Exploring business-to-business remote service value co-creation – a service recipient perspective.

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Abstract

The individual actor perspective plays a key role in the value co-creation literature. However, research also recognizes that the individual actor lens is rarely addressed, especially in the business-to-business (B-to-B) context. More specifically, the service recipient perspective has received limited attention, particularly in terms of what value types are important for them and how value is co-created when engaging with the service provider. In a highly involved B-to-B context – that of radiographer and equipment manufacturer – this study attains an understanding of the service recipients' sensemaking of remote service value co-creation with the service provider in the transformation of service delivery. Using a narrative approach, 19 semi-structured interviews were conducted with service recipients from different companies, as the focal actor, when jointly using remote services with the provider during the service encounter. The study identified the main tasks and participation behaviour, in addition to deriving service recipients' value types at discrete interaction points and provided four main contributions. Firstly, the variety of respondents added to a more sophisticated understanding of service recipients' view of their tasks and what value types are derived in joint remote interaction. Secondly, the study explores a novel way to describe the customer process of value co-creation by bringing attention to asynchronous interactions as episodes between discrete interaction points. Thirdly, the derived value types and process of value co-creation demonstrated relationship entanglement for each interaction point. Fourthly, the study extends previous research on value co-creation by focussing on the B-to-B service recipient perspective as an important part of the customer value sphere.

Keywords: service recipient, remote service, value-in-use, process of value co-creation, customer sphere, value co-creation

Declaration of Original Content

I declare that the work in this assessment was carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the assessment has been submitted as part of any other academic award.
Any views expressed in this assessment are those of the author and in no way represent those of the University.

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Abbreviations

B-to-B	Business to Business
B-to-C	Business to Consumer
CIT	Critical Incident Technique
COVID-19 –	Coronavirus Disease 2019
et al.	et alia
etc.	et cetera
EUREC	European Network of Research Ethics Committees
FDA	United States Food and Drug Administration
G-D logic	Good-Dominant logic
IAEA	International Atomic Energy Agency
i.e.	id est
MRI	Magnetic Resonance Imaging
MRT	Magnet Resonance Tomography
S-D logic	Service-Dominant logic
TGA	Therapeutic Goods Administration
VSA	Viable Systems Approach

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1 Introduction

The aim of this chapter is to outline the thesis. First, the chapter provides the relevant background information for the study and presents the research problem. The following sections describe the objectives, questions, approach, and contributions of the research. The chapter concludes by addressing the study's limitations, and outlines the structure of this research.

1.1 Research Background

Providing excellent quality and services for medical devices can be considered a necessity, and is monitored by many laws and regulatory organizations (e.g. the International Atomic Energy Agency [IAEA], the United States Food and Drug Administration [FDA], the Therapeutic Goods Administration (TGA) in Australia, The Act on Medical Devices, and federal law in Germany). However, a recent investigation across 36 countries revealed that more than 1.7 million injuries and nearly 83,000 deaths are potentially related to medical device malfunctions, as reported to US regulators over a 10-year period (Vrijhoef, 2018). According to Tase et al. (2022) the key aspects of potential medical device malfunctions are predominately related to the increased complexity of the equipment and the associated user training needs to enable proper device operation. Ensuring the full functioning of medical devices is critical, and the need to act immediately when incidents occur is vital for the benefit of patients. The diagnoses and treatments of strokes can be used as an example of the importance of swift action in emergency cases. As stated by Puig et al. (2020), when 'imaging is brain', the patient benefit is highly dependent on the clinical pathway and

proven to be highly time dependent. To avoid any specific delays in patient procedures from medical device malfunctions or handling inquiries, the demand to meet the exacting standards of medical device operators (e.g. radiographers) is high for those who provide medical equipment and associated support services.

As time plays such a significant role in such service delivery, medical manufacturers provide remote IT connections to offer support in a timely manner. Such remote service has been applied, for example, to medical devices for diagnosis, troubleshooting, software updates, as well as providing instant support for the service recipient (Grubic, 2014; Larivière et al., 2017; Paluch, 2011). This technology-mediated service provision addresses the active role of the radiographer to jointly resolve problems, and co-create a benefit for others (e.g. patients) at their workplace (Aarikka-Stenroos & Jaakkola, 2012; Corsaro & Anzivino, 2021). This example of collaboration is broadly described in the service marketing literature as an opportunity for value co-creation between two actors (at least), by integrating their resources and experiences for the beneficiary (Prahalad & Ramaswamy, 2000; Vargo & Lusch, 2004, 2008, 2016). According to Vargo and Lusch (2008, 2016) all economic actors are resource integrators and, therefore, co-create value when mutually interacting with another actor.

In 2004, Vargo and Lusch proposed service-dominant (S-D) logic as a new perspective to investigate value co-creation in market research. The authors describe value co-creation through the lens of the S-D logic as a cyclic, recursive, narrative of actors who integrate their resources in service-for-service exchange. More recently, through refinement, S-D logic has evolved to provide the concept of service ecosystems, which addresses the complex service exchange present in systems at different levels (micro, meso, or macro) of aggregation (Chandler & Vargo, 2011; Vargo & Lusch, 2011, 2016). The service ecosystem has similarities

to the concept of service system, which is described as a configuration of resources (tangible and intangible) 'that interact with other service systems to create mutual value' (Maglio et al., 2009, p. 395).

Yet, a service system can be defined in many constellations, and this study refers to the mutual remote service exchange of the service recipient with the service provider company. The participation offered to service recipients in joint remote service interaction is an important support in swift service exchange and plays a major role in enabling the provider company to effectively transition the delivery from physical to non-physical service. Whereas the benefit for patients, by using mediated technology in critical situations, might be quickly realised, the benefit for the service provider is also obtained in productivity gains (Grubic, 2014; Paluch, 2011; Wünderlich, 2010). Given these possible gains, it is unsurprising that medical device manufactures have provided remote services for more than three decades and have gradually increased the variety of remote service interventions offered. The benefits of remote service in B-to-B companies are well described in the literature (Grubic 2014, Jonsson et al., 2008; Paluch & Blut 2013; Wünderlich 2010). However, further research in B-to-B remote service has indicated a lack of: customer trust (Wünderlich et al., 2011); satisfaction (Paluch, 2011); value proposition (Jonsson et al., 2008); role understanding (Larivière et al., 2017); and potential depersonalization and frustration (Walker and Craig-Lees, 2002)—calls for additional investigation of value in remote service delivery are, therefore, also evident (Brax & Jonsson, 2009; Grubic, 2014). Hence, the focus on value co-creation at the individual level and its relevance in B-to-B relationships has already gained interest and generated demands for further research (Gonçalves et al. 2019; Jaakkola & Alexander, 2014; Neghina et al., 2015; Vargo et al., 2023). In the B-to-B -context of this study, the value co-creation opportunity for the radiographer to interact remotely

with the service provider and provide their labour is of chief interest. Therefore, the study follows the approach of centring the service recipient as the key actor in the value co-creation process.

1.2 Research Problem

In the current service science literature, the individual perspective of actors in B-to-B service systems remains almost absent (Aarikka-Stenroos & Jaakkola, 2012; Edvardsson et al. 2012; Gonçalves et al., 2019). Few studies have been conducted to explore value co-creation in B-to-B service systems, and much remains conceptual or concerns the meso-level of the value co-creation environment, without providing a contextual understanding of participant interactions (Aarikka-Stenroos & Jaakkola, 2012; Breidbach & Maglio, 2016; Mustak, 2019) Helkkula et al. (2012) have highlighted, especially in relatively new service processes, the individual customers' experiences and different variations of interaction with the service provider, which can additionally influence their participation.

For this research, when studying radiographers joint remote problem-solving experiences, their participation in the value co-creation processes is accompanied with high responsibility to ensure the best possible clinical outcome for patients, and requires a deeper understanding of the environmental context at their workplace. The radiographers' workload in terms of patient examinations grew, by, for example, 35% from 2010–11 to 2015–16 in the UK, while the average patient waiting time to receive an examination remained consistent (Beardmore et al., 2016). Due to the nature of every radiology examination, patient safety risks exist at all times (Wallin et al., 2019). Some studies examining the radiographers' environment have started to address such patient risks

(Chistiaans-Dinglhoff et al., 2011; Hannaford et al., 2013; Ishida, 2014; Waaler & Hofmann, 2010) and identified radiographers' challenges at work as: exhaustion (Blau et al., 2003), violence (Caruana, 2005; Ng et al., 2009) and pressure (Brown, 2004; Verrier & Harvey, 2010).

According to Kohtamäki and Rajala (2016) no B-to-B studies exist that shed light on the subjective actor experiences in their working environment when co-creating value at the micro-level. The actors' subjective experience of value co-creation in relation to service-for-service interactions can be addressed in two ways: as an outcome or a process (Corsaro & Anzivino, 2021; Gummerus & Pihlström, 2011; Gummerus 2013; Kohtamäki & Rajala, 2016). However, to understand the individual perspective of actors in B-to-B service context, the value co-creation outcome, process, and their relationship are important aspects to investigate their experiences in their working environment.

First, in the context of this study, the perceived value outcome from the perspective of the service recipient is as important as the transition of physical to non-physical service provision, potentially changing the engagement of the radiographers in resolving the service inquiries at their workplace. In other words, the service recipient has encountered challenges (malfunctions of the medical device and other operating inquiries), which are (virtually) located between the customer and the service provider company (Törnroos et al., 2017). These aspects also raise concerns for the provider in terms of what value can be derived from remote interactions from the perspective of the radiographer that can then inform the eventual development or expansion of the remote service delivery. Here, S-D logic proposes the concept of value-in-use to determine the value outcome at the micro-level, as "Value is always uniquely and phenomenologically determined by the beneficiary" (Vargo & Lusch, 2016, p. 8). Value-in-use is a well-established concept in service science and

the value co-creation literature, where it addresses temporal consumption through the usage of service system exchange from the actor (user) perspective (Grönroos, 2008; Grönroos & Ravald, 2011; Grönroos & Voima, 2013; Vargo & Lusch, 2008). However, no previous studies have addressed the question of what kind of value-in-use service recipients derive when jointly using remote service with the provider to resolve their inquiries.

Second, subjective experiences are also important in how actors interpret and process their resource integration interactions in service system exchange (Gummerus, 2013, p. 24). Gummerus (2013) emphasizes that research into value co-creation predominantly focusses on value outcome and, therefore, the understanding of how value is generated in the value creation process receives less attention (Corsaro, 2019; Corsaro & Anzivino, 2021 Gummerus, 2013). According to the S-D logic, all actors are resource integrators in service-for service exchange and, therefore, customers must play an active role in B-to-B value co-creation processes (Vargo & Lusch, 2011, p. 181). Nevertheless, little is known of the individual actor's perspective in value co-creation processes and how value is co-created (Payne et al., 2008).

Given the contextual environment in which radiographers operate, it seems vital to understand their perspective of how the value co-creation opportunities (located between the customer and the service provider) are experienced at their workplace. In that workplace, as with many others, as highlighted by Orlikowski (1992, p.33), new technologies are potentially transforming the organizational boundaries that are shaped by the actions of users. More recently Corsaro and Anzivino (2021) called for the investigation of value creation processes in B-to-B contexts to understand how time and space shape the boundaries from the customer perspective. Hence, whilst the investigation of the perceived value outcome and customer process of value co-creation are important concepts, the

literature remains silent on addressing their relationship and in understanding to what extent the form of interaction is relevant from the individual service recipient's perspective.

1.3 Research Aim and Questions

The overall aim is to better understand, from the service recipient perspective, their perceived value, and how this value is co-created with the service provider in the B-to-B remote service context. Therefore, the study draws on S-D logic (Vargo & Lusch, 2004, 2008, 2016) to conceptualize the perceived value outcome and customer process of value co-creation in B-to-B remote service context, and to provide empirical evidence from the radiographer perspective. Whilst the conceptualization of the value outcome and value co-creation process are key aspects in value co-creation research, this study's goal is specifically to differentiate the nature of remote service interactions and construe the relationship between both concepts, by analysing the empirical data. The study seeks, therefore, to contribute to S-D-logic by pursing the following research questions:

Research question 1): What types of value are perceived from remote service for the service recipient during value co-creation?

Research question 2): How does the customer's process of value co-creation influence the service recipient's derived value when using a remote service?

1.4 Research Approach

This qualitative study aims to gain a deeper understanding of the radiographers' remote service interactions with the provider, by interpreting their lived experiences at their workplace (Alvesson & Sandberg, 2022; Creswell, 2013; Graebner et al., 2012; Guba & Lincoln, 1994). Chandler and Vargo (2011, p. 18) emphasize the context and perspective in which value is co-created and expresses that it needs to be understood from "within the actor's direct context". To frame the contextual aspects in the domain of B-to-B remote service from the service recipient perspective, the study first reviews the relevant value co-creation literature and draws on the S-D logic to address the service recipient experiences in their environment. The service recipients' perceived value outcome experiences have been framed by the concept of 'value-in-use' to address research question one (RQ1). To address research question two (RQ2), the recipients' experienced value co-creation process(es) has been conceptualized in terms of those that reside at the remote service encounter with the service provider. Both concepts have been experientially approached and facilitated when addressing RQ1 by applying Holbrook's (1999, 2006) concept of consumer value and for RQ2 by using Payne et al.'s (2008) framework.

To explore and develop an understanding of how radiographers have experienced the virtually located value co-creation opportunities (service incidents), an interpretive paradigm was utilized (Alvesson & Sandberg, 2022). To explore radiographers' individual subjective experiences, Flanagan's (1954) critical incident technique (CIT) was applied to the research approach and operationalized through semi-structured interviews conducted with 19 participants (Bott & Tourish, 2016; Chell, 2014; Chell & Pittaway, 1998). As part of the methodology, the research provides comment on my researcher positionality, and develops

a reflexive account that encompasses my employment and role within a service provider company. The empirical data analysis applies thematic coding, according to an abductive procedure. The data discussion not only enables consideration of existing literature but also incorporates additional theories to develop and explain the research findings. The study concludes by drawing together this initial step in the systematic investigation of the perceived experiences from the service recipients in B-to-B context, and reflects on the relationship of value–outcome and process in jointly remote interaction.

1.5 Contributions to Theory and Practice

The present research explores the individual perspective (service recipient) in a B-to-B environment, a view that is almost absent in the literature (Aarikka-Stenroos & Jaakkola, 2012; Corsaro & Anzivino, 2021; Gonçalves et al. 2019; Kohtamäki & Rajala, 2016; Polese et al., 2020). This study highlights the importance of variety in understanding the individual perspectives of service recipients, and asserts (in concordance with S-D logic) that value is always co-created, and can be only created with, and determined by, the user (Lusch & Vargo, 2006, p. 284). Drawing on S-D logic, this work conceptualized the theoretical context to address the research questions. Research question 1 investigates the service recipients' experiential concerns regarding the perceived value outcome in different remote problem-solving interactions with the provider, by utilizing Holbrook's (1999, 2006) typology of consumer value. Holbrook's concept has been adapted according to a framework provided by Coutelle-Brillet et al. (2014), and has been found to provide an adequate tool to determine value-in-use within this B-to-B context. Almost all value types (except spirituality)

have been identified from radiographers' experiences of remote interaction with the provider. The first theoretical contribution to knowledge resulting is:

> an empirical framework in B-to-B to determine multidimensional value types according to different tasks when consuming remote service interactions.

The second research question examines the customer process of value co-creation by applying Payne et al.'s (2008) framework, and focusses on the relationship experience elements and participation variety according to the tasks to be resolved. The study explored a new way to describe asynchronous remote interactions as episodes when co-creating value from the perspective of the service recipient. The second theoretical contribution to knowledge frames:

> the potentially asynchronous (remote) service interactions, to distinguish discrete interaction points in the process of value co-creation, and focusses on the service recipients' most important task and their participation behaviour.

Drawing on these contributions, the study further explored the main temporal, spatial, and relational aspects in the B-to-B environment, and identified, according to the tasks, the recipient perceived resources in joint remote service interaction. By focusing on the perspective of the service recipient, this work extends the literature in the field of value co-creation, and S-D logic in particular, by developing a framework for understanding the individual perspective in relation to the outcome and process of value co-creation. This synthesized framework provides an entangled view of value outcomes and the customer value co-creation process at discrete interaction points, for multiple tasks, during the joint problem-solving interactions with the service provider. Therefore, the third theoretical contribution is:

> an empirical framework to explore multidimensional value co-creation in asynchronous remote interactions in B-to-B, from the perspective of the service recipient.

The empirical material detailing the service recipients' perspective has been further utilized as a 'dialogue' to improve the understanding between the value outcome and customer process of value co-creation in remote service interactions at their workplace (Alvesson & Kärreman, 2007, p. 1266). To provide an advanced explanation of the individual service recipients sensemaking behaviour in joint problem-solving situations, additional elements from systems theory (open- and viable-systems) were incorporated for this study (Ciasullo et al., 2021; Corsaro & Anzivino, 2021). With the theoretical reference to open systems and the potential energy transfer of the recipients in value co-creating opportunities, sensible behaviour as an outcome is more sophisticated, reflected as the identification of different levels of participation, and makes an important contribution to theoretical knowledge. Consequently, the fourth contribution to knowledge provides:

> the direction (expanding or contracting) of the customer value (co)-creation sphere in relation to the service provider during asynchronous interaction, depending on the value proposition, to potentially transfer energy at discrete interaction points.

