based equipment management solution, which would enable to track the location in real-time, with any outage. Customer 4 mentioned that they had considered before the purchase decision should they choose the intelligent equipment management solution as it does not have GPS. However, customer 4 admit that the most important feature was to achieve the knowledge what customer have and where. Customer 2 suggest that they would be fan of feature, where equipment would notify by itself if it is not in right place according the solution. Anyhow, this would definitely require GPS.

#### **4.3. Company representatives perceived value of intelligent equipment management solution**

Firstly, chapter presents how company representatives generally perceive the value of equipment management in construction industry. Secondly, the chapter deepens on company representatives perceived value of the case company's intelligent equipment management solution. As the perceived value is initially combination of benefits and sacrifices the chapter considers perceived benefits and sacrifices by customers (Woodall, 2003). Finally, chapter presents company representatives' improvement suggestions regarding perceived value of customers of intelligent equipment management solution.

##### **4.3.1. Perceived value of equipment management**

Interviewees strongly agreed about importance of equipment management in construction industry. Interviewed relatively were at same that every customer's pain is equipment management although challenges and importance of challenges might vary. Equipment management was seen as hot topic in the industry and need for solution as an urgent.

*The core business of construction companies is not equipment management it is constructing.*

*Companies are using absurd amount of time for that, what is not their core business, non-productive operations. In that sense equipment management is important issue (Representative*

*#5)*

Representatives stated that the equipment management is not core business of customer, which why customer are spending absurd amount of time of activity, which is not productive. All interviewees agreed that equipment management is causing costs and decreasing productivity if equipment are not managed or managed poorly. According representative's customers do not know what equipment they have and where those are. During years' customers might have purchased considerably much equipment hence they do not even know which equipment they have. However, searching for missing equipment has found as prevalent issue.

*Above of all, the challenge is that customer does not know what equipment they have and where those are. Every customer I have discussed with the problem summarizes more or less on that.*

*(Representative #1)*

When the customer does not know where equipment are, customer most likely has to search for lost equipment. All the interviewees confirmed that searching of equipment takes plenty of time and thus causes costs. Searching of equipment is always out of the productive working time of employees. All representatives pointed out that working time is expensive for customer company.

Costs occur when numerous employees are doing non-productive work. Representatives mentioned when equipment is missing, employees call for other employees, which engage several people working time as they go to search for missing tool from jobsite, storage or car while the one with missing equipment is waiting and probably cannot continue job without. As earlier mentioned the working time is expensive or according some interviewees even the most expensive cost of company. Anyhow, when customer does not know where equipment is customer needs to search for it, which takes time of employees and thereafter leads increasing costs and finally decreasing productivity.

*One person in jobsite needs something, tool or generally some equipment. He or she has now some primary contact, who he or she is calling to ask does he or she knows where it is. In this case primary contact arguably does not know where equipment is and thus is in contact with third party. And hereby one tiny question becomes issue for three people. Is it taking five minutes, fifteen minutes or at worst an hour, anyhow it is out of everyone's working time .. And as we know, the workforce and the working hour is the most expensive cost for company. (Representative #4)*

Working time is non-direct cost as it does not appear in income statement like purchase of new equipment does. However, representatives agreed that it is highly expensive for customer. Despite of searching in many cases customer perceives the searching troublesome and purchases or rents anyway new equipment, which rises more cost.

According representatives, customers appreciate that solution is digital. Customers are fancying real-time software as it enables them to plan purchasing and repairs. Customers request to have real-time information about what they have in storages and jobsites. Customers are willing to know are equipment in efficient use, which would help them to optimized overall equipment in company.

*This is not necessarily the most innovative industry in the world, thus implementing new system or solutions is truly stiff. I reckon that the most important feature in a sense is the user-friendliness, because if the solution is use-friendly then customers believe that it will be also possibly used.*

*(Representative #5)*

Few interviewees mentioned that many of customer are fancying GPS for equipment management solution, which would enable tracking location real-time all the time by using digital maps. Representatives 3 mentioned that one supplier in Finland already has GPS although they do not provide any service related. However, representatives emphasized that customers appear to be highly interested about GPS for equipment solution. Nevertheless, representatives added that it is challenging to provide GPS for equipment because in order to work GPS requires continuous power source for individual equipment as might prove to be highly challenging. In addition, GPS would raise prices of the complete solution as it requires higher developed technology and power resources.

*GPS is interesting customers .. First of all, it requires some power resource. And this is truly challenging to execute as it most likely increases cost significantly (Representative #4)*

#### **4.3.2. Perceived value of intelligent equipment management solution**

This sub chapter aims to examine company representatives perceived value of the intelligent equipment management solution. The perceived value is initially combination of benefits and sacrifices (Sweeny and Soutar 2001). In order to examine case company representatives perceived value of the intelligent equipment management solution both aspects are covered. Chapter will firstly discuss about the perceived benefits of the intelligent equipment management solution. A prefer perceived benefits of representatives has been covered the perceived sacrifices of representatives will be discussed. Perceived benefits and sacrifices will be allocated on expected and experienced. The purpose of examining expected and experienced value is to compare answers of representatives and customers answers in chapter five. Thereafter, researcher will analyse if the values are similar of different before and after purchase and hence, understand the customer perceived value better in future.

When representatives were asked what they consider as customer expectation about the intelligent equipment management solution before the purchase, tracking of equipment raised as primary benefit. Representatives thought that almost all customer had problems with locating their equipment and they wish to have more structure for their equipment and equipment structure.

*Based on conversations, it could be inferring that customers wish to have control towards equipment and understanding towards equipment and equipment structure. And naturally they wish to achieve also cost savings with the solution. Here we are again pointing overlapping purchases and reducing overlapping purchases (Representative #4)*

The other emphasized expectation before purchase were cost savings. Representatives especially pointed out cost savings from overlapping purchases, which representatives preferred as primary issue for customer. However, representatives thought that customer might not see cost savings from wasted working time for searching of missing equipment as a primary problem as the working time is non-direct cost.

All interviewed representatives agreed that the most beneficial feature of the intelligent equipment management solutions for customer is knowledge about what equipment customer company have and where equipment locate. Representatives opine that every customer is struggling with the missing equipment as a daily basis. When customer does not know where the equipment is it have to search for those in order to continue working. The intelligent equipment management solution helps any employee of the company is able to track the location of equipment easily and quickly.

The intelligent equipment management solutions straight forwards searching process and saves time of employees for more productive work. Jobsites are often busy and there is no time for time-consuming manual equipment management or especially searching of missing equipment. Even one missing equipment can lead to situation where multiple employees are involved on searching and calling back for others. All the saved time from unnecessary equipment searching can be used for core business and thus for better performance.

Time is money. Searching for missing equipment is always a cost because it always takes expensive working time of multiple employees which might lead even on delays on jobsite. However, in many cases missing equipment will be replaced with new one by purchase or rent, which causes more unnecessary costs. Customers can better optimize all equipment, which decreases overlapping purchases and renting. The intelligent equipment management solution decreases costs and finally increases productivity. Few of the interviewees highlighted exclusively the cost side of wasted time of employees.

*Average SME in construction industry saves quite easily about EUR 25.000 even EUR 30.000, if they have about 200-500 tags .. The size of the company is something like, I would say there is mechanics and carpenters around fifty to forty (Representative #2)*

Excluding one, all representatives mentioned as highly beneficial feature that the intelligent equipment management solution is real-timed. The intelligent equipment management solution removes problem with mobile application as it enables to have up-dated information available for everyone. Many of the interviewees agreed that mobile application is quick and easy to use which more likely increases the usage. In addition, smart phone is always with every employee compared to computer bound solutions.

