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Value perceptions of measurement and monitoring system customers

ABSTRACT

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The value that the customer perceives from a supplier's offering, impacts customer's decision making and willingness to pay at the time of the purchase, and the overall satisfaction. Thus, for a business supplier, it is critical to understand their customers' value perceptions. The objective of this thesis is to understand what measurement and monitoring system customers value, by examining their key purchasing criteria and perceived benefits.   Theoretical part of this study consists on reviewing relevant literature on organizational buying behavior and customer perceived value. This study employs a qualitative interview research method. The empirical part of this research consisted of conducting 20 in-depth interviews with life science customers in USA and in Europe.   Quality and technical features are the most important purchasing criteria, while product-related benefits seem to be the most important perceived benefits. At the marketing of the system, the emphasis should be at which regulations the system complies with, references of supplier's prior experience, the reliability and usability of the system, and total costs. The benefits that should be emphasized are the better control of customer's process, and the proof of customer's product quality

TIIVISTELMÄ

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Asiakkaan toimittajan tarjoamasta kokema arvo vaikuttaa asiakkaan päätöksentekoon ja maksuhalukkuuteen ostohetkellä, sekä asiakkaan tyytyväisyyteen. Sen vuoksi on äärimmäisen tärkeää, että toimittaja ymmärtää asiakkaidensa arvokokemuksia. Tämän diplomityön tavoitteena on ymmärtää mitä mittaus- ja monitorointijärjestelmä asiakkaat arvostavat, selvittämällä tärkeimmät ostokriteerit sekä koetut hyödyt.

Työn teoreettinen osuus koostuu yritysten ostokäyttäytymistä sekä asiakkaan kokemaa arvoa käsittelevän kirjallisuuden kirjallisuuskatsauksesta. Työ on toteutettu käyttäen laadullista haastattelututkimusta. Työn empiiriseen osuuteen kuuluu 20:n Life Science asiakkaan haastattelu USA:ssa sekä Euroopassa.

Laatu- ja tekniset ominaisuudet ovat asiakkaiden tärkeimpiä ostokriteerietä, kun taas tuotelähtöiset hyödyt koetaan tärkeimpinä. Tuotteen markkinoinnissa tulisi painottaa mitä säädöksiä systeemi täyttää, referenssejä toimittajan kokeneisuudesta, systeemin luotettavuutta ja käytettävyyttä, sekä kokonaiskustannuksia. Hyödyt, joita tulisi korostaa, ovat parempi kontrolli prosesseista sekä laadun takaaminen.

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"Beginnings are usually scary and endings are usually sad, but it's everything in between that makes it all worth living" –Bob Marley

Almost exactly five years ago I was on a beginning of an adventure. At that time the end of that adventure seemed so far away, it was almost unreachable. The time has passed in a blink of an eye, and now it is time to move on to new adventures. Not only has these five years brought me an education, but also great experiences, great friends, and great life lessons. Most exciting times have, however, been past months writing this thesis. Not many get to travel during their thesis projects, let alone to Las Vegas.

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Kouvola, 28.7.2015

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1   INTRODUCTION

In today's highly competitive markets, many suppliers find it difficult to compete based on technological advantages or quality features, as they are quickly imitated by competition (van der Haar, et al., 2001). In order to succeed, a business-to-business marker must understand the buying behavior of its customers' (Bunn, 1993). In order to do that, the marketer must understand what it is that its customers value. The value that customers perceive and realize, influence their decision making process and willingness to pay (Narayandas, 2005; Helkkula, et al., 2012). Thus, a business marketer must know how to create, communicate, and deliver value for its customers. Customer value is critical in all aspects of marketing decision making: core building blocks of marketing, including segmentation, targeting and positioning, value propositions, and pricing rely on customer value. (Ulaga, 2011).

Due to ever greater pressure from rampant commoditization, suppliers are increasingly searching for new avenues for value creation (Ulaga, 2011). One way suppliers can add value to their customers, is by providing integrated solutions – combinations of products and services that create unique benefits – by taking over the responsibility and risk of activities previously performed in-house by customers, or by developing new ways of components working together as an "integrated whole" (Brady, et al., 2005). Offering integrated solutions offer a way for technology-based suppliers to differentiate themselves from the competition, as the intangible nature of the solutions makes them hard to copy (van der Haar, et al., 2001).

Customer value is not by any means a new concept. However it has only recently achieved a great attention among marketing practicers and academics. For example, the Marketing Science Institute has defined understanding markets and delivering superior value as a research priority. (Lindgreen & Wynstra, 2005). There are a number of studies addressing the issue of how suppliers can create value to their customers (Ulaga & Eggert, 2006; Lindgreen, et al., 2012). Less understood remains for example, how customers actually perceive value (Lindgreen & Wynstra, 2005), and what are the relevant buying criteria for relevant solution offerings (Töllner, et al., 2011). Research on customer value perceptions also lacks on the knowledge of on how different individuals beyond the buyer perceive value (Ulaga, 2011).As the growing globalization means that business marketers must understand to what extent to standardize or adapt the value propositions across countries and markets, customer value research also needs "additional, internationally oriented empirical input". (Ulaga, 2011).

1.1   Research questions and objectives

The present study aims to create understanding on what basis customers purchase solutions and what kind of value do they perceive from them. The objective of the study is to identify which features should be emphasized at the marketing of environmental monitoring and measurement systems. As perceptions of value differ within different types of customers as well as within a single decision making unit, the thesis aims also to identify *to whom* they should be emphasized. The research questions of the present study are presented in the table 1.

Table 1. Research questions and objectives

Research question	Objective
1. What are the most important purchasing criteria for measurement and monitoring system customers?	To identify relevant purchasing criteria for measurement and monitoring system customers
2. What benefits do monitoring and measurement system customers perceive from the system?	To identify what kind of benefits they perceive from the system

The *first research question* aims to identify the most important criteria that monitoring and measurement system customers use when they are purchasing the system. Purpose for the *second research question* is to identify the benefits that customers perceive from the system. The knowledge created through answering to these questions will reveal what customers value in measurement and monitoring systems, and thus contribute to the overall objective of the present study.

1.2   Structure of the report

The present study consists of seven chapters. The study is structured as follows. First, the topic is introduced and the research questions and objectives are formed. Chapters two and three create the theory part of this study. Then the methodology of the study is explained and finally, the findings of empirical research are analyzed and results presented. The structure of the thesis is presented in figure 1 as an input-output chart.

INPUT	CHAPTER	OUTPUT
Background Research gap	**Chapter 1** Introduction	Research objectives research questions
Existing literature	**Chapter 2** Organizational buying behavior	Theoretical background
Existing literature	**Chapter 3** Customer perceived value	Theoretical background
Qualitative interview research Interviews	**Chapter 4** Methodology	Overview of the methodology used in the present study
Analyzed data	**Chapter 5** Results	Results from the data analysis
Empirical research findings	**Chapter 6** Conclusions	Answers to the research questions Managerial implications
Existing theory Research results	**Chapter 7** Summary	Summary of the study and the results

Figure 1. Structure of the present study

The first chapter introduces the subject of this thesis and presents the research objectives and questions. *The second chapter* examines current literature on organizational buying behavior. At first, the nature and fundamentals of organizational buying are explained. Then the literature on buying center, purchasing process and purchasing criteria are reviewed. *The third chapter* reviews existing literature on customer perceived value. In this chapter, different benefits and sacrifices noted in the literature are discussed. Then, customer value perceptions are presented in different levels – organizational and individual. After that, customer value is discussed as dynamic in nature. Finally, this chapter discusses existing literature on communicating value to customers. *The fourth chapter* discusses the methodology used in the present study. The qualitative interview research method is explained at first. Focal case of this study, Vaisala's measurement and monitoring system, is then introduced. The process of collecting and

analyzing data is also explained. In *the fifth chapter*, the findings from the interviews are analyzed. In this chapter buying process and especially purchasing criteria of monitoring and measurement system customers, and perceived benefits are examined. Then, differences in perceptions are compared in order to find out which groups value which features. *The sixth chapter* concludes findings of this study. In this chapter, answers to the research questions are presented, and managerial implications given. Recommendations for future research are also made. Lastly, *chapter seven* gives a brief summary of the study.

2   ORGANIZATIONAL BUYING BEHAVIOR

The purchase of goods and services can often add up to half of the generated sales revenue of the purchasing organization. The quality of supplier's input will directly impact business buyer's output quality. As such, the buying decision is of high importance to the purchasing company. (Fliess, et al., 2015, p. 171) Understanding customers' buying behavior is critical for the success of business to business (B2B) marketers. Organizational buying process is often described as dynamic and complicate, thus achieving this kind of understanding may be difficult. (Bunn, 1993).Organizational buying involves many individuals and goals, and "potentially conflicting decision criteria", takes extended period of time, requires multiple information sources, as well as comprehends many inter-organizational relationships. An organizational buying process can be described as a "form of problem-solving": the purchasing situation is created when a problem, which could be solved through buying action, is perceived by someone in the organization. (Webster & Wind, 1996). Organizational buying differs in many ways from consumer buying. The most important differences generally considered are that there are fewer, but larger buyers, the relationship between the buyer and the seller tends to be closer and longer-term, buyers tend to act more rationally, the buying may be specific to requirements, negotiation is more important, and the situation may be more risky and more complex. (Jobber & Lancaster, 2009, pp. 78-89)

Budget, cost, and profit considerations, as well as environmental, organizational, social, and individual factors influence organizational buying. Environmental factors include physical (geographic, climate, ecological), technological, political, economic, legal and cultural factors. They influence the purchasing process by providing information, constraints and opportunities. They may define the availability of goods and services, as well as general business conditions and norms and values. Organizational buying is directed and motivated by organization's goals, and constrained by its resources including financial, technological or human resources. Thus, organizational factors cause and individual to act differently than they would on their own or in a different organization. Social factors, i.e. how the group of individuals involved in the buying center is functioning, are influenced by individual members' personal characteristics and goals, the leadership within the group, the tasks of the group as well as external influences. Lastly, the purchasing process is influenced by individual factors, as in the end, all organizational buying behavior is individual behavior. (Webster & Wind, 1996)

According to Jobber and Lancaster (2009, p. 92) there are three elements in the organizational buying: the structure, the process, and the content. The structure is about who is involved in the decision making, and what their roles are. The process considers getting the information, analysis, evaluation, and decision making. Finally, the content is the "what" factor of the buying: what criteria is used along the decision-making process and by whom. This chapter looks into relevant literature on each of these elements. At first, the concept of buying center is explained. Then, literature on purchasing process is reviewed. Finally, this chapter looks into purchasing criteria literature.

2.1 The buying center

The buying center refers to those individuals of an organization, who are involved in buying of particular product or service (Johnston & Bonoma, 1981). According to Sheth (1973) there are typically at least three departments of the organization, whose members are involved in the process. Involving several people in the buying process reduces the risk of coming to a wrong decision for both the organization as well as the individuals involved (Fliess, et al., 2015, p. 182). Webster and Wind (1996) identify five roles in the buying center: users, buyers, deciders, influencers and gatekeepers. Table 2 contains descriptions of each role.

