Master Thesis

Customer participation in servitization: Defining the role of customers in the co-development of servitized offerings

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ABSTRACT

Since servitization is largely driven by a company's customers, the customer is seen as a necessary resource in solution co-development processes. Accordingly, this paper considers servitization as a dyadic phenomenon. However, available literature omitted the role of business customers. This study demonstrates the importance of closing this gap, since business customers and consumers are characterized by fundamental differences. The topic is approached through a service logic lens, considering value-in-use as the ultimate goal of business. This study provides a typology of business customers defining customer roles as well as type and degree of customer participation in servitized offerings. An ethnographic case study is adopted using interviews, observations, content analysis and a focus group. The analysis indicated the existence of seven antecedents of customer participation, functioning as a driving force to the established typology. Furthermore, the role of user advocate can be added to the literature, which appears as a central role in a B2B environment. The existence of the roles co-diagnoser, co-designer, co-innovator, co-producer, co-implementor, co-marketer and quality assurant is proven by empirical evidence. In addition, participation levels ranging from low to high degrees of participation are identified, depending on the stage in the solution process and the service intensity. The type of participation was found to vary with the interfaces in interaction the solution provider offers. This study argues that the customer is in control of the production process, which sets up a barrier for efficient value co-creation. Accordingly, we question the adequacy of the term 'customer participation'. Consequently, managers should aim to enter the development process earlier and support the role taking of customers by their insights won through this research. For researchers, this study raises the level of research up to a new stage. We encourage researchers to take this new stage of research in a business sector and claim for a more consistent use of terminology.

Keywords

Customer participation, servitization, Co-development, servitized offerings, customer roles, service logic

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1. INTRODUCTION

During the last decades, customers became more demanding, are better informed than ever and are aware of their options to switch the supplier (Vandermerwe & Rada, 1988). Therefore, suppliers strive to enhance their products with solutions to increase the benefits and to build up a stronger relationship with the customer based on customized solutions (Skarp & Gadde, 2008). The enhancement of offerings takes place by adding services to the core product. Vandermerwe and Rada (1988) describe this phenomenon as the servitization of business. They show the development of manufacturers from selling merely products or services to selling *"combinations of goods, services, support, self-service, and knowledge. Services dominate this era"* (Vandermerwe & Rada, 1988, p. 316). Lately, servitization has become a topic of high managerially importance. Vandermerwe and Rada (1988) describe the involvement of higher organizational complexity and different strategic thrust going along with servitization. In their opinion, traditional managerial recipes are no longer successful. Therefore, servitization is seen as top management issue that adds value, also because creating wealth by creating value is a primary objective of all businesses (Vandermerwe & Rada, 1988).

The existing literature on servitization in the B2B sector focuses largely on a one-dimensional perspective of the company itself within the servitizing process (Luoto, Brax & Kohtamäki, 2017). This implies that only the point of view of the supplier is taken into consideration. This fact appears to contradict the results of Ambroise, Prim-Allaz and Teyssier (2018) since added services increase the collaboration between provider and customer. This is proven by Story et al., (2017) who claim that closeness to customers is vital to any servitization endeavor, because a deep understanding of the customer's needs and requirements must be created. Accordingly, collaborative practices are of crucial importance for servitizing manufacturers (Kohtamäki & Rajala, 2016; Rabetino, Kohtamäki & Gebauer, 2017). To servitize successfully, there is a need to integrate all actors involved in the solution process (Ferreira, Proença, Spencer & Cova, 2013). Therefore, servitization is characterized by co-creation endeavors, in which the customer takes a central role in the development of solutions (Carlborg, Kindström & Kowalkowski., 2018). Thus, it is necessary to assess the customer's position in the co-development of servitized offerings. Consequently, this paper focuses on a two-dimensional approach, considering servitization as a dyadic phenomenon (Valtakoski, 2017). Ambroise et al. (2018) emphasize that this new vision urges researchers and managers to integrate different levels of customer participation and to discuss new classifications of servitization strategies.

With respect to the overall trend of servitization, there is much literature available on this research topic. It becomes clear, that the customer takes a central role within the servitization strategies of manufacturers. While the role of consumers is well studied, the literature lacks of studies which investigate the role of business customers (Mustak, Jaakkola & Halinen, 2013). According to Arnould (2008) the literature needs to be extended by a customer centric model to clarify in which way business customers engage in a firm's processes. Ambroise et al. (2018) state that the empirical evidence on servitization is not convergent and thus inconclusive. Therefore, future research has to provide empirical and conclusive results which integrate customers in the solution process. Research in this area can be done by typologies resulting from a conceptual framework to define the phenomenon of servitization and characterize the key construct of participation (Dong & Sivakumar, 2017).

Considering the need to integrate the customer into the co-development of solutions, the aim of this paper is to create a typology of customer participation in the co-development of servitized offerings. In line with Tuli, Kohli and Bharadwaj (2007), the typology will highlight the importance of the customer perspective by clarifying (1) the role of customers in the co-development of servitized offerings. However, even with clear roles, participation can take place by different types of interaction (Carlborg et al., 2018). So, the typology will show (2) the type of customer participation, either based on human to human or technology mediated interaction. Finally, the typology will present (3) the degree of participation, as every service urges different levels of participation, ranging from low to high level involvement (Carlborg et al., 2018). Subsequently, the guiding research question is: *What is the role of customers in the co-development of a servitized offering approached from a service logic lens?* In order to answer the research question in a systematic way, two sub-questions are established:

1. *Which roles do customers take when participating in the development of servitized offerings?*
2. *What are different customer participation levels in the development of servitized offerings?*

A service logic (SL) lens is applied to study customer participation in servitized offerings. The SL lens distinguishes from the service dominant logic, as it posits that both parties have to be present in the value co-creation process (Grönroos, 2008). Otherwise, the solution provider functions merely as a value facilitator. The dominating value construct in SL is the value-in-use (Grönroos, 2011). Value-in-use emerges through mental, possessive and/ or physical actions taken by the customer over time (Grönroos & Voima, 2013). In contrast, the service dominant logic considers value as an overarching construct, created by several parties (Grönroos, 2011). As value creation in SL is a customer-driven process, this perspective is most valuable to study the participation of customers.

To investigate the role of customers in servitization, a single case study is conducted. The investigation took place at an innovative construction and installation company in the Netherlands which wants to servitize their business model. The data of this study is collected via ethnographic case study (Visconti, 2010), by means of customer interviews and content analysis. Observations and a focus group interview were used to verify the obtained knowledge and to make the study more rigorous.

This paper contributes to the research on the phenomenon and deepens the knowledge by combining available literature and empirical evidence. It integrates all actors to the co-development process to provide a holistic, dyadic view. By developing a typology of business customers, this paper closes the present gap in the literature by demonstrating fundamental differences compared to consumers. Furthermore, this paper identifies causal explanations underlying this typology as driving forces. For managers pursuing servitization endeavors, this study fosters

the understanding of different customer roles and demonstrates enhanced value co-creation opportunities.

This paper is structured as follows. First, the key concepts underlying this paper are described and a review of the existing literature is given. Then, the methodology section provides insights into the data collection and analyzing methods to examine the subject. Hereafter, the results of the data collection are presented. Following, a conclusion is drawn which answers the research question and a discussion based on the existing literature is conducted. Finally, theoretical and practical recommendations are given as well as limitations and suggestions for future research.

2. DEFINING KEY CONCEPTS

2.1 Servitization

Servitization strategies become more important in today's business. Baines & Lightfoot (2013) consider servitization as a transformation of manufacturers, which increasingly offer services beyond their core product. Therefore, servitization includes a shift in the core business of companies and their revenue generation (Vandermerwe & Rada, 1988), so that modern manufacturing combines both, production and services (Baines & Lightfoot, 2010). For customers, these added services create additional value and increase the level of customization (Hakanen, Helander & Valkokari, 2017; Raddats et al., 2019).

By setting up a servitization strategy, companies are able to increase their competitive advantages (Baines & Lightfoot, 2010; Raddats et al., 2015; Vandermerwe & Rada, 1988). This includes strengthened customer relationships, higher barriers for competitors (Baines et al, 2009; 2011; Vandermerwe & Rada, 1988), new and resilient value streams (Baines et al, 2009; 2011) and a differentiated market offering (Raddats et al., 2015; Vandermerwe & Rada, 1988). Furthermore, a company can gain commercial and environmental benefits, as well as immense new opportunities which emerge through servitized strategies (Baines & Lightfoot, 2010; Vandermerwe & Rada, 1988). Servitization is especially powerful within business markets in which competitive advantages are difficult to maintain and extensive needs are present (Gebauer, Gustafsson & Witell, 2011; Hakanen et al., 2017). This is proven by Baines et al. (2009) who claim that particularly business customers' demand for additional services. However, the supplier adopts greater risks by servitizing their business, as he takes more responsibility for the performance of the customer (Baines & Lightfoot, 2013).

The adding of value through services becomes an important aspect in the corporate planning and mission of companies. Companies have chosen for different ways to move towards servitization strategies (Baines & Lightfoot, 2013). Some of them offer conventional or advanced services; others establish pure service strategies independent of their products and still others offer general consulting (Baines & Lightfoot, 2013). Mathieu (2001) puts a categorization of offered services forward. According to him, one can distinguish between services that support the supplier's products (SSP) or those that support customer's processes (SSC). Dadfar et al. (2013) add a third dimension, a joint provider-user specification. Here, the supplier and the customer jointly develop service specifications. Baines et al. (2009) identifies three categories, namely base (spare parts and goods), intermediate (repairs, training, help desks, maintenance) and advanced services (outcome contracts, agreements on customer support). The approaches of Mathieu (2001), Dadfar et al. (2013) and Baines et al. (2009) are combined in figure 1. Even if there are different ways to implement servitized offerings, the aim is always to create wealth by creating value (Baines & Lightfoot, 2013; Vandermerwe & Rada, 1988).

The development of a servitization strategy for manufacturers necessitates new capabilities, including organizational systems, structures and processes (Oliva & Kallenberg, 2003). Vandermerwe and Rada (1988) highlight the importance of the role of customers within servitization, as this phenomenon is largely driven by the companies' customers. This is confirmed by Ambroise et al. (2018). They emphasize that the implementation of service activities requires new ways of collaboration between the supplier and the industrial customer. Consequently, companies are able to reach more customer closeness (Hakanen et al., 2017). Regarding this growing interconnection, organizations have to be strong customer oriented (Salonen, 2011).

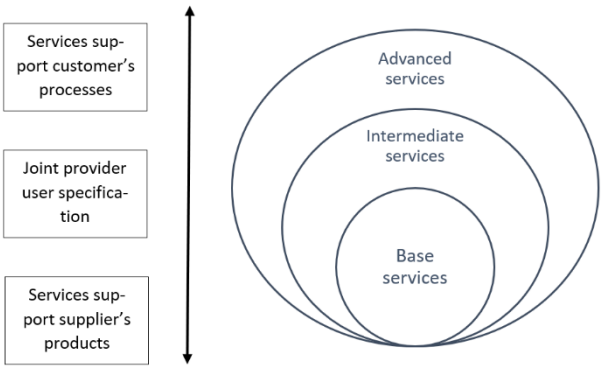

Figure 1: Classification of services within servitization strategies (based on Mathieu (2001), Dadfar et al. (2013) and Baines et al. (2009))

2.2 Service Logic

Since Vargo and Lusch (2004) introduced the service dominant logic, many researchers were encouraged to study the contribution of services in the field of marketing (Grönroos, 2008). The findings of Edvardsson et al. (2005) regard services not as a category of market offerings but rather as a perspective on value creation processes. This is in line with Grönroos (2011) who defines services as a logic of value creation. Considering value creation as the ultimate goal of business and as the base of all business relationships, services can function as a mediator variable in the value creation process (Grönroos, 2011).

With respect to the SL, customers are the creator of value, while suppliers merely function as a facilitator of value (Grönroos, 2011). Therefore, their role is basically to provide resources and interactive processes to support the value creation of the customer (Grönroos, 2011). However, in joint value creation processes suppliers are able to get the opportunity to function as a value co-creator. This leads to an extension of the market offering of the supplier and may influence the customer's value fulfilment (Grönroos, 2011).