*I reckon the mobile solution is the “wow-effect”.. If we do not have that mobile application, I reckon this would be in the same level with excel or so. But the mobile application does management as location based considerably easier .. Mobile application is the thing with the whole solution*  
(Representative #5)

The intelligent equipment solution is highly transparent. The transparency through whole asset capital will improve the productivity as customers are able to see how much there are equipment which are not use and which are in use in jobsite. Better transparency lead to better optimization and efficient use of equipment as all the purchases and repairs bases on facts not assumption which results decreasing costs.

Moreover, interviewees mentioned monitoring of repairs as a benefit although that was not seen as primary benefit of the intelligent equipment management solution. However, almost every customer had issues with broken equipment which moved around. With the intelligent equipment management solution, it is possible to document which equipment are requiring for repair. Likewise, customers can document required and continuous repairs of equipment to the solution when the solution gives an alert when the equipment requires for repair. However, none of the customer was not experiencing repairs as primary benefit of solution.

The expected sacrifices by company representatives can divided on two categories by the organizational level; managerial level and user level. Company representatives stated that in the manager level expected sacrifices were mostly about internal implementation of the solution. Before purchase managers had uncertainties considering will employees use the solutions. Representatives consider that manager level might have concerns towards management of change, which the solution requires in order to become utilized. Representatives add that in order to utilize, every single employee of the customer company needs to use it, which might cause anxiety in managers. Representatives mentioned that depending on the age structure of the customer company some employees might have negative attitudes towards solution as they might not use to work with digital

solutions. Managers might have doubts considering the change counteraction of employees as the attitudes are hard to influence in.

*I reckon major fear is that everybody will not start to use the solution and I reckon that might depend on age structure of the company (Representative #2)*

The other expected sacrifice by company representatives was concerning user level of the customer company. Representatives thought that the concern of the user level might be that users expected the solution will increase amount of work. If earlier employees were free to take any equipment without any documenting using the solutions might expect as an additional process and struggle as it takes their time.

*Customers are ready to make the investment because the investment is quite moderate in comparison what are benefits and the money is not the topic of the discussion there. However, but it is in that sense waste investment if will not be used. The feedback from customers have been frequently same type that they are a bit concerned about the implementation and will they anyway use it (Representative #5)*

Representatives preferred management of change as most uncertain experienced sacrifice of customer. All representatives considered internal implementation most remarkable sacrifice of customer, hence it remains as shoulders of customer company's management. Internal implementation concerns exclusively the management of customer company as they are responsible of executing of implementation. If a customer does not success with internal implement, probable all employees of companies will not adopt the solution as daily tool.

*It is not easy to success in implementation inside your company, there might be quite rebellion of change .. What would be more easy than take something from warehouse? It is an extra process for that if in beginning there was any process (Representative #1).*

Representatives verified that internal implementation is most prevalent experienced problem within the customers who are using the solution. Representatives perceive that lack of training might cause problems with the customer internal implementation. Representatives highlighted the importance of commitment of customer considering the intelligent equipment management solution. Customers need to understand that the responsibility of internal implementation is in customer hands.

*It is considerably important to understand considering the solution that in the end the responsibility is in customers hands .. the solution does not work without users .. We are giving the 24/7 support for user from the jobsites to offices but in the end the maintenance is in customer's responsibility*  
(Representative #4)

Representatives supposed that problems occur when end-users do not have knowledge about benefits of solution or end-users have not perceived that the solution will save time from searching of equipment. Almost all representatives mentioned attitude or age as a possible factor which effect on the change counteraction. Representatives add that construction industry might not be most innovative and some customer might not even believe on digitalisation.

According to some representatives the time, place or even the customer company can be wrong for purchase of equipment management solution. Hence, it is important to understand that every customer is not interested in same benefits and some might perceive some features as sacrifices whereas some customer might not. All representatives agreed that representatives should know the customer and its business widely before representative is able to sell the intelligent equipment management solution.

#### **4.3.3. Desired value map**

The most convenient problem according representatives was management of change, which remains as customer responsibility. Representatives agreed that case company should be repairing actives in order to support customer internal implementation of the intelligent equipment management solution. In the case that internal implementation does not success all employees will not use the solution and customers will not achieve the promised benefits.

*We could really assist in that great challenge, which is management of change. It is reality that customers are not necessary always taking the solution just like that, extremely happy, in every level of organisation. How engaged a customer is, what kind of asset customer has to handle that management of change? I reckon we should be even better this in future.* (Representative #1)

Representatives emphasized that is important to communicate clearly few issues for customers. Firstly, customers should truly know internal implementation is in their responsibility and it requires commitment. Thereafter representatives should communicate clearly what internal implementation takes particularly in the beginning of sales process. Second, it is important that customers understand the importance of familiarizing with the solution and spend enough time with account

creation. Policies of company should be go through carefully by representatives in order to be clear for representative who creates the account structure. However, communicating about implementation and maintenance was perceived sometimes challenging.

*I do understand the situation (communicating about maintenance and implementation) in that sense that sales representative is most likely nearby closing that he or she do not want to add “by the way this is not that easy”. In reality it is that easy if you keep it simple from the beginning; one gives facts what is expected from customer, what the solution is offering (Representative #4)*

Communicating about internal implementation of solution brought two kind of opinions. Some representatives thought that is was not hard to discuss about whereas some representatives thought that it might even harm the sales as customer would realize that the solution is not that easy than they might have thought.

*I reckon the problem with implementation is in our operating model. The training package, which we are offering to customer is not enough. Because it would demand that we would monitor, we would have plan how is this execute in practice. Hence, the solution is not that complicated that one could not use it .. Then the question is mainly about our role and what we have agreed with the person who has purchased the solution for company. But I will point us with finger with customers, which has bought the solution but the usage percent is low. I reckon we should take a look in a mirror (Representative #5)*

Representatives suggest that case company should have clear process or plan for internal implementation like other services of company has. It would include how case company is going through with trainings. One representative suggests that case company should provide training in addition of communal training for every jobsite individually in order to be confident that all employees can certainly use the solution. Also case company should be able to customize solution according requirements of customer. For example, if created account structure does not serve need of customer it would beneficial to be able to modify it.

*If we are undergoing this (the solution) once in meeting when all ten master craftsmen leave to their own jobsites they have already forgot the whole case. Whereupon I reckon we should do trainings for each jobsite individually. Ergo we would possibly have communal training and then we would have location specific or something equivalent trainings then in order to execute the implementation (Representative #5)*

Most of the representatives felt that problem is actually that representatives are not talking enough about solution. Most of representatives were concerned about preliminary qualification what representatives do for customers. Due to preliminary qualification sales representatives do not even offer solution to customer. Problems occurs as sales representatives are not talking about the solution enough and especially not for everyone.

Although most representatives agree that sales should talk about intelligent equipment management solution with everyone they consider why some sales representatives might think there should be done some preliminary qualification. As case company is more used to sell tools and equipment the solution might perceive as novel and scary.

*I do not mean that it would be worth to do preliminary qualification, but the homework absolutely. Ergo we have to know that how many jobsites they have, how many master craftsmen and do they have depot and what kind of equipment they have, do they have repairs, do they have lasers and do they have quality system?.. I am not saying it is the optimal solution for everyone but we are not the right person to make qualification. Rather customer has to decide it by itself not us on behalf of customer (Representative #5)*

Representatives agreed that in order for the customer to understand the potential value of the solution, sales representatives need firstly understand customer business, policies and challenges of the customer. However, it requires that sales representative actually examines this information as customer will not report information about equipment management for tool suppliers. After that it is also easier for sales representative to perceive why the intelligent equipment management solution would be valuable for customer. In order to understand customer business, sales representatives should have knowledge what is the most crucial problem of customer in equipment management and present the solution according. If sales representatives understand the equipment management of the customer comprehensively representatives should be able to present, what challenges customers have with equipment management and what kind of benefits the solution would provide for the customer without even selling the solution.