In addition, practitioners need to understand the service recipient perspective and contextual environment to design, implement, and facilitate the value propositions via remote service delivery. First, this research suggests the gaining of a deeper understanding of the customer processes, remote service tasks, and their temporal and spatial aspects when providing potential resources for the service recipient to enact on. Second, when transitioning from physical to non-physical service provision, this study highlighted the B-to-B relationship aspects for the service recipient in joint problem-solving situations. With

regards to multidimensional value proposition service delivery the provider might want to consider the customer value sphere more holistically and not limit their own processes to one dimension (e.g. remote) only. Based on the empirical data and developed framework, the study supports practitioners in their decision making to allocate potential remote service resources for service recipients, and to better understand how and where recipients invest their energy in joint problem-solving situations. Additionally, the framework provided offers practitioners an important opportunity to advance their B-to-B contextual understanding when striving to identify whether the service recipients derive value or not.

1.6 Thesis Limitations

This thesis limits its scope to the healthcare related B-to-B context and the service recipients' experiences from remote service interaction with the service provider. In addition, this research does not engage with other context-related participants such as, for instance, the service recipient employing institution, patients, or other service provider employees to discuss other viewpoints. However, the reader should bear in mind that as the researcher, I am also employed by the service provider company, and aware of the provider processes used to deliver remote service to its customers (Alvesson & Sandberg, 2022). Nevertheless, it was beyond the scope of this research to gather remote service experiences from supplier company remote experts. Another study limitation was access to and recruitment of participants, namely service recipients in their institutions (university, public and private hospitals, etc.). This was made more acute as the study was conducted during the pandemic (COVID-19), and it proved difficult to provide an equal distribution of participants for each form of institution to potentially identify differences or similarities

from the service recipients' derived value outcome and processes within the different organizational forms. Future research might employ comparison study mechanisms to investigate perceived remote service experiences from within different institutions. In addition, this work cannot provide a full discussion of the transition from physical to non-physical service experiences from the perspective of the service recipients, as this study has focussed on the remote service experiences from the perspective of a specific group of recipients—radiographers.

1.7 Thesis Structure

The overall structure of the thesis comprises of five chapters. The second chapter has four sections addressing current value co-creation literature. The first section introduces the theoretical approach of the study, namely Service Dominant Logic (S-D logic), to investigate the research phenomenon in the B-to-B environment. The second discusses the concept of value co-creation and the relevant literature to contextualize the theoretical situation. Section three refers to the nature of value, value outcomes, and concepts to determine perceived value from the individual perspective. Section four describes the value co-creation process(es), and emphasizes the customer process, which is key to the understanding of how service recipients are co-creating value with remote service interaction. Section five introduces the service recipient profession, practices, situational workplace context when using remote service with the service provider. The final section six provides by a detailed description of the research objectives and questions.

The third chapter is concerned with the methodology applied and a discussion of the approach and design for this study. The material elaborates the abductive research process,

and presents the procedures surrounding accessing, generating (semi-structured interviews), and analysing (with a thematic analysis) the data. In addition, the chapter presents a section that offers a reflexive account, which details my positioning with regard to the research process, and closes with ethical considerations for this study.

Chapter Four analyses the results from the service recipient interviews and discusses the findings according to the research questions. In addition, the chapter integrates the findings to propose a theoretical framework that represents the service recipients derived value outcome and their process of value co-creation.

Chapter Five concludes the contributions to theory, praxis, and offers suggestions for future research.

2 Theoretical Considerations

This chapter introduces the theory selected for this research. Service-dominant (S-D) logic has emerged as a significant theoretical lens for studying value co-creation, and therefore the chapter begins with a critical examination of its main concepts. The second section focuses on the value co-creation literature and provides an overview of the current literature in relation to the relevant research context. The third section starts by detailing the nature of value and the concept of value outcome in relation to the applied theory. The fourth section underlines the various value co-creation processes and determines key aspects for investigating the customer process of value co-creation. The fifth section introduces the main actor (radiographer) and the working environment and summarizes the main theoretical aspects in the situated context. Finally, in the sixth and final section, the objective of the study and the research questions are set out against the theoretical debates.

2.1 Service Dominant Logic

Services marketing emerged initially as a subdiscipline of marketing and is viewed as distinct from 'goods marketing' due to differences in the characteristics between services and goods (Rathmell, 1966; Vargo & Lusch, 2004). In their seminal paper, Vargo and Lusch (2004) described that "Goods are distribution mechanisms for service provision" and that economic exchange is in a broader sense about service provision (p. 8). This was in alignment with other service science literature and based on the prior work of both Grönroos (1983, p.111), who embraced relationship and service exchange process concepts, and Gummerson

(1993), who suggested that "customers do not buy goods or services: they buy offerings, which render services, which create value" (p. 250). Based on the increased attention given to service as a process, Vargo and Lusch (2004) introduced S-D logic as a new perspective on markets and exchange through service, and they challenged the goods-dominant (G-D) logic that had dominated much marketing research until then. Over the last two decades, this view of exchange entailed further conceptual transformations, which started by contrasting the G-D to S-D logic, developed through transitional concepts, and more recently was suggested as "being metatheoretical, S-D logic is applicable to all kinds of market and marketing phenomena in varied contexts" (Vargo & Lusch, 2017, as cited in Vargo et al., 2023, p. 7). Table 1 provides examples of the conceptual transitions from G-D logic to S-D logic (Lusch & Vargo, 2006).

Table 1: *Service dominant logic: reactions, reflections, refinements*

Goods-Dominant Logic	**Transitional Concepts**	**Service-Dominant Logic**
Goods	Services	Service
Product	Offerings	Experiences
Value Added	Co-Production	Co-creation of Value
Value-in-exchange	Value-in-use	Value-in-context
Price	Value Delivery	Value Proposition
Equilibrium Systems	Dynamic Systems	Complex Adaptive Systems

Note. Adapted from "Service dominant logic: Reactions, reflections, refinements", by R. F. Lusch and S. L. Vargo, 2006, *Marketing Theory, 6*(3), p. 286. Copyright 2006 by SAGE.

Originally, the theoretical approach of S-D logic proposed eight foundational premises (FPs), where four are identified as core and stated as axioms to explain the new service-for service-exchange perspective and evolution from the G-D logic (Vargo & Lusch, 2004). A

more recently released refinement of S-D logic incorporates the view that value co-creation involves multiple actors in service networks, which led to 11 FPs and five axioms (Vargo & Lusch, 2016). However, irrespective of this change, all foundational premises and axioms are developed from five foundational concepts (value, actors, resources, service and institutions), which are essential in the subsequent discourse of this study.

Value

Drawing on S-D logic, Vargo and Lusch (2004, 2008, 2016) made several attempts to define value. However, predominately the authors referred to the perspective of 'value-in-use' and advocated its substitution for 'value-in-exchange' (Grönroos, 2011). In G-D logic, value is embedded in the product by manufacturing and delivering products to be sold as an output, and thus, value appears in exchange. Given this, value is conceptualized in isolation from the customer, and value (embedded in the product) can be purchased (e.g. through currency) in exchange. S-D logic asserts that value is always co-created, and a beneficiary is always a co-creator of value because value can only be created with and determined by the user (Lusch & Vargo, 2006, p. 284). The determination of value by the user is conceptualized in S-D logic as "value-in-use" (see section 2.3) and describes the individual perspective as a temporal outcome by using a product (good or service) to derive value. However, by emphasizing the importance of the customer/user evaluations of value, the focus also shifts from a more product-centric to a more customer-centric logic. In other words, no value is created if the products are not used and do not provide value-in-use (Grönroos, 1997; Vargo & Lusch, 2008a). Additionally, Vargo and Lusch (2004) stated that firms can only offer value propositions and do not offer value per se. Only by an enactment of resource integration from the service beneficiary (e.g. customer recipient) are value propositions constituted. Hence, based on the view of S-D logic, goods provide a service, and it is the service provided

by the good that creates value in a certain context (Chandler & Vargo, 2011; Vargo & Lusch, 2012). Overall, in S-D logic, value is explained as phenomenological and determined by the beneficiary, which is seen as idiosyncratic, experiential, contextual and meaning-laden (Edvardsson et al., 2012; Vargo, 2009; Vargo & Lusch, 2008).

Actors

Consequently, in the beginning of the S-D logic developments, the language for value co-creators' roles referred predominantly to customers (consumer, user, service beneficiary, etc.) and firms (producer, provider, manufacturer, etc.). However, this perspective evolved to a more generic actor-to-actor perspective. This abstraction is grounded on the perspective that all specific roles and entities (see FP3 and FP4) are co-creating value through resource integration and service exchange (Vargo et al., 2023; Vargo & Lusch, 2011). As argued by the authors, the view of generic actor-to-actor entities provides a more in-depth understanding of B-to-B, B-to-C, or other actor constellations, which could be separately investigated to shed light on the individual actors "e.g. [their] norms, values, rules, conventions" in the context of value co-creation (Vargo & Lusch, 2019, p. 8).

Resources

According to S-D logic, actors co-create value through service exchange and resource integration; here S-D logic distinguishes resources in terms of operand and operant resources (Chandler & Vargo, 2011; Vargo et al., 2008; Vargo & Lusch, 2004, 2008, 2012). Resources that require action on them are considered as an operand (e.g. goods and money). Resources that are capable of performing actions on other resources (e.g. knowledge, skills) are called operant (Akaka & Chandler, 2011; Vargo & Lusch, 2004). This perspective had thus also departed from the previous G-D logic, which predominantly

described resources as tangible and fixed things for supply. In S-D logic, things become resources if they are integrated through interactions (Ballantyne & Varey, 2006).

Service

Viewing service as the fundamental basis of exchange, service is conceptualized as the intangible output of resources. This perspective affords an alternative view and focuses on intangible resources, such as relationships, dialogue, and interaction (Ballantyne, 2004; Lusch & Vargo, 2006; Payne et al., 2008). By applying competences (knowledge and skills) from one actor to another actor, the actor themself integrates their resources for service exchanges as part of a processes in a specific context (Lusch & Vargo, 2019, p. 8). However, S-D logic refers to the place of the actors' interaction as a service platform, which facilitates the mutual exchange to co-create value.

Institutions

Within S-D logic, institutions are understood as "actor-generated rules, norms, meanings, symbols, and similar aides of communication, collaboration, and decision-making (North, 1990; Vargo et al., 2023; Vargo & Lusch, 2016) that make value co-creation possible" (Lusch & Vargo, 2019, p. 9). Vargo and Lusch (2019) further argue that institutions are an important component in resource integration and service exchange, as they facilitate (or not) value co-creation activities (Toivonen & Kijima, as cited in Vargo & Lusch, 2019, p. 497). Vargo and Lusch (2016) argue that institutions could be understood as practices that facilitate the study of resource integration and service exchange within the duality of agency and structure. Additionally, the authors highlight the perspective of multiple institutions' logics, which an actor needs to coordinate with to exchange service for service (Vargo et al., 2023; Vargo & Lusch, 2016). As an example, Verleye et al. (2017) addressed the conflict between "business logic" and "patient logic", in which the individual actor needs to find a way

through the competing logics to adapt, or reject, their sensemaking behaviour in value co-creation situations (Jaakkola et al., 2019, p. 502). However, the different institutions and constellations that influence the actors' contextual evaluation are termed in S-D logic an "institutional arrangement" and are further supportive in understanding the concept of the service ecosystems.

Service Ecosystem

From the five foundational concepts, five axioms have been stated, which are nested in the service ecosystem. Vargo and Lusch (2014, p. 2) describe the service ecosystems as "a relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation". However, the view of interpreting service as a system is equally acknowledged in the value co-creation literature. As an example, Maglio and Spohrer (2008, p. 18) refer to service systems as "value co-creation configurations of people, technology, value propositions connecting internal and external service systems, and shared information (e.g. language, laws, measures, and methods)". Principally, service ecosystems are multiple service systems that provide a network perspective and include multiple contributors for value co-creation. In addition, the ecosystem concept introduces a framework "for reframing exchange with multiple levels – micro, meso and macro – and a dynamic meta layer of analysis" (Akaka, 2019, p. 133). Table 2 summarizes the Axioms and Fundamental propositions of the S-D logic.

Table 2: *Axioms and fundamental propositions of S-D logic*

Axiom1	FP1	Service is the fundamental basis of exchange.
	FP2	Indirect exchange masks the fundamental basis of exchange.
	FP3	Goods are distribution mechanisms for service provision.
	FP4	Operant resources are the fundamental source of strategic benefit.
	FP5	All economies are service economies.
Axiom2	FP6	Value is co-created by multiple actors, always including the beneficiary.
	FP7	Actors cannot deliver value but can participate in the creation and offering of value propositions.
	FP8	A service-centred view is inherently customer-oriented and relational.
Axiom3	FP9	All social and economic actors are resource integrators.
Axiom4	FP10	Value is always uniquely and phenomenologically determined by the beneficiary.
Axiom5	FP11	Value co-creation is coordinated through actor-generated institutions and institutional arrangements.

Note. Adapted from "An Overview of Service-Dominant Logic", by R. F. Lusch & S. L. Vargo, 2019, *The SAGE Handbook of Service-Dominant Logic*, 2019, p. 16. Copyright 2019 by Robert F. Lusch and Stephen L. Vargo.

Nevertheless, debates surrounding S-D logic have also taken place over the years. For example, Grönroos (2006, 2011) developed the notion of service logic (SL) to contribute to the importance of service marketing research but also to address some conflicting interpretations of value (co-)creation in contrast to S-D logic, which are discussed in the next section.

In essence, S-D logic has evolved continuously over the last decade and has undergone revisions that are consequently reflected in its fundamental premises (Vargo & Lusch, 2004, 2008, 2016). As Vargo stated: "the most essential concept in S-D logic for linking with and exploring experience: institutions—norms, rules, symbols, meanings, etc.—which serve as

coordinating mechanisms for value creation, as well as heuristic tools for its evaluation" and these will guide theme development in this research (Vargo & Lusch, 2014, as cited in Jaakkola et al., 2015, p. 188). In this sense, S-D logic was used in this study to explore and understand value co-creation from the individual actors' perspectives in a B-to-B remote service context (Akaka et al., 2019; Vargo et al., 2023).

2.2 Value Co-creation

Since the early 2000s, a large and growing body of literature has focused on value co-creation as a key concept in marketing to positively impact business relationships through mutual interactions (Ballantyne & Varey, 2008; Chandler & Vargo, 2011; Corsaro & Anzivino, 2021; Payne et al., 2008; Vargo et al., 2008, 2023). The work of Prahalad and Ramaswamy (2000, 2004) on value co-creation and the work of Vargo and Lusch (2004) that introduced S-D logic (2004) precipitated an increased volume of published studies concerning value co-creation over the last two decades and brought more attention to customers and their contextual aspects (Prahalad & Ramaswamy, 2000, 2004a, 2004b; Vargo & Lusch, 2004). The newly envisioned perspective shifted the view of value from being exchanged via goods to the concept that value is assessed and captured during a consumption process (Galvagno & Dalli, 2014). The existing literature on value co-creation is extensive, and a large volume of published studies focuses particularly on business logics to improve the actor (user) interaction experiences of value co-creation (Andersen et al., 2020; Gummerus & Pihlstrom, 2011; Heinonen et al., 2010; Storbacka, 2019).

Thus, there has been increasing theoretical efforts to understand the concept of value co-creation better. Ranjan and Read (2016) summarized 27 different definitions of value co-

creation and various conceptualizations of value co-creation. Whereas some scholars disagree on how the concept of value co-creation is constructed, the prevailing literature acknowledges that joint interaction and the context are fundamental aspects to investigate the actors' value co-creation experiences (Ballantyne & Varey, 2008; Chandler & Lusch, 2015; Corsaro & Anzivino, 2021; Neghina et al., 2015; Payne et al., 2008; Zeithamel et al., 2020). Nevertheless, how value is co-created and experienced depends on the applied 'logics' and the viewpoint of actor(s) in different situations (Grönroos et al., 2015; Jaakkola et al., 2015).

Drawing on S-D logic, value creation emerges in a service ecosystem from actors' mutually shaped value propositions. This underpins the ability of the actors to realize value through usage and consumption processes but guided within their structures, rules, norms, beliefs and through experience (Gonçalves et al., 2019; Plé, 2016; Vargo & Lusch, 2016). This view sees the actors as active contributors with potentially multiple roles in value co-creation processes, to arrange and enact in their environment throughout a (repeating) dialogue of evaluated experiences. Especially in business relationships, when interactions are exchanged on the micro-level, the service provider needs to understand the derived value and the contextual aspects of the customer (recipient) to further improve joint interactions and potentially develop further value co-creation opportunities.