Table 2. Roles of the Buying center

Role	Description
Buyer	Formal responsibility and authority for contracting with suppliers
Gatekeeper	Control the flow of information and materials into the buying center
Influencer	Influence the decision process either directly or indirectly by providing information and criteria for evaluation
User	Use the purchased products and services
Decider	Has authority to choose between different buying actions

Buyer's role in the purchase is to manage the relationship with the supplier and deal with the contractual arrangements. They have a role in selecting and establishing relationships with suppliers, but if any problems arise they rarely act alone. The buyer is usually responsible for negotiating with the supplier and to administer the order. *Influencers* can affect the choice between existing suppliers or introduce new suppliers. Influencers can be found in any departments of the customer's organization. *Users* of the potential system can be important influencers. Listening to users' opinions has increased in companies, as it may enhance the productivity. (Ford & Berthon, 2002). There are two types of users. The first type works directly with the purchased item. They rarely work on a higher levels of the hierarchy, and thus have no formal decision rights in the purchasing process. However, they can influence the decision either positively or negatively and hence often decide about the success or failure of the purchase. The second type of users do not use the item directly, but carry a responsibility for its proper use. Their influence as a user is generally higher as they tend to posit higher in the hierarchy. (Fliess, et al., 2015, p. 185) *Gatekeepers* control the information flow between the supplier and the rest of the customer organization. Finally, *deciders* have the role of limiting the choice of an offering to a specific supplier. In the purchasing situation, there may be one or more deciders. It may be difficult to identify a single decider or the point where the decision is actually made. (Ford & Berthon, 2002, p. 78) Major roles in the buying center stay the same over all purchases, however the participants change over purchase types and categories (Johnston & Bonoma, 1981). Also, several individuals may have the same role, and one individual may occupy more than one role (Webster & Wind, 1996).

There is a considerable amount of interaction between the individuals who are involved in the purchasing process, and they often decide jointly. However, each member has different expectations in the purchasing situation, which are created by different backgrounds, information sources, active search, perceptual distortion and satisfaction with past purchases. The background includes educational background, different professional goals and values as well as task expectations. Different individuals are exposed to different sources and types of information, which will generate different expectations to the purchasing situation. Each individual will try to make the information consistent with their own prior knowledge by systematically distorting it. Since each member of the buying center has different expectations, and thus different evaluation criteria, the level of satisfaction will be different among members. (Sheth, 1973).

The size of the buying center, and the relative influence between members varies according to the type of the organization as well as the type of the purchase. In larger size companies, the buying center tends to be bigger. Also, the more complex, or more important the purchase is, the bigger is the size of the buying center. In non-profit organizations, there tends to be more people involved in the purchase. If the time pressure is high, the buying center is smaller. (Fliess, et al., 2015, p. 184) The perceptions of relative influence between the members of the buying center vary also across the product types and whether the question is which supplier to select or which product to buy. For example, engineering is more influential when the question is which product to buy, and the purchased product is materials or component parts. Manufacturing has influence on the product decisions related to minor capital, supplies, materials, and component parts. In product decisions related to major capital, engineering and purchasing are perceived most influential. When the question is which supplier to buy from, purchasing department is perceived to be more influential in materials decisions than in major capital decisions. Top management has relatively little perceived influence when it comes to any product or supplier decisions. (Jackson, et al., 1984)

2.2   Purchasing process

Classification of purchasing schemes are important for development of effective marketing programs (Bunn, 1993). Webster and Wind (1996) identify five stages in the buying decision process: identification of need, establishment of specifications, identification of alternatives, evaluation of alternatives, and selection of suppliers. According to Bunn (1993) the buying process involves four underlying activities. *Search for information* considers the effort to scan the internal and external business environment in order to identify and monitor relevant information sources. *Use of analysis techniques* is the extent to which formal tools are used to objectively evaluate the aspects of the purchasing decision. The *proactive focusing* considers strategic objectives and long-term needs of the organization. *The procedural control* is defined as the extent to which the decision is "guided by established policies, procedures, or transaction precedents". (Bunn, 1993)

Approaches of purchasing differ in buyer's perceptions of purchase importance, task uncertainty, extensiveness of choice set, and perceived buyer power (Bunn, 1993). Bunn (1993) has identified six purchasing approaches, which are summarized in table 3.

Table 3. Purchasing approaches

	Purchase importance	Task uncertainty	Choice set extensiveness	Buyer power	Search for information	Proactive focus	Procedural control
Casual	minor	little	much	little or no	no search	no analysis	simply transmit to order
Routine low priority	somewhat	moderate	much	moderate	little effort	moderate	follow standard procedures
Simple modified rebuy	quite	little	narrow	moderate	moderate	moderate	follow standard procedures
Judgmental new task	quite	great	narrow	moderate	moderate	moderate	little reliance
Complex modified rebuy	quite	little	much	strong	high	high	follow standard procedures
Strategic new task	extremely	moderate	narrow	strong	high	high	little reliance

An example of casual purchase situation would be a real estate development firm purchasing desks for the organization, or an electrical supply firm buying a relay for repair purposes. Routine low priority situation occurs typically when a firm purchases production supply items, raw materials, or components. Simple modifier rebuy situation could happen when an electrical utility company purchases underground cable. The decision process in the judgmental new task buying situation can be described as "decide as you go". The high level of uncertainty in these types of situations may be because the customer firm is unfamiliar with the product, the product is technologically complex, or they are dealing with a new supplier. Products may be differentiated and difficult to evaluate. Complex modifier rebuy situations are usually a "routine part of previously negotiated contracts". Strategic new task purchasing situations are strategically and financially important to the customer firm, and the purchased products are critical elements in the customer's production process. (Bunn, 1993)

While Bunn's (1993) taxonomy on buying decision approaches focused only on buyer's perspectives, Moon and Tikoo (2002) found that four buying activities on Bunn's (1993) taxonomy are useful criteria for users as well. Their research showed that "buyers search for more information, make greater use of analysis techniques and exercise greater procedural

control" compared to users and that when the purchase item involves specialized considerations, users are more involved in the decision process. (Moon & Tikoo, 2002)

Different buying situations affect the purchasing process, for example the length of the purchase, and the size and composition of the buying center. New task and modified rebuy situations tend to last longer than straight rebuy situations. In straight rebuy situations, the size of the buying center is smaller, usually consisting of two to three individuals, while in new task or modified rebuys the number of individuals involved is usually from three to six persons. The composition of the buying center fluctuates in all purchasing situations. In straight rebuy situations, engineers, production managers, users and purchasing agents are involved in the evaluation of different suppliers. The final decision is usually done by the purchasing agent, engineers, or production manager. In modified rebuy and new task situations top management, production manager, head engineering, a board of directors, and purchasing managers are involved in the purchasing, either as a permanent or temporary members of the buying center. The participants are usually from different functional departments. The final decision is only seldom done by the purchasing agent. (Doyle, et al., 1979).

Perceived risk and uncertainty influence the flow of the purchasing process, and the structure of the buying center. Most common risks include delivery times, quality risks, supplier's (or buyer's) lack of expertise, or novelty of the situation. (Munnukka & Järvi, 2008).When the time pressure or importance of the purchase is high, the buying center tends to become more complex. In novel purchases, the buying center structure is less formalized, as organization may find it difficult to formulate an explicit set of procedures or rules to guide the decision making. (Lau, et al., 1999)

2.3 Purchasing criteria

Selecting the supplier is one of the key elements in organizational purchasing process. Selection decision involves two "basic but instinct" tasks: evaluation and choice. The evaluation task involves identifying the attributes or criteria relevant to the decision, and rating each supplier on each relevant criteria. (Patton, 1996) The objective is to find who the most optimal supplier is, rather than who offers the lowest price, quickest delivery, or the best service (Swift, 1995).

Previous research has identified quality, cost, delivery, and service as key attributes (Verma & Pullman, 1998; Bharadwaj, 2004). Sonmez and Moorhouse (2010) add that reputation, organizational capabilities, knowledge and understanding, as well as competences matter as well, especially in the case of purchasing professional services. The size and location of the supplier, the relationship, and even the salesmanship can have critical impact on the purchasing criteria (Sheth, 1973). When customers are purchasing industrial solutions, they expect the provider to excel in terms of six relational processes. They include requirements definition, customization and integration, deployment, post-deployment, signaling, and inter-process management. (Töllner, et al., 2011) Table 4 presents definitions for each relational process.

Table 4. Criteria of customer solution

Title	Definition
Requirements definition	Asking right questions and identifying specific needs and problems
Customization & integration	Designing, modifying, and selecting goods and services that (1) fit into customer's environment; and (2) work well with one another.
Deployment	Delivery and implementation of products and installation into customer's environment. (tuli et al)
Post-deployment	Providing spare-parts, operating information and routine maintenance, and deploying new products
Signaling	Demonstrating experience, competence, references and commitment to reduce customer's perceived purchase risk.
Inter-process management	Coordination, time management, incorporation and improvement, and proactive support.

At the requirement definition phase they expect the supplier to provide various technical options and a detailed documentation. At this stage, supplier should ask the right questions in order to understand customer's business model, needs and problems. Customization and integration is relevant criteria for purchasing solutions. Customization includes designing, modifying and selecting products that fit to the customer's environment, and integration includes selecting goods and services that work with one another. For the deployment of the solution, customers ask for running trials, staff training, workshops and detailed manuals. Offering operating information in case of need, and routine maintenance is also valued by customers. Customers also want the supplier to propose innovative products for evolving

requirements. Signaling includes demonstrating competence and experience, and providing information of how the solution is generated, *prior* the customer selects the supplier. Supplier's ability to show commitment for the project from the beginning is a critical aspect of choosing the provider. For inter-process management, customers ask for a supplier, who is able to coordinate all sub-contractors involved, as well as to manage all customer-supplier interfaces. The number of contact persons for customer should be low, and information exchange open. Supplier should reach goals according to schedule, and provide continuous incorporation and improvement of the product and the service. Trusting atmosphere is also critical criterion for purchasing solutions. (Töllner, et al., 2011)

The "key buying criteria" varies across different product categories (Bharadwaj, 2004), and according to size of the customer, manager's position, and department in charge of the purchasing (Sonmez & Moorhouse, 2010). Töllner et al. (2011) add that the relevance of each criteria varies across the roles in the buying center. For example, users are mostly interested in the deployment and customization of the solution. As they will work with the solution on a daily basis, the designing, modifying and selecting products and services that fit into their work environment is of highly interest for them. Users also often need detailed technical information and customized trainings, and thus they are more interested in the deployment of the center than any other roles in the buying center. Buyers' responsibility often centers on the earlier stages of the purchasing process. Thus, the buyer is mostly interested in the signaling and requirements definition. Buyers' objective most often is to reduce risk, so they compare providers based on evaluation of reference projects, establishment of competitive biddings, and examination of supplier's reputation and prior experience. Buyers also systematically collect requirements of other departments and discusses them with the supplier during the negotiations.

Deciders are, according to Töllner et al. (2011) strongly interested in requirements definition, signaling and inter-process management. The first two processes interest deciders as they want to reduce the risk of choosing a wrong supplier, however deciders rely on buyers' expertise on these matters. As the decider is responsible for the whole lifecycle of the solution, they also put strong emphasis in inter-process management. This way, the decider can ensure that the solution works as promised throughout its lifecycle. (Töllner, et al., 2011)

Customers are increasingly looking at purchasing as a way to increase profits, and therefore put pressure on suppliers to reduce prices. By accurately understanding what customers value and would value, a supplier can persuade its customers to focus on total costs rather than the

acquisition price. (Anderson & Narus, 1998). The value perceptions of the individuals in the buying center also influence the purchasing criteria used in the purchasing situation. (Fliess, et al., 2015, p. 178) The next chapter discusses the concept of customer perceived value.