Since markets are becoming more intertwined within servitization, value creation can take several forms (Carlberg et

al., 2018). However, value creation takes place at the customers sphere (value-in-use), as the customer is the creator of value (Grönroos, 2011). According to the service logic, the company can get involved in the value creation processes of the customer (Grönroos, 2008). To do so, the supplier takes part in interactive processes with the customer to foster value creation in their daily practices. Consequently, the supplier is directly engaged in the customers processes (Grönroos, 2008). The service logic suggests an interrelation of value consumption and value provision. As a result, the provider logic has to be linked to the customer logic as well (Grönroos, 2008). Therefore, value co-creation can be defined as a "*joint value creation process*" (Grönroos, 2011, p. 243), which demands the simultaneous presence of supplier and customer. The connection between the customers sphere and the company's sphere in the value creation process are visualized in figure 2. It must be noted, that this process is not linear and might take different forms. Due to the central position of customers in the value creation process, their contribution to servitized offerings has to be examined.

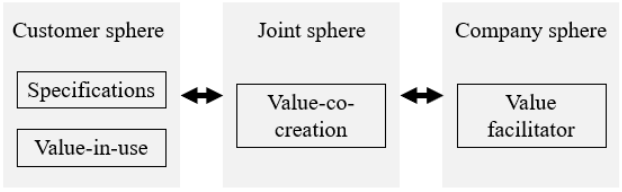

Figure 2: Value creation (see also service logic, Grönroos (2008; 2011))

2.3 Customer participation

The customer is central to any servitization strategy. Due to the necessity of the presence of supplier and customer in value co-creation, interaction between both parties is a condition to co-create value (Grönroos, 2011). If companies aim to add value by adding services, customer relationships get more long-term oriented and the participation of the customer in service deployment enhances (Carlborg et al., 2018). Considering the importance of collaborative processes between both parties, there is a strong need for frequent customer interactions and customer responsiveness (Bowen, Siehl & Schneider, 1989**).** Hakanen et al. (2017) show that business customers function as central actors in the development of servitized offerings, since they need to contribute necessary resources like knowledge, expectations and context.

Several researchers refer to this subject with different terms. The preferred term of this paper is customer participation, as the term has more consensus within the existing literature (Dong & Sivakumar, 2017). Customer participation "refers to the extent to which customers are involved in service production and delivery by contributing effort, knowledge, information, and other resources" (Dabholkar, 1990). By encouraging customer participation, the supplier is able to improve the overall firm performance, facilitate co-production, and co-design in the service processes (Berthon & John, 2006). Especially co-development is a central aspect within the collaboration of customer and supplier (Fang, 2008; Lengnick-Hall, 1996). In line with Mustak et al. (2013), the co-development of services and the term customer participation are used as synonyms.

One result of tight collaboration between both parties is the continuous presentation of the customers wants and needs in reality, so that divergent expectations are less likely to occur (Dadfar et al., 2013). Therefore, solutions better meet the requirements of the customer, the service quality improves (Bitner et al., 1997) and offerings become more customized (Prahalad & Ramaswamy, 2004). Accordingly, it is necessary for the supplier to understand the work practices of the customer, in order to deliver adequate service in future (Dadfar et al., 2013). Thus, the value for the customer increases, which leads to higher customer satisfaction (de Ruyter & Bloemer, 1999; Yen, 2005). Another crucial criterion for good collaboration between suppliers and their customers is a good and stable relationship. Dadfar et al. (2013) highlight the importance of trust and mutually accepted solutions in order to strengthen the relationship. This contains a shift from a blaming culture towards a problem-solving culture, in which both parties actively collaborate. The result is a higher degree of loyalty and trust going along with customer participation (Dabholkar & Sheng, 2012; Rosenbaum et al., 2005)

However, the degree of customer participation has to be a conscious decision by the supplier. As customers are becoming more active, the situations become more difficult to control. Companies have to be aware of fluent transitions between the actors involved (Carlborg et al., 2018). As business services are complex and may vary per case, the supplier has to adapt to each customer (Dadfar et al., 2013). Research by Chan et al. (2010) found that customer particiaption can increase the perceived workload of sellers.

3. LITERATURE REVIEW

3.1 Customer roles in the development of servitized offerings

The findings of Aarikka-Stenroos and Jaakkola (2012) indicate that both, customer and provider play a critical role in problem solving processes. Furthermore, Ambroise et al. (2018) show that added services in general increase the collaboration between the service provider and the customer in order to reach a customized solution. As a result, the customer becomes an important source of competence for the company. The customer's competences are based on the knowledge and skills he possesses, as well as his ability and willingness to engage and experiment (Prahalad & Ramaswamy, 2000). Considering the need to co-develop solutions, this assumption is proven by Grönroos & Voima (2013), as the customer is regarded as a necessary resource in the firm's production process. In this process of collaboration, accurate information is needed, thus the tight collaboration demands for appropriate interfaces to exchange knowledge and support cooperation (Tuli et al., 2007; Vargo & Lusch, 2004). Ranjan and Read (2016) highlight the importance of interaction as the primary interface in the co-development of solutions. Accordingly, interaction between the service provider and the customer is assumed to be a central variable in customer participation. By participating in the service development, customers can ensure their own satisfaction about the service delivery. Accordingly, the level of service the customer experiences depends on the interaction between the organization and the customer (Bitner et al., 1997).

With respect to the importance of the customer's competences and capabilities, the participation of customers depends on the roles the customer desires to take in the service process (Bitner et al., 1997). Consequently, both parties – solution provider and customer – can take different roles in interaction processes. Normally, value facilitation through the service provider precedes the costumer's value creation experience, but in case of active customers, the collaboration can be seen as a co-development process, thus the customer is included at an early stage in the project (Grönroos & Voima, 2013). Accordingly, the customer's value creation begins in joint development processes, which represent a value co-creation opportunity for the company (Grönroos & Voima, 2013). As a consequence, customers can take several roles in the value creation process when developing service solutions (Aarikka-Stenroos & Jaakkola, 2012). These roles are not mutually exclusive, but have a rather intertwined structure (Bitner et al., 1997) and vary with collaborative activities of both parties during the value co-creation process (Aarikka-Stenroos & Jaakkola, 2012). In doing so, companies which engage the customer and use them as a collaborative capacity, utilize the resources of the customer more effectively (Anning-Dorson, 2018). The following roles of customers in the value creation process are identified within the existing literature.

Co-diagnoser: The customer is the resource of relevant information about his needs, preferences, schedule, budget and usage (Aarikka-Stenroos & Jaakkola, 2012; Anning-Dorson, 2018), but it is the supplier's responsibility to know what the customer really needs (based on knowledge and experience) (Aarikka-Stenroos & Jaakkola, 2012). However, the customer is asked to introduce the service provider to the organization by giving information and describing operations (Tuli et al., 2007). Especially if the service becomes more important to the customer, the customer gets a clearer role in the problem-solving process by collaborating closely with the service provider (Kindström & Kowalkowski, 2014). Therefore, customer knowledge and knowledge flows are identified as central aspects in a manufacturer's servitization development (Hakanen, Helander & Valkokari, 2016).

Co-innovator: The customer is an important source of ideas and know-how, so his input can be translated by the company into new offerings (Ulwick, 2002). Therefore, the company can identify future needs by effectively utilizing the customers ideas and creativity (Ranjan & Read, 2014).

Co-designer: Supplier and customer negotiate about possible solutions, while the supplier has to guide the customer, who brings industry knowledge, interests and other details in. Solution design is the most important step for creating optimal value-in-use (Aarikka-Stenroos & Jaakkola, 2012). In line with this, Tuli et al. (2007) introduce the variable of 'political counseling' which refers to the customer's responsibility to provide guidance to the service provider and to introduce him to the internal politics of the firm. This enables the service provider to better understand the customer organization. Accordingly, this role mainly deals with mental processes and resources.

Co-producer: Co-production is the coworking with customers, including mutual exchange, access to expertise as well as mental and physical activities (Ertimur & Venkatesh, 2010). In order to achieve value configuration (Ballantyne & Varey, 2008), collaboration and dialogue is needed during co-production (Lusch et al., 2007; Aarikka-Stenroos & Jaakkola, 2012; Grönroos, 2012). To enhance this co-production effect, customers can be seen as partial employees to increase the productivity of the service. The maximum is a full self-service, where the customer produces the service on his own, with very little support of the organization (Bitner et al., 1997). Customers have central production roles that determine the quality of the service (Bitner et al., 1997), thus, the quality of the resources they bring in determine the service outcome. In contrast to the co-designer role, customers thus enhance the productive capabilities of a solution provider here. When organizing the process and the resources, customers need clear procedures to bring their resources (information and materials) in (Aarikka-Stenroos & Jaakkola, 2012).

Co-implementor: Both, supplier and customer can implement a service solution; the customer owns the resources of existing solutions and other materials (Aarikka-Stenroos & Jaakkola, 2012). As stated by Valtakoski (2017), "*solution implementation refers to the realization of the overall solution through development and delivery of the required knowledge components"* (p. 144). Thereby, the knowledge components of both parties are combined and integrated into one functional system (Valtakoski, 2017). This resource integration between company and customer is a central aspect in value co-creation (Macdonald et al., 2016). When implementing the solution, 'customer adaptiveness' becomes a critical variable. The customer needs to be willing to modify his processes and to adapt the supplier's solutions (Tuli et al., 2007).

Co-marketer: If the customer perceives sufficient value in use, they are likely to promote the providers skills regarding value creation and disseminate information on the value in use experience (Aarikka-Stenroos & Jaakkola, 2012).

Quality Assurant: As already stated, the production roles of the customer determine the quality of the service (Bitner et al., 1997). Thus, the quality of the resources they bring in determine the service outcome. Furthermore, effective participation increases the likelihood that the solution fits the needs of the customer due to frequent confrontation (Bitner et al., 1997; Dadfar et al., 2013). In addition, a higher participation in the service delivery provides the customer with a greater responsibility on the service outcome, so that he is less likely to develop feelings of dissatisfaction (Bitner et al., 1997).

3.2 Customer participation levels in the development of servitized offering

Since servitization is by definition based on the interaction between a solution provider and the customer, some level of collaboration is needed (Valtakoski, 2017). Considering the variety of customer roles in the co-development of servitized offerings, it is necessary to investigate whether different levels of participation are present. Earlier literature found that the success of new servitization strategies depends on the level of customer participation (Anning-Dorson, 2016). In addition, higher participation levels increase the customer's ability to influence the delivered value, which increases his satisfaction (Berthon & John, 2006).

As already stated, Mathieu (2001) distinguishes between services that support the supplier's products (SSP) and those that support customer's processes (SSC). The former contains product support services such as preventive services and basic maintenance. This approach is more product centric and demands for less in-depth customer knowledge. The latter focusses on the support of customer's processes, such as managing customer's requirements or routine maintenance and providing spare parts. In the joint provider-user specification mentioned by Dadfar et al. (2013), the supplier and the customer jointly develop service specifications (see also service types, figure 1). Accordingly, the degree of customer participation is expected to vary per service type, as these differ in knowledge intensity and customer centricity. With respect to the desired servitization strategy, the level of customer participation varies even across the organization (Ambroise et al., 2018), owing to functions with different degrees of customer orientation (Martinez, Bastl, Kingston & Evans, 2010). In addition, more important services demand for closer collaboration between both parties (Kindström & Kowalkowski, 2014). This is also proven by Bitner et al. (1997) who show three participation levels, ranging from low levels of participation to moderate and high levels of participation. In his approach, levels of participation are expected to vary with the type of delivered service. Services with low level of participation require the mere presence of the customer. In a Business-to-business environment, these services are less common as most services are knowledge-intense (Bitner et al. 1997). Other services depend on the aid of the customer to create a solution. This aid can include different forms of inputs, like information, physical possession or effort. Examples are the outsourcing of tax accounting or customer database management. In some cases, customers are highly involved in the co-creation of a service. In those cases, the customer needs to fulfil a central production role, otherwise the service outcome will be affected. Examples are all forms of training and education, since the service provider cannot deliver the service outcome without the participation of the customer (Bitner et al., 1997).

Furthermore, the level of participation is expected to vary per stage in the solution process. As stated in Ambroise et al. (2018), some stages in the interaction process between companies and customers demand for higher degrees of participation. This is confirmed by Anning-Dorson (2018), who states that the provider-customer interaction varies per phase of the development process. Especially at the problem identification stage, the exchange of knowledge is a central aspect, which intensifies the participation of the customer (Ambroise et al., 2018; Gadrey & Gallouj, 1998).

