CAPTURING CUSTOMER UNDERSTANDING WITH THIRD PARTIES IN DIGITAL SERVITIZATION: RELATIONAL MECHANISMS AND CHALLENGES

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ABSTRACT

Purpose: The advancement in digital servitization enables manufacturers to transform data from their customers' product usage into valuable customer insights. Despite this opportunity, the empirical evidence has shown that manufacturers may struggle in capturing customer understanding (i.e., obtaining and using customer knowledge in service processes) on their own and they need to cooperate with other firms during digital servitization. This study investigates relational mechanisms and challenges of capturing customer understanding in digital servitization.

Design/Methodology/Approach: A qualitative case study was conducted in four large manufacturers that offer complex industrial systems and services to their global customers.

Findings: The findings identify relational mechanisms to capture customer understanding, through considering the scope of the problem and the manufacturer's capability. The findings also reveal relational challenges in capturing customer understanding: industry insights, contractual, operational, and behavioural.

Originality/Value: Capturing customer understanding in digital servitization requires a relational view between the manufacturers and third parties.

KEYWORDS: Digital servitization, Customer understanding, Third party, Relational view

1. INTRODUCTION

Digital servitization, where value is created through products, services, and software, combines the concepts of servitization and digitalisation (Kohtamäki et al., 2019). It is a challenging transition for manufacturers, but essential for future competitiveness (Huikkola et al., 2020). Previous research calls for a value-system perspective in digital servitization, not only firm-centric research (Kohtamäki et al., 2019). While digital servitization emphasises value creation for the customers, manufacturers may need to cooperate with other firms during digital servitization (Momeni et al., 2023). There is a need for more knowledge on how manufacturers capture customer understanding in collaboration with third parties in the value chain during digital servitization.

In this study, customer understanding is seen as a firm's capability to use customer knowledge in service processes. The literature defines customer knowledge to be more than a firm's knowledge about customer needs and it is generated from customer information assets (Varadarajan, 2020). Understanding of various stakeholders' interests in the customer organisation, customer's business needs and business model are identified as important (Tuli et al., 2007). As an addition to this existing view, we consider that customer understanding entails awareness of the customer's operational environment and processes. Some digitalisation capabilities, such as analytic capability, enables manufacturers to transform the data from their customers' product usage into valuable customer insights and gain in-depth knowledge of their customers (Lenka et al., 2017).

During digital servitization, manufacturers involve different third parties such as IT suppliers to provide, for instance, access to relevant information (Momeni et al., 2023). Existing literature already acknowledges the importance of third parties in the upstream value chain during servitization (Huikkola et al., 2020). To be able to utilise the capabilities of these firms in digital servitization it becomes necessary for manufacturers to establish closer relationships with these suppliers. However, little is known about the manufacturers' collaboration with their suppliers.

The goal in this study is to identify relational mechanisms and challenges of capturing customer understanding in collaboration with third parties in digital servitization. In this study, 'relational'

concerns the way in which the manufacturer and third parties are connected. To address the above-mentioned research gaps, this study explores (1) How, through what kinds of relational mechanisms, manufacturers capture customer understanding, and (2) what kinds of relational challenges manufacturers face when capturing customer understanding. We concentrate on manufacturers' digital servitization, not servitization generally. The framework developed in this study can assist managers in implementing mechanisms to support the capture of customer understanding with suppliers during the service process.

2. THEORETICAL BACKGROUND

2.1 Customer Understanding in Industrial Service Processes

Manufacturers' offerings are treated as seller-based concepts instead of applying a customer-based view and understanding services value-in-use (Strandvik et al., 2008). In the context of industrial services, customer understanding is addressed through various closely related concepts. Previous research acknowledges end-user's process-oriented and relationship-based services (Oliva & Kallenberg, 2003), customer orientation (Baines et al., 2009), and customer-centricity and identification of customer needs, when manufacturers move towards integrated solutions (Brax & Jonsson 2009). Service business model studies contain a customer relationship element which includes the firm's capability of deep understanding on customer organisation's internal processes, operations, and organisational structures (Kindström & Kowalkowski, 2014). Even though current literature on industrial services discusses customer relationship concepts, specifically customer understanding has gained notably little attention.