3 CUSTOMER PERCEIVED VALUE

Customer value has become one of the key concepts in B2B marketing literature and practice over the last few decades (Lindgreen, et al., 2012; Ulaga, 2011). It is seen as a source for competitive advantage (Woodruff, 1997), and it is crucial for "creating and maintaining long-term relationships" between the supplier and the customer (Eggert, et al., 2006). Thus, a supplier must know how to create, communicate, and deliver value for its customers (Ulaga, 2011). Value is increasingly relevant concept, however many firms often find it difficult to measure or define (Lindgreen & Wynstra, 2005).

There are many definitions for customer value. Typically, customer value is explained as something perceived by the customer, not set by the supplier (Butz & Goodstein, 1996; Woodruff, 1997; Eggert & Ulaga, 2002), it is obtained through a use of a product or service (Woodruff, 1997; Lapierre, 2000; Homburg, et al., 2005) or through a business relationship (Lindgreen & Wynstra, 2005; Homburg, et al., 2005; Ulaga, 2011) and relative to the competition (Butz & Goodstein, 1996). Most definitions also involve a trade-off between benefits gained, and sacrifices made by the customer (Butz & Goodstein, 1996; Anderson & Narus, 1998; Ulaga & Chacour, 2001; Blocker, 2011). Some definitions for customer value are listed in table 5.

Table 5. Definitions of customer value

Definition	Authors
The [emotional] bond [between the customer and the supplier] develops when customers believe that the goods and services an organization provides regularly produce more benefits to them than the costs incurred… especially compared to the competition.	Butz and Goodstein (1996)
Value in business markets is the worth in monetary terms of the technical, economic, service, and social benefits a customer company receives in exchange for the price it pays for market offering.	Anderson and Narus (1998)
…the trade-off between the multiple benefits and sacrifices of a supplier's offering, as perceived by key decision makers in the customer's organization, and taking into consideration the available alternative suppliers' offerings in a specific use-situation.	Ulaga and Chacour (2001)
…the perceived trade-off between multiple benefits and sacrifices gained through a customer relationship by key decision makers in the supplier's organization.	Walter, Ritter and Gemünden (2001)
An industrial buyer's overall appraisal of the net worth of a particular transaction, based on the buyer's assessment of what is received (benefits provided by the transaction) and given (costs of acquiring and utilizing the transaction).	Han and Sung (2008)
Customer value in B2B contexts is defined as the customer's perceived trade-off between benefits and sacrifices within relationships.	Blocker (2011)

Supplier and customer may have different views on the value supplier's offering provides (van der Haar, et al., 2001). Thus, in order to fully understand the value its offering provides to customers, a business supplier must identify the sacrifices and the benefits their customers perceive.

3.1 Benefits and sacrifices

Perceived sacrifices include all the monetary and non-monetary costs that the customer needs to invest in order to obtain the product, or to maintain the relationship. Monetary costs include for example purchasing price, acquisition costs, and operation costs (Ulaga & Eggert, 2006). Non-monetary costs include customer's time, energy, and conflict. (Lapierre, 2000). Some studies claim, that the negative impact of sacrifices is greater than the positive impact of the benefits (Ravald & Grönroos, 1996). Perceived benefits can include for example a combination of available physical attributes, service attributes and technical support (Eggert & Ulaga, 2002) -or competence, market position and social rewards (Walter, et al., 2001). Customers obtain benefits through the use of a product or service, or, as emerging literature suggests, through a business relationship (Ravald & Grönroos, 1996; Walter, et al., 2001; Lapierre, 2000; Lindgreen & Wynstra, 2005).

According to Lapierre (2000), product-related benefits include supplier's ability to offer alternative solutions or tailor their offerings according to customer's needs, ability to offer products that meet unique specifications for products that competitors cannot offer, the ability to offer customized products to customers, and the quality of the product (Lapierre, 2000). Key aspects of product quality are consistent level of quality, performance, and reliability. Superior quality may offer potential differentiation for the supplier, although as it can be imitated by the competitors, its role is limited. (Ulaga & Eggert, 2006). High quality of supplier's product can help the customer to build premium image by increasing the quality of customer's product. It also reduces the risk of supplier selection. (Homburg, et al., 2005)

Supplier's ability to provide services benefit the customer in many ways. For example, it reduces the amount of coordination the customer needs to do and liberates resources that can be allocated to other activities (Ulaga, 2011). It can effect customer's cost level, by lowering operative and administrative costs, thus allowing the customer to earn higher margins (Grönroos, 2011). Lapierre (2000) mentions that customer is able to receive quick answers to

problems, new or replacing products and services in case of emergency, and specialized expertise from supplier's service. Ulaga and Eggert (2006) add that supplier's services enable the customer to improve its cycle times, as the supplier may perform certain tasks, such as testing or validation faster. Supplier's services, such as maintenance also increase the durability of the product, and thus enhances the product-life time (Homburg, et al., 2005).

Buyer and supplier firms do not do business with each other solely based on the value of the exchanged goods or services, and several researchers have started to focus on the concept of "relationship value", rather than value of the core offering (Lindgreen & Wynstra, 2005). Good relationship between the supplier and the customer adds value to the customer in many ways. For example, it reduces uncertainty, allows joint decision on goals and plans, and increases trust. Increased trust enhances competitiveness, allows more open sharing for new ideas, and reduces transaction, search, monitoring, and coordination costs. Supplier's flexibility towards the customer enables quick changes to unforeseen needs, improves customer's processes, and allows the customer to be more flexible with its customers. (Homburg, et al., 2005). Supplier may hold specific know-how that the customer does not have, and cannot or does not want to acquire. Supplier's knowledge may help the customer to reduce its time to market, find new sourcing alternatives, and add value to existing products. (Ulaga & Eggert, 2006). Personal interactions between the two parties enhances communication, allows any incurring problems to be addressed easier, and allows the objectives of each other to be understood better (Ulaga, 2011). Table 6 presents a summary of product-, service-, and relationship-related benefits.

Table 6. Drivers of customer value

	Benefits
Product-related benefits	Alternative solutions Product quality Product customization
Service-related benefits	Service quality Responsiveness Flexibility Technical competence Delivery performance Service support Effects on customers cost levels
Relationship-related benefits	Reduces uncertainty Trust Joint decisions on goals and plans Flexibility Supplier know-how Personal interaction

When the customer believes that the products and services the supplier provides produces more benefits than the incurred sacrifices, an emotional bond between the customer and the supplier will develop. Customers that are highly bonded to the supplier are more likely to buy from that supplier repeatedly and also recommend the supplier to others. (Butz & Goodstein, 1996)

3.2 **Value perceptions at organizational and individual level**

Previous research has shown that B2B customers perceive value in multiple levels (van der Haar, et al., 2001; Rugg, et al., 2002; Macdonald, et al., 2011) and that the evaluation of value is subjective in nature (Lapierre, 2000; García-Acebrón, et al., 2010). In B2B context, individuals may hold organizational or individual goals. They may also move back and forth between these. (Macdonald, et al., 2011).

According to Kleinaltenkamp et al. (2012) differences between value perceived at an organizational level and value perceived at an individual level can be found. Customer value for the organization is the sum of benefits and sacrifices in an ongoing transaction with a business partner, while customer value for the individual is the sum of benefits and costs

perceived by the individual. For example, "low operational cost" is an organizational benefit, while "personal reputation" is an individual's benefit. (Kleinaltenkamp, et al., 2012).

Those who are higher in the organization hierarchy tend to make valuations predominately on organizational level, while those lower in the organization assess benefits on the individual level. (Rugg, et al., 2002). Value assessments at both organizational and individual level are important for customer's view of value. Thus, supplier needs to account subjective benefits as well. (Macdonald, et al., 2011) Table 7 lists customer value constructs at organizational and individual level.

Table 7. Value constructs at organizational and individual level.

Level	Value constructs

Organizational	Low operational costs
	  – Efficiency
	  – Fast problem solving
	  – Avoiding down-time
	  – Fixed capital reduction
	Low coordination effort
	Reduced exposure to financial or other risks
	Innovativeness

Individual	Reduction on individual sacrifices
	  – Uncertainty
	  – Pressure
	  – Task simplicity
	  – Perceived control
	Individual benefits
	  – Personal reputation
	  – Social comfort

3.3 Customer value as a dynamic concept

Emerging literature on customer value suggests that customer value is dynamic in nature (Eggert, et al., 2006) Thus, the perceived importance of different value creation drivers may vary as the relationship "moves through its lifecycle" (Eggert, et al., 2006) and the same item may have a differing value "depending upon the time, the place, and the use" (Lindgreen & Wynstra, 2005).

Customer value can be described as a hierarchy (figure 2). At the bottom of the hierarchy, customers view the product as a bundle of certain, desired attributes and attribute performances. In the next level of the hierarchy, customers learn to view these attributes based on their ability to facilitate desired consequences, reflected in value in use. In the highest level of the value hierarchy, customers learn to desire certain consequences, which will help them to achieve their specific goals and purposes. Similarly, customers use their specific goals to evaluate the importance of consequences, which will guide the customer to attach importance to specific attributes. (Woodruff, 1997).

Figure 2. Customer value hierarchy model
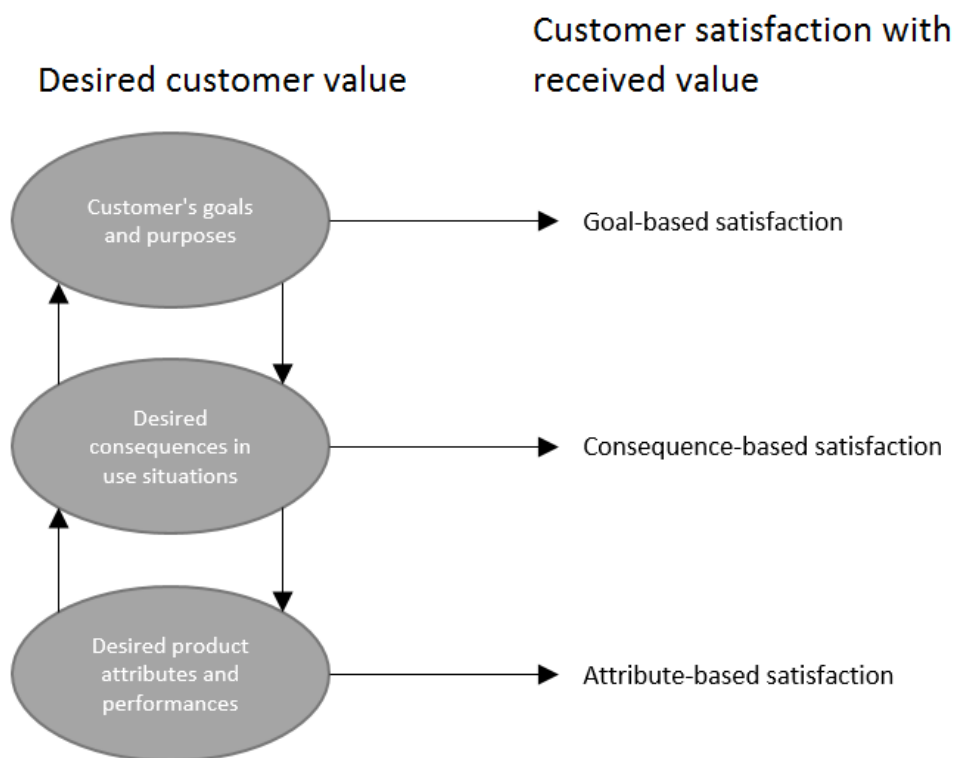
According to the hierarchy model, customers evaluate the product using the desired attributes, consequences and goals that are important to them at that time. Thus, the situation, in which the customer is using the system, is critical in the evaluation of value. If customers use situation changes, the linkage between attributes, consequences, and goals change. (Woodruff, 1997)

As figure 2 shows, customer value is also strongly linked to customer satisfaction with the value customer receives. Customer value hierarchy helps to understand what customers evaluate about their use experiences. Customers construct notions about what value they desire, based on what they have learned from past and present experiences. Desired value is composed of customer's goals, which are linked to preferred attributes, attribute performances, and consequences in use situations. Desired value guides the customer to form perceptions of how well (or poorly) the product performs in a specific use situation. (Woodruff, 1997)

3.4 Communicating value to customers

Sometimes business marketers find it hard to communicate the benefits of their offering to the customer. This is due to the fact that the decision is often done by a group of people, rather than a single person. Each member of the buying center is often only interested in one, or few of benefits rather than all of them. Thus, the communication of each benefit should be targeted to those members who are mainly interested of them. However, the marketer must make all of the persons involved aware the other benefits as well. (Narayandas, 2005) The difficulty with communicating value is also that customer's may only look at the price. Thus, it is highly important to make the customer understand and believe in the value of the offering. There are three kinds of value propositions: all benefits, favorable points of difference, and resonating focus (Anderson, et al., 2006). These are presented in table 8.