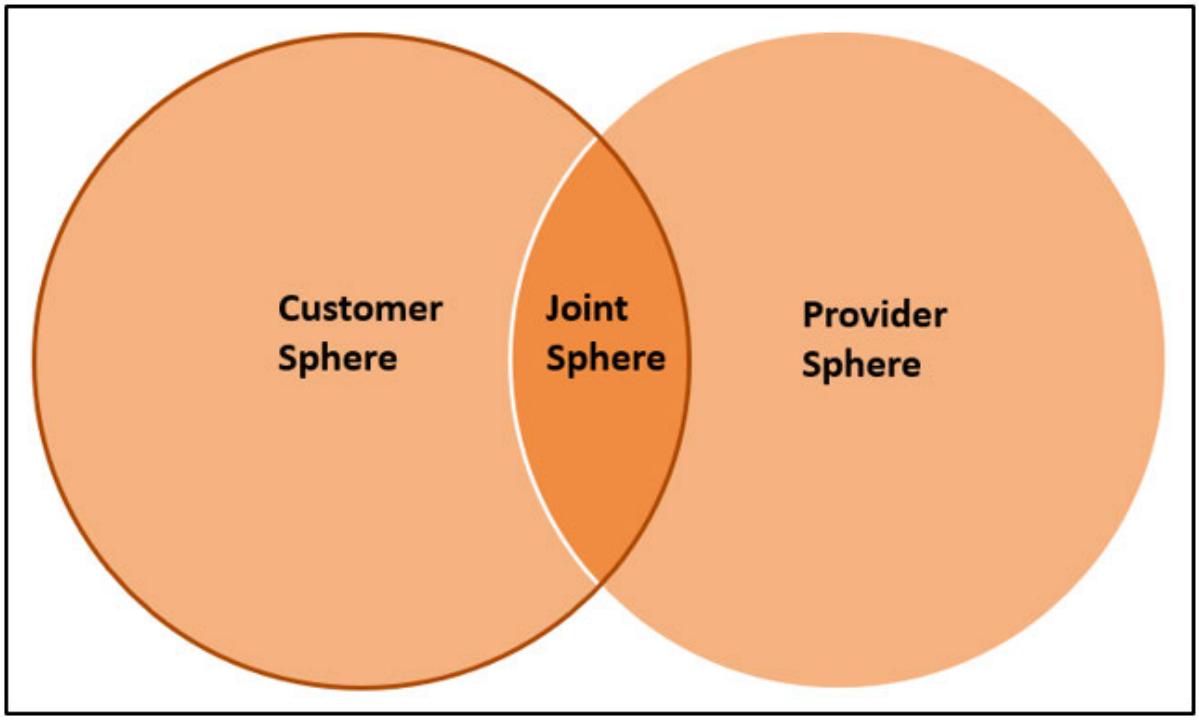
To capture and determine the value outcome of co-creation processes from the individual perspective, 'value-in-use' was conceptualized and empirically investigated (Grönroos, 2011; Gummerus & Pihlstrom, 2011; Macdonald et al., 2016). Previous research on value-in-use has now established and applied different 'logics' of service exchange, including the spatial and temporal. In this sense, value-in-use provides the temporal context when value is derived through the process of value co-creation from the perspective of the recipient.

To shed light on the spatial context and where value is co-created during the process(es) of value co-creation, the literature also reveals some debated viewpoints. In S-D logic, value emerges within the service ecosystem. However, because the service ecosystem builds on service system theory and network perspective, this conceptualization is rather abstract and less supportive for studying value co-creation interaction on the micro-level.

More recently, S-D logic facilitates the view on complex adaptive systems to describe the outcome of perceived value as the viability of the service ecosystem and the value (co-) creation process(es) as the adaptation of value (co-)creation (Polese et al., 2017; Vargo et al., 2023). This perspective shares the view of service as a system, which is a well-established theory in service science, and in consensus with the value co-creation literature, it views an exchange of service taking place on a platform between different systems. Maglio et al. (2009, p. 395,) hence defined a service system as a "configuration of people, technologies and other resources that interact with other service systems to create mutual value". Nevertheless, to investigate the individual perspective in the value co-creation context, systems might eventually remain relatively unspecified, as a platform constellation with generic actors (Polese et al., 2020; Storbacka, 2019).

In contrast, Grönroos and Voima (2013) placed the service exchange between customers and providers and, therefore, provided a more detailed view than a generic configuration of actors and space. They specified the role of the customer and provider to propose a theoretical concept of value creation through three dynamic value spheres (provider, customer, and joint spheres). According to Grönroos and Voima (2013, p. 136), Figure 1 visualizes the customer, provider and joint spheres. The first sphere represents the provider, who acts as the value facilitator. The second sphere is the customer, viewed as an independent value creator.

Figure 1: *Customer, provider and joint spheres*



Note. Adapted from "Critical service logic: Making sense of value creation and co-creation", by C. Grönroos & P. Voima, 2013, *Journal of the Academy of Marketing Science, 41*(2), p. 141. Copyright 2012 by the Academy of Marketing Science.

The joint sphere provides the platform for direct interactions where value co-creation occurs. Within this view, the customer is the 'only' value creator but can invite others to join the co-creation process through direct interactions (Grönroos, 2011; Grönroos & Ravald, 2011; Grönroos & Voima, 2013). This is in contrast with other work on value co-creation, where co-creation is 'jointly' created through interactions between the consumer and the organization (Prahalad & Ramaswamy, 2004a). S-D logic also does not share the view that the customer is the independent creator of value, nor does it see only direct interaction in a joint sphere as the only form of value co-creation.

As recognized in S-D logic, value can be assessed and determined for an individual actor (see FP10, "Value is always uniquely and phenomenologically determined by the beneficiary"), but it is postulated that value cannot be created by an actor alone (see FP 6, "Value is co-

created by multiple actors, always including the beneficiary") (Vargo & Lusch, 2016, p. 8). This view is important to this research as it is consistent with this study, which seeks to explore the individual actor perspective when applying their resources in service-for-service interactions with the provider. Subsequently, the perspective of S-D logic is applied within this research.

However, Grönroos and Voima's (2013) notion of value spheres provides another important theoretical contribution to the literature concerning value co-creation as, based on the concept of service as a system, the authors developed a service platform that localizes the space (and time) of service exchange. In this sense, by utilizing the service system perspective, the value spheres provide a boundary to delimit the spatial and temporal context of value co-creation (Corsaro & Anzivino, 2021; Törnroos et al., 2017). This aspect is in accord with S-D logic, which highlights the importance of the context when studying value co-creation (Spohrer et al., 2007; Spohrer & Maglio, 2008; Vargo et al., 2008, 2023).

Finally, S-D logic provides the specific temporally and spatially related concepts to explore the context of interaction experiences from the individual value co-creator perspective in relation to the service provider through process(es) of value co-creation. However, as value creation is predominantly described as a process, it is important to identify which value process are pertinent, how they are understood and their relationship when investigating the context of value co-creation (Ciasullo et al., 2021; Gummerus, 2011; Grönroos & Voima, 2013).

Here, S-D logic distinguishes between value outcome and value co-creation process(es), and the logic remains flexible to adapt to different actors' perspectives and the roles of resource integration and service exchange across different processes of value co-creation. In other words, to investigate the individually perceived value and process of value co-creation, the

approach needs to address additional spatial and relational aspects from the actors' perspective (Corsaro & Anzivino, 2021; Törnroos et al., 2017). Such an approach is proposed by Payne et al. (2008, p. 85) to understand the customer more fully "processes, resources and practices which customers use to manage their activities" to better manage the value co-creation opportunities from the supplier's perspective. The authors bring the customer and supplier processes to the fore and specify the service exchange interface as encounter processes. This framework draws on the different service systems and platforms to capture the value creation activities and the outcome of value co-creation experiences.

Overall, the value co-creation literature generally acknowledges the importance of the interactions between the actors and the situational context to co-create value. Nevertheless, in a B-to-B context, the individual perspective in value creation situations and the form of interaction is almost absent in the value co-creation literature (Gonçalves et al., 2019; Gummerus, 2011; Storbacka et al., 2016). Thus, some researchers state that the value co-creation is still in the conceptual stage of development (McColl-Kennedy et al., 2012; Neghina et al., 2015; Ranjan & Read, 2016; Zeithamel et al., 2020). Specifically, non-physical service exchange and the potentially asynchronous interaction are important contextual aspects in facilitating value co-creation in remote service delivery. Therefore, the aim of this research is to explore B-to-B remote service value co-creation interactions from the service recipient perspective. This perspective is central for this research as it facilitates investigation of the contextual aspects in particular, of the process of value co-creation and of the perceived value outcome for the service recipient in relation to the service provider.

This section provided a brief summary of the value co-creation literature and identified the main conceptualized perspectives used to study the research phenomenon. The perceived value outcome and the customer process of value co-creation are identified as the main

concepts and are further introduced in the sections later in this chapter. However, to emphasize the individual perspective in the research context, the next section starts with the nature of value.

2.3 Value Outcome

There is a large volume of published literature to define, conceptualize and measure 'value' in various disciplines, such as philosophy, sociology, economics as well as marketing and management (Gallarza et al., 2017; Vargo et al., 2023; Woodruff & Gardial, 1996). In marketing theory, value is one of the core concepts, and whilst it has garnered great interest, there are still calls in the literature to investigate the concept further (Sánchez-Fernández & Iniesta-Bonillo, 2007). Vargo et al. (2023, p. 5) argue "that all core marketing phenomena (e.g. value, brand meaning, exchange conventions, etc.) are outcomes of dynamic, interactive processes" and refer to the shift from the traditional viewpoint of value being derived and determined in exchange (G-D logic) to value being derived through service-for-service and determined in-use. Other marketing literature has emphasized that value creation for the customer is crucial in sustaining the firm's existence (Woodruff, 1997). Holbrook (1994) describes the value concept as essential for all marketing and customer research (Holbrook, 1994, 1996, 1999; Vargo et al., 2023; Woodruff & Gardial, 1996; Zeithaml, 1988, Zeithamel et al., 2020). It is evident, therefore, that value has been seen as a central construct that has generated considerable and varied treatment.

Whilst the existing literature is extensive, some authors highlight the lack of clarity regarding the concept of value, its definition, conceptualization and measurement (Gallarza et al., 2017; Helkkula et al., 2012; Sánchez-Fernández & Iniesta-Bonillo, 2007). Grönroos and

Voima (2013, p. 134) argue that “value is perhaps the most ill-defined and elusive concept in service marketing and management”. However, various definitions of value concepts exist within the service marketing literature, and this study draws on the S-D logic perspective (Gallarza et al., 2011; Gummerus, 2013; Vargo & Lusch, 2004, 2008, 2016), based on its fourth axiom: “Value is always uniquely and phenomenologically determined by the beneficiary” (Vargo & Lusch, 2008, 2016, p. 8). In addition, the authors emphasized that there is an inherent need for the engagement of multiple actors with FP7: “Actors cannot deliver value but can participate in the creation and offering of value propositions” (Vargo & Lusch, 2016, p. 8). According to these authors, the nature of value has been discussed and debated since Aristotle. Specifically, two general meanings of value, ‘value-in-exchange’ and ‘value-in-use’, reflect diverse ways of thinking about value and value creation (Vargo et al., 2008).

Whereas, the concept of value-in-use is well acknowledged in the value co-creation literature, particularly to investigate value on the micro-level, value-in-use also entails different perspectives and theoretical backgrounds that have evolved over an extended period of time (Medberg et al., 2016). According to Medberg et al. (2016), three different approaches to the value-in-use concept have been identified: *utility, consumption, and experiential*. Essentially, the *utility* approach follows a consumer perspective, which is based on an overall perceived value assessment, i.e. what is given and received (good or service for money). This view accords with the view of value as a ‘trade-off’ (Zeithaml, 1988). Value is viewed from the consumers’ perception as a trade-off between sacrifices and benefits (Ulaga & Chacour, 2001; Zeithamel, 1998; Zeithamel et al., 2020). Building from this perspective, value was operationalized as a one-dimensional value for money concept (Ruiz et al., 2008). Whilst this approach is relatively easy to implement, it does not reflect the

complexities of the multi-actor nature of service and the varied interactions of consumption (Gallarza et al., 2017; Medberg et al., 2016).

The *consumption* approach has its origins, according to Medberg et al. (2016), in the late 1950s as consumers had more options to select and consume their desired goods. As a result, businesses started to focus on customers' needs. Subsequently, value-in-use was connected to customer satisfaction and conceptualized as a consumption outcome (Medberg et al., 2016). Firstly, the work of Woodruff and Gardial (1996) defined the dynamic nature of value and explained the desired and received value of using goods or services. This perspective focuses on situations of utility (good or service), where the importance also rests on the states evident in the moments before and after consumption. This approach describes value-in-use as an end state that enables the achievement of customers' goals (Woodruff & Gardial, 1996). The consumption outcome view on customer value assumes that value is a process with a means-to-an-end perspective (Medberg et al., 2016). However, this viewpoint provides limited insights into the relational view of other important contextual aspects that might influence the derived value-in-use experience over time.

Lastly, the *experiential* approach is a multidimensional view used to conceptualize value, which moves away from goods and service utility, or consumption, to consider diverse user experiences; hence, it facilitates a phenomenological perspective of value (Helkkula et al., 2012; Holbrook, 1994; Vargo & Lusch, 2008, 2016). Based on Holbrook's definition from the consumer marketing theory of value as "an interactive relativistic preference experience", value co-creation researchers sought to adapt this perspective in relation to the value-in-use concept (Holbrook, 1994, 1999, as cited in Medberg et al., 2016, p. 717). With this view, value is seen as an outcome through interactions of individually assessed and determined

user experiences of a service or good. According to Gallarza et al. (2017), the experiential approach is the most recent and comprehensive perspective on value-in-use in (service) marketing. In S-D logic, value is explained as being phenomenological in nature and determined by the beneficiary, which is seen as idiosyncratic, experiential, contextual and meaning-laden (Akaka & Vargo, 2015; Edvardsson et al., 2012; Vargo, 2009; Vargo & Lusch, 2008a). As indicated above, the experiential approach to determine value is not new to marketing, and in particular consumer marketing research has intensively investigated individually perceived value experiences.

For instance, Sheth et al. (1991) introduced consumption theory and classified five consumption values as part of this: *functional, social, emotional, epistemic, conditional*. The authors developed a framework to better understand customer buying behaviour and operationalize their theoretical assumption of independent value types. Whilst the authors referred to multiple independent values, the focus of the work is ostensibly related to customers' decision-making regarding buying with a means-to-an-end perspective related to products. Babin et al. (1994) also introduced a framework and operationalized value in the context of shopping experiences by contrasting extrinsic (utilitarian) and intrinsic (hedonic) value dimensions. This work is based on Holbrook's (1986) view on shopping value, which is "subjective, characterized by consumers' interactions with an environment, and indicated by both the event's usefulness and an appreciation of its activities" (Balin et al., 1994, p. 654). This view is important as it appreciates the experiential approach and focuses on the consumer perspective to derive value from the 'event' itself and the related 'activities'. However, this framework is mainly related to shopping value, and other potential value(s) during the activities understandably receive limited attention.

Another study that is also associated with consumption values in the context of shopping is presented by Sweeney and Soutar (2001). According to their framework, four dimensions have been determined: functional value 1 (price/value for money), functional value 2 (performance/quality), emotional value and, finally, social value (enhancement of social self-concept). The authors operationalized a scale (PERVAL) to measure the perceived value of the post-purchase experience of goods. Later, the work of Sanchez et al. (2006) expanded upon this to also provide a view on the purchase experience. Whilst both studies address a multidimensional concept of value, their investigations focus on value in purchasing experiences.

In contrast, Holbrook's (1994, 1999) work on consumer value types provided a different approach to determine consumer value without addressing formative levels of value(s) in a specific context. Holbrook's (1994, 1999) typology of value is constructed on a matrix that identifies different components and dimensions of value. The approach considers 2x2x2 dichotomous dimensions of value, resulting in eight different types of value. Holbrook's (1994, 1999, 2006) concept of consumer value has also evolved over the years and is perhaps the most comprehensive work in conceptualizing experiential value (Gallarza et al., 2017; Sánchez-Fernández & Iniesta-Bonillo, 2007).

Drawing on S-D logic, more recently, Vargo et al. (2023, p. 6) stated that "value is a holistic, experiential outcome of complex interactions within the context of a given system", thus emphasizing the experiential approach to investigate actors' perceived outcomes of their value co-creation experiences. For this work, the phenomenological (experiential) view on value is important to better understand the various value-in-use experiences in complex B-to-B situations and to capture subjective value determination from the interactions with the service provider. Whereas the S-D logic approach highlights the complexity and contextual

components of systems for service exchange in general, the logic provides fewer details of the system-relevant aspects in the B-to-B environment. Whilst the B-to-B marketing literature discusses the concept of value intensively, the shift from “value in exchange” to “value-in-use” (see Chapter 2.1) and, therefore, a subjective perspective of value, was only acknowledged recently (compared with the position in material examining Business-to-Consumer). However, the contemporary literature in B-to-B marketing widely accepts the subjective view on value and value determination (Corsaro & Anzivino, 2021; Eggert et al., 2019; Macdonald et al., 2016; Mencarelli & Riviere, 2015), suggesting the application of value-in-use in the context is not problematic or contested.

Nevertheless, Eggert et al. (2019) highlighted several differently conceptualized approaches to determine subjective value in B-to-B constellations. They also provided an integrative framework of differing research approaches and categorized the subjective perspectives (including their individual and collective goals) based on the “…value beneficiary (i.e., collective or individual value perceptions), the underlying perspective (i.e., customers' or suppliers' value perceptions), and the reference object of value (i.e., transactional value based on expectations or experiences, and value of relationships)” (p.14).

In this sense the framework is supportive theoretically to further address and frame the research as presented in this study. However, the question of the value beneficiary and for whom (e.g. self vs. others) value is co-created depends on the individual perspective taken and their idiosyncratic assessment (Helkkula et al., 2012). This research concentrates on the individual (customer) perspective and their consumption of remote service interaction with the provider at the micro-level. Whilst the terminology of customer and/or consumer is sometimes used interchangeably in the literature, this work recognizes the B-to-B constellation and acknowledges the individual person as a customer who consumes remote

service at their workplace (Anker et al., 2015). By applying S-D logic, actors are outlined as active participants who integrate their resources in service-for-service exchange. This is consistent with the research aim to better understand the individual actor's perceived value outcome and their participation in the remote service offering of the provider. However, the term 'customer' might address a broader B-to-B constellation and seems less suitable to describe the relationship of an individual actor in this specific situated context. This work frames the individual actor as the recipient of the remote service and, therefore, uses the term 'service recipient' to focus on the individual perspective and distinguish other B-to-B context constellations (e.g. purchasing actors) (McLaughlin, 2009). By adopting this approach, the service recipient perspective is applied and their perceived value of remote service interactions with the provider are brought to the fore within this specific B-to-B context.

Hence, the potential 'value beneficiary' (self vs. others) is investigated through the accounts of service recipients in dialogue with the specific context and their idiosyncratic experiences (value-in-use) when consuming remote service as the object.