Customer understanding is constructed by multiple actors in manufacturing firms through customer touchpoints. Customer experience management literature emphasises the importance of customer touchpoints and their complex nature in a business-to-business service context (Zolkiewski et al., 2016). Manufacturers' customer touchpoints involve different actors from the supplier and customer organisation, may evolve over time, and may be controlled by the supplier, third party, or customer (Witell et al., 2020). There are multiple actors involved during the industrial product-service systems' operational life in the customer relationship and digital solutions bring a new channel to this interaction process (West et al. 2020).

Manufacturers can capture customer understanding during service development, sales, and delivery phases (Kindström & Kowalkowski, 2014) and use different mechanisms to construct the customer understanding during these phases. In this paper, our focus is on the service delivery phase. Table 1 shows examples of mechanisms manufacturers use to capture customer understanding in the different service process phases. The previous studies mainly discuss the importance and effects of customer participation in new service development (Alam, 2002; Edvardsson et al., 2012; Johansson et al., 2019), and the changes and tools needed in manufacturer's sales function when moving from products to services to be able to construct an understanding of the customer's processes and operations (Kindström et al., 2015; Ulaga & Loveland, 2014; West et al., 2020). While some previous studies acknowledged the criticality of customer understanding and identified enablers needed to capture customer understanding in service delivery phase (Baines et al., 2013; Goh & McMahon, 2009; Lenka et al., 2017; Momeni & Martinsuo, 2018), there is a need for more knowledge concerning the mechanisms applied by manufacturers to use customer understanding in the service process. In the service delivery phase, the ICT capabilities, such as monitoring, enable manufacturers to capture data from customer product usage and processes (Baines et al., 2013) and transform this data into a valuable customer insight (Lenka et al., 2017). Also, the utilisation of in-service knowledge, referring to the use of operational information and experiences by service personnel, enables continuous service improvements if service personnel have an incentive to capture this information (Goh & McMahon, 2009).

Compared to traditional servitization, in digital servitization software components serve as an enabler for capturing the value from customers (Kohtamäki et al., 2019) and therefore bring new possibilities for manufacturers to also capture customer understanding. Manufacturers' installed product base serves as a data source to analyse customer processes and service opportunities

(Kindström & Kowalkowski, 2014). Product usage and customer process data offer manufacturers an important customer insight (Lenka et al., 2017), but manufacturers must also know how to utilise the installed-base data in their service processes. A manufacturer may utilise the data to develop new solutions or to develop internal operations' efficiency (Huikkola & Kohtamäki, 2017). Also, the knowledge from their customers' operations and performance can be used to customise a manufacturer's services (Momeni & Martinsuo, 2018). To be able to grasp these opportunities, manufacturers often need to involve third parties and acquire digital capabilities through collaboration with different technology and knowledge-intensive suppliers (Momeni et al., 2023; Rapaccini et al., 2023).

Table 1. Mechanisms Used by Manufacturers to Capture Customer Understanding

Service process phase	**Examples of mechanisms in different service process phases**	**Example of sources**
New service development	Customer involvement - *User interviews, user visits and meetings, brainstorming, user observation and feedback, group discussions*	Alam (2002) Edvardsson et al. (2012) Johansson et al. (2019)
Service sales	Acquiring new customer-focus competencies, involving new stakeholders from customer and vendor organisation for the sales process, visualising customer process and touchpoints - *Establishing connections to new key customer contacts, customer journey mapping*	Kindström et al. (2015) Ulaga & Loveland (2014) West et al. (2020)
Service delivery	Utilisation of ICT capabilities such as remote monitoring, service in use information capture by service personnel - *Capturing the data, transmitting to communicate the data, storing to maintain the data, data analysis to transmit the data into information and respond to establish needed actions, capturing service in-use information by service personnel*	Baines et al. (2013) Goh & McMahon (2009) Lenka et al. (2017) Momeni & Martinsuo (2018)