*I mainly perceive that when you do not have to actually sell it, people are acting most preferable. It is also our way to act, we do not want to be merely sales representatives. If we go and sell like pay EUR 2.500 and you get this, the probability for success would be significantly lower compared if we discuss and regard if this might be solution for you. (Representative #4)*

## 5. RESULTS OF CROSS-GROUP ANALYSIS

The purpose of the cross- case analysis is to examine fit between value perceptions of the intelligent equipment management solution between customers and company representatives. In this chapter, possible differences and similarities in perceived value of the solution are compared and thereafter stated is there fit between customer's and company's perception. Thereafter, also desired value of intelligent equipment management solution will be discussed in order to understand what customers desire form the solution. Desire value of customer is based on value map of value proposition by Osterwalder et. al. (2014). In order to make comparative analysis clear as possible the sub chapter are divided based on research questions. The sub chapters conduct the analysis and thereafter based on sub chapter analysis the main research question will be discussed in chapter 5.5.

Firstly, chapter 5.1 focuses on comparing perceived needs of equipment management between customers and representatives. Thereafter chapters 5.2 and 5.3 will discuss about perceived benefits and sacrifices of the intelligent equipment management solution. Finally, the chapter 5.4 will present the desired value by value map in order to examine desired gain creators and pain relievers by customers and company representatives (Osterwalder et. al., 2014).

### 5.1. Perceived need for equipment management

Interviewed groups (case company customers and representatives) agreed about the importance of equipment management. Both groups agreed that poor equipment management is decreasing productivity, which why improved performance was perceived important need (Miller et al., 2002; Mylan, 2015; Osterwalder & Pigneur, 2010; Stremersch et al., 2001). Both groups stated that most crucial need of equipment management was knowledge, which equipment customer have and where in order to "get job done". Thus, groups stated that "get job done" is value creating element of the solution (Osterwalder & Pigneur, 2010).

In addition, groups agreed that they appreciate that equipment management solution is digital. Customers and representatives mentioned that equipment management solution should be able to present information real-time, which why online based solution would be only suitable solution. Thus, groups considered real-time data as value creating element (Hocevar & Jaklic, 2010; Osterwalder & Pigneur, 2010). However, some of the customers had concern towards digital solution as there might be some counteraction of change if all of customers were not that familiar with digital advices.

Certain differences occur also. Customer emphasized the importance of productive use of equipment and need for optimization of equipment portfolio. If customer know what equipment they have and where, they are also able to optimize their equipment better as they know where they need to purchase new equipment or do they already have required equipment and where they will receive it. Nevertheless, representatives did not mention that as need of equipment management.

Representatives emphasized time wasted on searching of lost equipment as need of equipment management and hence, representatives proposed time-saving as value creating element (Mylan, 2015). Company representatives perceived that one of the most important needs concerning equipment management was increasing productivity by decreasing lost time and money for searching of equipment. In addition, Representatives emphasized non-direct costs caused by unnecessary searching of equipment outstandingly more than customers. Representatives emphasized that working time is one of the major cost factors of company and thus, wasted working time on searching of equipment was realized crucial. However, customers did not mention wasted time and caused non-direct cost by working hours as major need towards equipment management.

As a summary, the most important needs of equipment management were quite similar with two groups. Both groups were at the same that equipment management is highly important. Particularly, both groups were at the same that it is important that equipment management is digital as they need real-time data, which is only enabled by online based solutions (Hocevar & Jaklic, 2010; Osterwalder & Pigneur, 2010). In addition, both groups were at the same that the most crucial need is to know what equipment customer has and where those are as they considered "getting job done" as value creating element (Osterwalder & Pigneur, 2010).

However, differences also occur as customers emphasized productive use of equipment and optimization as sincerely important need. By optimization improved performance is achieved, which was likewise important value adding element (Miller et al., 2002; Mylan, 2015; Osterwalder & Pigneur, 2010; Stremersch et al., 2001). Representatives emphasized wasted time and non-direct costs according wasted working hours on searching on equipment. Thus, differences in perceived needs of equipment occur as representatives perceived time and cost saving as significant value adding attribute like Miller et al. (2002), Mylan (2015), Osterwalder & Pigneur (2010) and Stremersch et al. (2001). Perceived benefits from equipment management were for both groups strategic, practical and economical like presented in Woodall (2003) research.

As conclusion, it can be stated that customer and representatives perceived need towards equipment management was mostly same. However, as customer stated productive use and optimization of equipment as major need it would be beneficial for customer company to emphasize that feature also for customer, instead of communicating specifically about saved time and non-direct cost according equipment management and direct-cost considering overlapping purchases. The reason why customer does not consider those as primary need might be that most of customer did not have any equipment management system and thus, they have not considered wasted time and money or even know if the purchase is overlapping or not.

	<b>CUSTOMERS</b>	<b>REPRESENTATIVES</b>
<b>Similarities</b>	importance of digital equipment management	importance of digital equipment management
	what equipment have and where	what equipment have and where
<b>Differences</b>	productive use and optimization of equipment	wasted time and cost of searching and overlapping purchases

**Table 3.** Perceived need for the intelligent equipment management solution

## 5.2. Perceived benefits of the intelligent equipment management solution

Customers and company representatives were more or less same with the expected an experienced benefits of the intelligent equipment management solution. Both groups were expecting and experiencing better structure from the intelligent equipment management solution and thus practical benefit, which would result improved performance (Miller et al., 2002; Mylan, 2015; Osterwalder & Pigneur, 2010; Stremersch et al., 2001; Woodall, 2003). Customers and representatives were both expecting time savings from reduced searching of equipment and thus, better tracking of equipment. Both groups agreed that they expected several cost-savings from overlapping purchases, however the customer did not perceive cost-savings as primary benefit as non-direct cost might be hard to detect as benefit of business intelligence solution (Hocevar & Jaklic, 2010). Like both interviewed group, also Mylan (2015) mentioned time-saving as a value adding attribute. Mylan (2015), Osterwalder & Pigneur (2010) and Stremersch et al. (2001) listed cost-reduction as a value adding element of the intelligent solution.

The experienced benefits within two groups were mostly likewise same excluding some features. Both groups were experiencing as benefit the efficient use of equipment and improved performance (Hocevar & Jaklic, 2010; Miller et al., 2002; Mylan, 2015; Osterwalder & Pigneur, 2010; Stremersch et al., 2001). All customers and company representatives considered information what and where customer has equipment as most important experienced benefit and thus “getting job done” and performance as most important value creating elements (Hocevar & Jaklic, 2010; Osterwalder & Pigneur, 2010). Both groups considered that saved time from searching of equipment is one of the main benefits and value adding attribute as it saves time for productive work (Hocevar & Jaklic, 2010; Mylan, 2015). Experienced benefits were mostly practical, strategic and quality (Woodall, 2003).

The other agreed experienced benefit was the mobile application. Both groups experienced mobile application highly beneficial as it is transparent and enables that responsibility can be divided within all employees of the company and thus, is providing practical benefit for customer (Woodall, 2003). Thus, both groups consider accessibility as value creating element (Hocevar & Jaklic, 2010; Osterwalder & Pigneur, 2010). However, some features of mobile applications raised differences. Customer experiences that user-friendliness is one of the key benefits of mobile application like also Mylan (2015) and Osterwalder and Pigneur (2010) covered usability as value proposition element. Representatives experienced that customer would appreciate the real-time mobile application as it is online-based. Both interviewed groups were also experiencing repair history as beneficial. However, whereas all the customers were truly interest about repairs only some representatives mentioned repairs as an experienced benefit.