This study is anchored in the perspective of the individual service recipient engaged in remote service usage and consumption processes on the micro-level and follows the experiential approach to determine the perceived value in B-to-B systems (Corsaro & Anzivino, 2021; Gonçalves et al., 2019; Plé, 2016; Vargo et al., 2023).

As Mencarelli and Riviere (2015) noted, perceived customer value in B-to-B and B-to-C domains has been studied in diverse ways for many years, often in conceptual studies with a macro-level focus. The authors highlighted the strengths in determining value in the predominantly separate research domains and called for an exchange between the two to broaden the perspectives through cross-fertilization. In terms of B-to-B research, the

authors emphasized that value is primarily determined from the perspective of the functional dimension of the cost–benefit trade-off and focuses on the seller–buyer relationships. In contrast, the B-to-C domain provides a relatively large amount of literature and sheds light on the non-functional (e.g. 'shopping value', 'play and aesthetic value' types) determination of value from personally-related value experiences. Consequently, Mencarelli and Riviere (2015) indicated the potential contributions to the B-to-B value co-creation literature by applying a micro-level approach from the domain of consumer market research in relation to perceived customer value and called for research to apply an experiential and multidimensional view of perceived value. They suggest applying Holbrook's (1994, 1999) work on consumer value types in the B-to-B environment, without neglecting the complexity and the contextual aspects of whose, where, when and what value is perceived. However, Macdonald et al., (2016) described the customer value typologies in a B-to-C environment as predominately focusing on individual's goal achievements, whereas individuals in the B-to-B environment also address goals at the collective level (e.g. team or company). However, an objection to this stance by Coutelle-Brillet et al. (2014) led to an adjusted framework for the B-to-B context based on Holbrook's (1994, 1999) consumer value typology. Coutelle-Brillet et al. distinguished the 'organization as a whole' and 'external stakeholder' and facilitated a more relational view of the value beneficiary.

As noted by Ravald (2010), only a few researchers (e.g. Holbrook, 1999) apply a philosophical theory of value (axiology) in marketing research. According to the author, axiology refers to "…human behaviour [that] is immediately associated to the individual's perception of the good and the bad, and it is assumed that humans turn to the good and retreat from the bad…" (Ravald, 2010, p. 45). By applying this philosophical assumption, human behaviour is understood from the individual perspective, value is attained when

striving for the good. Based on the fundamental work of Hartman's (1967) value theory, 'good things' provide a pattern as they fulfil an ideal standard (or concept) that is individually perceived. In this sense, 'good things' can be understood as the properties to describe the concept and provide a better understanding of why individuals value them. By this "goodness and value of objects then become related to what individuals want objects to be and do for them, i.e. the role they want goods, services, and relationships to various actors in the market to have in their lives" (Ravald, 2010, p. 46). With a similar proposition, Gallarza and Gil (2008) describe axiology as being the "judgment of goodness/badness" and refer to the value concept from Holbrook (1994, 1999) as an adequate tool to analyse consumer experiences (p. 4). In this sense, the concept of consumer value (Holbrook, 1994, 1999) also finds utility in facilitating the determination of the value outcome for this research.

For this study, the typical contextual cost–benefit trade-off and buying decision aspects often considered in B-to-B research are less important, as the remote service provision is typically incorporated into service contracts and the purchasing decision process is relatively dissociated from the service recipient. Therefore, the perceived value outcome of the individual service recipient from remote service interactions that present value co-creation opportunities with the supplier is even more relevant for this research, as the participation of the recipient is more voluntary than in other B-to-B relationships. However, this research follows the S-D logic perspective of value as an outcome of resource integration and service exchange on the micro-level that is phenomenologically experienced and determined by the individual actor (service recipient). Value-in-use is approached through an experiential perspective of recipient experiences and follows a multidimensional view. Finally, the

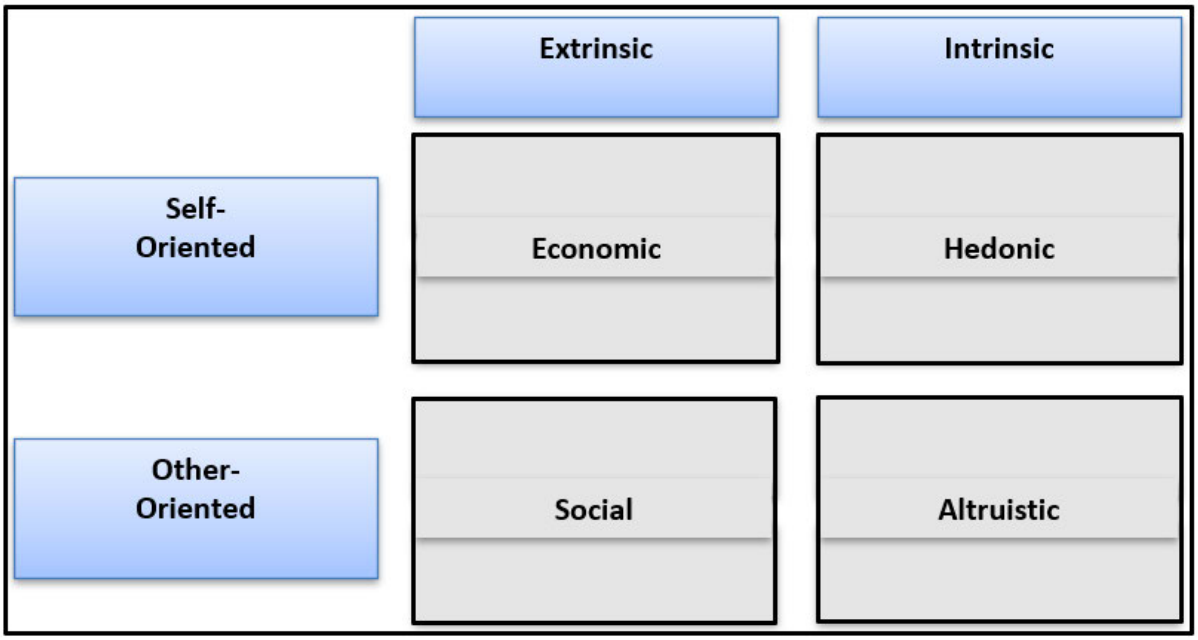
perceived value of the service recipient is investigated using Holbrook's (1994, 1999) work on consumer value types and a more detail concerning this approach is offered next. Holbrook's consumer typology (1994, 1999) is applied in this work to better understand the service recipient's value-in-use and to address in particular the non-functional value dimension of perceived value in B-to-B systems (Mencarelli & Riviere, 2015). As stated above, Holbrook's value typology framework presents 2x2x2 dichotomies of value dimensions, which result in eight customer value types. The dimensions are (1) extrinsic versus intrinsic, where extrinsic value is deduced from a means-to-an-end consumption experience, intrinsic value is originated in the consumption experience for oneself; (2) self-oriented versus other-oriented, where the self-oriented value consumption experience is for the benefit of the individual, the other-oriented value consumption experience is deduced for the sake of others; (3) active versus reactive, where the active value consumption experience is associated with a tangible or psychological interaction by a consumer, a reactive value consumption experience is created passively without direct interaction (Holbrook, 1999, 2006).

The eight associated values types are described as efficiency (self-oriented, extrinsic, active) in individual input/output comparison (e.g. time); excellence (self-oriented, extrinsic, reactive) related to quality and satisfaction; status (other-oriented, extrinsic, active) related to success, impression management; esteem (other-oriented, extrinsic, reactive) related to establishing reputation, materialism and possessions; play (self-oriented, intrinsic, active) related to fun and distinction to work and leisure; aesthetics (self-oriented, intrinsic, reactive) and appreciating beauty; ethics (other-oriented, intrinsic, active) related to virtue, justice, morality; and spirituality (other-oriented, intrinsic, reactive) related to faith, ecstasy, rapture, sacredness and magic.

Over the last decades, Holbrook's classified dimensions are often discussed and empirically investigated in the literature (e.g. Gallarza & Gil, 2008; Gallarza et al., 2017; Sánchez-Fernández & Iniesta-Bonillo, 2007). Whilst most of the empirical work only partially tested Holbrook's value types, Gallarza et al. (2017) were the first to empirically validate all Holbrook's 2x2x2 value consumer types. Due to the overall complexity of distinguishing all the value types and the relatively seldom use of the active versus reactive dimension, Holbrook (2006) proposed a consolidated view of the remaining (extrinsic versus intrinsic and self-oriented versus other-oriented) dimensions to derive economic, social, hedonic and altruistic value from the earlier (1994, 1999) eight identified value types (Figure 2). The adoption of this consolidated 2x2 matrix is consistent with this research as the service recipient is considered to actively experience value co-creation (opportunities) of remote service (human-to-human) interaction with the service provider.

Therefore, this study introduces and focuses on the 2x2 value dimensions, namely economic (self-oriented and extrinsic), social (other-oriented and extrinsic), hedonic (self-oriented and intrinsic) and altruistic (other-oriented and intrinsic).

Figure 2: *Typology of customer value*



Note. Adapted from "Consumption experience, customer value, and subjective personal introspection: An illustrative photographic essay", by M. B. Holbrook, 2006, *Journal of business research, 59*(6), p. 715. Copyright 2006 by Elsevier Incorporated.

Firstly, Holbrook (1999, 2006) describes *economic value* as self-oriented and extrinsic, which can be derived through the efficiency and excellence value types. Economic value in B-to-B relations is usually approached through a trade-off view of value and is addressed in the domain of remote service delivery (Grubic, 2014; Paluch, 2011; Wünderlich, 2010). Cost effectiveness is especially discussed in regard to the service provider in terms of their saving travel costs or as risk management for the customer, enabling them to manage their systems' operations availability (Jonsson, 2008; Paluch, 2011). Studies in B-to-C followed an experiential view to investigate economic value by applying a utilitarian (Babin et al., 1994) or functional value type (Sheth et al., 1991). With this approach, the economic value is experienced through the use of a good/service for a self-oriented purpose.

The *efficiency* value type (Holbrook, 1996) predominantly focusses on output/input ratio with money as the denominator; other studies focus on time and foreground the output/input convenience (Holbrook, 2002, p. 187). This "get-versus-give" aspect includes

the consumer's monetary cost, time and effort in relation to the service experience (Sánchez-Fernández & Iniesta-Bonillo, 2009, p. 427).

The *excellence* value type (Holbrook, 1996) is highly related to satisfaction and quality concepts and is described as an experience of an object (e.g. remote service) to achieve or perform some function (Sánchez-Fernández, 2009). Sánchez-Fernández and Iniesta-Bonillo (2007) highlight the contemporary literature between perceived quality and perceived value as some authors (e.g. Baker et al., 2002; Chen & Dubinsky, 2003; Cronin et al., 2000; Tam, 2004) see perceived quality as an antecedent and as having a positive effect on perceived value, whereas other authors (Holbrook, 1999; Sheth et al., 1991; Sweeney & Soutar, 2001) have argued that quality is a subcategory of overall value (Sánchez-Fernández et al., 2009, p. 100). Despite monetary costs for remote service not being the locus of this research, the economic aspect is relevant to investigating value from the service recipient perspective. The derived value from the output-input ratio (e.g. time, effort) and the perceived value from the experienced 'excellence' of remote service in their role as radiographer is also relevant to this research.

Social value is described by Holbrook (2006) as extrinsic and other-oriented and as incorporating two value types – 'status' and 'esteem'. Social value can be derived when an object improves the relationship between two parties (Sánchez et al., 2006; Sheth et al., 1991; Swenney & Souter, 2001). It is suggested that *status*, from the perspective of the consumer, is influenced through consumption (product/service) to improve one's image that is then perceived by others (Holbrook, 1994, 1999). For this study, social status may be derived by how effectively service recipients are perceived to perform and what type of activity may constitute improving their social status. Holbrook (1994) described *esteem* as more reactive appreciation of social value – characterized by how people or oneself believe

they are perceived based on one's own possessions (e.g. materialism) and how it might influence one's public image. In addition, the esteem value type might also be enhanced through achievements and praise received and how one is treated by others. From the service recipient perspective, social status may not be gained through possession as materialism, but rather from activities/interactions that are perceived and shared as 'best/good practices' and which positively influence self-esteem. However, Holbrook (1999, 2001) himself confessed that both subcategories are difficult to distinguish, which is also confirmed by other authors (Gallarza et al., 2017; Sánchez-Fernández & Iniesta-Bonillo, 2007).

Hedonic value is described as intrinsic and self-oriented and combines the subvalue types, '*play* and *aesthetic*' (Holbrook, 1999, 2006). While '*play'* is pursued actively for its own sake, it usually includes having fun and is also used as demarcation of work and leisure (Holbrook, 1999). While Sánchez-Fernández et al. (2009) highlight the importance of play as a construct of consumer value, other authors even see play as "an act of consumption (Holt, 1995), a prerequisite to relationship building (Deighton & Grayson, 1995), an antecedent of perceived value (Gallarza & Gil, 2006) and a key dimension of consumer value (Babin et al., 1994; Holbrook, 1994, 1999; Mathwick et al., 2001)" (p. 101). From the perspective of the service recipient, play is not only used to delineate work and leisure. For this research, it is rather of interest if the recipient appreciates being actively involved in or facilitating the value co-creation process.

Holbrook (1994) relates the '*aesthetic'* value type to the extent an object (e.g. product or service) is perceived as attractive in terms of appreciating its beauty. The consumer value literature concerning aesthetic value was originally related to art and later extended to everyday objects such as cars, events, services by Wagner (1999). The author extended the

perception of beauty through the experiences of consumption by the view that any person or idea that may attract or sustain the interest of a subject (Wagner, 1999). Mathwick et al. (2001) followed an empirical value approach and provided empirical evidence for an aesthetic value type (visual appearance and entertainment) for internet shopping. For this study, the service recipient perspective is of interest in terms of whether aesthetic value is derived (e.g. from remote service interaction with the service provider) by reactive observation. In the *altruistic value* Holbrook (1994) unifies the two related value types, '*ethic*' and '*spirituality*', which are described as intrinsic and other-oriented by Holbrook (1996, 2006). The '*ethic'* value type is defined as doing something for the sake of others and how the consumption will affect others or how they will react (Holbrook, 1999). Holbrook (2002) further proposed to consider "*virtue*— that is, the tendency for an individual's character to lead toward actions that follow the laws, obey the rules, or fulfil prescribed duties. […] *justice*—that is, a situation in which the laws that govern society tend to produce beneficent consequences. […] morality—that is, the tendency of that person's character to work toward outcomes that enhance the welfare of others" (p. 22). For this study, the service recipient's ethical consumption experiences are manifold as first the radiographer is per se enhancing or facilitating by their interaction with patients the welfare of others, whereby the object (remote service), during the value co-creation interaction, comes with other ethical aspects that might also be relevant for this study. The '*spiritually'* value type is described by Holbrook (1994, 1999) as to appreciate another, where the 'other' can be a divine power, cosmic force or an inner being and may assert a magical experience. This value type is very sparsely evidenced in the customer value consumption literature and occasionally applied in an experiential value model (Gallarza et al., 2017, Loades, 2018). How the spiritually value types might be derived by the service recipient is not clear

although emotions are most likely involved in the consumption of remote service. Table 3 provides an overview of the value dimensions and value types with a brief description and their application to this work.

Table 3: *Typology of customer value dimensions and value types*

Value dimensions	Value types	Brief description	Application for this work	Example papers
Economic: Self-oriented and extrinsic	Efficiency	Predominantly focuses on output-input ratio with money as the denominator; other studies focus on time and foreground the output-input convenience.	Recipients "get-versus-give" aspect experience (Sánchez-Fernández & Iniesta-Bonillo, 2007, p. 99). Decision to enact potential resources or not.	(Gallarza et al., 2017; Holbrook, 1996; Sánchez-Fernández et al., 2009)
	Excellence	Related to satisfaction and quality of an object (including service).	Recipients perceived "excellence" of remote service provision from the provider.	(Holbrook, 1996; Sheth et al., 1991)
Social: Other-oriented and extrinsic	Status	Influenced through consumption to improve one's image that is then perceived by others.	How effectively service recipients are perceived to perform and what type of activity may constitute to improving their social status.	(Gallarza et al., 2017; Holbrook, 1996; Swenney & Souter, 2001)
	Esteem	How people or oneself believe they are perceived based on own possessions (e.g. materialism) and how it might influence one's public image.	The recipient, may not gain through possession rather from activities/ interactions which are perceived and shared as "best practices" and positively influence self-esteem.	(Holbrook, 1996; Sánchez-Fernández et al., 2009, Swenney & Souter, 2001)
Hedonic: Self-oriented and intrinsic	Play	It usually described as having fun and is also used for the demarcation of work and leisure.	For this study, it is rather of interest if the recipient appreciates being actively involved or facilitating the value co-creation process.	(Babin et al., 1994; Holbrook, 1996; Sheth et al., 1991; Swenney & Souter, 2001)
	Aesthetic	To which extent an object (e.g. service) is perceived as attractive in terms of appreciating its beauty.	Derived (e.g. from remote service interaction with the service provider) by rather reactive observation.	(Holbrook, 1996; Mathwick et al., 2001; Wagner, 1999)
Altruistic:	Ethic	Defined as doing something for the sake of others and	Recipients' facilitating by their interaction	(Gallarza et al., 2017;

Value dimensions	Value types	Brief description	Application for this work	Example papers
Other-oriented and intrinsic		how the consumption will affect others or how they will react.	with patients the welfare of others when consuming a remote service.	Holbrook, 1996; Sánchez-Fernández & Iniesta-Bonillo, 2007)
	Spirituality	To appreciate another, where the "other" can be a divine power, cosmic force, or an inner being and may assert magical experience.	How the spiritually value types might be derived by the service recipient from remote service is not clear.	(Gallarza et al., 2017; Holbrook, 1996)

Note. Adapted from "Consumption experience, customer value, and subjective personal introspection: An illustrative photographic essay", by M. B. Holbrook, 2006, *Journal of business research, 59*(6), p. 715. Copyright 2006 by Elsevier Incorporated.