Another approach suggested by Carlborg et al. (2018) and Dadfar et al. (2013) shows that customers can be classified as active or passive customers within service solutions. The passive customer has a low level of human-to-human interaction, but may have a high level of technology mediated interaction (Carlborg et al., 2018). Active customers are classified by a high degree of human-to-human interaction. As this paper uses a service logic lens, it is assumed that value is only co-created in direct interaction with the customer. Therefore, the classification of this paper is not based on active/ passive customers, but rather on a high/ low level of participation based on human-to-human or technology mediated interactions (see figure 3). Anning-Dorson (2018) points out, that organizations are able to influence customer participation levels by clarifying the customer roles. This aspect shows a tight interrelation between the customer roles and the participation levels.

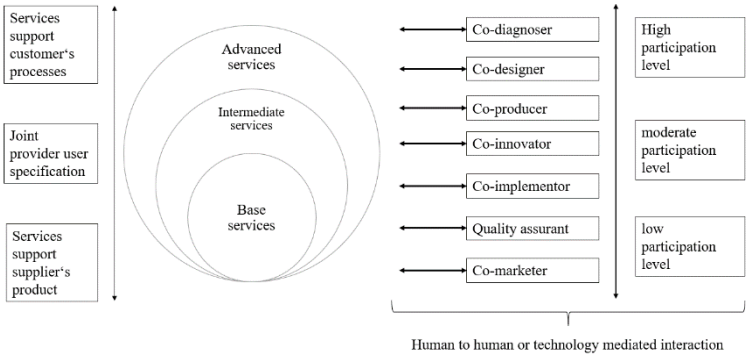

Figure 3: Customer participation in servitized offerings

4. METHODOLOGY

4.1 Research strategy

Given the lack of conclusive empirical results on customer participation in the development of servitized offerings in a business context, this study applies a field-based, inductive research design. Due to the absence of appropriate literature on customer roles in servitizting processes, the inductive approach aims to establish a theory derived from a single cases data (Eisenhardt & Graebner, 2007). Theoretical frameworks established from cases are more persuasive about causality and provide closer insights to the researcher than other empirical methods (Siggelkow, 2007). This approach provides stronger and more grounded bases for theory building (Eisenhardt & Graebner, 2007; Yin, 1994). Within the analyzed case, five customer projects are examined. In the following, these are referred to as "project". In line with the elaboration of Eisenhardt and Graebner (2007), each project is described as an own analytical unit. Then, the findings of all projects are merged in an aggregate analysis. To gather and analyze the empirical data, an ethnographic field study is being opted, since ethnography is highly concerned with empirical discovery. According to van Maanen (1979), ethnography is a suitable approach to identify how people manage doing business together in a repeated manner. The aim is to to uncover and explain how people work together in day-to-day actions, thus this approach is most suitable to study the co-development of customers in servitized offerings.

4.2 Ethnography

In the late 20th century, ethnography became an important research tool in management and marketing research. It emerged from the field of anthropology, used to identify and understand cultures, norms and practices (Venkatesh, Crockett, Cross & Chen, 2017). Ethnography gained in importance in the field of marketing and customer issues, systems and services which improve the people's lives (Venkatesh et al., 2017). It is a scientific approach to gain insights as well as deep and rich understandings

of the subject under study (Visconti, 2010). The overall aim of ethnographic studies is, inter alia, to identify the roots of people's behaviors (Venkatesh et al., 2017). Therefore, the researcher is highly interested in the meaning of practices and behaviors, rather than the action in itself (Visconti, 2010). Ethnography can be seen as a process of discovery, striving to find the truth or valuable insights by exposing organizations, people and practices (Visconti, 2010). An ethnographical approach starts with a research question or findings from prior research. As proposed by Visconti (2010), the research process of this paper started with the description of the phenomena of interest as a basis for the conducted study. Von Krogh, Roos and Slocum (1994) highlight:

"By doing organizational ethnographies, researchers enter the organization, learn the distinctions and norms pertaining to the knowledge of the organization, study self descriptions, in the organization, and establish and enter relationships necessary for the continuous knowledge development of the organization." (p. 66)

Accordingly, an ethnography can be seen as a research, in which data collection takes place within the company's natural setting by participating and living among '*those who are the data' (Rosen, 1991, p. 5)*. In this natural setting, qualitative data collection methods and analysis are employed. Therefore, ethnography is most suitable for research projects which aim to generate insights into different behaviors. Such ethnographic approaches provide thus the advantage that the researcher is closer to the data and the phenomena, as he directly observes behaviors and people in a naturalistic setting (Visconti, 2010).

4.3 Ethnographic Case Study

Visconti (2010) introduced the concept of ethnographic case studies in business research. He combines organizational ethnography and case study research to improve the relevancy of the research. Therefore, this paper applies this combination of ethnography and case study to gain relevant and grounded insights. The case at hand is a Dutch construction and installation company, which servitized their business model. Traditionally, construction and installation have been separate links in a chain. The company's vision is that one can only deliver the best performance if they apply real integration in the process of design, realization and maintenance. Through this, the customer can focus on his primary processes, gains more continuity of use as well as more effective and efficient installation and maintenance. The so called SmartilityDesk provides centrally organized business intelligence to the company, which supports the processes. Therefore, the role of the company changes from a pure product provider to a more service-oriented solutions provider. The aim is to adopt a Building as a service model.

According to Visconti (2010), the fieldwork activities in ethnographic case studies include five steps, namely goal setting, sampling, ethnographic immersion, data collection, interpretation as well as reporting and implementation. Hereafter, these steps are applied to this study.

4.3.1 Goal setting

Since goal setting and sampling are circularly intertwined, the research objective of ethnographic studies depends on the availability of empirical business cases. In line with the statements of Visconti (2010), participated goal setting is conducted in consultation with the company where the investigation took place. With respect to the service logic lens of this paper, the customer takes a central role in the value-creation process. Accordingly, this paper provides a customer centric approach for co-development processes. A typology is created clarifying central elements of customer participation: (1) the role of customers in the co-development of servitized offerings, (2) the type of customer participation and (3) the degree of participation.

4.3.2 Sampling

The determination of a study sample is an important step in every research design (Marshall, 1996). According to Visconti (2010), the procedure of sampling involves the following considerations:

Sampling steps: Following the typical method as described by Seawright & Gerring (2008), a case is selected which is a typical example of the subject under study. Thus, a company is chosen which develops from a production company towards a solution provider. As a first step, the researcher needs to identify the organizational context. In this study, an innovative construction and installation company (in the following: ICIC) located in the Netherlands is selected. The aim is to create representative samples which allow for valid inferences about the population (Marshall, 1996).

Sampling criteria: Within ethnography, samples are determined by theoretical selection based on established sampling criteria. Such theoretical selection corresponds with the judgement sample described by Marshall (1996). Herein, samples are being opted depending on their appropriateness to study the subject, which is determined by their likelihood to extending, contesting or replicating the emergent theory (Eisenhardt, 1989; Visconti, 2010). In this study, customer projects including added services beyond the core product were of interest. Other projects without added services were excluded from the research, since their potential to add valuable information on customer roles in servitization seemed to be absent.

Sample size: The sample size is determined by theoretical saturation, which occurs when new insights and learnings of additional respondents are minimal. Morse (2002) indicates that larger samples do not necessarily lead to more richness of the data. Following this procedure, five customer projects in total are selected, which differ regarding their stage in the development process and their service intensity.

4.3.3 Ethnographic Immersion

Immersion is the "*researcher's gradual naturalization in the inquired culture aiming to consolidate his/her cultural competence"* (Visconti, 2010, p. 32). Within this process, the researcher acquires skills and sensitivity on language, behaviors and interpretation. Therefore, the participation in the company's natural setting diminish the barriers between the researcher and the informants (Visconti, 2010). In the present study, immersion was achieved by participating in the company's everyday practices for twelve weeks in total. During this time, customer meetings,

e-mail communication and customer-oriented processes got observed and examined. Furthermore, means of desk research (e.g. the companies' websites, external project landing pages, internal documents and other publications) provided additional insights into work practices. Therefore, the researcher was able to understand and interpret the gathered data from the viewpoint of the informants, which led to a more grounded analysis.

4.3.4 Data Collection

Ethnographic research is very meaningful as it combines practices and dialogue (Visconti, 2010). Thus, ethnography is mainly based on observations and verbal reports. However, such collection methods do not provide insights into the perceptions and the informants internal states. This leads to the necessity to complement these data by verbal information (Arnould & Wallendorf, 1994). By moving from an etic (researcher/ analyst, outsider) to an emic (writer, insider) perspective, the gaze of the researcher is extended, thus the ethnography becomes more valuable (Lillis, 2008). LeCompte and Schensul (1999) show that ethnography consists of several essential methods, which include observations, interviews, and content analysis. Focus group interviews are regarded as a supplementary method to enhance the study, but cannot take place on their own to create an ethnography (LeCompte & Schensul, 1999).

Accordingly, data is collected via primary and secondary sources (see table 1). The primary data collection contains interviews, a focus group and observations. Key informants, which are most competent to provide valuable insights, were identified by the researcher. Therefore, the researcher collaborates closely with two Business Developers, who are involved in the servitization process, a Real Estate Advisor, who is closely related to the customer's processes as well as a tender manager and a process engineer, who are involved in the establishment of the servitized offerings. Firstly, semi-structured interviews took place with the company's customers to integrate their view into the analysis. Within these customer companies, well informed employees regarding the project were chosen. These are employees who were included in the whole solution-development process in close collaboration with the solution-provider. In project four, two customer parties were included. The first organization (in the following: organization) is specialized on renting social housing, while the second one is an elderly care institution (in the following: institution). These circumstances made it necessary to take both parties into account, accordingly interviews were held with the two responsible employees of the customers, which took part in the solution development process. An overview on the selected projects and the associated interviewees can be found in table 2.

Semi-structured interviews are a reasonable approach to ensure reliability and validity of the results (Raessens, 2015). The interviews were held on individually base to keep the interviewees unaffected of each other. Interview questions dealt with the perceived contribution part and the provided resources of customers during the solution development as well as the intensity of collaboration. The guiding questionnaire used in this research can be found in appendix 1. Then, observations took place throughout the whole data collection process including visits in customer meetings and shadowing employees during their daily work routine to gain insights into work practices in an unobtrusive manner. Lastly, the obtained knowledge got prepared and discussed in a focus group with business developers, customer advisors and project managers of ICIC. The participants of the focus group were selected by following the purpose of reflecting a broad spectrum of employees taking part in the solution process. The aim was to identify the perspective of the customer and also to discuss the possibilities of customer participation in the development of servitized offerings at the company's side. This is in line with Arnould (2008) who highlights the importance of a customer-centric approach by aligning the customer's perspective to the company's processes.

The secondary data is provided by the company and was collected for other internal purposes. This data contains documents about the different customer projects including tenders, contracts and other project descriptions which are analyzed by means of content analysis. This data was necessary for the researcher to familiarize with the products and services, and to collect information on the particular customer projects.

To improve the trustworthiness of this paper, triangulation is used by combining interviews, observations and a focus group (Shenton, 2004; Morrow, 2005). Furthermore, the research design of the study is described thoroughly, which contributes trustworthiness (Shenton, 2004). In order to guarantee ethical conduct, the data collection follows the ethical standards of the university and the participants ensured their consent to take part in this research.