However, some differences within groups also occur. All customers mentioned that they were expecting and experiencing better knowledge about condition of equipment. Customers were concerned that they have broken equipment in warehouse mixed with functioning ones, which influence negatively on productivity. Hence, that required more structure on repairs offered strategic and practical benefit for customer (Woodall, 2003). However, the company representatives did not consider better knowledge about condition of equipment as benefit.

In addition, all customers mentioned the implementation day as experienced benefits, however none of representatives mentioned implementation as benefit. In implementation case company creates structure for customer, trains and tags equipment for customer. Furthermore, all customers were expecting and experiencing better knowledge about the condition of equipment as a benefit. None of the representatives was not expecting condition of equipment as benefit and barely some mentioned that as experienced benefit of customer.

Finally, all customers mentioned relationship with company as expected and experienced benefit like Hakanen and Jaakkola (2012), Jaakkola and Hakanen (2013), Stabell and and Fjeldstad (1998) and Rust, Lemon, and Zeithaml (2004) stated in their study. Many of customers mentioned sales representative even as reason for purchase like Guenzi et al. (2009), Mainela & Ulkuniemi, (2013), and Neu & Brown (2005) mentioned in their researches. In addition, customer mentioned that case company's good reputation has impact on customer perceived value of the solution. Customers perceived case company as trustworthy, which why they have also all trust that case company's solution is better than competitors one (Hansen et al., 2008). However, none of the representatives did not mentioned relationship, reputation or sales representative as perceived benefit. According the research of Woodall (2003) service quality, strategic benefit, practical benefit, economical benefit and even emotional benefit were all expected or experienced benefit of the intelligent equipment management solution.

As reasons why customers end up on purchasing the solution they mentioned able to track the location of the equipment, personality of sales person and reputation of company. Thus, customer consider "getting job done" and brand as value creating element, which effect on purchase decision. Hansen et al. (2008) mentioned reputation as part of customer perceived value, especially if the solution is intangible and complex. Reputation has risk-reductive effect perceived value as customers trust more on company, which enjoys good reputation in market. Good reputation of the brand can provide emotional benefit for customer (Woodall, 2003).

Although, it can be stated that perceived benefits of customer and representatives were fairly same several rising issues from perceived benefits should be notice. Interestingly, customers and representatives were both experienced as benefit what equipment customer has and where, mobile application and repair history. However, any of customer or representatives mentioned those as expected experience and hence, it would important to communicate for customer about these benefits before actual purchase decision. Customers also mentioned that they experienced implementation day as beneficial, which why it should be emphasized in communication before purchase for customer.

Other way round, both groups were expecting cost savings from the solution, even though either of groups mentioned those as experienced benefits. Thus, it would extremely important for case company to make ensure that promised cost savings for customer will realize. Case company should also be aware that customers expected and experienced benefits about knowledge about the condition of equipment, relationship, reputation and sales representatives. Thus, these factors

should be emphasized even more by case company. However, as conclusion it can be stated that experienced benefits of customers and representatives were responding on needs of customers towards equipment management (what equipment customer has and where, efficient use and better optimization of equipment). Thus, it can be concluding that equipment management solution was responding on needs of customer towards equipment management.

	<b>CUSTOMERS</b>	<b>REPRESENTATIVES</b>
<b>Similarities</b>	expected & experienced; better structure, efficient use	expected & experienced ; better structure, efficient use
	expected; time-savings from wasted time for searching	expected; time-savings from wasted time for searching
	expected; cost-savings from overlapping purchases	expected; cost-savings from overlapping purchases
	experienced; what equipment have and where	experienced; what equipment have and where
	experienced; mobile application	experienced; mobile application
	experienced; repair history	experienced; repair history
<b>Differences</b>	expected & experienced; better knowledge about the condition of equipment	
	experienced; implementation day	
	expected & experienced; relationship, reputation and sales representative	

**Table 4.** Perceived benefits of the intelligent equipment management solution

### 5.3. Perceived sacrifices of the intelligent equipment management solution

The expected sacrifices between two interviewed groups were differing more than needs and benefits. Both groups were expecting and experiencing sacrifices concerning internal implementation like Brady et al. (2005) covered in their study. Both groups agreed that there is a risk that all employees will not use the solution (Woodall, 2003). Customers were concerned that if the

solution will not be used it would be for them just excessive cost for company. Both groups experienced it was sacrifice for managers as they must defeat the counteraction of change, which would require effort and time from customer (Woodall,2003). Customer had experienced that all employees were not using the solution or it was not “getting job done”. Osterwalder and Pigneur (2010) stated “getting job done” as value proposition element.

Groups were at the same that reason for not using the solution might be negative attitudes, age and inexperience with digital devices. Both groups also consider lack of training as reason why customer were not using the solution. Customers were mostly blaming their self they have not trained all employees internally whereas representatives blamed case company as it has not provided enough training for customers. Customers and representatives perceived Internal implementation was as a risk as customer is required to waste time and effort for implementation (Woodall, 2003). Mylan (2015) and Osterwalder and Pigneur (2010) stated that if intelligent solution is low-risk is it adding value. If the solution is high-risk it is not delivering value for customer. Internal implementation is increasing the risk of the solution.

All representatives and customer experienced the solution as additional process for users. Groups add that especially negative attitudes, age and even the non-innovativeness of the industry might have an influence on that. Customers mentioned that users experienced the solution as additional process as it was not improving performance, as customer values (Hocevar & Jaklic, 2010; Miller et al., 2002; Mylan, 2015; Osterwalder & Pigneur, 2010; Stremersch et al., 2001). Users who did not see the solution as ancillary or time-saving did have negative attitudes although any clear conclusion about the impact of age cannot be stated. Also Mylan (2015) covered time-saving as attribute which is adding value for solution. If solution is not time-saving it is not adding value for solution (Mylan, 2015; Woodall, 2003). Customers who had succeed with internal implementation did not report any struggles with attitudes as they had discussed before purchase about the solution and its benefits with employees.

Some differences occurred between groups as customer expected and experienced significantly more sacrifices than representatives. Customers were expecting licence limit as sacrifice as many of customer desired to follow as many equipment as possible individually. In many cases customer did not quite understand how to utilize the insert groups, which why they hoped that they could follow all equipment individually. Customer were valuing usability and thus expecting that licence limit would restrict that (Hocevar & Jaklic, 2010; Mylan, 2015; Osterwalder and Pigneur, 2010).

In addition, some customers mentioned that they were expecting sacrifices as the price was not mentioned in the any part of the sales process and customers had concerns were the solution cost-effective. Customers were expecting that price might be immoderate as it was not mentioned. Osterwalder and Pigneur (2010) mentioned price as value-creating effect of intelligent solution as some customers are more price- sensitive.

Nevertheless, customer experienced multiple sacrifices, which representatives did not mention. As other preventing customer to meet expectation was excluding service from implementation package. Customer 3 experience excluding tagging service as sacrifices, which has prevented them to meet any expectation. Company perceived that excluding the tagging service was the reason why any of the employees were not using the solution, which definitely increased risk towards the solution (Woodall, 2003).

Rest of experienced sacrifices by customers were considering technical issues of the solutions. Almost all customer experienced that the location of insert groups as sacrifice as insert were not easy to find by location. In many cases it was clear, that customers did not understand how to utilize insert groups, which prevent the efficient use of the solution. Also customer experienced that mobile application should be able for editing, for instance, if the customer wants to edit balance of insert or add new picture. One of the major perceived sacrifice was the password of the mobile application, which was not possible to save. All the customers experience that as sacrifices, some even the most crucial one. The Osterwalder and Pigneur (2010) found usability as value proposition element. If customers do not experience the usability of the solution it does not add value for the solution.