Table 8. Types of value propositions

Value proposition	All benefits	Favorable points of difference	Resonating focus
Consists of	All benefits customers receive from a market offering	All favorable points of difference a market offering has relative to the next best alternative	The one or two points of difference whose improvement will deliver the greatest value to the customer
Customer's question	Why should our firm purchase your offering?	Why should our firm purchase your offering, instead of competitors?	What is the *most* worthwhile for our firm to keep in mind about your offering?
Requires	Knowledge of own market offering	Knowledge of own market offering and next best alternative	Knowledge of how own market offering delivers superior value to customers, compared to next best alternative
Potential pitfall	Benefit assertion	Value presumption	Requires customer value research

Most managers simply list all the benefits of the offering that they can think of – the more the better. This approach does not require as much knowledge about the customers and competitors as the other two approaches. The potential drawback with this approach is that the manager may claim advantages for features that do not actually provide benefits for the customer. Another drawback is, that most of the benefits listed may be points of parity with those in competitors offering. Thus, the effect of few genuine points of difference become diluted. (Anderson, et al., 2006)

Some managers recognize that the customer has an alternative. This approach requires detailed knowledge of the alternative suppliers offering or solving customer's problem in a different way. However, managers relying on this approach may simply assume that favorable points of difference are valuable to the customer. Without knowledge of customer's requirements and preferences, suppliers may distress points that deliver little or no value to the customer. (Anderson, et al., 2006)

Final approach, resonating focus value proposition is used by best-practice suppliers. These value propositions are based on few elements that matter most to their target customers, demonstrate value of superior performance, and are communicated in a way that conveys understanding of the customer's business priorities. (Anderson, et al., 2006)

4 METHODOLOGY

In this chapter, the methodologies and data sources utilized in the present study, are discussed. First, the qualitative interview research method is explained. Then, the Vaisala's monitoring and measurement system is introduced. Finally, this chapter presents how the data for the study was collected and describes the analysis process.

4.1 Qualitative interview research

This thesis employs qualitative interview research method. The purpose of doing qualitative research interviews is to understand the subjects' point of view, to reveal the meaning of their experiences, and to "uncover their lived world prior to scientific explanations". (Brinkmann & Kvale, 2015, p. 3) Qualitative interview is needed, when there is a need for understanding the reasons for participants' decisions, and for their attitudes and opinions. (Saunders, et al., 2009, p. 324). Qualitative research allows the researcher to discover rather than test variables (Corbin & Strauss, 2008, p. 12).

Conducting a research is a multi-stage process. The number of stages may vary from research to another, but usually it includes formulating and clarifying the topic, reviewing the literature, designing the research, collecting and analyzing data, and writing up (Saunders, et al., 2009, p. 10). Research interviewing has an open structure, which is both an asset and a limit. There are no standard rules or procedures, however some standard choices at different stages exists. (Brinkmann & Kvale, 2015, p. 125). They include thematizing, i.e. forming research questions, planning the interviews, interviewing, transcribing the interviews, analyzing, verifying, and reporting. (Brinkmann & Kvale, 2015, p. 136)

The research questions in this study were planned based on literature, and information given by Vaisala. This information included objectives for the research as well as background information of the product and the company. The data collection was prepared by preparing interview guidelines and choosing how the interviews would be conducted. Appendix 1 shows the interview guideline. The data was collected through 20 in-depth interviews, and finally analyzed in order to answer the research questions. The process of data collection and analysis are further explained in chapter 4.3.

4.2 **Case description**

Vaisala Oyj is a Finnish based multinational company operating in the industry of environmental and industrial measurement. This thesis is focused on Vaisala's Life Science (LSC) sector, which provides monitoring and measurement systems to life science industry. LSC customers include pharmaceutical and vaccine production companies, hospitals and pharmacies, blood and tissue banks, medical device manufacturers, warehouse storage and cold chain distributors, and laboratories, drug discovery and clinical trial centers.

LSC industry is highly controlled by different national and global regulations. Treated or handled samples must remain in a stable, controlled environment. Measurement and monitoring systems are used to follow for example temperature and humidity of certain environments, such as freezers, refrigerators or clean rooms. Measurement and monitoring systems are not part of customers' core business, but due to numerous regulations and guidelines, usually compulsory for customers to have. Figure 3 presents Vaisala's continuous monitoring system.
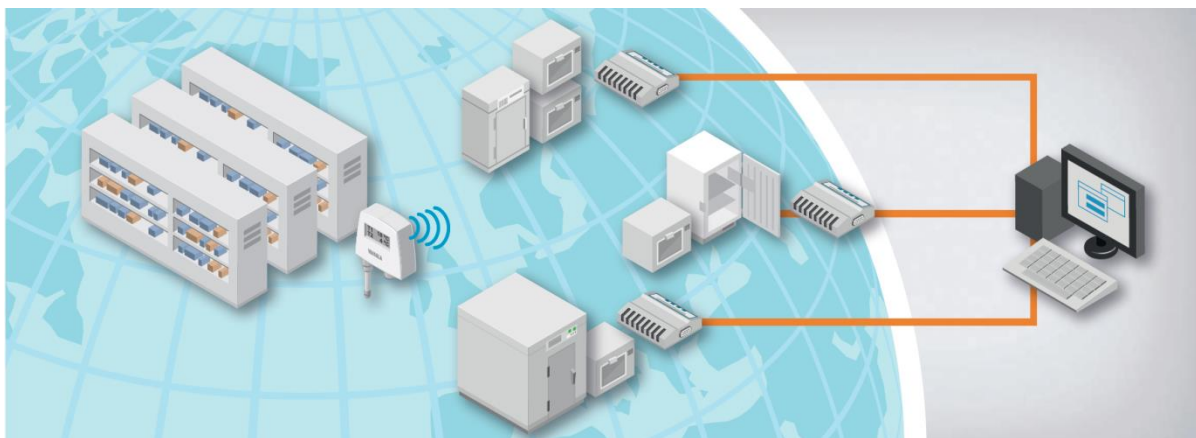
Figure 3.Vaisala continuous monitoring system

Vaisala Continuous Monitoring system includes viewLinc Software, data loggers, transmitters, and related service such as installation, validation, calibration, training, technical support. (Vaisala, 2015b). The system provides customers with continuous data, records, reports and alarms (Vaisala, 2015c). Typical value propositions of continuous monitoring system are summed up in table 9.

Table 9. Typical value propositions of Vaisala monitoring system

Value proposition	Example
Risk reduction	"…reduce the risk posed by environmental deviations in your critical assets"
Peace of mind	"Vaisala has years of experience in providing reliable loggers to be sure customers have peace of mind over their valuable assets"
Easy to install, use, and maintenance	"Vaisala viewLinc is one of the easiest monitoring systems to use, install and configure"
Accurate and reliable	"Trusted Vaisala quality"
Compliance	"Vaisala keeps you compliant with major regulatory regimes"

4.3 **Data collection and analysis**

The data collection for the present study included conducting 20 semi-structured interviews. Interviews were done during autumn 2014 and spring 2015. 12 of the interviews were conducted in Europe. These were either in-person or phone interviews. 8 in-person interviews were conducted in USA, in a pharmaceutical conference in Las Vegas. Due to tight schedule of conference attendees, the interviews in Las Vegas were kept short. Data collected from interviews was supported by field notes and material provided by Vaisala. Interviewee profiles are summarized in the table 10.

Table 10. Interviewee profiles

Job Position	Country	Size of the company	Role	Vaisala's customer
Development manager	Finland	Small/medium	User	
Equipment engineer	Finland	Small/medium	Buyer	[1]
Automation AC manager	Finland	Small/medium	Buyer	[1]
Microbiologist	Finland	Small/medium	User	Yes
Production development engineer	Finland	Large	User	
Process development engineer	Finland	Small	User	
Property maintenance expert	Finland	Large	User	
Process engineer	Sweden	Small	User	Yes
Analytical chemist	Sweden	Small	User	Yes
Head of production	Sweden	Small	Decider, buyer	Yes
Facilities and utilities supervisor	UK	Large	User	Yes
Validation technician	UK	Large	User	Yes
Consultant	USA	-	Influencer	
Technical director	New Zealand	Small/medium	Decider, buyer	
Director of supply chain and operation strategy	USA	Large	Decider, buyer	
Packaging engineer	USA	Small	Influencer, user	
Engineering manager	USA	Large	User	
Product manager	USA	Large	**Buyer**, *User*	
Senior process engineer	USA	Large	User	
Director of quality audits	China	Large	Decider	

10 interviewees work in a small or medium size company, and 9 interviewees work in a large company. One responded did not give information about his employer. 8 interviewees currently have Vaisala's monitoring system or have purchased parts of monitoring system, such as loggers or transmitters from Vaisala. 12 interviewees use competitors' products. The themes discussed in the interviews included purchasing a monitoring system, evaluating benefits of the monitoring system and satisfaction to current situation. Three sets of questions were prepared: for Vaisala's current customers, for competitors' customers and for those who did not yet have a monitoring system. Interviewees' roles in the buying center include users, deciders, buyers and influencers. Some interviewees have multiple roles, for example in smaller companies the buyer is usually also the decider. All interviewees work in a pharmaceutical industry, for example in production of medicines and vaccines, in pharmaceutical packaging, or in research laboratories. Interviews that were done in Europe, were organized by Vaisala personnel. Interviewees were chosen based on their knowledge and

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[1] Loggers or sensors from Vaisala

experience on monitoring systems. In Las Vegas, the objective was to interview as many attendees of ISPE Annual meeting 2014 as possible. The conference was chosen, because many of the attendees work on the field of life sciences and thus are expected to use measurement and monitoring systems.

All interviews were recorded and later transcribed. The analysis was done by using NVivo 9 – software for qualitative analysis. The data was coded firstly by using open coding system in order to understand the customer's point of view. The coded data was then formed into categories. Three major themes were analyzed: purchasing process, purchasing criteria, and perceived benefits. Next chapter reveals the results from the data analysis.