Table 1: data collection techniques

Method	Key informants/ Data source	Purpose	Application
Ethnographic Interviews	Customers	In-depth information, description of practices	Per project
Content analysis	Documents	Enhance understanding	Per project
Observations	Employees ICIC and customers	Record situations and their meanings for the participants	In daily work routine & during focus group
Focus group	Employees ICIC	Enhance understanding, make study more rigorous	Verify overall findings

Table 2: overview of selected projects

Project	Stage solution process	Function interviewee	Type of service
1: construction of a new school building including the establishment of outbuildings and ground	Construction phase	Team leader	Advanced services: outcome contracts (e.g. energy volume guarantee) Intermediate services: Maintenance: long-term maintenance, non-daily (to ensure the quality of the building) and daily maintenance (periodic and preventive or incidental, in case of incidents or breakdowns) base services: cleaning services
2: construction of a school for secondary education	Development phase	Manager administration and maintenance	Advanced services: outcome contracts Intermediate services: Maintenance Base services: cleaning services
3: residential and care complex with 44 apartments Challenge: Dealing with two customer parties	Construction phase	(1) Manager building and ICT (2) Project manager	Intermediate services: long term planned maintenance
4: construction of a school	Exploitation phase	Director	Intermediate services: long term planned maintenance
5: construction of a school for preparatory secondary vocational education	Construction phase	Project manager	Intermediate services: long term planned maintenance

4.3.5 Data Interpretation

To investigate the subject under study, the collected data is analyzed systematically, pursuing the procedure as mentioned in Gioia, Corley & Hamilton (2013). This approach is combined with the procedure of interpreting ethnographies according to van Maanen (1979). In ethnographic case studies, it is necessary to distinguish between first- and second order concepts. This separation is mainly based on the question which position is taken, the researcher's or the informant's one (van Maanen, 1979). Since researchers who conduct ethnographies have to record almost everything due to the limited determinability of importance of data (Visconti, 2010), the structuring of data is a crucial step. Respecting both procedures, the data analysis is divided into three steps. The process starts with the 1st-order analysis. Herein, many informant terms, categories and codes emerge (Gioia, Corley & Hamilton, 2013). Categorical relationships are identified, so that the data can be translated and organized in a logical and systematic manner (Hsieh & Shannon, 2005; Ryan & Bernhard, 2003). Therefore, codes are created pursuing a directed content analysis as described by Hsieh and Shannon (2005). The definition of codes takes place before and during data analysis, so that the codes derive from theory or fundamental research findings (Hsieh & Shannon, 2005). In this approach, the data gathered from the interviews, observations, documents and the focus group, are structured by the categories identified in the literature. Consequently, the roles in the value creation process of services as well as the degree and type of participation are applied to the acquired data. In the course of the analysis, similarities and differences among the categories are identified. This step is called 2nd-order analysis and aims to reduce the number of categories (Gioia, Corley & Hamilton, 2013). These second-order concepts are created which provide a pattern to the first-order data. Therefore, it is required to translate the first order data into second order interpretations (Rosen, 1991). Since the aim of ethnographies is to derive second-order concepts, the revealed first-order concepts are decisive for the second-order (van Maanen, 1979). Then, the 2nd-order themes are reduced to aggregate dimensions. The 1st and 2nd order theme and the aggregate dimensions form together the data structure. This proceeding functions as a visual aid when analyzing the gathered data (Gioia, Corley & Hamilton, 2013). The obtained code structure can be found in appendix 2.

4.3.6 Reporting

In line with the findings of van Maanen (1979), the researcher adapts the point of view of the informant when writing up the findings. By doing so, presentational skills and methodological rigor are basic conditions to promote reliability, robustness and the perceived relevance of the study.

5. RESULTS

The obtained knowledge of all projects is combined to create an overall picture on customer roles, type and degree of participation in the co-development of servitized offerings. These offerings hold the promise for the customer of reducing time spend on supporting processes, so that they can focus on their core processes. In all cases, the solution provider stated the aim to relieve the customer regarding supportive processes and to be able to reduce the total costs of ownership. The following part presents the results of the interviews and the text analysis per project. Then, an aggregate analysis is made, containing the results of the interviews, observations, text analysis and the focus group.

5.1 Project findings – solutions containing advanced services

5.1.1 Project I

Role of customers

At first, the development process started with the customer's problem identification, since the old building did not meet the current requirements of education. The new building should be future oriented, include new education concepts and ensure higher PR-value. When the project started, the customer determined education models which will be executed in the building. Based on this, the tender process started which was won by ICIC. Accordingly, all requirements and needs were identified before the collaboration between provider and customer started. The

same applies to the services, for which the customer used external advisors to specify the requirements. This was necessary since schools have to meet certain standards. In addition, budget and time frame of the project were determined by the customer.

Then, the collaboration between the provider and the customer started and the established requirements were translated by the provider into materialization and service specifications. The design of the whole process was created by the provider. Therefore, the provider had to mediate between the customer and his desired specifications and the requirements determined together with external advisors. The customer describes this process as challenging, especially for the provider due to his initial absence of insights into the customer's processes. The ultimate user is identified as a central aspect in the considerations of customers. One reason of this customer to choose such servitized offering is the promise, that the customer can concentrate on his primary process, without wasting time on supportive processes. Furthermore, the customer considers the achievement of performance requirements as necessary to gain a higher quality for the ultimate user.

The maintenance and service planning are drawn up by the provider based on the formed outcome contract. Since the unobstructed operation of the installations is of huge importance to the customer, he is aware that maintenance must occur in collaboration between both parties. The team leader states: *"…temperature, air quality, these are very important for us and determine the quality of education, thus you have to maintain jointly"* [Project 1]. Additionally, the customer perceives a common interest which arises by this servitized approach and the outcome contracts. The foundation for the collaboration is the shared responsibility of both parties in the process. This becomes clear in the providers statement *"we feel responsible to deliver a functional and aesthetic building for the next 15 years"* [ICIC, project 1]. In case of incidental maintenance during exploitation, the provider states to search for a solution at the customer's sphere together with the responsible employees of the customer, which ensures fast problem solving.

Through the common interest and the shared responsibility, the customer expects a higher quality of the product, since the provider can be confronted with potential issues also later in the development process. This is confirmed by the provider, because this sort of collaboration is an important aspect to guarantee quality and performance. Furthermore, the approval of the customer is asked for central decisions several times during the process, so that the solution fits the needs more closely. Nonetheless, the customer states to monitor and control the services and performances on his own to ensure a high-level quality.

Before the implementation of the solution, several considerations between all stakeholders take place. Important aspects are the introduction of different people, the instruction of the customer's employees and the testing of the customer portal. In the first days after implementation, the provider states to provide support to the customer to introduce installations and facilities.

Type of participation

Communication and interaction took place in regular meetings, phone calls and e-mails. The contact persons, which is available during the whole collaboration, is another central aspect here. Furthermore, interaction also occurs on a non-personal basis. The customer portal is used to disclose issues or other kinds of information. Problems with a high priority should get reported in the customer portal, but to ensure a fast solution, the provider recommends to establish personal contact. Problems with a low priority can be delivered by the customer portal or the building management system. Via this building management system, the provider is able to check the installations on their own. In case of problems, these can be recognized immediately and solved without recognition of the customer. By making the building smart, the building can deliver data about occupancy, lighting, energy use or the required cleaning intensity, to work more efficiently.

Degree of participation

The customer describes the development of a solution as a continuous process, in which he takes an active role. Since this approach uses single sourcing, the customer experiences a high degree of collaboration with only one provider. After the tender process, many meetings took place, but the frequency declined during the process. Therefore, the customer expects that the intensity further declines after the implementation of the solution. During the intensive collaboration, the customer highlights communication and regular evaluation about performances as central aspects.

5.1.2 Project II

Roles of customers

In 2013, the school identified the need for a new school building, since the old one is outdated. This resulted in less competitive abilities compared to other schools during the past years. Furthermore, the building needs to adapt to the recent developments in education. Therefore, internal research took place to determine the (changed) needs and requirements of the school. To do so, different internal parties like the management and the personnel were asked to jointly identify the specifications. The required services were determined by the manager of administration and maintenance himself due to his knowledge in this area, but he also considered a construction management agency for advice on this topic. However, he also states to made a conscious decision to involve the solution provider at an early stage, to jointly develop these services.

After the requirements were determined, the planning became more definitive and a solution to the diagnosed problem was created by the solution provider. This development phase contained close collaboration between the customer and the provider. The manager administration and maintenance especially mentions the long-term planning, which is jointly established. The planning shows the requirements in detail and gives overview on the planned services. However, the manager of administration and maintenance also states the possibility to adjust this planning in consultation with the provider if needed. This creates a cycle, in which both parties continue to develop and adjust the solution, which is enabled by the consultation structures during exploitation. The customer is aware of different knowledge sources, since the customer expects to profit from the provider's advice on the planning. This also applies to the provider, since

he wants to provide clarity about different possibilities and various interests. The ultimate aim here is a "*win-win situation*" [Manager administration and maintenance, project 2] for both, since both benefit from the input of the other party.

A further source of knowledge is the ultimate user. Accordingly, the input of the ultimate user is necessary to facilitate best conditions during the design and construction phase. However, the customer stated that the ultimate users have problems to articulate their wishes. Therefore, consultations are organized by the provider to support the customer and the user to make the right choices by clarifying the options in advance. As this project is a design, build, maintain and operate assignment, the customer can benefit from optimum relief, so that the building is kept in an optimum condition, allowing the customer to focus on their primary processes. This integrality was a crucial criterion for the customer, with the result that the docents can focus on their teaching activities, which increases the quality of education.

During the whole process, the customer is aware of the different roles they might fulfil. The interviewee highlights the different people involved as the most important contribution. Therefore, they discuss the distribution of roles together with the provider. The provider established a multidisciplinary team, by what an interorganizational building team arose. This team jointly works on the solution and the maintenance plan, since only the basis is determined in the design phase and further details are added at a later stage. Despite this close collaboration in the building team, the customer considers the provider as fully responsible for the progress of the project.

The customer expects the solution provider to deliver high quality, which needs to be verified by the customer organization. Accordingly, the project is evaluated two or three times a year as determined in the planning. Based on performance indicators, the provider shows to meet the requirements and methods set by the customer. The prevention of conflicts, achieved through proactive escalation and risk communication, shall enhance the quality of collaboration and finally of the solution. Additionally, the maintenance services must be carried out proactively to be able to guarantee performances, as the provider states: *"by performance maintenance, we are in control of the process, the performance and the building, which improve the buildings, the implementation of optimisations and increases the services"* [ICIC, project 2]. Before delivery, the provider organizes implementation meetings with all parties (object manager, asset manager and care takers) to introduce each other and to guarantee a smooth start.

It was striking, that the customer describes this project as *"vital"* [manager administration and maintenance, project 2], since the enrolment of students declines in case of a building in bad condition. But also, the services and the maintenance are important to the customer, because the building must provide adequate place for studying. Hygiene is a crucial aspect which must be guaranteed. The manager of administration and maintenance names these immaterial values, which are essential to support the quality of the primary processes. By choosing a solution, the customer values the integral approach, as the provider must think about materialization and sustainability in a more distinct way. This increases the quality of the building and a decrease of TCO.

Type of interaction

The interaction takes place via direct communication or via technological means. To exchange documents and other information, the DocumentManagementSystem is used. During the implementation phase, ICIC provides a link between the operating software systems, which monitor maintenance and occurred calamities. By doing so, the customer is enabled to see real-time data. A management information system enables communication with the provider. The customer describes this as a self-service desk, where they can submit wishes or complaints, which will be solved by the provider. In the exploitation phase, the customer can still submit wishes via an application in the customer portal. By making the building smart, much data is gathered from the building. This data is linked to the smartility desk to analyse it, so that the services can be improved based on data analysis. The data is inter alia collected by sensors, which show occupation information to save resources and improve quality. It is expected, that these presence sensors are able to reduce up to 10% of cleaning hours. Furthermore, these sensors can schedule rooms more efficiently, thus in unused building rooms the installations and the lightning are left off. This provides the customer with direct operating costs savings. The data collected by the provider enables a transition, which can lead to new revenue models for the solution provider as well as for the customer. This is confirmed by the manager administration and maintenance, who states that *"through this approach we hope to figure out more innovative things"* [project 2], so that the ultimate user benefits from this.

Another aspect is the personal communication in this project, which mainly takes place via mail and phone, but also in regular meetings between the customer and the provider. The customer states to highly value this direct interaction, but also the provider regards these meetings as important. They state the importance to get to know each other, since this is the basis for a smooth-running process. Furthermore, ICIC communicates proactively, because they aim to create an atmosphere of trust. A central aspect is also the contact person, which is responsible for the communication throughout the whole collaboration. During exploitation, this person is present at a regular basis to work together with the caretakers and to ask for experiences, problems and wishes.

Degree of interaction

The interview revealed an active role of the customer in the development process of the solution. The manager administration and maintenance claims: *"this is about collaborating"* [project 2] and highlights the importance of finding a joint solution. During the design phase, intensive collaboration takes place on a daily basis, since fundamental aspects need to be determined. Especially the provider aims to create a high level of involvement of the customer in this phase to clarify various interests. In the construction phase, the intensity of collaboration declines and mainly takes place in project consultations to discuss the planning and to inform the customer about the current state every four weeks.