Although the eight suggested value types (Holbrook, 1999) are comprehensively discussed and partially operationalized by several authors (Babin et al., 1994; Mathwick et al., 2001; Sheth et al., 1991), the overall conceptual framework from Holbrook (1994, 1999) has not been empirically tested for a relatively long period. This may be because the complex structure of the value framework complicates measurements of the individual value types; as Holbrook (2002) postulated, "in no way do I mean to imply that the four are independent or mutually exclusive. Rather they compose an interconnected system" (p. 5).

More recently, Gallarza et al. (2017) conducted a study in hospitality consumption to empirically verify all eight of Holbrook's (1999) value types. The authors demonstrated that the different value types can occur simultaneously, while the social value type, with the subcategories "status" and "esteem", offered the closest interrelatedness between the value types (Gallarza et al., 2017, p. 746). In the same study, the value type "ethics" stands out and, therefore, seems to be more independent from other value types in the hospitality context, and the authors suggest future investigation of this value type is required. Gallarza et al. (2017) further measured the highest interrelationship between extrinsic and self-oriented value dimensions and the lowest between extrinsic and intrinsic and self-oriented

and other-oriented value dimensions. For this study, it is important to consider that there may be interdependence between the value types and that it may be difficult to distinguish between them.

Overall, by applying the S-D logic approach and determining the value-in-use from an individual perspective, the value creation literature has highlighted the need to investigate the perceived value more holistically and focus on the consumption experience instead of considering value as transmitted via the product. In particular, the B-to-B literature revealed the need to investigate the non-functional value dimension in the context of value co-creation on the micro-level. However, an extended review of the B-to-C literature complements this goal and facilitates the experiential and multidimensional view on value and, therefore, provides more potential insights into perceived value when consuming a good or service to derive value. Under the introduced multidimensional value concepts, the consumer typology from Holbrook (1994, 1999) is applied in this work to better understand the concept of value-in-use and capture additional value types that are rarely identified in the B-to-B context (Sánchez-Fernández et al., 2009), but which are in consonance with Holbrook's (2002) definition on consumer value:

> […] consumer value is an interactive relativistic preference experience, we mean that the relationship of consumers to products (subjects to objects) operates relativistically (depending on relevant comparisons, varying between people, changing among situations) to determine preferences that lie at the heart of the consumption experience. (p. 9)

This study embraces the variety of the service recipient subjective experiences and seeks to understand their sensemaking behaviour from their individual perceived remote service value co-creation consumption, and it therefore uses Holbrook's concept (1994, 1999) as a

lens to identify individual service recipients perceived value types without limiting the experienced narratives by an a priori set of value types.

To shed light on the service recipients' resource integration and service exchange experiences, the next section reviews the literature and highlights the importance of the value co-creation process(es).

2.4 Value Co-creation Process(es)

The literature on value co-creation has highlighted several different theories that seek to describe how value co-creation processes operate (Corsaro & Anzivino, 2021; Grönroos & Voima, 2013; Gummerus, 2013; Polese et al., 2017; Vargo et al., 2023). Whereas, for many years, value was considered to be produced by firms and delivered to customers (G-D logic), S-D logic shifted the perspective to one where value – as an outcome – is determined by the recipient of service-for-service exchange and always co-created through a process involving at least two actors (Vargo & Lusch, 2004, 2008, 2016).

According to S-D logic FP7, "Actors cannot deliver value but can participate in the creation and offering of value propositions" (Vargo & Lusch, 2016, p. 8). In addition, the role of the actors is described by FP6: "Value is co-created by multiple actors, always including the beneficiary", and FP9 adds that "All social and economic actors are resource integrators, as active resource integrators in service-for-service exchange" (Vargo & Lusch, 2016, p. 8). Given this perspective, the roles of the actors have received more attention in the value co-creation literature as actors are actively accessing, adapting, and consuming a service or a good to derive value.

From a broader perspective, S-D logic underscores that value occurs within the actors' coordinated processes and activities on the micro-level, whereas value co-creation is coordinated through "actor-generated institutions and institutional arrangements" (Vargo & Lusch, 2016, p. 8). In other words, actors can influence and shape the service ecosystem by integrating resources within their embedded social context (Gonçalves et al., 2019; Polese et al., 2021; Vargo & Lusch, 2016). Nevertheless, especially in terms of the B-to-B environment, actors are integrated into a structure with agency to perform certain tasks (Corsaro & Anzivino, 2021; Storbacka, 2019).

Kleinaltenkamp et al. (2012) provided a framework that addressed resource integrators as actors, e.g. individual or organizational level, which utilizes operant resources (e.g. knowledge and skills) to enact operand resources in the process of resource integration. The authors highlight the need to investigate further the structural aspects in which the actors are embedded and the practices of the individual actor to co-create value when integrating resources. This is important as the resource integration (process) only relates to value co-creation and service systems, but it is not per se understood as the value co-creation process itself. This concurs with Payne et al. (2008, p. 86), who described resource integration "a continuous process, which has been defined as 'a series of activities performed by an actor'".

When applying S-D logic, Peters et al. (2014) highlight the temporal aspect of resources when investigating the value co-creation process as resources need to 'become' and resources need to retain their status as resources, depending on their continuous usage (similar to value-in-use). Peters et al. (2014, p. 249) conceptualized resources and resource integration according to ontological and epistemological assumptions to investigate resource integration as emergence or resource integration as interaction. The authors

highlight the importance of theoretical viewpoints to better understand resource integration, firstly to distinguish resource integration as an emergent process in which resources are described as constituting a new entity with its own particular characteristics (i.e. structures, qualities, capacities, textures, mechanisms) and secondly, to distinguish resource integration as interaction, which is described as a specific set of interactions occurring between key actors (or entities) and particular resources (Peters et al., 2014, p. 256). Whilst Peters et al. (2014) emphasize resource integration as part of the overall value co-creation process, they also highlight the dependency of the theoretical perspective and importance of, for example, the actors' perceived reality, disposition and interactions when investigating the experiences of resources integration.

As this study aims to investigate the value co-creation process from the service recipient perspective, the individual recipient capacity and perceived resources are important factors when recipients apply their operand resources on the service supplier provided operant resources (or not). In the same vein, Koskela-Huotari and Vargo (2016) underline the actors' disposition towards potential resources and how they are accessed is experienced and perceived differently and, therefore, needs to be considered when studying the value co-creation process (Koskela-Huotari & Vargo, 2016).

Whereas the value co-creation literature is less specific in studying the value co-creation process, there is consensus among service marketing researchers that the 'overall' value co-creation process comprises different processes of value co-creation and elements that need to be addressed when studying value co-creation (Corsaro & Anzivino, 2021; Grönroos, 2008; Grönroos & Voima, 2013; Gummerus, 2011, 2013; Payne et al., 2008; Vargo & Lusch, 2008, 2016). Nevertheless, the conceptual elements that support determining the processes of value co-creation are differently approached and depend on the perspective taken to

investigate the area of interests. The literature provides different value co-creation models, which have been developed to investigate the process of value co-creation (Ciasullo et al., 2021; Grönroos, 2008; Gummerus, 2013; Payne et al., 2008; Polese et al., 2017; Prahalad & Ramaswamy, 2000; Vargo & Lusch, 2004, 2008).

One major theoretical contribution concerning the process of value co-creation was that of Prahalad and Ramaswamy (2000, 2004a, 2004b). The authors proposed the DART model to conceptualize co-creation processes, which are described in the four basic elements of value co-creation, namely dialogue, acquisition, risk assessment and transparency. The 'dialogue' block represents the interface between the customer and the firm, used to develop joint processes of value co-creation. 'Access' is predominantly understood from the supplier perspective and relates to providing the customer with more information and tools to enhance their own selection and therefore the customer value co-creation process. 'Risk assessment' invites the customers, as active co-creators, to address issues including the shared benefits and risks as potential outcomes to principally improve their provider processes. 'Transparency' enhances the openness to information sharing to improve the collaboration between the customer and service provider. The DART framework focuses attention on and enables the enhancement of the dynamics between the companies and customer by considering their value co-creation interactions. Nevertheless, the model tends to privilege the supplier perspective and interactions that can be classified under its value co-creation building blocks and hence might, if applied, be too prescriptive.

Another important empirical contribution to the value co-creation process literature that draws on S-D logic was provided by Aarikka-Stenroos and Jaakkola (2012). The authors provided a framework to investigate activities, roles and resources in joint problem situations that potentially lead to perceived value-in-use. The model acknowledged the

different joint collaboration process stages as “diagnosing needs, designing and producing solutions, organizing the process and resources, managing value conflicts, and implementing the solution”, which addresses the value co-creation process more from the perspective of the customer and the provider (meso) level (Aarikka-Stenroos & Jaakkola, 2012, p. 15). The authors indicated that the value co-creation process is constituted by many different processes and called for further research to investigate the differently perceived roles in different value co-creation situations to derive value-in-use either from the customer or provider perspectives. However, the work focuses on the meso-level and does not reflect the individual differences and perspective of the service recipients (as above, for example, the disposition of potential resources and how they are accessed and applied).

A different approach to bringing customer practices to the fore came from McColl-Kennedy et al. (2012), who demonstrated how customers (patients in study undertaken) create value for themselves (healthcare) through their own style of activities. The authors framed the activities of the customer beyond the typical dyadic interaction and expanded the customer viewpoint to encapsulate their network perspective of different practice styles to improve their own well-being. Thus, the study predominantly examined the customer perspective. McColl-Kennedy et al. (2012) highlight the need to investigate the extent to which patients feel influenced by the different situational and personal factors during the changing encounters (different places) when engaging in processes of value co-creation to derive their value-in-use.

The examples from the literature broadly frame different value co-creation process perspectives, which are mainly distinguished by the customer, supplier and joint value processes and their interrelation in managing the relationship experience.

Nevertheless, the rather general perspective of S-D logic in considering every actor as a resource integrator has created some concerns in the value co-creation literature, particularly with respect to specifying the value co-creation process. In this regard, Grönroos and Voima (2013) refer to service marketing literature and indicate the different but often synonymous use of the terms value, value creation and value co-creation. Additionally, one of the main controversial debates in the value co-creation literature is principally linked to S-D logic Axiom 3, that "all social and economic actors are resource integrators" (Vargo & Lusch, 2016, p.8). Grönroos and Voima (2013, p. 137) highlight that by applying this perspective, "When viewing value creation as an all-encompassing process, co-creation becomes a metaphor – everything is co-creation, everybody co-creates – that does not allow for further analytical developments". Instead, Grönroos (2008) promotes focusing on the customer–provider relationship and, therefore, suggests three perspectives (firm, co-creation, and customer logic) in which value co-creation can be approached and investigated.

Additionally, in contrast to the position expounded in S-D logic, Grönroos and Voima (2013) limit value co-creation to the direct interaction between the supplier and the customer and argue that customers independently create value in their (customer) processes and that the firm can only act as a value facilitator if no direct interaction occurs (see value co-creation, section 2.2). This approach implies that other actors (e.g. service provider) are not needed to create value in the customer process, whereas S-D logic is less specific about the actors predefined roles and who is value (co-)creating and participating in service-for-service exchange.

S-D logic describes actors as entities (constellation of the beneficiary, operant resources and goods) and does not limit the form (direct) of interaction to determine the perceived value

of the beneficiary (customer). As highlighted by Helkkula et al. (2012, p. 61), S-D logic proposing considering "value in the experience to be the value that is directly or indirectly experienced by service customers within their phenomenological lifeworld contexts".

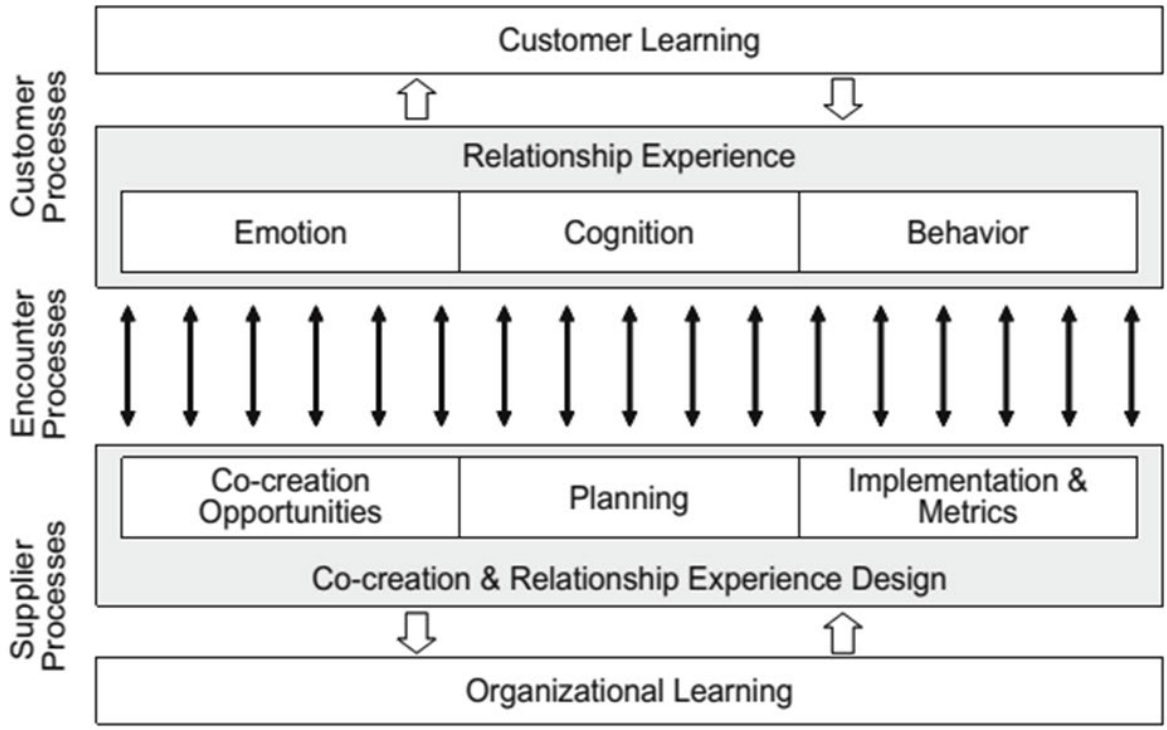
In this sense, the perspective of Grönroos and Voima (2013) seems incommensurate with the nature of S-D logic. Whereas Vargo and Lusch (2016) prefer to describe a rather generic actor-resource integrator constellation, S-D logic provides more theoretical space and invites more empirical research. As this study focuses on the subjective experience of the service recipient, indirect interactions are also important when investigating the perceived remote services of the recipients at their workplace. Therefore, this research is aligned with S-D logic as the phenomenological approach to investigate the value co-creation processes from the perspective of the service recipient.

To frame the different value co-creation processes in the B-to-B context of this study, however, this work distinguishes the provider (firm), co-creation and customer value co-creation processes (Ciasullo et al., 2021; Corsaro & Anzivino, 2021; Durugbo & Pawar, 2014; Füller et al., 2011; Payne et al., 2008). This is in accordance with the work from Corsaro and Anzivino (2021), Gonçalves et al. (2019) and Gummerus (2011, 2013) on value (co-)creation, which seeks to investigate the actors' activities within the different processes. Gummerus (2011, p. 19) describes the value co-creation processes (firm and customer co-creation) as longitudinal, in which the value outcome can be determined (as a snapshot) based on the experiences from the processes. This perspective on the value co-creation process as experiences over time is important as it implies the potential adaptiveness of the actors' (service recipients) sensemaking practice (customer value co-creation process) to derive value-in-use (or not) from value co-creation interactions and influence their relationship with others.

This perspective on investigating the customer value processes was also shared by Payne et al. (2008), who developed a value co-creation framework to support organizations in managing value co-creation processes by equally incorporating the view from the customer and supplier. The perspective consists of three main process components, which relate to activities in business relationships: (1) The customer value creation processes are "the processes, resources and practices which customers use to manage their activities"; (2) The supplier value creation processes are "the processes' resources and practices which the supplier uses to manage its business and its relationships with customers and other relevant stakeholders"; and (3) The encounter processes are "the processes and practices of interaction and exchange that take place within customer and supplier relationships and which need to be managed in order to develop successful co-creation opportunities" (Payne et al., 2008, p. 85).

In accord with S-D logic, Payne et al. (2008) emphasize starting with an understanding of the customer processes and, therefore, considering the customer situation and task, which can be assisted by the supplier to co-create value. This perspective contrasts with traditional industry business models, which usually follow an inside-out approach (Payne et al., 2008; Prahalad & Ramaswamy, 2000; Vargo & Lusch, 2004).

Figure 3: *A conceptual framework for managing value co-creation*



Note. Reprinted from "Managing the co-creation of value", by A. F. Payne, K. Storbacka & P, Frow, 2008, *Journal of the academy of marketing science, 36*(1), p. 86. Copyright 2007 by the Academy of Marketing Science.

By starting with the customers' value co-creation processes, the outside-in perspective consequently supports the importance of the customer role, e.g. for service recipients to actualize their value-in-use through the experiences contained within value co-creation processes. More specifically, the service recipient decides to enact (or not) potential resources by applying their knowledge and skills, and, therefore, the service recipient is considered a key contributor to the service encounter processes. This view is important for this research as the perspective from the service recipient is taken to understand the relationship experiences through value co-creation interaction with the service supplier. In contrast to Grönroos (2006), Payne et al. (2008) support the perspective, from S-D logic, that at least two actors are required in an interaction to (co-)create value, and they thus highlight that the encounter processes involve both parties. The authors provide three

encounter types that distinguish the joint practices between customer and supplier. The 'communication encounter' seeks to enable and improve communication channels and activities, the 'usage encounter' addresses customer practices that are supposed to enhance the use of a service (e.g. internet banking) and the 'service encounter' typically involves personal interaction between the customer and the supplier. This research investigates whether the human-to-human interactions are central, and the encounter will therefore be specified as a 'service encounter'.