As a summary, some action needs to be done according perceived sacrifices. Most importantly, all customers and representatives were perceiving internal implementation and reasons and results of that most crucial sacrifice. Case company should be able to give more support with internal implementation as all customer and representatives perceived increasing risk, which is non-monetary sacrifice (Woodall, 2003). Either of groups were not expecting not training of all employees and the solution additional process for users as sacrifice although it was experienced one. Thus it is highly important to ensure that all employees of customer will be trained and also sell the solution as an ancillary for users, which provably reduces negative attitudes and increases possibility of usage and of course increases unexpected surprises. Customers stated that there was no interaction of change when management discussed with users about benefits of the solution beforehand, which would increase risk. Low-risk was stated as value adding attribute of solution (Miller et al., 2002; Mylan, 2015; Osterwalder & Pigneur, 2010).

In addition, customers expected sacrifices from licence limit and price, which did not realize. These expectations would be easy to remove by clear communicating. Reason why customer did expected sacrifices from licence limits were that customers were not quite understanding how to utilize insert groups, which is decreasing usability of the solution what customer values (Osterwalder & Pigneur, 2010). Thus, it would important to explain the benefit of insert groups and how to utilize those clearly and comprehensively. Similarly, customers were concerned as any prices was not mentioned during sales process. Representatives did not mention any concerns towards price. Vice versa, representatives reckon that price was not an issue. Osterwalder and Pigneur (2010) mentioned price as value creating element especially for price-sensitive customers. It might be valuable to give price frames for customers during the sales process of the solution in order that customer will not expect price unnecessary high.

Customers were experienced several problems with technical issues concerning the solution. The management level of case company should intervene on experienced sacrifices with location of inserts, possibility to edit mobile application and save the password on mobile application. However, sales representatives could have more knowledge about the insert groups and how view those easy as possible. In fact, the technical knowledge and support of sales representatives should on better level

	<b>CUSTOMERS</b>	<b>REPRESENTATIVES</b>
<b>Similarities</b>	Expected & experienced; internal implementation and counteraction of change	Expected & experienced; internal implementation and counteraction of change
	Expected & experienced; age, attitudes, inexperience of employees	Expected & experienced; age, attitudes, inexperience of employees
	Experienced; not training all employees	Experienced; not training all employees
	Experienced; additional process by users	Experienced; additional process by users
<b>Differences</b>	Expected; licence limit	
	Expected; price not mentioned	
	Experienced; excluding services	
	Experienced; viewing easily location of inserts	
	Experienced; editing with mobile application	
	Experienced; saving a password in mobile application	

**Table 5.** Perceived sacrifices of the intelligent equipment management solution

#### **5.4. Desired value map of the intelligent equipment management solution**

In this research the customer desired value of the solution is based on value map of value proposition of Osterwalder et. al. (2014). Value map includes desired gain creators and desired pain relievers, which would describe features which are customer desires how the solution could add value for customer and how it can relieve in problems of customer.

Customers and case company representatives desired value differed quite although some similarities were observed. Similarities in desired customer values were regarding mostly earlier stated great challenge, internal implementation. Customers reclaim that they were struggling with

internal implementation. However, they did not have many suggestions how to relieve pain of internal implementation for customer. Internal implementation is increasing risk and thus it can be stated that customer propose as value creating element risk-reduction (Miller et al., 2002; Mylan, 2015; Osterwalder & Pigneur, 2010; Stremersch et al., 2001; Woodall, 2003).

However, several suggestion concerning support with great challenge, internal implementation, was received. Some customers mentioned that it might gain creating to train more employees on implementation day in order to implement the solution more fluently and getting the job done like covered as value creating attribute in Osterwalder and Pigneur (2010) research. One representative suggests that in addition of communal training, there should be training for each jobsite in order to reduce risk of unsuccessful implementation by customer. Risk-reduction was covered in researches of Mylan (2015) and Osterwalder and Pigneur (2010) as value creating activity.

Furthermore, both groups were at the same that communication about the importance of internal implementation and training should be clear as possibly as it relieves the pain of internal implementation. Topic generate various discussion within representatives as many of them thought that most crucial problem is that representatives are not communicating clearly enough that solution requires commitment from customer as it might have negative impact on closing sales. All representatives stated that case company should support more comprehensively with the implementation by communicating, planning and coordination. Also Prior (2013) mentioned these as activity categories of company representatives. The mission of case company should be to ensure that customer is engaged and customer has required tools for managing the internal implementation by their self.

In addition, interviewed groups were at the same that it is important that customer understands how critical it is for customer to familiarize oneself with the solution that the account structure would respond customer needs. In addition, it is highly important that also representatives will understand business, policies and challenges of customer as the needs of the customer are different and representative should present the solution according gained information. Hence, representatives should be clear in their communication, ask and ensure always when uncertain.

Finally, several customers proposed GPS for the solution as they perceived it as gain creator to see in real-time where equipment are moving. Nevertheless, any of the representative did not mention that as improvement for case company's solution although representatives mentioned that customer were desiring to have GPS in equipment management solution in general.

However, value proposition elements also differ within two groups. Most of the value propositions of customers were regarding technical and practical issues. Customers were eager to have editing option for mobile application, which would allow, for instance, edit balance of insert and adding pictures. Customers also wished that mobile application would remember their password. In addition, almost all customers proposed that viewing insert more easily would be beneficial. Researches of Mylan (2015) and Osterwalder and Pigneur (2010) covered usability as value creating element like many of the proposition were related on improving usability.

As comparison value propositions of representatives were definitely more theoretical. One controversial proposition was the preliminary qualification. Some of the representatives thought that the solution is not for everyone and sales representative should consider the size of the customer company. However, most of the representatives proposed that sales representatives should talk more about the solution and stop doing preliminary qualification. Representatives proposed that they should discuss about the solution for all customer as daily basis. In fact, Berry & Terry (2008) agreed that construction industry requires lot of personal interaction especially when presenting complex solutions.