5.1.3 Analysis

In both projects, the **requirement determination** took place in the customer's sphere by internal research. Accordingly, the solution provider had an initial absence of knowledge when joining the development process. The provider had to take a mediating role, which means aligning **the expertise of different actors** by including also the ultimate user. Owing to the added services and long-term approach, provider and customer perceived a common interest and **shared responsibilities** within the development process. In both projects, the development is described as a "*continuous process"* [Team leader, project 1] or *"cycle"* [Manager administration and maintenance, project 2]. This gives rise to a **cyclical design**, in which both parties continue to co-develop the solution throughout the whole process of collaboration. Consequently, both customers claim that the development of a servitized offering differs significantly from the development process of a non-servitized offering. The customers perceived an active role in the development, but with a declining intensity in the course of the project, indicating that the degree of participation depends on the **stage of the solution process**. Furthermore, different **interfaces** between provider and customer **in co-development** are described. During exploitation, services can take place without recognition of the customer or by self-service of the customer, thus without direct interaction, which means that no value is co-created here.

5.2 Project findings – solutions containing intermediate services

5.2.1 Project III

Roles of customers

At first, the diagnosing of needs and requirements mainly occurred at the sphere of the institution. Their old building was technically outdated, so they needed a solution to this problem. The institution views themselves as the initiator of the project and executed internal research to specify their needs and requirements. Since this project had a long history as it started twelve years ago, both customers had a precise idea on the required specifications. From the solution providers point of view (who joined the project one year ago), a requirement analysis was made to identify and particularize these customer needs. The institution also emphasised the importance of collaboration between the customer and the solution provider at an early stage, as they can benefit from the provider's sophisticated knowledge and insights. Since the provider is responsible for the maintenance, they think differently about their options according to material. However, the interviewees also state the importance of bringing in their own wishes and being clear on the available budget. The organization recommended ICIC to the institution, because they jointly finished successful projects in the past.

After the tender was won by ICIC, the real development process began and ICIC took the lead to coordinate and communicate between the parties to realize their different wishes and requirements. The project manager mentions: *"the provider is responsible for the design, but to achieve a satisfactory design, we have to contribute our input and our wishes, so we have a big contribution here"* [project 3]. In this case, the expertise regarding care was introduced by the institution, since they know the expectations of their clients and wanted to solve their current housing problems. Besides this flow of information, the organization brought in their expertise on building apartments. They stated to never trust the maintenance plan of a provider blindly. Instead, they use their expertise and an own delegated department to direct these planning. In addition, the requirements of a further party needed to be considered in the development phase, since the law, which is represented by the municipality, determines mandatory specifications for care complexes. Therefore, customer and provider were both aware of the fact that adequate reconciliation is fundamental to a satisfactory design. However, the customers described the information flow as not ideal, so the design phase was less efficient.

It was striking, that all parties regard the ultimate user as a central aspect in their considerations. The customers stress that the building must fulfil the targeted function, so that the institution can focus on their core business. Accordingly, the institution needs to involve the ultimate users and advocate their wishes in the construction meetings, because they exactly know the challenges during their daily work practices.

The documents on this project revealed that an interorganizational team is formed, which includes employees of the customer and external advisors, since the solution provider highly values collaboration in the development and realization phase. Considering this team, existing knowledge of the different parties can be brought into the table and coordination as well as decision making can take place based on progress reports. The customer also regards this building team as an efficient way to bring their knowledge and insights in. Therefore, they are also aware of their responsibilities and their contribution to the solution. They state, that the provider needs to react flexibly on their input, so that their experience of the product and the services will be right. During the construction phase, they continuously examine the building to see whether the requirements are met and if the materialization provides the right experience. In the future, the customer considers the takeover of energy supply and production by the supplier as a potential step, by which the provider gains greater responsibilities.

During the whole development process, the quality of the solution should remain high or even improve. To do so, the provider considers themselves as responsible to ensure the quality of the work. This is aligned with the customer's responsibility of testing and accepting. Therefore, the customers are asked to give judgment, and to test and accept the solution. Furthermore, they have to ensure that the project is realized according to their wishes and within budget. In line with these statements of the customer, the provider values continuous demonstration and maintenance of the required quality. With respect to the institution, the quality of the installations (heating/ warm water/ air conditioner) is very important, and in case of problems, a fast solution is needed.

To implement the solution, which means moving in, a planning is established by the solution provider. In addition, considerations and agreements are made by both parties and installations get tested. This shall ensure the continuous quality improvement within the project and the team. Furthermore, the collaboration improves which leads to better results. The customer

expects the provider to react flexibly in case the maintenance services need to be upscaled.

For both customer parties, the project is of high importance and associated with a financial risk. Overall, both parties value the integral design of such solutions, the possibility to highly customize the solution as well as the good overview of the total costs of ownership. Furthermore, the maintenance services are considered as essential for the sustainability of the building, not least because of the more conscious decisions regarding materialization taken by the provider.

Type of participation

With respect to the development phase, a fundamental aspect of interaction is the fixed contact person of the provider. This continuity of the contact person is important for the customer, since this enhances the collaboration. All parties value meetings on a regular basis, but phone calls or emails are also a common communication tool in this phase. The organization stresses the importance of short lines and in case of problems, they will contact an employee of the provider immediately. Therefore, the provider is available 24/7 in the time after implementation, so they can ensure a fast solution in case of critical problems. By doing so, the contact person is still the first person to ask. Besides the personal contact, information delivery also takes place by technological routes. In the development phase, programmes are used to store important documents and other requirements, in order to enable the access to this data for every party. After implementation, technical monitoring of the performance targets is executed to detect deviations earlier. Based on this data, the solution provider can carry out the maintenance in a strategic manner.

Degree of interaction

The customers highlighted to have an active role in the development of the solution, and to collaborate closely with the provider. The degree of participation is regarded as intensive in all phases, nonetheless, the design phase is seen as the most intense phase considering collaboration and contact moments. According to the interviewees, the collaboration intensity depends on the phase of the project and will decline during the building process. After the implementation, the customer expects the provider merely to deliver the maintenance.

5.2.2 Project IV

Roles of customers

The process started with the school's definition of their needs and requirements, followed by the publishment of a tender. Due to a rising number of students, the old school building got to small and an extension of the building was necessary. Furthermore, a financial frame was set by the customer that might not be exceeded. After the tender was won by ICIC, a number of start-up meetings took place. These were necessary to identify the customers involvement and to become more familiar with each other. ICIC states, that they are responsible for this process and value sharing and discussing of different choices. The director stated that the decision for a servitized offering was made due to the promise to be able to focus on primary processes, thus education taught in a good maintained building.

Then, many things have been developed jointly between customer and provider, since the published tender allowed for new ideas or improvements. Therefore, both parties brought in knowledge from their different perspectives. The customer *"purely from the perspective of education"* [director, project 4], while the solution provider introduced technical knowledge. The customer states that much consultation took place regarding the specifications of the building. During the whole development process, certain aspects got changed and were customized in the way the customer required it. However, the director also mentioned the importance of negotiating about these wishes, since some aspects cannot be changed from a constructional and structural point of view.

In the progress of this project, a construction team comprising the customer, the solution provider and further advisors negotiated on a regular basis, for what a whole schedule was prepared. As noted by the provider, this does not only include collaborating, but also being jointly liable and making business together. Furthermore, they highlighted that *"you build together, not alone"* [ICIC, project 4], which underlines the importance of close collaboration. This is proven by the statements of the customer, who again shows the different desires, because the provider aims to deliver a building with a certain quality standard, while the customer wants a building where they can fulfil their primary processes. Accordingly, they regard it necessary to bring all parties together, so that the knowledge from different angles can be merged. That means, that the customer is aware of their own contribution part during the construction phase: "*a building, where we have participated, what we pay, what we designed on the drawing board"* [director, project 4].

During the whole process, the acceptance of the customer was asked several times. They needed to accept the overall planning and monitored the execution of the provider. Further verifications took place by the solution-provider and their quality manager. Another party which needs to be considered is the municipality, who controlled the building several times, due to their responsibility for the building's safety. The solution provider states the importance of good communication and mutual support to achieve a satisfactory result. The customer evaluates the communication as succeeded, since they were kept informed about procedures and required adjustments, so that they had an overview on the progress at any time. Considering the good collaboration and the high degree of satisfaction, the customer already recommended the provider to others.

With respect to the implementation phase, the customer was confronted with some issues. After consulting the provider by phone, the specialized department dealt with these issues. They adjusted, checked or repaired the affected components. Accordingly, the problems during implementation were solved fast and to the entire satisfaction of the customer.

Type of interaction

Interaction mainly took place either personal in the consultation meetings or via phone. In case of problems, the customer had the opportunity to make a complaint or report a defect in the customer portal. However, in case of a high urgency, they prefer personal contact via phone.

Degree of interaction

The customer perceived a high degree of participation throughout the whole project. Meetings took place on regular base every 2 weeks or, if necessary, once a week. These regular consultations aimed to steer the process. As stated by the solution-provider, meetings preferably took place at the customer's sphere to gain a deeper understanding of the organization and their requirements. Furthermore, they outline the importance to fascinate, bind and engage each other, so that a we-feeling arises. Due to the close locality, interaction took place daily, which contributed the emergence of trust and mutual understanding. These aspects can be summed up by the statement of the service provider: *"we are real collaborators and team players"* [ICIC, project 4]. However, the customer experienced two peak moments, which asked the highest degree of collaboration, so you "*just need each other"* [director, project 4]. These moments were the start of the process, where you have to get familiar with each other, and the implementation and delivery. Even though the customer perceived a high degree of participation, the solution provider regards themselves as main responsible and described to take an active role in the communication.

5.2.3 Project V

Roles of customers

The development process began with internal research and feasibility studies by the school to determine the requirements. After this, an external consulting agency was integrated in the process to get advice. The needs were determined jointly between both parties and with respect to the determination of required services, the customer could profit from their experience in this field. The reason to choose a solution was the relief of the ultimate users and smarter choices in materialization. Accordingly, the requirements regarding design, exploitation and services were specified before the service provider entered the engineering process. When the provider joined the project, startup meetings took place to clarify these various interests. Furthermore, the provider set up processes to ensure a good collaboration in future.

After the requirements were clear, the provider introduced optimization recommendations and discussed these jointly with the customer. During this design phase, different knowledge sources were used. The customer brought in knowledge about education, their vision and their education concept. An employee of the customer had expertise in technical aspects, so his input was very valuable for the establishment of a suitable design. The project manager states: "*You can place a building and say: herein, you have to work. But it rather needs to be the other way around, the question is: what do we want in our building?"* [project 5]. Accordingly, the customers input is very important, and in some situations, it is even indispensable. For some specifications, it was necessary for the customer to contribute to the design by providing their knowledge. In these situations, the provider steered the process and communicated what knowledge is required. In other moments, the customer had to take own initiative to bring in their input. In addition, a maintenance planning is developed prior to each year and discussed together with the customer. In all considerations, the wishes of the ultimate user were central to the customer. The provider illustrates the importance of the input of the ultimate users. Accordingly, consultations took place in working groups together with docents or concierges to clarify their perspectives. But also, the quality of the primary process for the students appeared to be an important aspect to consider. By choosing a solution, the customer wants to relief their employees and ensures a good maintained building, which guarantees the primary processes of the organization.

During the engineering phase, consultations take place on a regular base, in which coordination and decision-making take place jointly. Furthermore, the provider states that the customer is always welcome to attend to internal coordination sessions. Before the exploitation phase, preventive maintenance is scheduled in a planning. If defects occur, the customer has to take action and give a notification to the provider, so that he can fulfill the corrective maintenance work.

When it comes to implementation, a planning is established by the provider which clarifies the proceeding and future maintenance. To guarantee implementation on time, regular project consultations take place. The customer examines that the provider has much experiences regarding these procedures, but for them a new building includes new challenges. They are aware of the need to adapt their behavior and expect support of the provider during implementation. This is especially important since new buildings have teething problems, which need to be solved jointly with the provider. Accordingly, the provider states to deliver close support during the first weeks after implementation. If the user experiences the need to adjust some aspects during exploitation, a request can be made which gets implemented by the provider.

Furthermore, the customer considers the review of the required quality as important. At two moments in the design phase, they checked the design for the presence of functional and technical requirements. At several other moments the approval of the customer was required for proceeding, which ensures a solution according to their wishes. In addition, the provider expresses the importance of communication and a *"dare to ask"* [ICIC, project 5] atmosphere to ensure the best quality. Beyond, employees of the provider are involved in the usage of the building to achieve the required performance quality. All in all, the customer evaluated such servitized offerings as beneficial regarding quality, since the maintenance for the next 15 years is assured. This aspect also guarantees the continuity of the performance, which also applies to corrective maintenance in case of calamities.