2.2 Involvement of Third Parties in Manufacturers Digital Servitization

Digital servitization requires new capabilities from manufacturers (Lenka et al., 2017) and often the needed resources and capabilities are managed by different firms in a business network (Töytäri et al., 2018). Lenka et al. (2017) have identified the following digitalisation capabilities in their study which manufacturers need to develop for digital servitization: intelligence capability, connect capability, and analytic capability. Also, Töytäri et al. (2018) have identified the importance of complementary capabilities as an enabler in digital transformation. Momeni et al. (2023) reveal capability building mechanisms for digital servitization in their study: learning, building, and acquiring. Both building and acquiring mechanisms imply the involvement of third parties, whereas learning may occur in-house (Momeni et al., 2023). Thus, to grasp the new opportunities offered by digitalisation, external partnerships in the supply chain play an essential role (Chen et al., 2021) since third parties, such as IT suppliers, often own the needed capabilities. During servitization manufacturers need to re-position themselves downstream in the supply chain and at the same time develop coordinating mechanisms for a reliable supply base (Huikkola et al., 2020).

Current literature indicates that manufacturers need closer collaboration with suppliers in digital servitization (Sklyar et al., 2019). Partnering with, for example, knowledge-intensive firms can support manufacturer's digital servitization journey, such firms may even act as orchestrators in the ecosystem, and collaboration with these firms may even be a key element in manufacturers' digital servitization (Rapaccini et al., 2023). Also, it has been identified that collaborative strategic partnerships in the supply chain mitigate the manufacturer's risks related to the implementation of advances services (Bigdeli et al., 2018). Traditionally upstream firms, especially IT suppliers, have been treated as outsourcing partners, or sometimes even as a competitor risk (Sklyar et al., 2019), referring to transaction-based relationships between the manufacturer and suppliers. The relationships between manufacturers and their suppliers evolve during digital servitization and manufacturers should

establish closer partnerships with selected IT suppliers to support the transformation (Bigdeli et al., 2018; Rapaccini et al., 2023; Sklyar et al., 2019).

A relational view of competitive advantage emphasises the importance of interfirm knowledge sharing routines, complementary resources, effective governance, and relation-specific assets (Dyer & Singh 1998). Previous studies in digital servitization identified the importance of a relational view on the transformation process in digital servitization (Kamalaldin et al., 2020). However, these studies have mainly focused on the manufacturer-customer relationship and identified different relational governance approaches between the manufacturer and customers (Kamalaldin et al., 2020; Sjödin et al., 2019). We lean on the relational view (Dyer & Singh, 1998; Kamalaldin et al., 2020) and contribute by revealing the relational mechanisms manufacturers use when capturing customer understanding in collaboration with third parties and identifying relational challenges.

3. RESEARCH METHODOLOGY

A qualitative case study was conducted in four large manufacturers that offer industrial systems and services to their global customers. The companies were selected based on the increased importance of services in the firm's offering, extensive effort in promoting digital servitization, and active use of third parties such as software suppliers in advancing digital servitization. Fictional names – Intelligent automation, Global Mining, Industrial solutions, and Lifting technology – have been used to maintain anonymity. Table 2 shows some background information of the case companies and interviewees.

Table 2: Background information of the case companies and interviewees

Company	Industry	Net sales	Employees	Interviewees
Intelligent automation	Automation solutions	~ €3,1 M	~ 450	Head of service product management, Head of service business development, Head of field service
Global mining	Mining equipment	~ €306 M	~ 1,400	Head of services business, Director of service solutions, Director of technology, Solution architect
Industrial solutions	Industrial equipment	~ €3 B	~ 13,000	Head of industrial internet, Head of service development, Director of life cycle services
Lifting technology	Heavy lifting equipment	~ €3 B	~ 3,000	Head of digital experience and business design, Digital portal manager

The main sources of data were semi-structured interviews and public documents. The interviewees ranged from top-level executives to mid-level managers who were actively involved in digital servitization. In total, 12 interviews were conducted and lasted between 45–90 minutes. The interview questions were designed to understand the participants' perspectives on digital servitization, including their experiences and challenges in collaboration with third parties.