The framework from Payne et al. (2008) is comprehensive in facilitating value co-creation research from different perspectives; this research sheds light on the perspective of the service recipient and their experiences to derive value-in-use through their interactions within the service encounter with the service provider. Subsequently, the service encounter process and the customer processes are predominantly examined to understand the sensemaking behaviour of the service recipient when interacting via remote service technology with the service provider.

Firstly, the customer value co-creation process is explored in addition to how the individual service recipient variety of capacity (disposition) and (different) practices potentially influence their contextual environment is considered. Payne et al. (2008) approached the customer value co-creation process through an experiential standpoint (similar to that discussed in section 2.3, value-in-use) and defined relationship experience as an outcome of the customers' contextual perceived emotional cognition and behavioural experiences. From the viewpoint of the customer, the three elements (emotional, cognition and behavioural) are context dependent and result in individual relationship experiences when consuming a service to pursue a task (Payne et al., 2008).

Such a multidimensional perspective of experiences has been widely accepted and demonstrated among value co-creation researchers to investigate, for example, actor engagement (Alexander et al., 2017; Brodie et al., 2019), actors' disposition and activities (Storbacka et al., 2016), collectively shared dispositions of actors (Kleinaltenkamp et al., 2019; Wilson, 2019); B-to-B partner collaborations (Vivek et al., 2015) or actors' brand relationship (Hollebeek, 2011).

However, relatively little is known of the emotional component of experiences, as feelings and fun are rarely investigated in the B-to-B-environment (section 2.3) (Corsaro & Anzivino, 2021; Gonçalves et al., 2019). However, Gummerus (2011) has highlighted that the use of technologies in the B-to-C context arouses emotional experiences, even when working on less complicated tasks and they are, therefore, an important aspect in shaping mutual value propositions with the customer.

In addition, research in social science offers a relatively rich and large volume of studies on emotional experiences from social interaction. As an example, some studies on emotional experiences have been undertaken in the context of worry and anxiety in waiting time (Rankin et al., 2019), anticipated time pressure (Leroy & Glomb, 2018), individual polychronicity in tasks (Slocombe & Bluedorn, 1999), synchrony preferences in adapting in social interactions (Leroy et al., 2015), the role of psychological distance in value creation (Holmquist et al., 2015) alongside social presence (Hollebeck et al., 2021) and empathy (Dijike et al., 2020).The literature reveals the variety of potential emotional experiences on the micro-level and unfolds further areas for this research to investigate the context in which the individual service recipient might feel emotionally influenced when deriving value from a remote service interaction with the supplier.

Payne et al. (2008, p. 87) broadly defined emotion as “feelings, moods and affect-based personality characteristics”. The emotional experiences of the service recipients from the process of value co-creation are an important contextual aspect that helps gain further insights into recipients’ attitudes and preferences and shape expectations (Salomonson, 2012).

In addition, Payne et al. (2008, p. 87) suggest approaching the cognition component in two ways, based on the perspective provided by Holbrook and Hirschman (1982). Firstly, in the sense of information processing that “focuses on memory-based activities and on processes that are more sub-conscious and private in nature”; for example, the organizational literature provides insights into the extent of temporal reflexivity to which actors re-evaluate the temporal process models in their organizations, which are performed in their daily practices (Orlikowski & Yates, 2002; Reinecke & Ansari, 2015). Orlikowski and Yates (2002) found that actors in organizations are shaping and maintaining various temporal structures in their environment to coordinate their and others’ activities.

Thus, organizational processes provide temporal structures; it is important to understand how individuals think about time in relation to past, present and future events within such structures. The literature in social science and organization management provides some studies derived from individual cognitive experiences concerning individual ‘temporal frames’ (Shipp et al., 2009) or ‘time perception’ (Przepiorka, 2016), which led to an individual temporal disposition of time (Tang et al., 2020). The different temporal dispositions and how time is perceived on the micro-level play an import role in the situational context of this work. The service recipient practice might be differently performed when interacting with the provider and how they influence their working environment to exchange service for service and access resources to enact (or not).

However, individual disposition is not necessarily limited to time but is used as an example of how the individual actor's capacity varies and is shaped by previously achieved outcomes in relation to different cognitive experiences. Therefore, actors with different temporal dispositions may work on comparable processes at different locations but generate the same outcome. Vice versa, when actors with a relatively similar temporal disposition execute a similar process, it may result in a different outcome. Individual dispositions are manifold, e.g. perceived spatial proximity (Van Boven et al., 2010) or self-efficacy (Bandura, 1997), but are interrelated with the contextual aspects as seen from the actor's (service recipient's) perspective.

This position accords with that expounded by Aarikka-Stenroos and Jaakkola (2012) to investigate the different situations (e.g. joint problem-solving) and tasks which are highly relevant for the actors in the customers' value co-creation process. This approach is important as the service provider offers multiple opportunities for the service recipient to participate in joint remote interactions, which advances the understanding of why actors behave as they do in response to certain situations and tasks.

Payne et al. (2008) framed the third element of relationship experience as behaviour, which is described as the action from experiences and action which results in experiences. The authors highlight that behaviour should be approached in a broader sense than purchasing decision-making processes and instead seek to reveal the experiences of the actors from consuming the product or service. This is in line Gonçalves et al.'s (2019) approach, discussed earlier, that seeks to bring the perspective and interaction of the individual actor in the B-to-B environment to the fore by investigating how actors represent their companies' B-to-B relationships through their interactions and how the individual actor is influenced by the "social rules, norms, procedures, values, and beliefs of the ecosystem

where they are embedded" (p. 181). However, by exploring the customer's value co-creation process and the service recipient's behaviour through their business interactions, it is also crucial to be able to make sense of the relational context. In other words, when examining the service recipient experience, a certain preunderstanding of the customer's contextual environment is also relevant to studying the service recipient perspective.

Payne et al. (2008, pp. 86–90) defined the customer's value creation process "as a series of activities performed by the customer" and the encounter process "as a series of two-way interactions", which indicates discrete temporal episodes. However, the framework leaves space to interpret how the series of activities and interactions might be delimited from one discrete episode to another. In terms of relational experiences, this is an important aspect as actors might adapt their behaviour for certain events or tasks based on their previous experiences and potentially other factors, such as the nature of the temporal episodes.

As highlighted by Dawson and Sykes (2019, p. 102), actors might make sense in terms of retrospective experiences to adapt their behaviour by recalling knowledge that has happened before and also by making sense of experiences in a prospective manner. The authors refer to actors in unresolved events (during the process of consumption) and their 'antenarratives', which requires interpretation of future possibilities and, therefore, making sense prospectively of the (possible) experience. In a similar sense, Stauss (1993) stated the following:

> Actions are characterized by temporality, for they constitute courses of action of varying duration. Various actors' interpretations of the temporal aspects of an action may differ, according to the actors' respective perspectives; these interpretations may also change as the action proceeds. (p. 32)

Subsequently, when investigating the service encounter process, the series of interactions might cause different actors to behave differently and potentially have different experiences for discrete episodes. However, whilst a growing body of value co-creation literature has investigated the actors' value co-creation behaviour in different environments, it still lacks clarity in defining and framing different concepts of customers' behaviour in service interactions.

Dong and Sivakumar (2017) highlight their concern over the different terminology used for customers' involvement in service interactions and primarily address two different constructs, namely 'customer participation' and 'customer engagement'. The authors contribute with improved classifications and a definition of 'customer participation behaviour' (mandatory, replaceable, and voluntary) for service interactions. This is in line with the B-to-B marketing literature, as individual actors (customers) perform different roles to enact a task, which can be voluntary but cannot be performed by the provider. For example, the provider company offers the customer (service recipient) the opportunity to participate in the remote problem-solving situation. The service provider needs the permission of the customer, and the recipient decides whether they participate (or not). This study applies the term 'customer participation' for the research in a B-to-B-context to describe the service recipient behaviour in value co-creation interaction with the service provider. There is a large volume of published studies that uses the term 'customer participation' in the domain of service marketing and also specifically in the value co-creation literature (Aarikka-Stenroos & Jaakkola, 2012; Halinen & Kaartemo, 2016; Lovelock & Young, 1979; Mustak, 2019; Mustak et al., 2013; Yi et al., 2011).

As highlighted by Mustak et al. (2013), customer participation has been studied for many years, and around the late 1970s, a small number of studies first addressed that customers'

behaviours can be utilized to change service provision and potentially contribute to productivity. Over the past decades, this view has changed, and customer participation has been researched from different perspective to determine the value outcome for sellers with respect to faster service recovery (Dong et al., 2008a; Xu et al., 2014), brand image (Bogazzi & Dholakia, 2006) and price sensitivity (An et al., 2004), and for customers with respect to fun and enjoyable self-service (Bagozzi & Dabholkar, 2002), value of time and place (Heinonen, 2004) and customer and supplier value outcome as value perception over time (Mustak, 2019), value in-use in joint problem-solving situations (Aarikka-Stenroos & Jaakkola, 2012) or enabled technology value co-creation practices (Breidbach & Maglio, 2016; Wells et al., 2015; Yi & Gong, 2013).

However, the degree to which customers participating in value co-creation service encounters process this is difficult to evaluate (Breidbach & Maglio, 2016; Helkkula et al., 2012). Wells et al. (2015) analysed the behaviour of customers in value co-creation situations when consuming educational training from the service provider. The authors developed a framework to address the variety of customers' behaviour and their degree of participation (low, medium, and high) in value co-creation situations. The authors referred to the framework from Yi et al. (2011) to discuss the presence of different behavioural elements (e.g. information seeking, information sharing, feedback, etc.) of the customers' participation interactions during the service encounter process. Other authors use similar approaches to assess whether customer participation is constituted through different elements of behaviour and varies in its degree of participation when consuming a service or a product (Aarikka-Stenroos & Jaakkola, 2012; Breidbach & Maglio, 2016).

According to Payne et al. (2008), behaviour is an important aspect in the customer process perspective that contributes to the overall relationship experience. Nevertheless, only after

a customer has evaluated (cognitive and emotional) potential set activities (their own and others), which are important to them in a certain situation, do they enact the application of their resources to actualize value-in-use.

Overall, Payne et al. (2008) framed the customers' resultant experiences into a process of continuous learning to adapt or maintain their behaviour for future events and derive their intended type of value through a certain activity. However, how this process of learning, as part of the customer processes, is practically performed remains essentially conceptual but seems also to be interrelated to the encounter processes. Whereas Payne et al. (2008) referred to interactive processes and a mutual learning between the customer and the supplier, the interaction itself requires further attention. The work of Ballantyne and Varey (2006, p. 335) addresses the importance of interactions and that knowledge, especially tacit knowledge as operant resource, is created through joint activities between customers and the supplier. However, Ballantyne and Varey (2006) emphasize the importance of an "open dialogue" between the actors to generate knowledge through experiences, which increases the level of knowledge capacity for the individual over time. Consequently, the customer learning activity is sourced through the interaction with the supplier during the encounter and depends on the individual's openness to acting on it.

Komulainen (2014) described learning as "...an essential aspect required from the customer in the course of value co-creation to perceive value in new technological B2B services" (p. 248). That study investigated the role of learning in B-to-B value co-creation service and highlights the importance of learning to understand customer motivation to use the service provider's offered service. By applying S-D logic in this research, learning is achieved through the acquisition of new knowledge and skills (competences) and potentially contributes to improve the value co-creation process (Vargo & Lusch, 2016). Thus, learning

new problem-solving abilities might offer additional opportunities for the service recipient to successfully achieve individual- and organizational goals and engage in a more meaningful dialogue with the service provider. Therefore, recognizing aspects of the service recipient's learning in the customer process of value co-creation is important to better understand why it seems relevant for them to participate in remote interaction with the provider, or not. However, the framework from Payne et al. (2008) provides less information about the series of interactions between the actors and therefore also offers limited information on how customers turn interaction experiences into their process of learning. Hence, the authors call for empirical data to investigate the individual perspectives and contribute to investigating the customer and supplier value co-creation processes. From the supplier standpoint, customer learning is highly relevant as this perspective also includes a deeper understanding of the customer perceived processes of value co-creation. Therefore, the supplier requires information about the customer's tasks, perceived and applied resources and derived value outcomes when designing or improving service exchange activities during the service encounter. Consequently, the interaction and form of interaction are important aspects that need to be further addressed in the research context (see section 2.5).
From the supplier standpoint, customer learning is highly relevant as this perspective also includes a deeper understanding of the customer-perceived processes of value co-creation. When service recipient individuals acquire additional knowledge and skills in remote service situations, they potentially increase the opportunity to influence the value co-creation process and may encourage the service provider to design further remote service offerings. For the service provider, remote service is an important source of productivity gains and an inherent aspect in transitioning from physical to non-physical value propositions.

To conclude, the framework of Payne et al. (2008) provides the necessary aspects to frame the investigation of the process of customer value co-creation through the service encounter with the service provider from the perspective of the service recipient. Firstly, the perspective from which value co-creation is investigated was made evident by bringing the service recipient, as the consumer of the remote service interaction with the service supplier, to the fore. Secondly, the actor-to-actor (micro-level) and the service encounter in the B-to-B environment are reflected in the framework. Thirdly, the multidimensional view of subjective experiences (emotional, cognition and behavioural) to investigate the customer process of value co-creation underpins the experiential approach to this study.
This section has provided an overview of the current literature on value co-creation processes and has specifically drawn on the perspective of S-D logic to investigate the customer process of value co-creation and the service-for-service exchange during the encounter with the supplier. The work has presented different studies and concepts to instigate value co-creation processes and concluded by applying the framework from Payne et al. (2008) to investigate the process of customer value co-creation from the perspective of the service recipient.
Overall, to pursue the research objective, the provided theoretical framework requires a more detailed description of the individual service recipients in a technology-enabled service as well additional attention to the individual interaction between the service recipients and the service provider staff. Therefore, the next section begins to shed some light on the situational environment and summarizes the contextual aspects of this research.

2.5 Research in Context

Sections 3 and 4 discussed the extant literature and provided the theoretical aspects to frame the described value outcomes and value co-creation process(es) in a B-to-B context. As also emphasized by Payne et al. (2008), the applied individual perspective needs further contextual details of the interaction on the micro-level. This research investigates the perceived value outcome and value co-creation process by means of remote service in the context of B-to-B (service exchange) from the perspective of the radiographer. However, before the focal actor (service recipient) is introduced, the work begins to discuss the situational context on the meso-level (market and service ecosystem). Vargo et al. (2023, p. 14) highlight the dependency of actor-specific aspects on the meso-level and recommend the perspective as a starting point for analysing enduring changes through value co-creation.

Situational Context

This research is situated in the healthcare market environment and remote service exchange between healthcare providers, (e.g. hospitals, universities or imaging centres) and a manufacturer and service provider company (hereafter also called a service provider, supplier or manufacturer). The manufacturer is a traditional medical device manufacturer with roots back to the first X-ray system invented by Wilhelm Röntgen in 1885. Currently, the company is one of the major actors in the medical device imaging system market, to which it has strongly contributed through the development of various new medical imaging processes and devices. In addition to the manufacturing of medical devices, the company provides service support through a team of field service engineers to improve or maintain the functionality of their devices. Over the last decades, the company also

started to utilize remote service connections to predominantly provide medical device-related service. The key principle of remote services is based on a combination of hardware- and software-related data from sensors in the medical devices that transmit automatically, or on demand, via broadband-based communication systems to offer further system diagnostics.

Remote service has thus become a key technology used by service providers to engage with the radiographer to co-create value during joint remote processes. The remote connection provides immediate support for the users of the medical devices (radiographers) and is one of the most important provider-recipient communication tools. It also reinforces service provider and service recipient employee interactions. The new remote service offering has been significantly increased, mainly through IT developments (e.g. mobile internet connectivity, virtual private networks). The use of a remote service initially also negates the need for onsite field service engineer intervention, but once initiated the remote service interaction might lead to an onsite service to finally resolve the problem.

The service provider additionally offers remote service as a value creation opportunity facilitated by technology-mediated services to co-create more value for the customer and themselves. From the manufacturer perspective, remote service provides productivity gains, potentially limits other service provider activities, and offers business growth opportunities for developing new value propositions with customers.

Whilst remote service offers various opportunities to co-create value, the service is usually offered and bundled in service contracts, which predominantly refer to cost categories for the customer. These service contracts support customers in the minimization of their risks in terms of system availability and service recovery, or they fulfil industry logics, such as radiation and safety regulations. However, the relatively recently introduced business

models (Smith, 2013, p. 2), such as ‘power by the hour’, that seek to reshape manufacturers’ business strategies and to platform outcome-based service contracts is noticed but not applied in this research, as the service provider company predominantly strives for fixed-fee full protection service contracts (Chan et al., 2019).

Instead, this research firstly takes an approach to better understand radiographers’ (recipients of the service) derived value outcome and process from remote service interactions by selecting a more common situational context between the healthcare provider and the manufacturer rather than focusing on new business models. However, in the literature in the domain of remote service, it is unclear how the different remote services contribute to competition and generate revenue as a new type of service delivery; therefore, it is relevant to firstly determine the value-in-use of remote service from the perspective of the radiographers in their environment (Brax & Jonsson, 2009; Grubic, 2014; Paluch & Blut, 2013).