Type of participation

The collaboration takes place in regular meetings, via telephone or mail. An important aspect here is the contact person of the provider, who is responsible for communication and coordination. Technological measures to collaborate are software programmes to exchange documents, and a customer portal. The customer portal provides real-time insights into the building management. Furthermore, the provider is able to check the portal for proactive monitoring of the installations. The purpose of this platform is to collect building data and make it accessible to both parties. The software is linked to the Smartility desk. This creates an integral building dashboard in which energy generation, energy consumption, open disruptions and their status as well as upcoming planned activities can be viewed on one screen.

The service provider states, that the possibilities to use Smartilitydesk in combination with sensors are endless. Aims are for example to achieve waste reduction, reduce cleaning intensity, adjust catering to building occupancy, align the class schedule to building occupancy, provide availability guarantees as well as providing insight into parking and building occupancy.

Degree of interaction
The customer describes to have an active role in the solution development process. The collaboration with the provider was the highest at the beginning of the engineering phase. The customer expects, that the intensity of collaboration will decline during the construction phase. However, *"in the beginning of the exploitation phase, we [customer and solution provider] need regular consultations to align the expectations"* [ICIC, case 5].

5.2.4 Analysis
At first, **requirement identification** and feasibility studies were conducted by the customer, which corresponds to the findings of projects one and two. In addition, external consulting agencies are hired in to support the diagnosing of needs. In the collaboration with the provider, the customer had a big contribution part, but the provider is regarded as responsible for the design. This phase can be described as a joint development process, in which the **expertise from different actors** is negotiated. Furthermore, the ultimate user is central in these considerations. The customers described the formation of interorganizational project teams, which shows the **shared responsibilities** of both parties. Accordingly, trust and mutual support arose. The collaboration is perceived as intensive in all phases, however, *"two peak moments"* [Director, project 4] can be identified during the design and implementation phase. After implementation, the collaboration declines and the customers merely expect the delivery of maintenance and technical monitoring. Accordingly, the **stage of the solution process** affects the degree of participation. All customers state to have an active role, but they perceive no remarkable difference to the development of non-servitized offerings. This aspect proves that the **service intensity** is an important factor influencing the degree of participation. Furthermore, different collaboration **interfaces** during **co-development** were recognizable. Especially at the beginning, human to human interaction occurred, which got replaced by technological routes later. Accordingly, the value co-creation opportunities for the provider decline throughout the process.

5.3 Aggregate Analysis
The following analysis triangulates the aforementioned findings per project and data from the focus group and further observations. The findings of this study need to be translated into a typology, which aims to clarify (1) the role of customers in the co-development of servitized offerings, (2) the type of customer participation, either based on human to human or technology mediated interaction and the (3) the degree of participation. Across the gathered data, customer participation turned out to be a central aspect when considering servitization as a dyadic phenomenon. The findings are organized according to the identified antecedents of customer participation, namely (1) requirement identification, (2) expertise of actors, (3) shared responsibilities, (4) cyclical design, (5) stage solution process, (6) service intensity, and (7) interfaces in co-development. These antecedents emerged as driving forces for the typology of customers (see figure 4).

It was striking, that all customers evaluate the projects as very important to them. For the customers, the solution solves arisen problems, and for the majority of them the project contains financial risks. It is assumed that these customers are willing to participate more intensively than customers attaching less importance or risk to their projects.

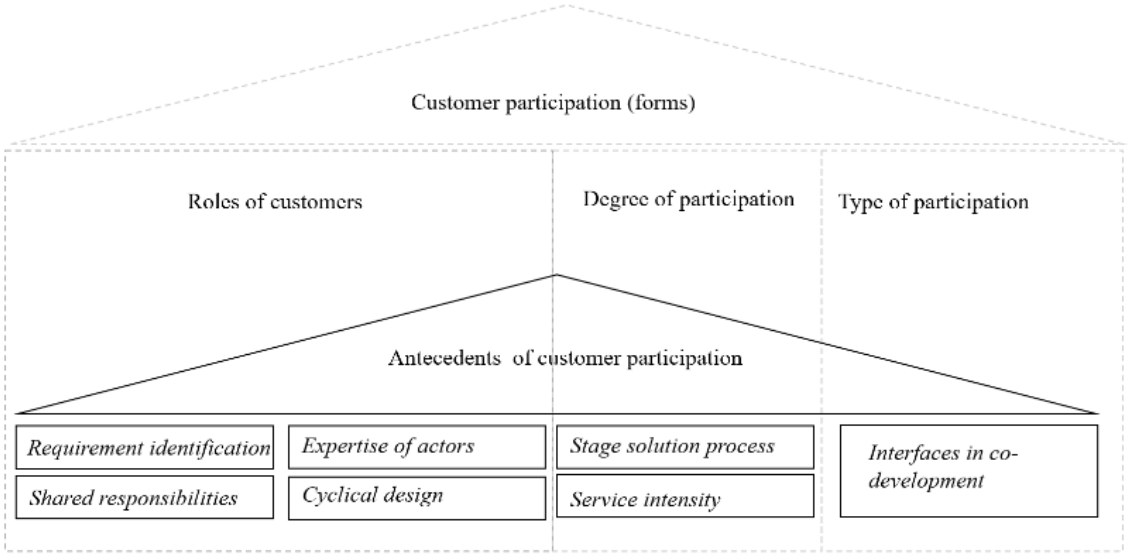

Figure 4: antecedents of customer participation

Roles of customers

The focus group came to the consensus that the different roles the customer takes in the development process are intertwined, may be coincident and cannot be separated from each other. However, the focus group clarified that all customer organizations are different in nature, so that the insights into different roles are limited in the beginning and the provider needs to adapt to every customer.

Requirement identification

At first, the solution co-development process starts with the customer's requirement identification. In the analysed projects, the tender process must be highlighted, which turned out to be a barrier for efficient value co-creation opportunities of the solution provider. Due to this procedure, the customer already has a precise idea on his wishes and requirements before the actual collaboration with the solution provider starts. Accordingly, the needs are identified mainly at the customer's sphere by internal research, but also external advisors are used to specify the requirements. Therefore, the customer adapts the role of co-diagnoser:

"We conducted feasibility studies to see what exactly we are going to do and where we are going to do it. And after this process, we hired a construction management office to specify the requirements" [Project manager, project 5].

Thus, the degree of participation is low in the beginning. Nonetheless, when the solution provider joins the process, a value co-creation opportunity emerges and a high degree of participation is possible. However, the customers cannot always articulate their wishes properly. One employee of the provider stated that deeper reasons are behind some specifications, but the customer cannot translate them in an appropriate way. This aspect is thus a further barrier, preventing optimal value creation and highlighting the importance of adapting to each customer.

Expertise of actors

After the tendering process, the actual collaboration between both parties begins and start up meetings take place, so that the provider can identify the customers wishes and engagement. However, several customers express the importance to include the provider as soon as possible to take advantage of their knowledge. Considering the diagnosis taking place at the customers sphere, the developed concept and expectations need to be adapted when the solution provider joins the development process. Therefore, the provider has to merge the expertise of different actors and translate this to one solution design. Due to these knowledge sources and different perspectives, the design phase is characterized by intensive collaboration. Within this joint development, the customer thus takes the role of a co-designer. It is closely related to the customer's role of co-diagnoser, since the input of the customer is central to the design process. Consequently, the design phase is a key cornerstone for a long-term planning, a customized solution and characterized by a high degree of participation accordingly.

"the provider is responsible for the design, but to achieve a satisfactory design, we have to contribute our input and our wishes" [Project manager, project 3].

The solution provider stated his desire of providing a building which satisfies the customer for a long period. Accordingly, the provider tries to adapt optimizations to the customer's specifications in order to decrease the TCO. These aspects raise the question if the provider can be included in the process at an earlier stage to enable earlier value co-creation.

One ICIC employee stated that the role of the provider is rather a re-designer, since they adapt the customer's wishes, translate them and bring in technical knowledge. This underlines the finding that the requirement identification at the customer's sphere is a barrier for efficient value co-creation. Furthermore, it was mentioned that it is also about alerting the customer, since they are not aware of the consequences of certain choices they make. Therefore, the customer can profit from the providers knowledge contribution, indicating the importance to be aware of the expertise of different actors. However, this critical step is hard to fulfil due to the providers initial absence of customer knowledge, thus it is the customers responsibility to introduce the provider to their organization and their primary processes. Accordingly, the knowledge of the provider is limited at the beginning of the phase. By executing reconciliation meetings, as one employee emphasises, it is possible to achieve completely different solutions than it was thought of in the beginning. However, one customer highlighted the provider's need to meet the customer at the place he is. Summing up, these aspects show the importance of the different knowledge sources and a right translation by the provider to reach a customized solution.

Besides customer and solution provider, a third party becomes introduced to the process. All respondents highlighted the importance of the ultimate user, which is owing to the business-to-business environment the provider is operating in. In the focus group, they described this as a joint value creation, since decisions are made together, trust arises and real collaboration is possible.

"We have formed working groups together with different people, teachers, concierge, to draw up the requirements with regard to sustainability and circularity. So, to determine the different wishes" [Project manager, project 5].

The focus group confirmed the central role of the ultimate user emerged through the interviews. Accordingly, the ultimate user is an important source of knowledge, and in joint consultations all interests are examined to make the right choices. Since it is the customer's responsibility to introduce the requirements of the ultimate user, he can be seen as a user advocate, articulating the wishes of the user. In addition, the customers stated the wish to fulfil their organization's vision by outsourcing supportive processes and focussing on the primary ones. Such solution provides relief to the customer and an increased quality for the ultimate user. However, the focus group revealed several issues, which are at first, that the ultimate user is not always clear, second, each organization has different primary processes and different visions, and third, the ultimate user cannot articulate his needs in a

suitable manner. The observations show that the provider ensures to make the ultimate user the subject of discussion, which underlines once more the mediating role of the provider and the need to adapt to the customer. The role of user advocate is taken over by the customer at an early stage in the development process, since the requirements of the user are central to the solution design.

Furthermore, the focus group confirmed the appearance of new innovations due to the customer's participation in servitized offerings. It happens more and more often that the provider is stimulated by customer requirements to come up with innovative solutions. For example, in a customer meeting the customer stated to value an innovative approach to respond to the set requirements. Beyond, the focus group revealed the importance of data in this context, since collected data can be a source of innovative ideas. However, this is not only about generating new ideas, but also about understanding the customer to improve the processes by new approaches.

"New ideas for innovations occur mainly through customer requests, demanding for a particular solution. This encourages us to think about new ways of problem solving. Or by the use of data, so we can understand what really happens at the customer's organization" [employee ICIC, focus group]

In case of agreed outcome contracts, the supplier has the freedom to fill in the services with innovative approaches. Thus, the customers encourage the provider to find innovative solutions, which indicates the existence of a co-innovator role taken by the customer.

Shared responsibilities

In all cases, shared responsibilities between customer and provider were recognizable. Interorganizational building teams are established, in which coordination and decision making takes place. Accordingly, both parties are jointly liable and make business together. An interviewee states, that different people and their knowledge are the most important contribution factor. This aspect is especially important to the services, since added services appear to make closer collaboration necessary. An example is the joint problem-solving process during exploitation, in case performance aims are not met. These aspects show the occurrence of a co-producer role of the customer.

"I believe in results-oriented collaboration, I also believe in partnership and what do I mean by that? Transparency, trust and collaboration." [Manager building and ICT, project 3]

The role of co-producer is connected to the role of co-designer, including also a relatively high degree of participation. The customer adopts this role especially during manufacturing and exploitation. The observations in customer meetings allowed closer insights into the working with interorganizational building teams. The need to collaborate as well as the long-term character were recognized. Even if the provider is considered as the executing part, the customer stated to want to be involved in the process and to discuss important decisions.

"We believe that a good end result stands or falls with clear and enthusiastic communication. It is important that we can fascinate, bind and engage each other. Then you create mutual support and the WE feeling arises, where everyone can be proud of her or his contribution!" [ICIC, project 3].

The described WE feeling can be regarded as the aim of the collaboration, since the boundaries between both parties blur and the final outcome becomes central in this relation. During the focus group, it became clear that the resources the customer brings in are not always clear and may change during the process. Accordingly, mutual understanding and structured procedures are central aspects. Therefore, the collaboration is characterized by partnership.