The interviews were audio recorded and transcribed verbatim. Data analysis was done through thematic coding and cross-case tabulation to identify patterns and themes across the data. The coding process involved identifying key mechanisms to capture customer understanding in collaboration with third parties. Through pattern analysis, these mechanisms were mapped into two dimensions, namely the scope of the problem and the manufacturer's capability (Figure 1). Key challenges were identified in manufacturers' relationships with third parties in capturing customer understanding: industry insights, contractual, operational, and behavioural challenges. Cross-case tabulation was used to compare the findings across the four cases, which allowed for the identification of similarities and differences.

4. FINDINGS

Interviewees emphasised obtaining and using customer understanding for tailored and effective services. Traditional methods such as collaborating with different internal and external actors are still in use, but interviewees highlighted the importance of digital and analytical tools, such as data analytics to understand customer operations, digital tools for analysing service usage and performance, remote monitoring, and hiring knowledge-intensive business firms. To be able to do that,

case companies need to collaborate with third parties such as IT suppliers. The findings first explore the relational mechanisms between the manufacturers and third parties, and then introduce relational challenges in capturing customer understanding.

4.1 Manufacturer-Third Party Relational Mechanisms for Capturing Customer Understanding

To capture customer understanding, the manufacturers had to collaborate with different third parties; they employ various mechanisms to accomplish this. A framework was developed to differentiate between these mechanisms (Figure 1). The framework maps the mechanisms based on the scope of the problem being addressed and the manufacturer's own capabilities. The scope of the problem refers to the level of uniqueness involved in addressing the customer understanding needed. For example, a narrow problem may require creating unique solutions, while a broader problem is a common problem that can be seen in different industries. The manufacturer's capabilities refer to the level of resources and expertise available to the manufacturer to capture customer understanding. This can include factors such as the availability of internal resources, financial resources, and technical expertise.

Mechanisms are grouped into three categories based on the level of third parties' involvement: in-house, collaborative, and sourcing mechanisms. *In-house mechanism*s rely on internal resources to obtain and use customer understanding. For example, Lifting technology uses remote monitoring of customers' operation and discussing with internal and external knowledgeable informants to better understand the customer's process and needs for repair and maintenance service processes where they can rely on their extensive knowledge and capabilities. Collaborative mechanisms involve working with external parties. *Manufacturer-led collaborative mechanisms* can include joint projects with IT suppliers, academic institutions, or collaborations with other knowledge-intensive business firms on a need basis. For example, Industrial Solutions, which has developed a good level of data analytics over time, has been involved in joint projects with IT suppliers to use data analytics in certain customers' operations. *Third party-led collaborative mechanisms* involve working closely with IT suppliers and knowledge-intensive business firms where the third party oversees capturing customer understanding in service processes. Global mining, who does not have enough resources and infrastructure to develop digital servitization, has collaborated with various IT suppliers to develop and use digital tools for analysis of service usage rate and service performance and decision-making about further development. *Sourcing mechanisms* involve acquisition of external resources to capture customer understanding. Intelligent automation that has not been successful in maintaining and upgrading digital solutions, has hired consultants to interview customers and develop research methods to be further applied by the company.