Radiographers are well-educated and trained professionals working in healthcare organizations, who undertake medical imaging examinations to assist doctors in diagnosing diseases or injuries. Their profession is “driven by social factors and a rapidly changing technological environment” (Decker, 2006, p. 159). Radiographers coordinate and safeguard the patient examination process to accomplish the best quality patient images for further diagnosis or treatment. These tasks require physiological and anatomical knowledge, and those engaging in them are highly responsible as safety hazards (e.g. radiation and electromagnetic field exposure) in the examination process, which could potentially harm patients or themselves (Chistiaans-Dinglhoff et al., 2011; Waaler & Hofmann, 2010; Wallin et al., 2019). The examinations are governed by strict regulations (atomic law, medical product law, radiation, and data protection law, etc.) and focus on the patient’s integrity.

Furthermore, radiographers require adequate communication skills to exhibit empathy for patients' inquiries and accompany the patients through the examination. Some studies have shown patients' pre-examination distress and anxiety during examination, for example during MRIs (Bangard et al., 2007) or among claustrophobic patients (Munn et al., 2022). Due to the nature of the image acquisition process, patients are requested to remain motionless during the examination as movements potentially jeopardize the image quality outcome. Therefore, the interactions (preparing the patient for the examination and reassuring them to offer comfort) between the radiographer and the patient are a very important aspect of the radiographer's daily operations. Consequently, the radiographer's daily activities can be described as demanding and responsible tasks. However, medical device developments that offer new image acquisition methods and IT requirements continuously impact the enactment of the radiographers' profession in their environment – and in particular their interactions with other healthcare professionals and patients. Additionally, the time required to examine patients has gradually been reduced due to various technological enhancements. In accordance with the reduced examination time, the numbers of patients have increased and subsequently this has led to less time between examinations to prepare for image acquisition or enable patient image post-process management. The increasing volume of examinations and increased range of procedures has risen by 15% per annum in relation to requests for magnetic resonance and computed tomography examinations (Verrier & Harvey, 2010, pp. 116–117).

These changes to the daily work of radiographers can be also associated with technological developments: "The context in which products and services are designed, produced, and consumed is changing at a frenetic pace" (Larivière et al., 2017, p. 1). A number of studies has revealed the challenging and stressful factors related to radiographers' work within the

contemporary healthcare environment (Brown, 2004; Caruana, 2005; Ng et al., 2009; Verrier & Harvey, 2010). Several studies have investigated radiographers' workplace factors in relation to burnout and emotional exhaustion (Alakhras et al., 2022; Knapp et al., 2022), increased workload (Thom, 2018), work-related stress, compassion fatigue and reduced patient relationships (Robertson et al., 2022). As the number of patients per day has continuously increased, so has the effort to coordinate, schedule and execute the patient workflow; time, therefore, plays a major role in the radiographer's workplace. Patients perceived waiting time and potential changes in the patient schedule could especially lead to tense and even violent situations in the workplace (Caruana, 2005; Ng et al., 2009). Unexpected malfunction (events) of the medical device aggravates the already time-pressured workflow and extends patient examination waiting times.

Immediate support from the service provider through remote service technology is a common opportunity to alleviate and resolve the situation. However, to solve the inquiry remotely, the radiographer needs to apply their knowledge and skills (operant resources) to jointly interact with the service supplier (operand resources). Radiographers are required to provide the requisite information relevant to troubleshooting or improving image application and processing by sharing deeper knowledge of their daily processes. Nevertheless, some events remain critical, for instance, in the context of the research and the role of the radiographer, situations where unexpected incidents (system- or software-related) appear during patient examinations. These situations interrupt the radiographer's workflow and could cause harm to patients. Based on the decision of the radiographer to manage the incident (mainly in terms of timing), the service provider will be contacted for support. As remote service interactions may intervene in patient examinations by changing

patient protocols or resolving system functionality, all service provider activities need to be documented by law.

Therefore, remote service performance is highly related to a specific medical device, and interactions between a company's service employees and its customers follow a formal, prescribed script. These initial activities selected by the radiographer, which address how and when service is exchanged, are relevant to this research as the decisions are highly context dependent and influence the customer's process of value co-creation during the service encounter. However, in their work on value co-creation in a B-to-B environment, Aarikka-Stenroos and Jaakkola (2012, p. 17) specified the service encounter process and conceptualized the interaction as a joint problem-solving process, where "suppliers apply their specialized professional skills, methods and judgment, while customers contribute resources such as knowledge, in order to create optimal value-in-use". Whilst this description aligns with the position adopted in this research, the perspective of the service recipient is particularly salient, and it therefore remains within the radiographer's judgement as to what extent they participate (or do not) during the joint problem-solving process.

Firstly, the radiographer decides how to solve the problem – either by following the prescribed service provider processes and joining the remote service interactions, or they may rather insist on onsite service support by a service engineer. Secondly, if there is a decision to participate in the remote service interaction with the service provider, this will also entail the "transfer of labour to the customer" (Payne et al., 2008, p. 84). While the benefits for the customers are demonstrable, the service provider company is also applying remote services to gain productivity, which is described by other authors as substitutions of customer labour for provider labour (Fitzsimmons, 1985), hence treating customers as

partial employees (Mills & Morris, 1986) or even exploiting the customer (Zwick et al., 2008). Nevertheless, it remains unclear what kind of situation and to which extent the radiographer jointly solves problems via remote service interaction with the service provider. Depending on the joint problem-solving activity, different remote service interactions could improve the workflow of pre- or post-imaging processes for patient examinations as service provider employees can connect to the medical device and retrieve error codes, run software diagnostics, and actively control the functionalities of the system. Therefore, the radiographer is entitled to initialize the service encounter process either by reacting to service inquiries (e.g. a system malfunction) or proactively reaching out (e.g. image processing) to the service provider.

Contextual Summary

Overall, when drawing on the applied S-D logic and contextual aspects, the research is situated on the micro-level between recipients of the remote service and the service provider company in a B-to-B healthcare context. The focal perspective of this work is on the experiences of the service recipient (radiographer), who receives the remote service supplied by the provider, and it follows the call from Gonçalves et al. (2019) to investigate the individual actor and their interactions in their embedded working environment. To help the exploration of the lived experiences of the radiographer, Chandler and Vargo (2011, p. 18) highlight the context and perspective from which value is co-created and express that it needs to be understood from "within the actor's direct context".

To frame the theoretical context, the extended literature on value (co-)creation has drawn on S-D logic, resulting in an in-depth review of the nature of value, value determination and value co-creation process(es). Firstly, to contextualize the perceived value outcome by the service recipient, the work discussed the value-in-use concept by following an experiential

approach and selected the concept of consumer value (Holbrook, 1994, 1999, 2006). Through the service recipient-accessed dispositions and applied operant resources (knowledge and skills), value-in-use was co-created when the remote service is consumed in joint problem-solving interactions with the service provider. Secondly, the value co-creation processes were distinguished and contextualized by the framework of Payne et al. (2008). To capture the activities of the service recipients at their workplace, the customer value co-creation processes and service encounters from this framework (Payne et al., 2008) were selected to investigate the recipients' experiences.

As discussed in the literature, S-D logic provided a broad theoretical context, namely the temporally and spatially related context, to explore the recipients' (value outcome and value co-creation process) experiences in the B-to-B environment, and relatively little theoretical context to investigate the recipient's perceived interactions with the provider. According to the S-D logic narrative, actors (entities) integrate resources in service-for-service exchange to derive value, including the beneficiary (Vargo & Lusch, 2016). However, the actors' interactions are context-specific and therefore relevant for this research.

For this research, the radiographers assessed their resources (or not) and initiated their process of value co-creation in service-for-service exchange during the remote service encounter. Value was co-created when the offered remote service was used by the service recipient to resolve their inquiry.

Each service event was situated within regulatory frameworks, professional norms and personal beliefs that colour the interrelations with and consequences for other actors (e.g. patients), which influence the individual radiographer's participation behaviour during a remote service interaction. These environmental aspects also impact the service recipients' process of value co-creation and influence what type of value might be derived (or not)

when using a remote service. However, due to the nature of mediated technology-enabled interaction, the service encounter between the service recipient and the remote service engineer is fundamentally different when compared with onsite support by a field service engineer.

To shed light on the B-to-B remote interaction, this work seeks a deeper understanding of the temporal and spatial aspects in relation to the perceived value outcomes and customer process of value co-creation from the perspective of the service recipients. The applied framework from Payne et al. (2008, pp. 86–90) addresses interaction on the micro-level as the "series of activities and two-way interactions" within the customer and service encounter processes. Consequently, the framework (Payne et al., 2008) remains flexible enough to define various interactions in different business co-creation contexts without predefined boundaries for the actors (see section 2.4).

However, to capture the remote joint problem-solving interaction on the micro-level, studies on value co-creation provide further literature to frame the interaction between actors (Breidbach & Maglio, 2016; Paschen et al., 2021). As Füller (2010) has argued, "any interaction, including value co-creation, can be understood by investigating the actor(s) (i.e., who?), the activities (i.e., how?) and the resource(s) (i.e., what?) of the interaction" (as cited in Paschen et al., 2021, p. 3). This approach resonates with an attempt to describe the interactions of the actors and facilitates locating the interaction of this research context (Andersen et al., 2020). Nevertheless, the temporal and spatial aspects on the microlevel, in particular the individual perspective of how the recipient perceives the interactions, has still not been addressed (Corsaro & Anzivino, 2021; Törnroos et al., 2017).

This research needs to consider the variety of individual service recipients' dispositions and how they represent the firm through their interaction when seeking to understand their

embeddedness in their workplace (Gonçalves et al., 2019). In other words, the experienced interactions are highly subjective, and temporal elements, such as tempo and timing, or spatial elements, such as proximity or connection, are important aspects when investigating the service recipient's perceived working environment. Through following the structure of this work, the contextual elements are expanded in the events that connect the service recipients with the service provider (Pettigrew, 1992). These events are important as they support capturing the process of customer value co-creation and emphasize the perceived perspective of the recipients (Elliott, 2005).

Nevertheless, how these events influence the service recipient in the value co-creation process when deriving value requires an (pre-)understanding of the sensemaking behaviour of the recipient on the part of the researcher as well (Alvesson & Sandberg, 2022; Gonçalves et al., 2019). Alvesson and Sandberg (2022, p. 396–397) highlight pre-understanding as "a necessary condition for knowledge development" and emphasize positive input when investigating "experiences and cultural reference points". For this work, the B-to-B working environment of the radiographer and service events are salient when investigating the perceived joint remote interactions in order to advance the understanding of the service recipient. As the value co-creation literature has demonstrated, almost no studies on the B-to-B environment reflect the individual actor's perspective, which might also be related to the necessary conditions (e.g. practical understanding of the working environment) to reflect the variety in an actor's account of their 'lifeworld' (Alvesson & Sandberg, 2022; Gonçalves et al., 2019; Kohtamäki & Rajala, 2016).

2.6 Research Aim and Questions

The overall aim is to better understand how value is co-created via remote service and how it is perceived by the service recipient in a B-to-B context at their workplace. Therefore, the intent is to generate insights into the customer process of value co-creation and determine value-in-use in the domain of B-to-B remote service from the service recipient's perspective, which is rarely considered in the B-to-B literature (Aarikka-Stenroos & Jaakkola, 2012; Corsaro & Anzivino, 2021; Gonçalves et al., 2019; Kohtamäki & Rajala, 2016; Storbacka, 2019). The previous sections have reviewed the current literature on the value (co-)creation outcome and processes and have introduced the theory applied in this research. Drawing on S-D logic, the individual perspective of the service recipients in B-to-B remote service encounters was conceptualized through the concepts of value-in-use and the process of value co-creation. Firstly, this perspective follows an idiosyncratic view of perceived value, which is experientially approached by Holbrook's (1999, 2006) multidimensional framework of consumer value types as a tool to determine the value outcome experiences of the service recipient. Therefore, the first research question addressed is as follows:

> Research question 1: What types of value are perceived from the remote service for the service recipient during value co-creation?

Secondly, the framework of Payne et al. (2008) was presented and introduced to contextualize the customer process of value co-creation in this research, to investigate how service recipients co-create value via remote service technology with the provider. The framework provides the necessary contextual elements to investigate resource integration and service exchange between the service recipient and the service provider in this B-to-B environment. Specifically, the service encounter and customer processes were identified as the context used to examine the process of value co-creation from the recipients' perspective. From this viewpoint, the customer relationship experience is multidimensional

(emotional, cognition and behavioural experiences), experiential and context dependent. Thus, the framework broadly provides the temporal (value-in-use), spatial (service encounter process) and relational (customer process of value co-creation) context in the B-to-B environment. Therefore, the second research question is the following:

> Research question 2: How does the customer process of value co-creation influence the service-recipient-derived value when using a remote service?

3 Methodology

This chapter is dedicated to research methodology. I first discuss the chosen research approach. Then describe the research procedures, explaining the reasons for the selected method and data analysis. I close the chapter by considering issues surrounding the influence of a researcher's perspective (myself) on the research and its ethical considerations.

3.1 Research Approach

Up to this point, research has mostly been located at the juncture of the theoretical and situational context (spatial, temporal, relational) aspects between the unit of analysis (service recipient) in their environment and the space of interaction (remote service with the service provider). However, in the present study I also followed an experiential approach to gain a deeper understanding of service recipients' perceived experiences in the context of their remote service interactions with a service provider. I did this by interpreting the lived experiences from the perspective of the radiographers at their workplace (Alvesson & Sandberg, 2022; Creswell, 2013; Graebner et al., 2012; Guba & Lincoln, 1994). Lived experience is, according to Chandler and Vargo (2011), "an actor's unique individual perspective" and needs to be understood from "within the actor's direct context" (p. 45). This approach enables the exploration of the "subjective representations of these services" Flick (2019, p. 70) in the B-to-B health care environment, in particular in relation to remote service provided by radiographers.

Qualitative researchers are interested in "developing an understanding of the meaning and experience dimensions of humans' lives and social worlds" (Fossey et al., 2002, p. 717). To understand social phenomena in a comprehensive manner, the researcher's perspective needs to be considered. In addition, Alvesson and Sandberg (2022, p. 396) emphasized making more use of the (qualitative) researcher's pre-understanding when studying the phenomena, and they highlighted this approach as an enrichment for many studies, in particular in areas of "participation in society and organizations". It is important to define what a certain phenomenon means to the researcher and to be aware of how to act during the research process (Guba & Lincoln, 1994). These views guide our thinking, our beliefs and our assumptions about society and ourselves, and they map out how we see the world around us, which is what social scientists call a paradigm (Schwandt, 2000).

This is also sometimes referred to as *research philosophy*, and concerns how to constitute knowledge and the nature of that knowledge. These assumptions underpin the research strategy and the selected methods within that strategy. The two main philosophical dimensions to differentiate research paradigms are ontology and epistemology (Laughlin 1995; Manson, 2017). *Ontology* relates to questions of whether, if an objective reality exists, it can be defined as science of being (Burrell & Morgan, 1979). It also incorporates the approach to social inquiries research (e.g. service research) and attempts to investigate the nature of social reality and the type of reality that exists (Tronvoll et al., 2011). Description of research philosophy primarily covers a position taken on the nature of reality by adopting a dichotomous (objective vs. subjective) view. *Epistemology* refers to the questions of how we understand the world and how we communicate this knowledge to others (Burrell & Morgan, 1979). The two ends of this continuum are derived from the ontological positions used and often described as *positivism* and *constructivism*.

The constructivist paradigm is also called the “naturalistic, hermeneutic, or interpretive paradigm (with slight shadings in meaning)” (Guba & Lincoln, 1989, p. 83), which hereafter is referred to as the *interpretivist/constructivist approach*. Research can also be conducted from a positivist position, whereby researchers seek to obtain universal law-like results (Neuman 2014). In contrast, interpretivist/constructivist research tends to rely upon the “participants’ views of the situation being studied” and acknowledges “their own background” and experiences to interpret “the meaning others have about the world” (Creswell, 2013, p. 8).

This research seeks to understand “the service recipients’ experience”; the subjective view is embraced to better understand the radiographers’ “world around them” and how they synchronized their remote interaction with the service provider in different situations to resolve their tasks (Cohen & Manion, 2018, p. 20). However, as Kelly (1955, p. 55) noted, “persons differ from each other in their construction of events” and “a person’s construction system varies as he successively construes the replications of events” (Kelly, 1955, p. 72, cited in Winter & Reed, pp. 519–520).

Kelly (1955) also emphasized that individuals make sense of their environment by creating their own ‘personal constructs’, which are highly dependent on the individual’s capacity over time (Mair, 2015, p. 505). However, according to Schutz (1962), the access to an experience is always a selective process because the lived experiences have already been interpreted by participants, who make sense to them. Schutz argued that the process of exploration to gain an understanding of the participants’ lived experiences in their environment needs to be first be approached through the multiple realities of the participants ‘everyday knowledge’ and then through the process of research, which later develops and constructs second-order concepts that can be recognized in science (Schutz,

1962). In this sense, the variety of subjective experiences are captured, and the researchers "collecting, treating and interpretating data" is part of the research process of reaching an understanding of a phenomenon (Flick, 2018, p. 71). Developing such an understanding of the variety of perspectives held by the service recipients from their remote service experiences within their environment requires a research design that uncovers and recognizes various views, practices, and the participation of different actors—including the view and interpretation of the researcher (Alvesson & Sandberg, 2022).

Because this research aims to reflect the meaning of the real-world activities from the study participants' perspective, the worldview of the researcher plays an important role. Creswell (2013) called for a thoughtful and detailed description of the researcher's positionality when pursuing interpretative research. *Positionality* is an individual's worldview and the position the researcher choses to adopt in relation to a specific research task (Foote & Bartell, 2011). This perspective includes the understanding that the researcher is part of the setting, the context, and the social phenomenon that they seek to understand (Schwandt, 2000).