5 RESULTS

This chapter presents the empirical part of the research and reveals the results of data analysis. First, the purchasing process of the system is explained. Then, customers' purchasing criteria and perceived benefits are revealed. Finally, perceptions of different customer types are compared.

5.1 Purchasing process

As purchasing of measurement and monitoring systems is not the core business for customers, the buying center is usually not very large; there are typically 3-5 persons involved. They most likely work in the departments of production, development, quality, validation, facilities or supply chain management. The manager from the department that is pursuing the purchase, is most likely to be the final decider:

"The one who's "money" it is, does [decide]." –Equipment engineer

In some cases, the purchasing is done as a group. Thus, everybody has to agree on the decision:

"I would say anyone was singly important. We all had to come to an agreement… There was no sole person, it's very much a group thing." –Facilities and utilities supervisor

In smaller purchases and smaller companies, the decider is also the buyer. Larger companies and governmental organizations such as universities, usually have a purchaser, whose responsibility is to contact suppliers and do the negotiations, based on recommendations given by different departments:

"The purchasing of the monitoring system is done by our purchasing department, but they only purchase what we advise them to purchase." –Validation technician

Users, who typically are production or process engineers, chemists or biologists have an important role on giving their opinions on different offerings based on their experiences with former systems and knowledge of the process that is to be monitored. Users typically help most with composing specifications.

Five stages can be identified in the purchasing of measurement and monitoring system: start, search for information, user requirement specification, design qualification, and final decision. The stages and who participates in each of them are presented in figure 4.

Start	Search for information	User requirement specification	Design qualification	Final decision
•Anyone	•Buyer, decider	•Users, influencers	•Buyer, Users	•Decider

Figure 4. Purchasing process of monitoring and measurement system

The purchasing process *starts* when the need is recognized. Anyone in the organization can be the initiator. The need emerges most usually from the perceived risk, for example the old system may be outdated:

"The need to have the system arose from the fact that the old system we were using, the previous one that we'd been using, it was a stand-alone system, so it couldn't be accessed via a network. You have to physically plug to the computer to it. So it was a very old system, it wasn't particularly accurate, it wasn't user friendly, and it was wired as well. So there were several reasons. It came to end of its life, I think." –Facilities and utilities supervisor

The need may also rise from realization that competitors are getting competitive advantage from a specific kind of system. Third trigger for the purchase are regulatory requirements. Life science customers need to fulfill a range of regulations set by the law, or in order to comply different standards.

The next stage is *search for information*. This stage is mainly done by the decider or buyer. The search typically begins with an internet search. The buyer or decider may also ask employees, colleagues or acquaintances about the systems that they have previously used. Two to three potential suppliers are selected, and then contacted for more information, meetings, references and demonstrations.

After searching for information, customers develop a *user requirement specification* (URS) document. This stage is the most important stage for customer in the purchasing process. In the

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document, the customer describes what they want the system to do and achieve, and it contains the criteria and conditions that the system needs to meet, and what it is supposed to do. URS document is a compulsory by different regulations and without it the system cannot be validated. Users and influencers play a major role on setting up and developing the URS document. Once finished, the URS document is sent most potential suppliers, who in turn give their response on how their system can achieve those requirements. If the customer is uncertain of which type of monitoring system they want, they may also write a number of URS's and then eliminate and pick the one they prefer.

Design qualification phase includes creating a design qualification (DQ) document, based on URS and supplier's response. It consists of what the supplier promises and commits that the system can achieve, and also what could not be achieved. The design of the system is also finalized. After the validation document is written, the *final decision* on purchasing is done.

Purchasing criteria is set at the URS stage, and evaluated in the DQ stage. Customers usually start by purchasing only few loggers or transmitters to the system, and if it works as expected, then gradually add more to the system. The phases that cause the most problems to the customer are need recognition and user requirement specification, and thus offer a potential for suppliers to provide added value.

5.2 **Purchasing criteria**

Customers evaluate monitoring and measurement systems based on a number of attributes. These attributes can be grouped into five categories: quality features, technical features, supplier features, service features, and costs. Technical features include customers' technical requirements to the system. Quality means how those requirements are reached. Service features include all the services the supplier provides. Supplier features mean suppliers specific capabilities and features relevant to the customer. Costs include purchasing price and all the costs incurred during the life time of the system. At the time of purchase, measurement and monitoring system customers mostly evaluate quality, technical, and supplier features. The most important attributes include regulation compliance, reliability, usability, and references. Next, each category of purchasing criteria is explained.

5.2.1   Quality features

Quality of the monitoring and measurement system is very critical, as it reduces customer's risks. All the attributes in this category and how many times they were mentioned during the interviews are presented in table 11.

Table 11. Quality feature attributes, number of respondents

Attribute	Number of times mentioned	Example quote
Regulation compliance	9	"…it would need to follow all the regulatory requirements that a monitoring system would require" – Engineering manager
Reliability	8	"It needs to be very secure system. So that data is kept safe." – Process development engineer
Usability	8	"So easy to implement, and easy to monitor…" - Packaging engineer "…the user-friendlity of the software as well, that was important." – Facilities and utilities supervisor
Robust	2	"…and also that it is robust system of course." –Head of production
Improvement	1	"… can it improve our process efficiency, can it improve our product quality…" - Product manager

The most important attributes in this category are regulation compliance, reliability, and usability. Regulation compliance means what regulations the system complies to. Life science industry is governed by multiple regulations and guided by several different guidelines and standards. Thus, regulation compliance may in some cases be the main trigger for the purchase of monitoring and measurement system. This makes it usually the most important purchasing criteria for customers. Reliability of the system is also very critical. Customers cannot afford any losses of data, or that the data is tempered or changed. Usability includes how the system can be used and is it easy to use. Customers do not want to spent too much time on learning how to use the system, thus the system and the software should be easy and intuitive to use.

This category also includes robustness and ability to improve customer's processes. Customers look for robust systems that are firmly done. One respondent mentioned that they look for systems that enable them to improve their own processes.

5.2.2   Technical features

Technical features include technical requirements for the system; *what* the system can achieve. Ability to alarm, accuracy, and accessibility were the most important criteria in this category. Table 12 presents technical features mentioned during the interviews.

Table 12. Technical features

Attribute	Number of times mentioned	Example quote
Alarms	5	"…ability to alarm or indicate any excursion of the temperature and humidity." –Director of quality audits
Accessibility	4	"…being able to access it online. So wherever you are, you know where the issue is." –Validation technician
Accuracy	4	"It would need to be accurate. Part of the problem I find with some monitoring programs is that if they are not setup quite right, the frequency of the data it collects may not be fast enough for the process you are trying to monitor." –Engineering manager
Number of points	2	"…the number of points that we can monitor at once" –Director of quality audits
Range	2	"We look at the operative range, so what temperature ranges it is capable of operating, because like I said, we store products in different temperatures. So we need devices which can work at that range." –Facilities and utilities supervisor
Calibratable	2	"We looked at can it be calibrated" –Facilities and utilities expert
Reporting system	2	"…[we] look at… reporting systems" –Technical director
Back-up	1	"We want something that would have --- back-up features so that if part of the system would go down we wouldn't lose data." –Engineering manager
User levels	1	"…different user levels you can set." –Property maintenance expert
Validatable	1	"obviously validatable" –Director of supply chain and operations
Wireless	1	"We like the idea of the wireless devices. Because that reduces the cabling needs." –Facilities and utilities supervisor

Five interviewees mentioned that they look for systems that are able to alarm when there are issues, thus enabling customers to response immediately. Customers look for systems which send alarms by email or sms, preferably both. One respondent explained that their email servers are in USA while they operate in Sweden – problems with email might take up to several days to get repaired. They wished for sms alarms, as they felt it would be more secure for the monitoring system.

Accessibility means the ability to access the software easily, remotely and online. Some customers felt this was one the most important criteria for them, while one said that it would not be a requirement, but more of a nice feature to have. Accuracy of the system is also very critical. As one interviewee said:

"We cannot have the device not accurate" –Facilities and utilities supervisor

There are number of technical requirements, which differ in different companies according to their specific needs. Rest of the technical features include for example number of points that can be monitored at once, operative range, back-up features, can the system be calibrated, or what kind and how many user levels the customer may set to the system.

Technical and quality features create *boundary conditions* for the purchase – they need to be fulfilled to even be considered as an option. This means, that the customer looks for two to three suppliers, who are able to show they can fulfill their technical and quality requirements. These features are easily imitated by competitors, and thus neither technical or quality features represent a great possibility for differentiation.

5.2.3   Supplier features

Supplier specific features include supplier's location, existing relationship with the customer, previous experiences with the supplier or its products, and supplier's ability to show its capabilities through references. Table 13 presents supplier features.

Table 13. Supplier features

Attribute	Number of times mentioned	Example quote
References	9	"We want references, so they need to have previous customers in pharmaceutical industry." –Development manager
Personal experiences	7	"I like to buy from a person, not from a company" – Equipment engineer "We used to have a maintenance engineer, who was working for Honeywell earlier… So maybe he was familiar with them, and thus looked into that." – Process development engineer "And also, we have that system in USA." –Process engineer
Trust	4	"We need to consider can we trust the supplier." –Production development engineer
Economic connections	1	"…there was these economic connections, we have bought other products and services from [the supplier] so we could negotiate monitoring system for relatively good price." –Property maintenance expert
Location	1	"Domesticity in that sense, that if there is problem, it's easier to communicate. --- And if there is a maintenance office somewhere relatively near, it helps that we get urgent repairs as soon as possible." – Property maintenance expert

Supplier features are fairly important, however not all of these features may be the top priority to the customer:

"I don't know actually about the company itself… I don't know if we are that interested about the company, predominantly about the service or the solution or the product or something, whatever they are offering" -Microbiologist

Customers mainly look for references, any personal connections to the supplier, as well as for proof that they can trust the supplier. References are one of the main criteria in the purchase, as they show supplier's capabilities and experience in the life science industry. Thus, it is critical that the references are from a similar industry that the customer is operating in. For customers it does not matter whether the references are from a local company or from one abroad. One of Vaisala's current customers was evaluating three suppliers when they were purchasing process. Vaisala was chosen, because of the ability to show previous experience within pharmaceuticals:

"Two other suppliers that we had, they were not familiar with the pharmaceutical industry... it wasn't really a competition." –Head of production

References may also include demonstrations or "open day" visits to customer sites. These are highly valued by customers who are in the process of purchasing the system, as they can be very effective to show how the system actually works:

"I think it always helps if you can, visit, another company which is using, the system… It's always nice to see, see the system in use somewhere else, so you can virtually see an example of a system. I think that always helps." –Facilities and utilities supervisor

The relationship with the supplier may have an impact in the purchasing decision. For example, the customer may already have some economic or personal connections to the supplier. Economic connections arise when customer is already purchased something from the supplier earlier. This can also include something that is not related to the focal purchase. Personal experiences can mean that somebody from a customer has used the system in their previous jobs, or is otherwise familiar with that supplier. It can also mean that somebody in customer's organization knows someone from the supplier's organization, or perhaps have themselves worked there. Economic connections mean that customer has already purchased other products from that supplier, even if the products are from completely different business areas. Thus, they know the supplier already and may favor it over other suppliers. Customers may also feel that due to these connections, they are able to negotiate cheaper prices for the offering. Personal experiences seem to be more important for customers than economic connections.