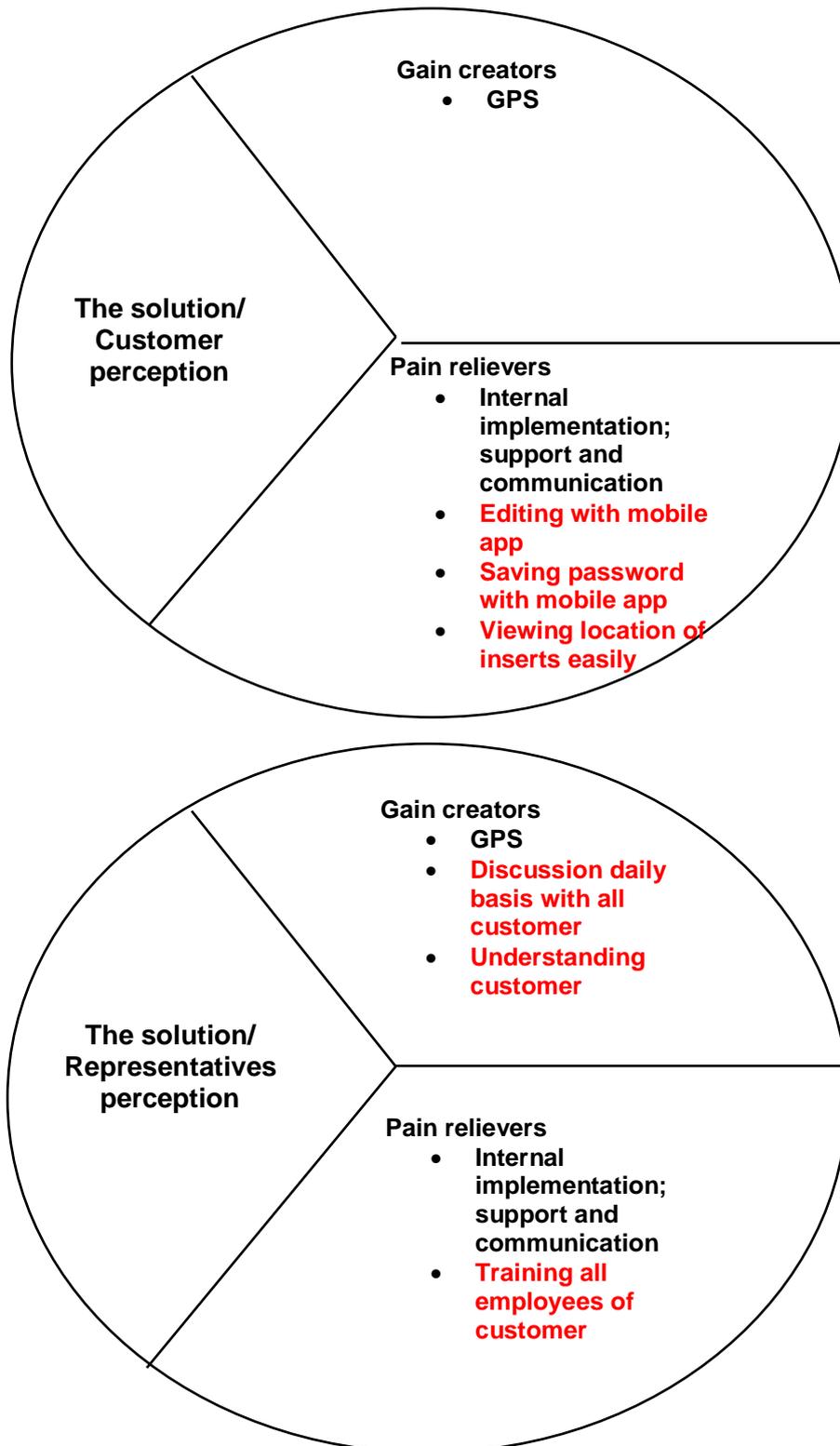
Nevertheless, representatives add that sales representatives should definitely do the homework concerning customer's business. Representatives should gain information about amount of jobsites, employees and equipment, repairs and discover how company was managing earlier equipment in order to understanding customer. Also Barry & Terry (2008) stated that is highly important to understand customer value especially in industries, which include lot of personal interaction and challenging environment shared professional services require deep customer understanding. According Dulaimi (2005) construction industry lack of customer understanding and orientation, which verifies partially proposition of better understanding of customer. In optimal situation by doing the homework and gaining information before hand, sales representatives do not have to sell the solution, thus representatives recommended to avoid selling of the solution. In best scenario both parties would together state that the solution is valuable tool for customer.

Overall, both groups were at the same about challenges towards internal implementation and change of mind-set with study of Brandy et al. (2005). Some actions need to done in order to relieve the pain of customers. As customer did not have many suggestions on how to manage the internal implementation, thus the case company needs to be proactive. To relieve pain of internal implementation It would be beneficial to train also employees of the customer, for instance, by jobsite, hence all employees are not able to come on communal trainings as standstills of jobsite

become highly expensive. The responsibility of customer about commitment, responsibility and importance of internal implementation is important to communicate clearly for customer. Case company should ensure that customer will success in internal implementation by offering support and this way reduction risk.

Differences also occur between value proposition elements of groups. Representatives were more concerned about internal issues and customer were more concern about technical difficulties. It would be beneficial if sales representatives would understand technical issues and could assist as many customers had problems with technical issues of solution, especially usability and utilizing insert groups like mentioned in Osterwalder and Pigneur (2010) research. Understanding and communicating about insert groups should be clear for customer. As challenges of customer were mostly technical, the answer is to offer support with challenges and do possible up-dates for software. Sales representatives should support open discussion about the solution on daily basis with all of their customer. However, sales representatives should understand that selling the solution is process and they should gain and find out information about the customer before and during the sales process.

Research of Prior (2013) proposed activities of company representatives, which would have positive influence on perceived value; communicating, planning, risk management and coordination. Representatives considered communication as most important feature of value proposition in order to have mutual understanding about the solution. By planning sales situation, representatives were familiarizing their self with customer company's business in order to understand customer and present perceived value of solution more relevantly for customer. In addition, based on representative interviews, risk management was part of proactive identifying and reducing risks. Finally, representatives proposed coordination as important activity as allocating resources, for instance external and internal and training are required.



**Figure 5.** Desired customer perceived value of the intelligent equipment management solution by value maps (Based on Osterwalder et. al. (2014))

### **5.5. Perceived value of the intelligent equipment management solution**

In this research as base of perceived value are benefits and sacrifices by Woodall (2003). In order to deepen perceived value definition also time of perceiving was noticed. Thus, the desired value by value map (Osterwalder et. al., 2014) was included on perceived value as it undergoes desired benefits of customer more closely by dividing those on gain creators and pain relievers.

Most significant attributes of perceived value were similar within interviewed groups. Especially perceived benefits of the intelligent equipment management solution were mostly same. All customers and representatives proposed as expected, experienced or desired benefit efficient use of equipment, what equipment they have and where, repair history, time-saving from searching of lost equipment, cost-savings from overlapping purchases and mobile application as beneficial. Thus, the most important benefits were quality, practical, strategical and economic benefits (Woodal, 2003). Interviewed groups proposed as most important value creating elements improved performance, “getting job done”, time-saving, cost-saving, usability and accessibility (Hocevar & Jaklic, 2010; Miller et al., 2002; Mylan, 2015; Osterwalder & Pigneur, 2010; Stremersch et al., 2001). In addition, customers emphasized also relationship with case company as perceived benefit.

However, sacrifices had more differencing factors than similar ones. Similarities within perceived sacrifices were mostly regarding the great challenge, internal implementation. Both groups consider that internal implementation was the most crucial sacrifice. Internal implementation can interpret as risk increasing element as responsibility relies on customer hands. Thus, customer proposed as value creating element risk reduction (Miller et al., 2002; Mylan, 2015; Osterwalder & Pigneur, 2010; Stremersch et al., 2001). According Woodall’s (2003) research the most common sacrifices were risk, time and effort.

Customer perception also varied concerning sacrifices as customer perceived some technical sacrifices towards solution. In addition, customers experienced that excluding tagging service is significant sacrifice for customer and case company should not even offer option for it. Hence, it can be inferring that customer proposes as value creating elements usability and risk reduction (Miller et al., 2002; Mylan, 2015; Osterwalder & Pigneur, 2010; Stremersch et al., 2001). Case company should be more aware of these sacrifices, that customers experience, and operate according.

Desired value map discovers how customers and company representatives perceive that the solution should create gains and relieve pains (Osterwalder et. al., 2014). Both groups were at the same that pain could be relieved with more support with internal implementation. Also

communicating about the importance should be clear. Representatives also suggest that training all employees of customer would relieve the pain with implementation although customers deny that they did not see extra training necessary. Both groups also stated GPS as a gain creating feature for the intelligent equipment management solution. (Osterwalder et. al., 2014).

The perceived value, which both groups considered, was conditional, functional and epistemic as Prior (2013) stated in his study. The functional value is about fulfilling customer needs or solve problem. In case of equipment management, the most crucial need was what equipment customer has and where those are. The conditional value is opportunity cost, which is perceived if competitor's solution is available and purchase intention is the same. Cost or most significant sacrifice of the solution were according to groups' challenges with internal implementation. Groups also perceived epistemic value, which is the ability of competitor's option to arouse curiosity of customer and satisfy the desire. For instance, both groups mentioned desires towards GPS- based equipment management solution.