"Since we agreed upon outcome contracts, we have a common interest" [Team leader, project 1]

Considering this common interest, the shared responsibilities and the collaboration on a long-term basis, both parties aim to achieve a high quality of the solution. Due to continuous demonstration of the quality and the necessity of customer approval, the quality is ensured. Other measures of the provider to keep the quality high are proactive escalation, risk communication and proactive maintenance to guarantee performances. However, also the customer takes part in this process. Some respondents stated to monitor and evaluate the performances and services based on earlier determined performance indicators. In addition, the provider states that both parties are able to enhance the quality of the solution by good communication and mutual support. Therefore, the findings describe the customer's role as a quality assurant. The role of quality assurant is linked to the user advocate, because this role wants to ensure the quality and the performance of the solution, which increases the quality of the primary processes for the ultimate user. In both roles, the participation takes place at a moderate level. Besides these parties, a further actor is mentioned in several cases, which is the municipality who is responsible for the compliance of quality standards. The customer meetings showed that all parties always strive to find the optimal solution, owing to a common interest and the high lifespan. Accordingly, the respondents of the focus group stated that the detectability of quality is an important aspect in the development process. In project 4, the customer perceived optimal value-in-use, thus he recommended the solution provider to other potential customers. This provides evidence for the existence of a co-marketer role. This role appears to be connected to the quality assurant, since optimal value is closely related to the quality of the solution. Due to the fact that this role requires no or only indirect interaction with the provider, the degree of participation is low here. Accordingly, value-in-use is created at the customer's sphere.

"I would always work with them again. I have already recommended ICIC to others, because we are very satisfied about the collaboration" [Director, project 4].

Data is a further aspect, rising in importance in the context of solutions. Besides the importance of data for innovations, data could take further roles in the future, functioning as a basis

for self-service. In line with this, the focus group suggested the addition of a data provider role, since data becomes more important in the development of servitized offerings. As data is connected to the product, the performances can be measured and self-service can be enabled.

When implementing a solution, a planning is established by the solution provider and considerations with all stakeholders take place. Installations and the customer portal get tested and the users receive instructions of the provider's employees. In project 4, problems occurred during implementation, but the intensive support of the provider in the time after implementation ensured a fast solution. Accordingly, the customers stated to expect flexible adaptions of the required service, especially during implementation. At this stage, the customer adopts the role of co-implementor. This point in the co-development process is characterized by a high degree of participation. During implementation, close collaboration is needed to introduce the customer to the solution.

Cyclical design

The integral approach allows for adjustments of the solution during construction and exploitation. In project one and two, a cyclical design is described, in which both parties continue to co-develop the solution, which is enabled by the consultation structures during exploitation. The development is regarded as a "*continuous process"* [Team leader, project 1] or *"cycle"* [Manager administration and maintenance, project 2]. Therefore, the role of co-designer does not stop when the implementation phase begins, it rather continues throughout the whole duration of collaboration. With respect to the dominating role of services in the solution development, a long-term planning is created which demands regular adjustments. Accordingly, the circularity emerges through the added services, which seems to become a central in the collaboration.

Degree of participation

Stage solution process

Interaction is identified as the main variable of customer participation. All in all, a declining intensity of interaction throughout the development process was recognizable. While the intensity of collaboration is very high at the beginning of the design phase, it decreases during construction. The focus group confirms this assumption emerged from the interviews that the customer's participation is the highest at the beginning of the joint development process, since this is the basis for future developments. The participants highlight the need of a good design process to achieve a satisfactory and customized result. However, some customers experienced or expect an increasing intensity during implementation. Summing up, the participation depends on the stage in the solution process. It is highest when the provider joins the development and declines throughout the process.

Service intensity

All customers perceived an active role in the co-development of a solution. The focus group indicates a clear distinction to non-servitized projects. Here, the design phase would be less intensive since optimizations are less extensive, because the supplier is not responsible for the exploitation phase. Therefore, the collaboration in servitized offerings appears to be more intensive, especially during the design phase. The projects at hand, which include advanced services (project one and two), perceive the collaboration in the development process as different and more intensive than in non-servitized offerings.

"The collaboration is better compared to traditional forms. If you purchase several years of maintenance, separated from the purchase of the building, that won't work. It can work, but if I build something myself, and I am allowed to maintain it, then I already know why I did something in a certain way during construction. And vice versa, if I am maintaining it, and I know how I once put it together, then I can maintain it much better." [Manager administration and maintenance, project 2]

Both customers describe the collaboration as win-win situation or characterized by common interest. Within the other interviews, this aspect was less obvious. In those projects which include less intensive services, the customer perceives less difference to non-servitized approaches. Accordingly, the collaboration with the customer also differs with the service intensity. This finding can be confirmed by the focus group, which clarified that in more advanced services, closer collaboration is needed. The provider considers themselves as a coordinator in this process, aiming to bind the customer during exploitation. They state that the customers are not aware of a bigger contribution part in case of more advanced services, since the customer chose the services to get relieved.

Type of participation

Interfaces in co-development

Participation takes place via different interfaces. During the requirement identification, no interaction took place since this phase mainly occurs at the customer's sphere. In the beginning of collaboration, the interaction mainly occurred on personal basis. During exploitation, most of the collaboration takes place via technological measures. By means of the dashboard, the provider monitors and maintains the building or installations even without recognition of the customer. Summing up, this shows a high proportion of personal interaction at the beginning of collaboration, which becomes more and more replaced by technological measures and data transfers during exploitation. According to the SL, value is only co-created in direct interaction (Grönroos, 2008), thus only human-to-human interaction provides a value co-creation opportunity to the provider. Therefore, the roles of co-designer, co-producer, co-implementor, user advocate and quality assurant are central roles in value co-creation, since these are characterized by higher human-to-human interaction. The provider has no or little value co-creation opportunity at the diagnosing phase, as well as little opportunity during exploitation, owing to a high proportion of technological communication. Consequently, the value co-creation opportunities for the provider reduce during the course of the development, owing to technological ways of interaction. Based on all the above, a typology of customer participation in servitized offerings is created (see figure 5).

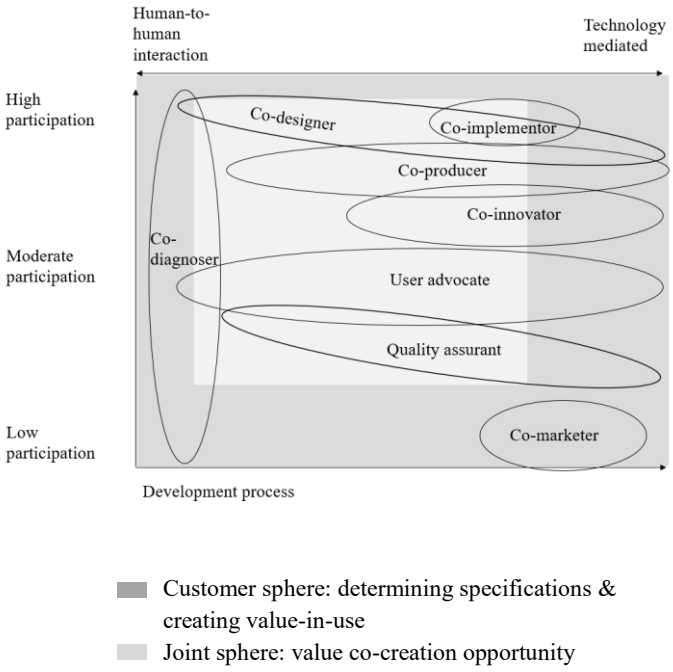

Figure 5: typology of customers in servitized offerings

6. CONCLUSION

This paper provides insights into different customer roles and participation levels in the co-developing of a solution, while considering servitization as a dyadic phenomenon. The presented results aim to answer the following research question: *What is the role of customers in the co-development of a servitized offering approached from a service logic lens?*

This study provides evidence that servitization is largely driven by a company's customers. When analyzing this phenomenon, a service logic lens was applied. As value creation in SL is a customer-driven process, this perspective is most valuable to study the participation of customers. Fundamental findings are that added services generate long-term oriented and closer collaboration. Furthermore, mutual understanding, support and trust are central constructs, emerging by common goals. In addition, the value-in-use perceived by the customer increases, due to the customer's contribution part. Interaction could be determined as the central variable of customer participation.

By identifying the antecedents of customer participation, the driving forces behind the established classification become clear. Accordingly, the antecedents 'requirement identification', 'expertise of actors'. 'shared responsibilities' and 'cyclical design' influence the role taking of customers in servitization. The created typology which aims to answer the research question, shows the different roles the customer adopts in the co-development of servitized offerings in a B2B context. These are: co-diagnoser, co-designer, co-innovator, co-producer, co-implementor, user advocate, quality assurant and co-marketer. The roles are intertwined and depending on each other. Beyond, the roles depend on the stage in the solution development process. To start a value co-creation process, managers should strive to enter the development process as soon as possible. This is a necessary step, since the process starts at the customer's sphere by the customer's identification of needs and wants, indicating that the customer is in control of the process. This aspect creates a barrier for efficient value-co-creation.

The analysis determined 'stage in solution process' and 'service intensity' as antecedents and thus driving forces to the degree of participation. It becomes clear that a distinction can be made between low, moderate and high degrees of participation. The provided typology shows the declining degree of customer participation during the development process. The highest degree of participation is identified during the design phase. The lowest degree of participation is found at be very beginning and end of the projects. Furthermore, a distinction must be made per type of delivered service. More advanced services like outcome contracts ask for a higher degree of participation. Within intermediate or base services, customers participate less intensive.

The interaction between solution provider and customer also changes during the co-development process, thus the 'interfaces in interaction' determine the type of participation. At first, interaction is marked by a high degree of human to human communication. Later in the process, technology mediated interaction becomes most important, especially during exploitation. Accordingly, the value co-creation opportunities for the provider decrease. All in all, it can be summarized that the participation of customers can be characterized by eight roles, in which especially the role of user advocate is a central difference to consumer typologies. Furthermore, the degree of participation depends on the stage in the solution development process and the service intensity.

7. DISCUSSION

In this section, a discussion of the findings based on the available literature takes place. The findings of this study support the fundamental ideas that added services increase the participation of the customer and the collaboration becomes long-term oriented (Bowen et al., 1989; Carlborg et al., 2018). This is in line with the underlying concept of this paper, the service logic, since both parties have to be present in the value co-creation process (Grönroos, 2008).

Since literature on the role of business customers in co-development processes remained absent, this paper supports an enhanced understanding of the phenomenon. Key to this grounded understanding are seven antecedents which could be identified by the field work. The antecedents 'requirement identification', 'expertise of actors', 'shared responsibilities' and 'cyclical design' appear to directly influence the customer's adoption of roles, while 'stage in solution process' and 'service intensity' affect the degree of customer participation. The available 'interfaces in interaction' determine the type of participation. These antecedents show causal explanations and underlying reasons for the phenomenon under study. Furthermore, these antecedents seem to occur especially in a B2B environment, since basic differences compared to consumers could be found.

This paper argues that customers can take several roles in the collaboration, Bitner et al. (1997) describe these roles as intertwined and not mutually exclusive. The empirical results provide evidence for this assumption, since it appeared that the

roles are overlapping and depending on each other. Respecting the crucial importance of collaborative practices for servitizing manufacturers (Kohtamäki & Rajala, 2016; Rabetino et al., 2016), the developed typology provides important insights for researchers and managers. According to Ambroise et al. (2018), this new vision also demands to integrate different levels of participation and to discuss new classifications. Following on from this, the typology integrates customer roles, type and degree of customer participation.

7.1 Theoretical Implications

This paper deepens the knowledge on customer participation in servitization by combining available literature and empirical evidence, because empirical evidence on this phenomenon remained absent until now (Ambroise et al., 2018). Since the literature lacked of studies which investigate the role of business customers (Mustak et al., 2013), this paper closes the gap by providing a typology of business customers in the co-development of servitized offerings. This study underlines the importance of closing this gap, because the roles of consumers and business customers are characterized by fundamental differences. This aspect urges researchers to differentiate between these customer groups more distinctly. In line with the proposition of Arnould (2008), a customer centric model was established which shows how business customers engage in a firm's processes. Furthermore, this study identifies the antecedents of customer participation, which emerge as driving forces to the typology. Therefore, this research moved the field forward by clarifying underlying concepts and their causal explanations.