Many customers value supplier's presence throughout the purchasing process and afterwards. Only one respondent made clear that this had been one of their major criteria for choosing that supplier's offering: He had approached few suppliers, including Vaisala. A representative from a competitor had come personally, while he could not even find clear contact information in Vaisala's website for representative in Finland. As he preferred the supplier to have a "face" – to purchase from a person rather than from a company, he chose the other supplier, even though their offering was not as good technically as Vaisala's would have been. Being present, having a "face", and being easy to approach serves a great potential for differentiation.

Whether the customer feels they can trust the supplier may be important, especially if there is closer collaboration among the two. Customer also needs to trust whether the product is good and valid, or that the supplier is going to exists and is able to provide services even after some years.

Supplier's location is not very important when customers are purchasing the system. It may have an impact on the purchasing decision, as for example it may mean that the customer is able to receive support and service quicker.

5.2.4 Service features

For some customers, services provided are essential. The need varies according to customer's needs. For example, smaller customers are more likely to need services provided by the supplier, while larger customers have the resources to perform them on their own. This will be discussed more on chapter 5.4.All the attributes mentioned during interviews are presented in table 14.

Table 14. Service features

Attribute	Number of times mentioned	Example quote
Support	3	"The support, the after-sales support that was offered. That was quite important." –Facilities and utilities supervisor
Installation	2	"…kind of total package, which includes installation" –Equipment engineer"
Qualification	2	"…he thought that Vaisala had very good documentation. IQ OQ" –Process engineer
Calibration	1	"…that supplier was the only one who could offer calibration services we approved at that time…" –Equipment engineer
Updates	1	"Updates are easily available" –Process development engineer
Maintenance	1	"Maintenance is easily available" –Process development engineer

The services that customers look for with monitoring and measurement systems includes installation of the system, qualification procedures, support, calibration, updates to the system and maintenance. The overall service level needs to be adequate. The most important services for customers are support, installation, and qualification. Customers look for suppliers who can

provide the installation of the system. This saves customers' time but also provides a possibility to learn about the product and how to use it. Qualification procedures are compulsory by regulations and often time consuming for customers. Thus, customers value highly if the supplier is able to provide for example validation documentation or to perform qualification procedures:

"...so I don't have to contemplate on how to formulate the qualification protocol. In that sense, that it will be good enough for some auditor, coming to audit us." –Equipment engineer

Support provided by the supplier after the sales is seen as important. Customers look especially for technical support. Support can be arranged by emails, however in case of emergencies customers hope they can call somewhere to get the help immediately.

Calibration services are needed by customers who do not have the resources to perform that themselves. Customers want that the calibration is done in a reasonable time and preferably somewhere close where they operate. Preventive maintenance provided by the supplier is valued by customers, as it reduces risks and provides support when it comes to audits. Customers are also looking at constant updates for the system if it helps them to improve their own processes or reduce risks.

It seems that while services provided may be essential and have an impact on the purchasing decision, customers tend to focus more on technical and quality aspects of the system when they evaluate the systems. Services should be easily available and reasonably priced. Next, the roles of price and total costs in the purchase are discussed.

5.2.5 Costs

8 interviewees mentioned, that they evaluate the costs when they are purchasing a monitoring and measurement system. They do not look solely the price, but rather evaluate the total costs of the system, including any kind of maintenance or consumable cost.

One of the respondents explained that the price had been the most important factor in their purchasing decision:

"This is going to make our firm sound extremely cheap, but it was primarily cost. This… it's very low cost, easy to use system, like I said it doesn't necessarily give us real-time monitoring, but we kind of sacrificed that for, you know, price." –Product manager

However, many interviewees saw that the cost is just one of the criteria, but not the most important:

"Of course, it's always, price is one criteria, but by no means it's the only one. The final result is important, so price is not by any means the only criteria." –Automation AC manager

"Well, cost is a factor. You know, not an overriding factor, but a factor." –Facilities and utilities supervisor

The main reason for costs not being the most important criteria, is that there is not much difference within the price between suppliers who are able to provide products and services that fulfill customers technical and quality requirements:

"...it often is, that price and quality go hand-in-hand… Not so often there is that much difference, if we go into quality fulfilling suppliers." –Automation AC manager

The importance of price in the purchasing depends on the customer company's specific needs for monitoring, and especially on perceived risk. The bigger the risk, the less impact the price plays in the purchase.

5.3 Perceived benefits

Customers receive a number of benefits from the system, which result from the product itself, from the service offered by the supplier, or from the relationship between the supplier and the customer. Based on the interviews, the product-related benefits are the most important, as they are the easiest to perceive. The benefits that monitoring and measurement systems perceive, and the number of times they were mentioned during interviews, are combined in table.

Table 15. Perceived benefits and the number of times mentioned

Product (40)	Service (9)	Relationship (9)
Better control of process (21)	Works as should (6)	Learning (5)
Proof of quality (13)	Save resources (3)	Good communication (4)
Minimize risks (7)		

5.3.1 Product-related benefits

Product-related benefits include minimizing risks, better control of the process, and proof of quality. These benefits were mentioned the total of 40 times during the interviews. The features of the product that mostly are accountable of the benefits mentioned are continuous monitoring, alarms, remote control, and audit trails.

The first, and most important, product-related benefit is better control of the process. This was mentioned 20 times. Better control includes for example full-time monitoring, remote monitoring, operating more economically, indication of replacements, and being easier to manage. Due to these, customers' processes are improved:

"We're able to respond quicker, we're able to respond and improve our facility as well" – Technical director

"Instead of having all the manual controls, we are able to work with other things" –Head of production

These benefits are mostly perceived at the organizational level, however, they may also be perceived at the individual level. For example, monitoring and measurement systems reduce the workload of an individual employee and allows an employee to take little bit of an ownership of their work

The second product-related benefit is the proof of quality of customers' products. This was mentioned 13 times during the interviews. Monitoring and measurement systems ensures the product quality to customer itself, but also "covers customer's back" when it comes to audits done by regulatory agencies or end-customers. It also enables the customer to provide data out of short notice if requested.

"It brings us coverage when it comes to audits. Because they can see the system is a good quality system. It follows all the cGMP principles and, all 21 CFR part 11 because it's a qualified on the computer validation as well. It covers your back on a lot of ways really" – *Validation technician*

The third product-related benefit is that monitoring and measurement systems reduce the risks that customers perceive in their operations. As one interviewee said:

"It allows us to avoid costs due to losses that can be caused by not having the conditions you need to produce" –*senior process engineer*

When something goes wrong in their process, it can potentially yield issues worth of millions. Monitoring and measurement systems enables customers to know, and to react, immediately if something is not the way it should be. Minimizing risks was mentioned as a benefit seven times during the interviews. Risk minimizing benefit is perceived at the organizational level.

5.3.2 Service-related benefits

Service-related benefits were mentioned nine times during the interviews. Benefits that emerge from services include that everything works as it should, and saving customers' resources. Supplier's services, especially preventive maintenance and technical support helps the system and customer's processes to work as should:

"...you have the pro-active actions of bringing the suppliers in, periodically making sure that the systems are working as they should." – *Senior process engineer*

Supplier's service reduces the risk of something going wrong and also helps to solve any occurring problems. The benefit of system working as it should was mentioned by six interviewees. O-call, 24/7-available support was seen especially beneficial, although this is something that their suppliers did not provide.

Service-related benefits also save customers' resources, such as time. This was mentioned by three interviewees. In some cases, customers do not have the time, or expertise to perform needed actions. Services that saves customers' resources include for example maintenance, calibration, and validation. As most of the times, saved resource is an individual employee's time, this benefit is mostly perceived at individual level, while the system working properly

can be perceived at both levels. All in all, service-related benefits make customers operations easier to do.

5.3.3 Relationship-related benefits

Customers also receive benefits from the relationship between them and the supplier. These benefits include learning, easier communication, and introduction of better technologies. These were mentioned nine times during the interviews. Close relationships offers a customer an opportunity to learn, which will lead to better and more efficient use of the system. Learning was mentioned as a benefit five times.

Good relationship will also lead to better communication between the supplier and the customer. This will result the supplier to better understand customer's needs, and thus will be able to provide the customer right, better suiting products and services or new technologies first-hand. Good communication was mentioned four times during the interviews

"Part of the benefits of having suppliers close enough is that you get first hand at those [new] technologies" –Senior process engineer

5.4 Differences in perceptions

Customers' perceptions on value differ from each other. A supplier must recognize these differences, as they have an impact on the purchasing decision: different features should be emphasized to different customers. Here value perceptions of European and USA customers, smaller and larger customers, current and potential customers, and users and deciders are compared. Detailed comparison can be found in appendix 2 and 3.

5.4.1 Europe and USA

European customers in this study are located in Finland, Sweden or UK. USA customers are those interviewed in Las Vegas, who are located in United States, thus excluding two respondents who lived in China or New Zealand. In Europe, supplier features are the most important, closely followed by quality features. Least important criteria is costs. In USA, customers evaluate technical features the most times. Quality features are the second important,

followed by costs. Service features were not mentioned at all by USA customers. Within USA customers, supplier features seem to have only a little impact on the purchasing decision. When looking at the attribute level, references, personal experiences, regulations compliance, and usability are the most important in Europe. In USA, the most important attributes are total costs, regulation compliance, and accessibility.

Both European and USA customers focus on product-related benefits. However, European customers tend to also consider more service- and relationship-related benefits than USA customers. Service- and relationship-related benefits had only minor importance in USA. Three most important benefits for European customers are control of the process, proof of quality, and learning. For USA customers, these are proof of quality, control of the process, and minimizing risks. Table X sums the most important

Looking at both perceptions of purchasing criteria and benefits, it seems that USA customers focus on technical and product-related features when making evaluations. European customers value more supplier's features and provided services. Based on the interviews, USA customers acquire monitoring and measurement systems to comply with regulations and thus ensure the product quality. Evaluations are done with these goals in mind. For USA customers interviewed in this study, the most important thing with monitoring systems is that it does its basic functions. As costs are of high importance, quality and add-on features are sacrificed for it. It may also be, that customers in USA take the relationship with the supplier granted, and thus it was not mentioned during the interviews. In Europe, the most important purpose for obtaining monitoring and measurement systems is also to comply with regulations, but evaluations are done more on individual, rather than organizational level. The relationship with the supplier is highly valued, as is supplier's ability to show its experience and knowledge. European customers want to make sure that the system they purchase is high quality and provides added value. Thus, monitoring and measurement system customers in Europe tend to make evaluations more on individual level than customers in USA.

5.4.2   Company size

For small and medium sized customers, quality of the system and supplier features are the most important at the purchase. Large customers tend to focus first on technical features, followed by quality features. Significant difference can be identified in the importance of services. While

for small and medium sized customers these features are the third important, for large customers they represent little or no importance. SME customers usually do not have all the expertise in-house, such as validation or calibration possibilities, so they need to have it done by the supplier. This also means that the customer wants a good, close relationship with the supplier. As large customers tend to perform these themselves, they do not have the need for them. Large customers are mainly interested in what the system can achieve, and how it does it, thus they mainly focus on technical and quality features. The most important attributes for small and medium sized customers are references, personal experience and total costs. For large customers, it is the regulation compliance, usability, and reliability.

For small and medium sized customers, product-related benefits are the most important, but service- and relationship benefits are also valued. Better control of the process is the most important benefit. It is followed by minimizing risks and that everything works as should, which were both mentioned four times by SME customers. Large companies tend to focus on product-related benefits, as again, service and relationship are not that important for them. The most important benefit for large customers is the proof of quality. The second important benefit is better control of the process, and third is minimizing risks.