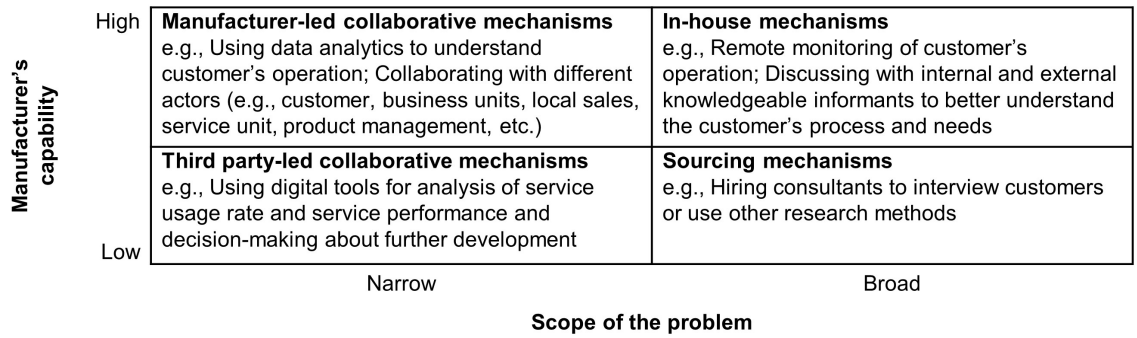

Figure 1: A summary of key relational mechanisms for capturing customer understanding

4.2 Third-Party Relational Challenges in Capturing Customer Understanding

Manufacturers faced several challenges in their relationships with third parties in capturing customer understanding: industry insights, contractual, operational, and behavioural (Table 3). *Industry insights challenges* involve understanding manufacturer's industry and processes, as well as the customers' operations. *Contractual challenges* refer to ownership, intellectual properties, earnings, and confidentiality. *Operational challenges* include understanding the customers' complex organisational

structures, communications, and project management, managing customer interface, and knowledge transfer and retention. *Behavioural challenges* involve establishing trust, remote connection, and ensuring the availability of the right skills.

Table 3: Challenges faced by case companies in their relationships with third parties

	Intelligent automation	**Global mining**	**Industrial solutions**	**Lifting technology**
Industry insights challenges				
- Understanding industry and processes	X	X	X	X
- Understanding customers' operation processes	X	X	X	X
Contractual challenges				
- Solution ownership	X	X		
- Intellectual properties	X	X		
- Earning logics		X		
- Confidentiality			X	X
Operational challenges				
- Understanding the customers' complex organisational structure	X			
- Communications and project management	X		X	X
- Managing customer interface	X	X		
- Knowledge transfer and retention	X	X		
Behavioural challenges				
- Enabling remote connections	X	X		
- Establishing trust	X			
- Availability of right skills				X

Table 3 shows that companies face similar challenges in all four categories, with varying difficulty. Industry insights challenges are common in all manufacturers when collaborating with third parties, such as IT suppliers who may not fully understand the manufacturer's industry and processes, and customers' operations. Thus, efforts must be made to understand partners' strengths and weaknesses and provide support to enhance their knowledge and skills.

Regarding contractual challenges, Intelligent automation and Global mining face challenges with solution ownership and intellectual property. Industrial solutions and Lifting technology are more advanced in digital servitization and have addressed these issues in partnership agreements. Global mining faces challenges with earning logics, which refers to revenue-sharing agreements or other financial arrangements. Industrial Solutions and Lifting technology face challenges with leaking customer knowledge and sensitive information. Thus, proper data security measures, confidentiality agreements and employee training are essential.

Regarding operational challenges, Intelligent automation, Industrial Solutions, and Lifting technology face difficulties with communication and project management with their third parties, resulting in delays, miscommunication, and lower-quality outputs. Intelligent automation and Global mining struggle with managing customer interface and to have a shared view about the customer's needs. These two manufacturers also struggle with sharing of information and insights across teams and with third parties. Intelligent automation, who serves various industrial customers, faces additional challenges with third parties understanding the organisational structures of various customers, resulting from a lack of communication or third party's inadequate market understanding.