## 6. DISCUSSION AND CONCLUSION

This study discovers case company customers and representatives perceived value of the intelligent equipment management solution in the Finnish construction industry. Context of study considers equipment management in construction industries, which has risen as hot topic (Peiffer, 2017). Even though perceived value of services and products has been examined widely, perceived value of equipment management solutions remains phenomenon which is still barely unknown among academics. Thus, emphasis in this study is on perceived value of intelligent equipment management solutions. The research examines perceived value of two interviewed groups; case company representatives and customers. In the end, similarities and differences of answers are compared in order to examine is the direction of case company same with customers.

After gathering information of perceived value of customers and representatives' perception were gathered in order to find similarities and differences. Firstly, research examined needs for equipment management in order to discuss what kind of needs customers have towards equipment management. Customers and representatives mostly agreed that most crucial need towards equipment management is to know what equipment customer has and where. However, perceptions also differ as customer mentioned also productive use and optimization of equipment as important need toward equipment management. On the other hand, representatives thought that customers would consider wasted time for searching of equipment and caused cost against lost working time. Nevertheless, perception towards need of equipment management found fit between customers and company representatives.

Perceived benefits within groups were more or less same and both groups stated as a most gain creating benefit were efficient use of equipment, what equipment they have and where, repair history, time-saving from searching of lost equipment, cost-savings from overlapping purchases and mobile application. However, customers mentioned implementation day and better knowledge about the condition of equipment also as a benefit, what representatives did not.

Perceived sacrifices differ more than benefits. Perceived sacrifices, which both group mentioned were pains with internal implementation and reasons and consequences of it. In addition, customers mentioned licence limit and various technical issues as sacrifices. Research included also desired value map of the solution in order to examine which are gain creators and pain relievers that customer desire to have. Although answers within groups varied both groups stated that support and

communicating about internal implementation would relieve pain with the solution. In addition, both groups mentioned GPS as gain creating feature for the solution.

As summary, the research found that the perceived value of the intelligent equipment management was generally positive and customers were mostly satisfied with the solution. The comparison of expected and experienced values of customers verifies that customer who were succeed with implementation were satisfied with the solution. However, it is important to notice that customers who has not succeed in internal implementation were not met expectations with the solution. Vice versa, they perceived internal implementation as most convenient sacrifice considering the solution. Interestingly, all customer mentioned that they had experienced some challenges considering internal implementation. In addition, it is remarkable that most of customer were expecting cost and time savings from the solution. However, none of the customer mentioned that they would experience any cost or time savings from the solution.

The perceptions within customers and company representatives were mostly same concerning need for equipment management and perceived benefits. In other words, it can be stated that there is fit between perceived benefits and need for equipment management, as there were more similarities than differences. However, more differences occur with sacrifices and desired value maps. Hence, it can be stated that considering these features of perceived value the fit was not found as the perceptions customers and company representatives were more non-parallel than parallel.

### **6.1. Theoretical contributions and implications**

The academic literature of supports perceived value of the intelligent equipment management solution. Values that both interviewed groups consider were conditional, functional and epistemic. These values were also covered in Prior (2013) model. Findings of this research support that value creating activities are fairly same with the intelligent equipment management solution than with other intelligent solutions. As a value creating elements this research found improved performance, time-saving, cost-reduction, usability, getting job done, risk reduction and usability. Also literature of Hocevar & Jaklic (2010), Miller et al. (2002), Mylan (2015), Osterwalder & Pigneur (2010), (Prior, 2013), Stremersch et al. (2001) identified these value creating elements earlier in academic literature.

This study found as value creating activities equipment performance, capability forecasting and planning recommendations, equipment operating advice and equipment configuration advice for operational contextual capability. However, some of eleven capabilities were not mentioned in this

research. In addition, this research discovered that value creating activities by case company representatives are communicating, planning, risk managements and coordination. All of these activities has positive impact on perceived value. Value creating activities by representatives were all covered earlier in literature by Prior (2013).

Like stated in previous literature, the base of perceived value was combination of benefits and sacrifices in this research. In addition, also value map of value proposition design canvas by Osterwalder et. al. (2014) was taken as part of research in order to deepen on gain creators and pain relievers of intelligent equipment management solutions. Also desired value map of customers and representatives was discussed in order to discover more briefly what features customer and representatives desire as gain creator and pain reliever. According both groups desired gain creator was GPS and desired pain relievers were support and better communication about the importance of internal implementation. (Osterwalder et. al., 2014). Neu & Brown (2003) stated that impact of human resources on training frontline employees is significant for perceived value of intelligent solution.

Benefits compose from service quality, strategic benefit, practical benefit, economical benefit and even emotional benefit, which Woodall (2013) identified also earlier in academic literature. Woodall also identified non-financial sacrifices; risk, time and effort, which also this study discovered. From the entire model of Woodall (2013) only personal benefits and financial costs were missing.

Most important perceived benefits by interviewed groups were better structure towards equipment management. Customer and representatives were especially interested in information what equipment customer company has where those are. In addition, both groups were perceiving benefits regarding time- savings from searching of missing equipment and cost-savings from overlapping costs. As an individual beneficial factor rose mobile application. In addition, customers also found implementation day, relationship, reputation and sales representative performance beneficial (; Grönroos & Ravald, 2011; Guenzi et al., 2009; Hansen et al., 2008; Hakanen and Jaakkola, 2012; Hansen et al., 2008; Jaakkola and Hakanen, 2013; Mainela & Ulkuniemi, 2013; Neu & Brown, 2005; Stabell & Fjeldstad, 1998; Rust, Lemon, and Zeithaml, 2004). These all provided service quality, strategic benefit, practical benefit and economical benefit like in Woodall (2013) model. In addition, value creating activities of Hocevar & Jaklic (2010), Miller et al. (2002), Mylan (2015), Osterwalder and Pigneur (2010), (Prior, 2013), Stremersch et al. (2001) can be identified.

The perceived sacrifices within interviewed groups varied more than benefits. Customers and representatives both mentioned challenge of internal implementation and consequences of that for managers and employees as perceived sacrifice. Also research of Brady et al. (2005) covered change of mind-set as most difficult feature of acceptance of novel intelligent solution. However, customers were experiencing excluding tagging service and some technical challenges towards software, for instance, viewing location of inserts, editing option with mobile application and saving the password with mobile application. All these non-financial sacrifices, time, risk and effort, discovered in this research can be also found from model of Woodall (2013).

This research contributes customer perceived value of intelligent solutions as it forwards previous literature by presenting customer perceived value from two different aspects; customer and supplier representative. It offers to previous literature more overall viewpoint considering customer perceived value and offers standpoint for case company representatives to observe are the perception parallel. In this research case company's representatives and customer perceptions were fairly same, however sacrifices and desired customer perceived value differ according some features.

Finally, the results of customer perceived value of the intelligent equipment management solution supports previous literature of customer perceived value of intelligent solutions. Nevertheless, this study includes perceived sacrifices more comprehensively as part of customer perceived value. Finding show that customers and representatives found the counteraction of change an internal implementation challenging, which is according this study mainly reason of attitudes, age and lack of training. Additionally, this research emphasizes also suggestion for development by introducing desired customer perceived value by value maps, which earlier academic literature lacks. The most significant finding of desired customer perceived groups was desire for pain relieving considering internal implementation. Groups suggest that better communication and support would assist them in internal implementation. As summary, it can be stated that customer perceived value of intelligent solutions and equipment solutions are fairly same, although intelligent equipment management solution requires more support and communicating than other intelligent solutions.

## **6.2. Managerial implications**

Thesis provides several managerial implications according customer perceived value of intelligent equipment management solution. By managerial implications, thesis provides support for organizations to success with parallel perceptions with customer needs, benefits, sacrifices and desired value of intelligent equipment management solutions. Managerial implication assists organizations to create and sustain competitive advantage by provided information.