5.4.3   Current and prospect customers

There are also differences of perceptions between Vaisala's current customers and those who have purchased their monitoring system from another supplier. For Vaisala's current customers, the most important features are quality features, followed by supplier features. The most important attributes were personal experiences, references, and quite surprisingly, total costs. As Vaisala's offerings tend to be more expensive than some of its suppliers', the importance of costs implies that Vaisala's current customers have understood the value of Vaisala's offering. Monitoring system customers who have purchased their system from another supplier, also mostly evaluate quality features. For these prospect customers, the importance is of technical features is slightly bigger than the importance of supplier features. The most important attributes for prospect customers have been reliability and regulation compliance.

Vaisala's current customers interviewed in this study perceive better control of the process as the most important benefit that they receive from Vaisala's system. Current customers mentioned it 11 times during the interviews. For those interviewee's who had purchased the monitoring system from another company, the most important benefits were proof of quality, and better control of the process, which both were mentioned nine times. The next important benefit for prospect customers was minimizing risks. For Vaisala's current customers, the second most important benefit was proof of quality, by four mentions. It was followed by saving resources, learning and better communication, each mentioned three times. It seems that Vaisala's current customers perceive more benefits from their relationship with Vaisala, than prospect customers from relationship with their supplier.

5.4.4   Users and Deciders

The comparison of perception differences within the decision making unit was done between users and deciders or buyers. Deciders and buyers were put on the same group for two reasons. First, because most buyers interviewed were also deciders and vice versa, hence their perceptions will be similar. Second, because there were not enough deciders or buyers alone to get reliable results. From now on, deciders and buyers -group will be referred just as "deciders" for the sake of convenience.

Users mainly evaluate quality and supplier features. Technical features are also important for users. These features are important for users, as they directly affect their daily life. Not surprisingly, users are least interested in the costs of the system. The most important attributes for users are regulation compliance, references, and personal experience. Personal experience is important because the users are those who will eventually be in contact with the supplier when the system is in use. Thus, they are looking for suppliers who are nice to work with. Deciders and buyers tend to focus most on the technical features, followed by quality features, and costs. The most important attributes for them were total costs, reliability, ability to alarm, and that the system is easy to use.

Some differences in the perceived benefits can also be identified. For users, the most important benefit is better control of the process, which was mentioned 15 times by them. This is understandable, as it directly affects their own work: they are able to perform better. Better control of the process was followed by proof of quality, by eight mentions, and minimizing

risks and that it works as should, by six mentions each. Better control of the process, and proof of quality were mentioned by deciders the most times (five times each). This was followed by saving resources. All in all, interviewed users mentioned each benefit more than deciders. This is most likely a result of users using the system on a daily basis. Thus they are more familiar with the benefits they receive from the system than deciders, who may only be involved with the system at the time of purchase and occasionally after that.

6 CONCLUSIONS

Monitoring and measurement systems monitor and measure conditions, such as temperature or humidity, in laboratories, clean rooms, refrigerators, freezers and such. The monitoring is often compulsory to customers operating in life science sector, as the industry is highly regulated. The purpose for this study was to find out which features of monitoring and measurement system do life science customers evaluate, and what benefits do they perceive from the system.

In order to reach the objectives of this study presented in the introduction, qualitative interview research method was employed. The empirical part consisted conducting altogether 20 in-depth interviews in Europe and USA. Interviewees were both Vaisala's current and potential customers, and included users, buyers and deciders from small, medium and large sized customers.

This chapter concludes the present study. First, the research questions are answered, and their implications discussed. Then, managerial implications are given. Finally, limitations of this study are presented.

6.1 Answers to the research questions

This study was guided by two research questions related to the objectives of this study. The first research question was focused on the purchasing criteria of monitoring and measurement customers. It was as follows:

1. What are the most important purchasing criteria for measurement and monitoring system customers?

Life science customers evaluate monitoring and measurement systems based on number of attributes, which can be grouped into five categories: quality features, technical features, service features, supplier features, and costs. Quality and technical features create boundary conditions, which must be met, in order to be considered as an option. Service and supplier features are rather value adding features, which enable the suppliers to differentiate themselves. At the time of purchase, customers tend to focus the evaluation on quality features, however technical and supplier features are important as well. The most important purchasing criteria includes relevant regulation compliance, use of references, and total costs. Through the use of

references, the supplier is able to show its previous experience in pharmaceutical industry. This is important for customers, as it reduces their risks. The supplier should also be able to explain the total costs of the system throughout its lifecycle, as customers do not only focus on the purchasing price.

While the monitoring and measurement system is indeed compulsory for customers, they receive multiple benefits from the use of it. For a monitoring and measurement system supplier, the identification of customers' perception of these benefits is crucial. Thus, the second research question concentrated on perceived benefits:

2. What benefits do monitoring and measurement system customers perceive from the system?

The benefits that monitoring and measurement system customers perceive are related to the product itself, to the service the supplier provides, or to the relationship between the customer and the relationship. Product-related benefits includes minimizing risks, better control of the process, and proof of quality. Service- related benefits include saving resources and everything works as should. Learning and enhanced communication can be identified as relationship-related benefits. Product-related benefits are perceived the most by the customers. The most important benefit for monitoring and measurement system customers is that it enables better control of the process, for example the process can be monitored all the time, and as the customer does not need to perform manual controls, they are able to focus on other things. The next important benefit is the proof of quality. The quality is proofed to the customer itself, as they now know they are producing what they should be, but also to third parties, such as end-customers or authorities. The key purchasing criteria and perceived benefits for each type of customer compared in this study are summarized in table 16.

Table 16. The key purchasing criteria and perceived benefits

Customer type	Most important purchasing criteria	Most important benefits
All	Regulation compliance, references, total costs, reliability, usability	Better control of the process, proof of quality, minimize risks
Europe	References, personal experiences, regulation compliance	Better control of the process, proof of quality, learning
USA	Total costs, regulation compliance, accessibility	Proof of quality, better control of the process, minimize risks
SME	Personal experiences, references, total costs	Better control of the process, minimize risks, works as should
Large	Regulation compliance, usability, reliability	Proof of quality, better control of the process, minimize risks
Current	Personal experiences, references, total costs	Better control of the process, proof of quality
Potential	Reliability, regulation compliance	Better control of the process, proof of quality, minimize risks
Users	Regulation compliance, references, personal experience	Better control of the process, proof of quality, works as should, minimize risks
Deciders	Total costs, reliability	Better control of the process, proof of quality, saves resources

6.2 Discussion

The answers to the research questions show that customers evaluate different features at the time of the purchase, to which they receive benefits from. This is in line with Woodruff's (1997) value hierarchy framework, as it can be seen that customers learn to value new features that are in line with their goals, as they move along with the system. Before the purchase, customers' goal is usually to comply with the regulations, and thus evaluate features such as regulation compliance. When the system is in use, customers learn that it easies their workload, and helps to control or improve their processes better.

This study also shows that when purchasing and using smaller-scale solutions (compared to, for example dewatering plant solutions in mining industry), customers tend to do evaluations more on individual level. At the time of purchase, the importance of personal experience is inevitable. When evaluations of the benefits of the system are made, the focus is again on individual level. However, in line with previous research (Rugg, et al., 2002), those higher in the organization tend to view things more on organizational perspective, thus focusing on technical aspects, costs, and quality verification.

The study also shows, that perceptions on purchasing criteria, and to some extent, perceived benefits, vary within different customer types. In USA, the most important criteria are total

costs, accessibility, and regulation compliance. In Europe, they are references and personal experience. Large customers put emphasis on the regulation compliance and usability, while small and medium sized customers value personal experience and references at the time of purchase. Vaisala's current customers choose Vaisala's offering based on personal experiences, references, and total costs. Customers who purchased the system from a competitor use look at reliability of the system and regulation compliance. For deciders and buyers, the most important purchasing criteria are total costs and reliability, while for users they are references and regulations.

As with the purchasing criteria, some differences could be identified on the perceptions of benefits, although there is not as much difference as in purchasing criteria. In Europe, in addition to better control and proof of quality, learning is perceived as an important benefit. In USA, proof of quality is the most important benefit, followed by better control and risk minimization. For small and medium sized customers, better control, minimizing risks and that everything works as should are the most important. For large customers, the most important benefits are same as for USA customers. Compared to Vaisala's current customers, potential customers perceived risk minimization benefit more. Both users and deciders though better control of the process and proof of quality are important, however users also viewed that everything works as should and minimizing risks important, while deciders focused on saving resources.

6.3 Managerial implications

The findings of this study can be used as a basis for marketing monitoring and measurement systems. Two types of managerial implications can be drawn from this study: those for before the customer purchases the product, and after the customer has purchased the product. The latter is important for creating customer satisfaction, positive word-of mouth and additional sales.

6.3.1 Before the purchase

Related to customers' purchasing criteria, the marketing of the measurement and monitoring system should firstly emphasize which regulations the system complies with. Supplier should show a variety of references to demonstrate previous experience from life science industry. Reliability and usability should also be emphasized. These should be demonstrated to customers by for example free trials or visits to reference sites. The supplier should also be able to indicate the total life cycle costs of the measurement and monitoring system. The benefits that should be emphasized at the marketing, are that the customer is able to control its processes better and the proof the quality of their product, as these are the most important for the customer.

It is essential to communicate right value propositions for right persons. In Europe, it is highly critical to show a variety of references to increase trust. Also, attention should be paid to ensure good personal experience. This can be done for example by personal visits to customers' sites. In USA, the emphasis should be on total costs, as well as technical and quality features. Large customers are interested in technical and quality features, and proofing their products' quality. Thus these should be emphasized to them. Smaller customers tend to view things more personally, thus ensuring personal experience and demonstrating supplier's experience should be done to them. Services should also be targeted towards smaller customers, as they are more likely to need them. For deciders and buyers, detailed cost calculations and information on technical features should be provided. Reliability of the system should be emphasized. For users, the focus should be on quality aspects. Users should be taken into consideration while selling the system, as they will give their recommendations to deciders.

As the study shows, while quality and technical features are indeed important to emphasize for potential customers, huge impact can be done through personal relationships. Having a "face" reduces customers' risks and uncertainty. Having a face means that the customer personally knows the employees of the supplier company. From a customer point of view, this has been a problem for Vaisala, especially in Finland. During the interviews, one respondent said that even though they have purchased some parts of their monitoring system from Vaisala, and even though they are located 30 kilometers away from Vaisala's facilities, they did not know a single person from Vaisala. This ended up being one of the reasons why they purchased the monitoring system from another supplier, although Vaisala's system would have been technically better.

During the customers purchasing process, the supplier should be physically present at customer's facilities. As this way the supplier gets to know the customer's needs better and the customer gets to know the supplier, the trust between the two parties is increased and personal experience enhanced. Education and consultation provided to the customer during the purchasing process helps also the customer to define their needs, in the favor of the supplier who provides this. Supplier should also be easy to approach: the contact information to right people should be easily available, and the ways of communication should be convenient. For example, supplier's website should include contact person's name, phone number, and email address.

6.3.2   After the purchase

Supplier's actions that create positive word-of-mouth are important with monitoring and measurement system customers, as those customers who are going to purchase a new system tend to ask recommendations from their acquaintances also working in life science field. Personal relationships with the customer will also ensure that the customer will repurchase from that supplier or create additional sales.