Regarding behavioural challenges, Intelligent automation and Global mining face challenges in understanding and adapting to customer behaviour that enables remote connections. Not all customers are willing to facilitate remote connections, specially concerning the connection and communication with third parties. In connection with the previous challenge, Intelligent automation struggles in creating and retaining customer trust in third parties. Industrial Solutions faces a challenge

in ensuring that the right competencies are available in the right place and at the right time. Not all third-party partners have the expected commitment to provide the necessary skills and knowledge to deliver high-quality outputs.

5. DISCUSSION

The first research question investigates relational mechanisms between manufacturers and third parties to capture customer understanding. The findings are framed as four mechanisms: In-house, sourcing, manufacturer-led collaborative, and third party-led collaborative mechanisms. The study complements previous studies of digital servitization, which have mainly focused on the new service development phase and especially customer participation as a mechanism (Alam, 2002; Johansson et al., 2019) for capturing customer understanding, through emphasising the importance of capturing customer understanding in the service delivery phase. This study acknowledges the utilisation of ITC capabilities to capture customer understanding (Baines et al., 2013), and the findings further show that the manufacturers use a selection of mechanisms in relation to the scope of the problem and the manufacturer's own capabilities.

The findings of this study confirm the importance of third parties in digital servitization (Momeni et al., 2023; Sklyar et al., 2019) and show that three of the capturing mechanisms involve third parties and one of them is even third party-led mechanism. The previous study acknowledged the need for a variety of capabilities in digital servitization that are not necessarily possessed by the manufacturers (Lenka et al., 2017). While our findings acknowledged the capability level as one dimension, they show that the scope of the problem also determines the choice of mechanisms. A narrow scope that indicates the uniqueness of the problem demands more collaborative mechanisms with third parties. However, for problems that have a broader scope, the manufacturer may use either internal or external resources to address the need and thus decrease the collaboration costs and challenges.

The second research question investigates the relational challenges in capturing customer understanding. The findings complement the discussion on the relational view in digital servitization that focuses on the manufacturer-customer relationship (Kamalaldin et al., 2020; Sjödin et al., 2019), in this case by offering new insights on the manufacturer-third party relationship and challenges they face in capturing customer understanding. The findings confirm prior research that proposes the need for a suitable governance approach and knowledge sharing routines between different actors (Kamalaldin et al., 2020). However, the findings reveal that capturing customer understanding with third parties such as IT suppliers create a more extensive range of challenges than for customer relationship, including industry insights, contractual, operational, and behavioural challenges.

6. CONCLUSIONS

The findings of this study identified the relational mechanisms for capturing customer understanding in the service delivery phase and the importance of considering the manufacturer's own capabilities and the scope of the problem, and thereby adds to the current understanding (Baines et al. 2013; Goh & McMahon 2009; Lenka et al. 2017; Momeni & Martinsuo 2018). Our findings reveal the increased application of data analytics and digital tools in analysing customers' processes and decision-making, which in turn highlighted the role of third parties in capturing customer understanding. Moreover, this study contributes to the existing literature on the relational view of digital servitization (Kamalaldin et al., 2020; Sjödin et al., 2019) by identifying the challenges faced by manufacturers when capturing customer understanding in collaboration with third parties. There is a need to consider not only the governance approaches but also other relational aspects such as industry insights, contractual, operational, and behavioural challenges.

While advances in digital technologies allow manufacturers to capture huge equipment and customer operation data, manufacturers often need to collaborate with third parties to enable capturing customer understanding. The relational mechanisms framework could help manufacturers to choose an appropriate mechanism and address the specific problem at hand, while also considering

their own capabilities and limitations. The findings of this study indicate that manufacturers require a robust plan to overcome relational challenges. This requires investments in developing knowledge management systems and training programs, building long-term relationships with third-party partners, proper contract management, and data security measures.

A case study with a limited number of companies limits the generalisability of the findings. This study took the manufacturers' perspective, but it would have benefited from additional data from third parties and customers. Further research should investigate the relational mechanisms in a triadic setting to deeper understand the roles, relationships, and challenges between the manufacturers, third parties, and customers. Further research should also explore how the relational mechanisms evolve over time.

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