The first central implication of this study concerns the co-diagnosing. Current literature indicate that co-diagnosing processes start with customer and provider exchanging relevant knowledge, including needs, preferences, schedule and budget (Aarikka-Stenroos & Jaakkola, 2012; Anning-Dorson, 2018; Hakanen et al., 2016). In the presented cases, the requirement identification occurred mainly at the customer's sphere by internal research and the involvement of building management agencies. After a tendering process, the provider joins the collaboration process. These findings extend the assumptions of Grönroos and Voima (2013). They show, that development processes are not linear and may follow different sequences. On the one hand, value facilitation by the provider can precede the value co-creation process. On the other hand, the process can start at a joint value creation sphere, if the customer acts like a co-developer (Grönroos & Voima, 2013). This investigation adds that it also can be the customer who makes an initial step and starts the development process by identifying his needs and requirements solely at the customer's sphere. Contrary to the findings of this study, the literature expected the highest degree of participation at this problem identification stage (Ambroise et al., 2018; Gadrey & Gallouj, 1998). Accordingly, the provider is not completely in control of the production process as stated in Grönroos and Voima (2013), since it is not the customer who joins the development process but rather the provider. Therefore, the customer seems to be in control of the production process. Considering the entry of the provider taking place after the diagnosing of needs, the value co-creation process starts later than assumed before, since value co-creation only takes place when both parties are present (Grönroos & Voima, 2013), setting up a barrier for optimal value-in-use. Consequently, the appropriateness of the expression 'customer participation' is questionable, because it is rather the provider who becomes introduced to the process. This finding provides a completely new view on customer participation, due to a shifting perspective on customers who are in control of the process.

The second central implication is the addition of a further role to value co-creation processes, called user advocate. According to Ferreira et al. (2013), successful servitization depends on the integration of all actors in the solution process. This paper shows the central role of users in a B2B context, which are advocated by the provider. Since earlier literature only focused on consumers, this role was omitted in available considerations on customer participation. By adding this role to the available literature, researchers gain an enhanced understanding of the role dynamics and the value co-creation processes during co-development in a business context. This study demonstrates fundamental differences of business customers and consumers by identifying the customer's role user advocate.

A further important contribution to the existing literature is the finding, that the customer's role of co-designer can continue throughout the whole collaboration process. This becomes especially important, because the collaboration in servitized offerings is long-term oriented. Accordingly, added services create a cycle of constant adjustment of the customized solution. When the customer introduces such internal knowledge, he must be guided by the provider (Aarikka-Stenroos & Jaakkola, 2012). This study provides evidence for the the important contribution part of the customer, the different knowledge sources and perspectives, which need to be translated by the provider into a customized solution. The variable of political counselling as described by Tuli et al. (2007) can be recognized. Since every customer organization has a different primary process, the solution provider needs to be introduced to the organization's vision and procedures. This also affirms the statement of Dadfar et al. (2013), that the supplier has to adapt to every customer due to the complexity of the business-to-business environment. Aarikka-Stenroos and Jaakkola (2012) consider the design phase as central to create optimal value-in-use. This proposition is strengthened by the findings of this study, since the interviews emphasize this stage as the foundation of a long-term planning and a customized solution. Accordingly, all respondents perceived the highest degree of customer participation at this stage in the development process.

In addition, this study adds to the literature that the resources change throughout the process, so that the availability of such resources cannot be assured to the provider during the co-development of a servitized offering. This research could identify that shared responsibilities as well as the contribution of people and different knowledge are central aspects, which was described by the literature as the access to mental and physical activities (Ertimur & Venkatesh, 2010). Besides the customer's role as a co-producer, Bitner et al. (1997) show that customers can be seen as partial employees to increase the productivity of the service. This can be confirmed, since the collaboration in the projects at

hand is based on interorganizational building teams and partnership. As proposed by Aarikka-Stenroos & Jaakkola (2012), the customers in these cases had structured procedures to bring their resources in, but mutual understanding was another central aspect here. In the fieldwork, it emerged that added services make closer collaboration necessary, which is illustrated in joint problem-solving processes during exploitation.

The literature indicated that customers experience clearer roles and closer collaboration in more important services (Kindström & Kowalkowski, 2014). In all cases at hand, the services are considered as important to fulfil the primary process, thus all customers experienced a high degree of participation. Here, the question arises if the customer experiences a difference in the development of servitized and non-servitized offerings. This study shows that customers with more advanced services perceive a clearer difference in the collaboration with the provider compared to non-servitized offerings. This confirms the assumption emerged from the theory, that the degree of participation varies per service type (Ambroise et al., 2018; Bitner et al., 1997). Base services or services supporting the supplier's product as mentioned by Baines et al. (2009) and Mathieu (2001) thus need less customer participation. Advanced services and services which support the customer's processes (Baines et al., 2009; Mathieu, 2001) require more collaboration between provider and customer.

In line with Ranjan & Read (2016), this paper regards interaction as the primary interface in the co-development of solutions. Therefore, interaction is seen as a central aspect of customer participation and a central antecedent of the type of participation. This study distinguishes between two interfaces in the co-development of servitized offerings, namely human-to-human interaction and technology mediated interaction (Carlborg et al., 2018; Dadfar et al., 2013). The findings show a huge proportion of human-to-human interaction in the beginning of the development process, which is replaced by technology mediated interaction, especially during exploitation. According to the SL, value is only co-created in direct interaction (Grönroos, 2008), thus only human-to-human interaction provides a value co-creation opportunity to the provider. Therefore, the roles of co-designer, co-producer, co-implementor, user advocate and quality assurant are central roles in value co-creation, since these are characterized by higher human-to-human interaction. Consequently, the value co-creation opportunities for the provider reduce during the course of the development, owing to technological ways of interaction.

7.2 Practical implications

By identifying the roles of business customers, this study demonstrates decisive differences to consumers and a new view on the concept of customer participation. Therefore, managers operating in a B2B environment profit from this new understanding and the new stage of research. The seven identified antecedents of customer participation show causal explanations for role taking of customers and forces which underlie the developed typology. Respecting the customer as a necessary resource in the firm's development process (Grönroos & Voima, 2013), managers should strive to support the roles the customer takes in the co-development process. It is assumed, that a deepened understanding fosters the value co-creation, due to the providers awareness of more effective value facilitation. This aspect promotes the value-in-use for the customer, which is the central aim of organizations (Grönroos & Voima, 2013). Since Anning-Dorson (2018) shows that providers are able to influence the customer participation by clarifying customer roles, companies should support the customer to take different roles and participation levels, in order to ensure the success of the servitization strategy. The analysis shows that the degree of participation varies per stage in the solution process, thus the assumption that different stages in the development process demand for higher degrees of participation (Ambroise et al., 2018) can be supported. With respect to the findings of Aarikka-Stenroos and Jaakkola (2012), the solution design is the most important step for creating optimal value-in-use, thus the cases at hand had the highest degree of participation here. Furthermore, a high degree of participation is also attributed to the implementation phase. Especially in the beginning, human to human interaction is needed. In the course of the project, the degree of participation declines and more technological mediated interaction takes place. Consequently, the value co-creation opportunities for the provider decrease, since no direct interaction occurs (see Grönroos & Voima, 2013). Therefore, the developed typology provides a useful categorization for companies to accompany the customer and to find out about his needs, contribution and involvement at a particular stage. The findings show the demand to grasp value co-creation opportunities as soon as possible to create optimal value-in-use. By adding the role of the user advocate, providing companies understand the position of the customer better, since they also advocate the wishes of the ultimate user. This aspect is a major difference to existing typologies presenting individual consumers.

Second, the analysis yielded that it is the customer who is in control of the development process, inviting the provider to join the process. The provider appears to be the participant. Therefore, companies should aim to enter the development process of the customer earlier, so that the supplier can foster the role of the co-diagnoser. This enables an earlier value co-creation opportunity for the providing company. Since this stage in the process is crucial for the further co-development process, it is expected that the value-in-use perceived by the customer benefits from faster value co-creation. Furthermore, optimal value-in-use promotes the customer in his role as co-marketer, thus the customer is more likely to recommend the provider to potential future customers.

In addition, tight collaboration demands for appropriate interfaces between customer and provider to exchange knowledge and support cooperation (Tuli et al., 2007; Vargo & Lusch, 2004). Consequently, companies need to provide adequate interfaces to guarantee efficient collaboration with customers. Since servitized offerings profit from close collaboration on a long-term basis, this aspect is seen as a central competitive advantage for companies.

7.3 Limitations and suggestions for future research

This research is based on an investigation in a Dutch construction and installation company. Since the sample size was limited to five customer projects, the sample size can be regarded as a limitation of this study. However, larger samples do not necessarily lead to more richness of the data (Morse, 2002). Since the findings of the interviews and the text analysis are verified by the focus group and observations, the credibility of this study enhances. By providing thick descriptions, a high degree of transferability is given. Therefore, future research could replicate this study by choosing a larger sample size or a different research setting. Another concern is researcher bias, since qualitative researchers tend to be subjective rather than objective (Kawulich, 2005). However, researchers of ethnographic studies are requested to write up all field notes in detail, so biases are less likely to emerge.

The field work proposes the addition of the role of 'data provider'. This suggestion is based on the rising importance of data, which was also identified by this research. However, this study could not find persuasive evidence indicating the existence of this role. Nonetheless, it is possible that research taking place in the future or in another setting can identify this role.

Considering the development process which starts at the customer's sphere without interaction of the provider, it is questionable if customer participation is the right expression in this context, since the customer introduces the provider into the process. This study proposes the consistent use of co-development instead of customer participation in a B2B setting. Accordingly, the literature must strive for more consensus concerning terminology while distinguishing clearly between consumer and business markets. Therefore, future research can also focus on the terminology of this phenomenon, since this study indicates that 'customer participation' may be a less suitable expression in a B2B environment and should be replaced by co-development.

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10. APPENDICES

Appendix I: Questionnaire customer interviews

a. Wat heeft u gedreven om dit project te starten?
b. Waarom heeft u voor een project/ tender met aanvullende prestaties en services gekozen? Waarom koopt u de prestaties niet apart in de exploitatiefase?
c. Wat zijn de aanvullende prestaties en services in dit project?
d. Wat zal deze manier van werken (prestatieborging) u op gaan leveren?
e. Wat is een solution in uw mening?
f. In welke mate moeten de producten/ gebouwen op maat gemaakt zijn?
g. In welke mate moeten de services op maat gemaakt zijn?
h. Wat verwacht u van de te leveren services gedurende de exploitatiefase en hoe verwacht u dat deze prestaties worden geborgd en geëvalueerd?
i. Op welke manier zullen de services op onderhoud bijdragen aan een beter gebouw voor u en welke waarde vertegenwoordigd dit?
j. Hoe belangrijk is het hele project voor u?
k. Welk risico en welke uitdagingen omvat het project?
l. Welk risico hebben de onderhoud en de services op de continuiteit van de organisatie of het primaire proces?
m. Kunt u de project ontwikkelings-proces beschrijven? Wat was de rol van uw organisatie in dit proces?
n. Hoe hebben de services zich ontwikkelt?
o. Wanneer is de intensiteit van samenwerking met de solution provider het hoogst? Afstemmingsmomenten?
p. Hoe zou u de samenwerking met de solution provider omschrijven?
q. Welk soort resources (informatie, kennis, interesse) brengt u in de ontwikkeling van het project en de services in?
r. Heeft u een actieve rol in deze processen?
s. Hoe zijn de opgaven en verantwoordelijkheden in de Project en service ontwikkelings proces verdeeld?
t. Heeft u duidelijke procedures om uw resources in te brengen of it dat op uw eigen initiatief gebaseerd?
u. Hoe beschrijft u de interactie met de solution provider?
v. Hoe vaak communiceert u met de solution provider, wat zijn de contactmomenten?
w. Welke communicatie tools gebruiken jullie om met elkaar te communiceren?
x. Over welke thema's communiceren jullie?
y. Hoe weet de solution provider welke services op een specifieke moment nodig zijn?
z. Denkt u, dat de samenwerking anders verloopt door de bijgevoegde services?
aa. Waarom heeft u voor de solution provider gekozen?
bb. Is het waarschijnlijk on in de toekomst nog andere services aan de solution provider uit te besteden? Waar denkt u aan?

Appendix II: Coding structure