First of all, there should be one or few familiar contact persons, who would process all customer's requests. This will save customer's time (and nerves) as they do not need to find themselves who they should contact if there is problems. Contact person should be someone who was involved in the initial purchase, as this way they are already familiar for and with the customer. Locality of the contact person enhances communication and reduces the risk of misunderstandings due to cultural differences or language barrier.

Ensuring that the customer receives the value that was promised at the purchase is beneficial for both parties. The supplier will learn more about customer needs, and the customer will learn to use the system more efficiently. Customer satisfaction questionnaires are for example beneficial. With the questionnaires it is important that the supplier does not just expect good feedback, or leave it there. Any occurring problems should be solved personally with the customer experiencing them. If any problems occur, the customer needs to be notified on how the process is going on. For example, customer should be provided with timetables for solving the problem. The supplier has to make sure that the customer does not need to call the supplier

multiple times in order to make sure things are going on (this had been a case with one of the interviewed Vaisala's customer).

Educating current customers is also a good way to increase customer's satisfaction as well as their efficiency, as customer learns to use the system more efficiently. Education can be done by webinars, during maintenance and installations, or through the contact person. Education should focus on new or better ways of using the system. New innovations should also be communicated efficiently to the customers. Table 17 sums the managerial implications of this study

Table 17. Managerial implications of the thesis

Before the purchase	
Features that should be emphasized at the marketing	– Regulation compliance – References – Reliability, Usability – Total costs – Better control of the process – Proof of quality of customer's product
Right value propositions to right persons	– References and regulations in Europe; Total costs, regulations, and accessibility in USA – Cost calculations and reliability to deciders, regulation compliance for users. Ensure good personal experience for users. – Technical and quality features for large customers, expertise and total costs for small customers
Have a "face"	– Build personal relationships – Be present – Be easy to approach – Offer education on and consultation
Demonstrate experience	– References – Visits to existing sites – Free trials
After the purchase	
Contact person(s)	– Familiar for and with the customer – Preferably local to customer
Ensure promised value	– React to negative feedback – Inform the customer about the process, for example provide timetables
Education	– Webinars – Within maintenance/installation, contact person – Communicate actively new innovations

6.4 Limitations and future research

All research is subject to limitations, as is this study. Firstly, the life science industry is restricted by several regulations and guided by number of guidelines. Thus, the purchasing criteria and benefits identified in this study may not apply to other industries. Interviews that were conducted in Las Vegas were kept very short due to the nature of the environment and participant's time restrictions. As such, the answers are not absolutely comparably to those received in Europe. However, some indications of differences can be made. These are

presented in the results chapter. The interviews that were done in Europe were arranged by Vaisala employees, which may have had an impact on the answers.

Academic research on organizational buying behavior tends to be outdated, as most research on this field has been done during the period of 1970-2000. Thus, more research is needed on how different types of organizations buy nowadays. Especially interesting is the field of purchasing integrated solutions. Future research should focus on how organizations evaluate different types of solutions, and how the evaluations differ on purchasing large-scale solutions compared to smaller-scale solutions. As customer value has been a "buzzword" for marketing research and practice for the past decade, the academic research on this matter is abundant. However, more attention should be paid on how the perception of value differ from the point of view of customer versus the supplier, as well as how the perceptions differ within different roles of the customer organizations.

7   SUMMARY

Business-to-business suppliers find it extremely difficult to compete based on technical advantages in today's highly competitive markets (van der Haar, et al., 2001). The key to succeed in business-to-business markets is to understand customer's buying behavior (Bunn, 1993) and value perceptions (Ulaga, 2011). The value that the customer perceives from the supplier's offering can be defined as a trade-off between benefits they receive and sacrifices they must pay (Blocker, 2011) and affects the customer's willingness to pay (Narayandas, 2005).

The purpose of this thesis was to identify the key purchasing criteria and perceived benefits of measurement and monitoring system customers in order to find out which features should be emphasized at the marketing of the system. The thesis focuses on life science customers, for whom the measurement and monitoring systems are compulsory due to numerous regulations they need to follow. The thesis adapted a qualitative interview research method, and a total of 20 interviews were conducted in USA and Europe.

This study shows that customers evaluate measurement and monitoring systems based on five types of criteria: technological features, quality features, service features, supplier features, and costs. Regulation compliance is the most important purchasing criteria, followed by references and total costs. European customers tend to make evaluations more on individual level, taking a good consideration of supplier features, compared to USA customers, who tend to focus on technical features and total costs.

The benefits that the customers perceive, relate to the product itself, to service provided by the supplier, or to the relationship between the customer and the supplier. The most important benefits in the case of measurement and monitoring systems are the product-related benefits, the better control of process being the most important.

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APPENDIX I: INTERVIEW GUIDELINE

Part 1: Background and general questions

1. Background information (name, job description and experience in current position and equivalent tasks, in working years

2. What kind of monitoring needs does your business have?

    i. What application do you need a monitoring system for?

    ii. What are the areas to be monitored?

    iii. What kinds of products are to be monitored?

3. In your opinion, can a wireless monitoring system be reliable? (If not, what kinds of evidence would convince you that a wireless monitoring system is reliable?)

4. What features do you evaluate when you consider buying a monitoring system? Are some features more important than others? (If the system has to satisfy specific regulations, what are those regulations?)

5. How do suppliers communicate the potential benefits of their monitoring systems? For example:

    i. Technical benefits

    ii. Operational reliability

    iii. Cost savings

    iv. Minimization of risks

    v. Other? Would you have liked more information on any feature?

6. Do you already have a monitoring system, and if yes, who provided it?

7. How did the purchasing process proceed?

    i. What were the key phases in the purchasing process?

    ii. What was evaluated in each phase?

    iii. Who were involved? Whose opinion was the most important?

    iv. What were the problems in the buying process (or in each phase)?

    v. Where did you find information about the features of the offering?

Part 2a: Questions to be asked of customers who already have a Vaisala monitoring system

8. What features led you to choose the Vaisala monitoring system? Why?

9. Who are Vaisala's main competitors with respect to monitoring systems?

10. Which sales arguments were most important to you when you made your decision to buy?

11. In your opinion, which features did Vaisala emphasize in marketing the monitoring system?

    i. Technical benefits

    ii. Operational reliability

    iii. Cost savings

    iv. Minimization of risks

    v. Other? Would you have liked more information on any feature?

12. What kinds of benefits does the monitoring system bring to your company – and to an individual employee?

13. In what respects is the Vaisala monitoring system better than its competitors? In what respects is it worse?

14. In what respects is Vaisala better as a supplier than its competitors? In what respects worse?

15. What assistance did Vaisala provide in installing the monitoring system? (How could they improve even further on the assistance they provide?)

16. What kind of support does Vaisala provide after installation of the monitoring system? (How could they improve their support even further?)

17. How does Vaisala ensure you can realize the promised benefits of the monitoring system in practice? (How could this be further improved?)

18. Are you satisfied with Vaisala's monitoring system? (How could it be improved even further?)

Part 2b: Questions to be asked if the customer has a competitor's monitoring system:

7. What features led you to choose your current monitoring system? (Did you consider buying the Vaisala system? If so, why did you not choose it?)

8. Which sales arguments were most important to you when you made your decision to buy?

9. In your opinion, which features did the system supplier emphasize in marketing the monitoring system?
    i. Technical benefits
    ii. Operational reliability
    iii. Cost savings
    iv. Minimization of risks
    v. Other? Would you have liked more information on any feature?

10. What kinds of benefits does the monitoring system bring to your company – and to an individual employee?

11. In what respects is your current monitoring system better than Vaisala's? In what respects worse?

12. In what respects is your current monitoring system supplier better than Vaisala? In what respects worse?

13. What assistance did your current monitoring system supplier provide in installing your monitoring system? (How could they improve on the assistance provided?)

14. What support does your current monitoring system supplier provide after installation of the monitoring system? (How could they improve their support even further?)

15. How does your current monitoring system provider ensure you can realize the promised benefits of the monitoring system in practice? (How could this be further improved?)

16. Are you satisfied with your current monitoring system? (How could it be improved even further?)

Part 2c: Questions to be asked if the customer does not yet have a monitoring system:

7. What kind of monitoring system have you considered buying? (Have you considered Vaisala's system: why/why not?)
8. What kinds of benefits do you expect to gain from a monitoring system?
    a. Which expectations are essential?
    b. Which expectations are not essential but you would find them useful?
9. What do you expect of a monitoring system supplier?
10. How could a potential monitoring system supplier assist you in installing your system?
11. How could a potential monitoring system supplier support you after installation of the system?
12. How could the potential monitoring system supplier ensure you are able to realize the promised benefits of the system in practice?

APPENDIX II PURCHASING CRITERIA

Quality features

Attribute	All	Europe	USA	SME	Large	Current	Potential	Users	Deciders
Improve	1	0	1		1		1		1
Regulations	**9**	**6**	**3**	4	**5**	4	**5**	**6**	2
Reliable	**8**	5	2	4	**4**	3	**6**	4	**4**
Robust	2	2		2		2		1	
Usability	**8**	6	2	4	5	3	3	6	3

Technical features

Attribute	All	Europe	USA	SME	Large	Current	Potential	Users	Deciders
Accessibility	5	1	**3**	1	**4**	1	4	2	3
Accuracy	4	3	1	2	3	2	3	3	2
Alarms	5	2	1	3	2	1	4	2	3
Back-up	1	0	1	0	1	0	1	1	0
Calibratable	2	1	1	0	2	1	1	1	1
Points	2	1	0	0	2	1	1	1	1
Range	2	2	0	0	2	2	0	2	0
Reporting system	2	0	1	2	0	0	2	0	2
User levels	1	1	0	0	1	0	1	1	0
Validatable	1	0	1	0	1	0	1	0	1
Wireless	1	1	0	0	1	1	0	1	0

Supplier features

Attribute	All	Europe	USA	SME	Large	Current	Potential	Users	Deciders
Economic connections	1	1	0	0	1	0	1	1	0
Location	1	1	0	0	1	0	1	1	0
Personal experiences	7	**7**	0	**6**	1	**5**	1	**5**	2
References	**9**	**8**	1	**6**	3	**5**	4	**6**	2
Trust	4	3	1	1	3	1	3	3	1

Service features

Attribute	All	Europe	USA	SME	Large	Current	Potential	Users	Deciders
Calibration	1	1	0	1	0	1	0	0	1
Installation	1	1	0	1	0	1	0	0	1
Instruction	1	1	0	1	0	1	0	0	1
Maintenance	1	1	0	1	0	0	1	1	0
Qualification	2	2	0	2	0	2	0	1	1
Support	3	3	0	2	1	2	1	2	0
Updates	1	1	0	1	0	0	1	1	0

Costs

Attribute	All	Europe	USA	SME	Large	Current	Potential	Users	Deciders
Total costs	**9**	5	**4**	**5**	3	**5**	4	3	**6**

APPENDIX III: PERCEIVED BENEFITS

		All	Europe	USA	SME	Large	Current	Prospect	Users	Deciders
Product-related	Minimize	7	4	3	**4**	3	1	**6**	**6**	1
	Control	**21**	**15**	**5**	**14**	**6**	**11**	**9**	**15**	**5**
	Proof	13	**6**	**7**	3	**10**	**4**	**9**	**8**	**5**
Service-related	Works as should	6	4	2	**4**	2	1	5	**6**	0
	Saves resources	3	3	0	3	0	3	0	1	2
Relationship-related	Learn	5	**5**	0	3	2	3	2	4	1
	Better communication	4	3	1	3	1	3	1	3	1