To emphasize productive use and optimization of equipment for customer was stated beneficial instead of emphasizing saved time, non-direct cost and direct-cost considering equipment management as customer perceived those as one of the important needs towards equipment management. Perceived benefit within groups were fairly same, although some improvement could be done. It is important to communicate for customer about benefits of mobile application, repair history and implementation day before purchase as any of customers were not expecting those as benefit. In addition, it would be particularly important for case company to ensure that promised cost savings for customer will realize as all customer were expecting those but none of customer mentioned experienced any cost-savings. Case company should also be aware that customers perceived benefits from knowledge about the condition of equipment, relationship, reputation and sales representatives. Thus, these factors should be highlighted even more by case company.

Perceived sacrifices required more actions by case company as perceptions of representatives and customers about sacrifices of the solution were not similar. Most importantly, all customers and representatives were perceiving internal implementation as most crucial sacrifice. Those customers who had struggles with internal implementation in the time of interview have not met expected benefit, which why actions were considered crucial. One improvement for internal implementation would be ensuring that all employees of customer will be trained for usage. For instance, case company could train all employees by jobsite, because all employees are not able to come on communal trainings as standstills of jobsite become highly expensive. The responsibility of customer about commitment, responsibility and importance of internal implementation is important to communicate clearly for customer. Case company should ensure that customer will success in internal implementation by offering support.

Customers were experiencing several sacrifices concerning technical issues of the solution. The management level of case company should intervene on experienced sacrifices concerning location of inserts, possibility to edit mobile application and save the password. Also, the technical knowledge and support of sales representatives should on better level in order to assist customer with technical issues of solution, especially concerning usability and utilizing insert groups. Understanding and communicating about insert groups should be clear for customer. Also communication about license limits and price beforehand would prevent that customer would not expect any sacrifices towards these features.

### **6.3. Limitation and directions for future research**

This research had few limitations, which gives a way for future research. The broader examination of perceived value of equipment management solution in construction industry would shed light for prevalence of findings. Thus, the findings of this study are not able for generalization statistically. The perceived value of equipment management would be interesting to discover further in construction industry and provide broader view of phenomenon. In addition, one must consider that all findings are derived from the Finnish construction industry, hence findings might not be applicable to other context or countries. However, as the Nordic countries share similar societal as Finland, the result might be discretionally applicable in Nordic countries.

In addition, this research examines perceived value of case company customer and representatives. Therefore, a research focused only customers' or either representatives' perceived value of the solution would obtain more thorough and fundamental information of their perceptions. In addition, broader examination purchasing of the equipment management solution in construction industry would be valuable for future research. It would be interesting to examine the reasons why some customer did not purchase the solution. In addition, it would be interesting to immerse deeper in purchasing decision of customers who already bought the intelligent equipment management solution.

Additionally, further research where the description of perceived value of equipment management solution would be broaden would interesting. This research is the first research integrating perceived value with equipment management solution of customers and representatives. Hence, topic might provide more potential features for future research.

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## APPENDICES

### Appendix.1 interview questions

#### Interview Guide (for customer firms)

##### Part 1: Background information

1. Could you please tell your name, current role in your company, and experience in the construction industry?
2. Could you describe the size of your company in terms of turnover, employees, and jobsites?
3. Could you describe briefly your firm's core business?

##### Part 2: Equipment management in the construction industry

4. In your opinion, how important is equipment management in the construction industry?
5. What kinds of equipment management needs you have in your business?
  - a. What are the typical issues or challenges with equipment management in your business?
6. In your opinion, how important are intelligent (i.e., rfid) equipment management systems or solutions in the construction industry?
  - a. What kind of benefits they could deliver compared to more traditional or manual equipment management systems?
  - b. How could they help you to improve your own working processes? What about your workers /operators processes?
  - c. What kind of concerns you (would) have about adopting intelligent (i.e., rfid) equipment management systems or solutions?
  - d. What do you think would be some of the key barriers that would prevent you from purchasing intelligent (i.e., rfid) equipment management systems or solutions?

##### Part 3: Questions about the intelligent equipment management solution

7. How familiar are you with case company's the intelligent equipment management solution?
8. In your opinion, what features led your company to choose the intelligent equipment management solution?
  - a. Are some features more important than others?
9. In your opinion, what were the key expectations from the intelligent equipment management solution before the purchase

- a. What kind of benefits you expected it to deliver to you as a company/to individual workers
  - b. How did you expect it to improve your business processes?
  - c. How did you expect it to help the day-to-day work of construction workers
  - d. Did you expect any challenges or difficulties before purchasing the intelligent equipment management solution?
  - e. What were your key concerns?
10. In your opinion, what kind of benefits has the intelligent equipment management solution delivered to your operations after the purchase/deployment?
- a. How has it helped the organization?
  - b. ... Construction management?
  - c. ...Individual user/operator?
  - d. How has it helped you to deliver value/benefits to your own customers?
  - e. Have you experienced any (unexpected) difficulties with using the intelligent equipment management solution?

#### Part 4: Relationship-specific questions

11. How would you describe your company's relationship with case company?
12. In what respects is the case company's intelligent equipment management solution monitoring better than its competitors? In what respects is it worse?
13. In what respects is case company better as a supplier than its competitors? In what respects worse?
14. What kind of assistance did case company provide in deploying the intelligent equipment management solution?
- a. How could they improve even further on the assistance they provide?
15. What kind of support did case company provide after deploying the intelligent equipment management solution?
- a. How could they improve their support even further?
16. How does case company ensure that you can realize the promised benefits of the intelligent equipment management solution in practice?
- a. How could this be further improved?

17. In general, how satisfied are you with the intelligent equipment management solution?
  - a. How could this be improved even further?
18. In your opinion, how has the intelligent equipment management solution influenced your perceptions of case company 's image?
19. In your opinion, are there any other important issues related to the intelligent equipment management solution that we have not discussed yet?
20. In your opinion, who could be other potential informants from your company who would be interested or knowledgeable about intelligent equipment management solutions in general, or the intelligent equipment management solution in particular?

#### Interview Guide (for case company representatives)

##### Part 1: Background information

1. Could you please tell your name, current role in your company, and experience in the construction industry?

##### Part 2: Equipment management in the construction industry

2. In your opinion, how important is equipment management in the construction industry?
3. What kinds of equipment management needs your customers usually have?
  - a. What are the typical issues or challenges with equipment management in your customers' business?
4. In your opinion, when customers consider buying equipment management solutions, what features do they usually evaluate?
  - a. Are some features more important than others?
5. How does the intelligent equipment management solution help customers?
6. In your opinion, what kind of value does the intelligent equipment management solution deliver to customers?
  - a. What kind of benefits it delivers compared to more traditional or manual equipment management systems?
  - b. How does it help customers to improve their own working processes?
  - c. What about their workers /operators processes?
7. In your opinion, do customers always understand what kind of value the intelligent equipment management solution can deliver?

- a. What (kind of benefits) customers usually expect from the intelligent equipment management solution?
  - b. What kind of benefits customers have realized from the intelligent equipment management solution? (can you give examples?)
  - c. What are the typical concerns that customers have about the intelligent equipment management solution?
  - d. What do you think are some of the key barriers that (would) prevent customers from purchasing the intelligent equipment management solution? (can you give examples?)
8. In your opinion, how does case company's sales force usually communicate the potential value of the intelligent equipment management solution to customers?
- a. Do the sales usually understand the whole value potential of the intelligent equipment management solution?
  - b. How do you think the sales understanding of potential value of the intelligent equipment management solution could be improved?
  - c. What are the key benefits they communicate?
  - d. What are some of the benefits that are more difficult to communicate?
  - e. How do you think the sales message should be improved?
9. In your opinion, are there any other important issues related to the intelligent equipment management solution that we have not discussed yet?