In terms of this study, it is important to note that I, as the researcher, am also employed by the service provider company and entered the research with a preunderstanding of this B-to-B health care environment. The positioning—and the perspective—of myself to the study is more comprehensively expressed in Section 3.7. In Section 3.7.4 I summarize the identified potential bias and opportunities given my dual position in the service provider company, the reporting of my positionality in the next sections considers issues around the participant group, access, power, and data generation and interpretation.

Before those issues are addressed, it is necessary to examine the broader matter of research design, which concerns the planning of the research to answer the research questions (Flick, 2018, p. 98). Furthermore, the planning needs to consider how the research design fits with

the research process. Constructivists do not generally begin with a theory (as positivists do); instead, they 'generate or inductively develop a theory or pattern of meanings' (Creswell, 2013, p. 8). This study followed the interpretivist approach and aimed to gain a better understanding of the relation of value outcomes and the customer's process of value co-creation by interpreting individual perceptions, situations, and experiences from the service recipients and, therefore, had an exploratory research design (Heppner et al., 2008). However, this design reflects an abductive research approach because the empirical data require alignment with the literature and vice versa (Dubois & Gadde, 2002, 2014; Gioia et al., 2014). As Alvesson (2010) highlights, when exploring a complex situation "methodologically, there is interplay between emergent ideas, attentions and inspiration from additional readings and ideas." (p. 196). As my aim as a researcher is to develop my pre-understanding of the research context to generate a more in-depth appreciation, I seek to cycle between the empirical data and the literature (and vice versa) to progressively unpack and interpret the multiple perceived remote service experiences (Alvesson & Sandberg, 2022).

In order to achieve a trustworthy explanation of the findings, I follow an abductive research approach, which includes my reflexivity, and embraces the considering of a variety of different perspectives and potential relationships that might not be immediately obvious in the data (Dubois & Gadde, 2002, 2014; Gioia et al., 2014). In addition, by adapting an abductive research approach, it becomes possible to identify hidden, or less apparent, behavioural aspects that may contribute to exploring the potential emergent patterns in remote service value co-creation. Furthermore, in relation to a pure inductive or deductive approach, the adductive approach offers the opportunity to create new knowledge and refine existing theories through a more sophisticated treatment of the service recipient's

account (Dubois & Gadde 2002). Lastly, as emphasized by Janiszewski et al. (2022), abductive theorizing reconciles idiosyncratic construct relationships in the applied theory. In other words, for this research, the idiosyncratic concept of value co-creation and their relationship of value outcome and process will be reflected through an adductive research process as inference to best explanation and through the perspective of the service recipient.

According to Creswell (2013), closer insights and opinions can be studied through direct interactions with the affected and involved people. The focus is on the sense-making of their reality and how their understanding of this reality influences their behaviour (Creswell, 2013). Therefore, the value co-creation process has been investigated through the perspective of the radiographers and raises data-gathering considerations for this study.

As many medical device malfunctions and operating issues happen unexpectedly, an observation over time does not seems to be appropriate. Waiting until incidents to appear for only one medical device was considered too time consuming. The observation itself also would not clarify how the incident was perceived by the researcher or by the radiographer and vice versa. Therefore, the observation of radiographers during their daily activities was rejected; instead, this study relied on verbal data to explore remote service interactions (Flick, 2018, p. 207).

The gathering of verbal data from focus groups was considered but raised some concerns because the coordination and organizational effort required of the hospitals to organize and host focus group discussions might impact their daily workflow and associated patient outturns. Similarly, seeking to manage staff schedules outside their normal work patterns to assemble focus groups could also be challenging—and in smaller health care contexts there may also be a limited pool of radiographers. In addition, radiographers have different

working experiences, different levels of knowledge of medical devices, and different experience in the use of remote service provision, which might require more in-depth questions that could be difficult to steer in a group discussion (DiCicco-Bloom & Crabtree, 2006).

According to DiCicco-Bloom and Crabtree (2006), semi-structured interviews are a well-established and frequently applied method used in qualitative research and are typically used in a health care context (Gill et al. 2008). The method is also suitable "when participants had a low level of awareness of the subject" or are not used to talking about questions of interest, such as the value they derive from remote service interactions (Åstedt-Kurki & Heikkinen 1994, as citied in Kallio et al., 2016, p. 2959). As the research design is qualitative and had an exploratory design to generate knowledge of the kind of value radiographers perceive when using remote service and how these value co-creation opportunities influence their processes, semi-structured interviews seemed appropriate. This is in part because semi-structured interviews provide flexibility through probing questions, whereas the standardized questions seek to structure the content of the responses for further validation (Flick, 2018, p. 227). Therefore, the semi-structured interview, as a method, was used to generate information from service recipients (radiographers) who are engaging with the remote service value co-creation opportunities offered by the service provider.

To support procedural rigour within the research setting, the design followed a framework adapted from the *critical incident technique* (CIT; Flanagan, 1954). Flanagan introduced the CIT in 1954 and through subsequent developments it has become, and remains, a well-recognized qualitative research method to explore and investigate perceived experiences in specific contexts (Bott & Tourish, 2016; Butterfield et al., 2005; Chell & Pittaway 1998;

Fitzgerald et al., 2008; Woolsey, 1986). Chell (2014, pp. 106–115) emphasized the flexibility of the CIT within an interpretivist approach and highlighted the advantage of capturing relational experiences in their temporal and spatial context to understand the subjects' perspectives.

3.2 Research Procedure

The philosophical underpinnings of the interpretivist view invite the steps of the research procedure to be discussed alongside those of the CIT. Given the flexibility of the CIT procedure, the selection and decisions surrounding the research steps are explained in the following sections.

In the next section, 3.3, I introduce the background of the CIT and its applications and limitations. Secondly, in Section 3.4, I provide a detailed overview of the data generation approach in this study. In Section 3.5 the data analysis approach is detailed. In Section 3.6 I address my reflective account as a researcher. In the fifth section, I address quality issues about the research, and in the last section (3.8) I emphasize the ethical considerations for this study.

3.3 Background of the Critical Incident Technique, Applications, and Limitations

The CIT has its roots in the Aviation Psychology Program of the U.S. Army Air Forces in World War II for selecting and classifying pilot candidates (Flanagan, 1954). John C. Flanagan was one of the psychologists who set up this new programme to establish factual reports that are given by competent observers to determine an objective definition of effective or ineffective behaviour on the part of the applicants. The programme was extended beyond World Warr II and further developed by Flanagan and his students at the University of Pittsburgh. It was not until 1954 that Flanagan published a scholarly article describing the CIT.

When this article was published, positivist tenets, especially in natural science, were predominant, and, therefore, the CIT technique was traditionally used within a positivist view (Butterfield et al., 2005; Collis & Hussey, 2009; Norman et al., 1992). Whereas Flanagan preferred experts to create data by observation, he also spent time considering how to generate data from the participants to support the accuracy of recalled incidents. Therefore, the CIT is not limited to expert observation but instead is flexible enough to apply to multiple methods (e.g. observation, questionnaire, interviews, and focus groups).

It was almost four decades until the flexibility of the CIT procedure was utilized and adapted by a social constructivist approach. Chell et al. (1991) were some of the first researchers who applied the CIT with an interpretative paradigm by investigating entrepreneurial behaviour of small- to medium-sized enterprises. Chell et al. focused on the perspective of the participants and interviewed respondents about how they perceived incidents in their environment and what outcomes were used to address the situation. Consequently, Chell (2014) developed her own definition of the CIT:

> The critical interview technique is a qualitative interview procedure, which facilitates the investigation of significant occurrences (events, incidents, processes or issues) identified by the respondent, the way they are managed, and the outcomes in terms of perceived effects. The objective is to gain an understanding of the incident from the perspective of the individual, taking into account cognitive, affective and behavioural elements. (p. 108)

This view was also applied in this research because it supports capturing the perspectives of the participants' remote service experiences at their workplace. Whilst the CIT method has traditionally been used in other disciplines (e.g. psychology), in service marketing it gained more attention in the 1990s through the work of Bitner et al. (1990), Chell (1991), Edvardsson (1992), and Stauss (1993).

Applications in Service Research and Limitations

Gremler (2004) provided an overview of more than 140 applied CIT procedures in service research that explored a wide range of different service marketing phenomena and various methodology assumptions. Despite the flexibility of the CIT, especially in regard to gathering and analysing data, the method resonates with a wide range of research approaches. Other advantages include being able to generate the data from the perspective of the respondent with an inductive approach without further hypotheses (Edvardsson, 1992); gain an understanding of actors' experiences and provide beneficial information for practical use (Stauss, 1993), and using the thick descriptions of the respondents about encountered incidents and contextual factors for theory problematization (Bott & Tourish, 2016). Although the benefits of the CIT method are very helpful in that they let researchers focus on specific respondent experiences, situations, and context, some criticism needs to be considered in regard to this intended study.

One of the major difficulties in exploring the individual perspective is to rely on participants' memories. The limitations inherent to participants' recall of events leads to questions of reliability and validity (Chell, 1998; Gremler 2004). In addition, the information provided could be misinterpreted (Edvardsson, 1992).

In the next sections, I consider the drawbacks of the CIT procedure and discuss how the limitations can be mitigated. As a guiding support when applying the CIT with an interpretivist approach, Chell (2014) recommended certain procedural steps to consider relevant aspects, namely: preparatory design work, introducing CIT in the field, reflexivity, focusing the theme, controlling the interview, and concluding the interview and analysing the data (Chell, 2014, pp. 118–122). This study, like others (e.g. Bott & Tourish, 2016; Chell, 1998; Chell & Pittaway, 1998; Schluter et al., 2007) follows Chell's (2014) recommendation to discuss the relevant elements in the broader sections (data generation, data analysis, research quality, researcher's reflective practice and ethics) of this work.

3.4 Data Generation

Preparatory Design Work

Before applying the CIT procedure, it is important to clarify what kind of critical incidents are important to the intended research. As Gremler (2004) outlined in his research, the majority of studies do not define what constitutes a critical incident. Flanagan's (1954) definition provides a broad view of what events or behaviours constitute a *critical incident*: 'By an incident is meant any observable human activity that is sufficiently complete in itself to permit inferences and predictions to be made about the person performing the act' (p. 327). As mentioned earlier, Flanagan discussed methods other than observations to generate the

data, and in the present study semi-structured interviews were conducted. However, as Alvesson and Sandberg (2022) recommend, when investigating the individual perspective of the actors (radiographers) in their working context, it is necessary to consider the subjective temporal–spatial and relational elements (Corsaro & Anzivino, 2021).

In the health care profession, the term 'incident' in particular might link to thoughts of crisis situations and is associated with strict and mandatory reporting consequences (Schluter et al., 2008). Different regulatory bodies worldwide are tasked with ensuring the safety of medical equipment by law. For instance, in the United States, medical device laws, regulations, guidance, and policies, encompassing the entire product life cycle, are governed by the Food and Drug Administration; in Germany by the federal Act on Medical Devices law, and in Australia by the Therapeutic Goods Administration. Consequently, Schluter et al. (2008) recommended using the term *significant event* after some nurses participating in a study refused to be involved in work that referred to 'an incident'.

Given the context of this research, this leads to reconsideration of adopting the term *critical incident*. Even though radiographers are occasionally confronted with malfunctions of medical equipment, the purpose of this study also includes their remote service interactions, which do not always necessarily have to be critical. Therefore, the term *service event* is used to allow respondents to refer to noncrisis–related happenings (e.g. learning workflow applications). This also enables the need for an intervention (joint problem solving) by a service activity to be addressed.

Before reaching out to respondents it is also important to define what kind of critical incident/service event should be captured. Gremler (2004) emphasized that respondents tend to recall the most critical situations and "when using the CIT method; "usual" or "ordinary" incidents are generally not reported (Stauss 1993), and service researchers

typically use the CIT method to study only the “extremes” (Johnston 1995)” (Gremler, 2004, p. 78). In addition, Dasborough (2006) noticed that, if the researcher does not specify the type of incidents to be considered, respondents tend to recall negative incidents. In Flanagan’s (1964) original work, the ‘extreme’ situations needed to be investigated, and later studies demonstrated that the CIT method is especially useful for extraordinary events (Gremler, 2004). Edvardsson and Stranvik (2000) addressed these difficulties and asked researchers to consider this issue when applying the CIT in the future.

First, for the present study, as described by Langley (1999, pp. 697–703), events (positive and negative) provide the opportunity to “dig under the surface” and, therefore, should not be understood as “purely descriptive data”. Instead, they could bring the temporal aspects to the fore, which serve in the analysis as a sense-making device to better understand the radiographers’ remote interactions at their workplace. Therefore, as this research follows an interpretive approach, the interviews did not follow a list of critical incidents or predetermined answer options (Gremler, 2004). By using the CIT in a freer fashion, the respondents are allowed to choose the incidents and decide the importance of each one for themselves, without reducing the variety of overall activities. Such an approach also embraces the subjective view of how they experienced the incident and how they managed the situation.

Secondly, to help this study avoid falling short on service interactions that usually represent the majority of service events, and only capturing the most extreme or negative incidents, Karpen et al. (2015, p. 99) recommended applying a timeframe (within the past 12 months) for the participants to recall the service events (positive and negative incidents). Third, to avoid participant recall difficulties, Bott and Tourish (2016) suggested sending one or two questions to them in advance, to provide them more time to think about the incidents.

Through this, the respondents are free to select the incidents by themselves instead of following a catalogue of predetermined possibilities. To limit respondents' recall issues, this work followed the Karpen et al.'s (2015) and Bott and Tourish's (2016) recommendations. Consequently, the respondents were asked, before the in-person interview was conducted, to think about an event (positive & negative) they could remember in particular. I perceived this preparatory work as very supportive as the respondents were better prepared to articulate positive service incidents as well; it also provided the opportunity to investigate the perceived value outcome of remote service from the radiographers' perspective.

Introducing the Critical Incident Technique in the Field

By selecting an interview for the CIT procedure, the researcher should aim to discover, together with the respondent, an understanding of the actors' behaviour (Keatinge, 2002). In addition, the respondent should be encouraged during the interview to tell their story and feel comfortable in a familiar environment (Sharoff, 2008). Therefore, the intended interviews were planned to be conducted face-to-face in the radiographers' work environments. To gain access to the radiographers, I (as employee of the service provider) needed to be non-aligned with the designated country organization of the manufacturer company to avoid any possible impact on current projects (e.g. public tender, contract negotiations). The interviews should not influence the relationship between the customer and the company, and, therefore, the interview contact was minimized to a single visit for each radiographer. Furthermore, in the year 2020 COVID-19 pandemic restrictions required some internal pre-alignment within the service provider company (myself and dedicated country and region management) before the customers were contacted. First, the preselection of potential customer accounts was approached through various departments (key account manager, customer service management, and field service experts) of the

company in different locations in Germany. Once the confirmation from the customer was established, hygiene precaution measures (e.g. wearing a mask and maintaining a certain distance during the interview) was ensured.

However, as mentioned by previous researchers (e.g. Bott & Tourish, 2016; Chell, 1998; Chell & Pittaway, 1998; Karpen et al., 2015) who have used critical interview techniques as a qualitative interview procedure, it is advisable to acknowledge the relation between the researcher and the respondent and reflect along the research process.

Reflexivity

As Chell (2014) highlighted, reflexivity is an important device to pursue with the research process. Although, according to Chell (2014), '*reflexivity*' is mainly part of the data generation process, my study dedicated a separate section (Section 3.7) to my reflective practice along the entire research process. The section addressing the 'researcher reflective practice', for reasons of readability, is presented later. Section 3.7.4 summarizes my positionality in relation to the participants in terms of access, power, and data generating, interpreting, and reporting.

However, the research design reflects an abductive research approach, and reflexivity occurred in various moments along the listed process steps (Dubois & Gadde, 2002, 2014; Gioia et al., 2014). As an example, the generation of data and their analysis are interdependent for this research approach. To address issues around sample size it is important to stress the difference between a critical incident sample size and the number of interviews conducted to investigate a certain behaviour (Butterfield, 2005; Chell & Cassell, 2004; Flanagan, 1954; Gremler, 2004). The data generation was carried out gradually, with a preliminary analysis of the data to identify specific themes, such as the naming of specific tasks and the handling of critical events and to ascertain whether new descriptions emerged

from the interviews. In this sense, the interviews conducted were intended to represent the 'stories' of the participants in a 'rich' and 'complex' and manner to answer the research questions (Braun & Clarke, 2021). No additional information's (experiences from remote service interactions with the service provider) from the interviews had been described after the 12 participants. However, the recruitment of interviews was initiated in parallel to the data generation process and the experiences from all 19 participants were analysed for this study.

Focusing the Theme

As Chell (2014) noted, in some interview situations the respondent might not be able to recall the incidents or might feel stressed to provide the exact contextual aspects. Thus, the interviewer should be prepared for some situations when the respondent may not be able to recall or identify any critical incidents. Gremler (2004) and Butterfield et al. (2004) provided a variety of incidents that participants could select. However, from an interpretivist perspective one could argue that a predefined selection of possible incidents would be too predetermined and thus would not leave enough space for surprising responses. Therefore, to ensure a fluent dialogue, in this study I did not prepare any predefined incident categories but embraced my preunderstanding as a practitioner of a remote joint problem-solving situation and my personal experiences (service provider's perspective) to engage with the radiographers within the interviews (Alvesson & Sandberg, 2022).

Before the customer interviews were conducted, I prepared and practiced an interview guide to answer the research questions and focus on certain topics of the radiographers' experiences for this study (Appendix I). The structure followed an adapted sequence of research questions proposed by Kvale (1996) (see below) and two former customer

radiographers, now employees of the service provider company, volunteered to participate in pilot interviews. The pilot study confirmed the sensitive use of the term *incident*, and so I used the term *service event*. In addition, I added a question about what radiographers believe patients expect from the examination and why they think this. As this question might yield further insights into the radiographers' working environment, it was considered meaningful and was incorporated into the interview guide.

Guiding the Interview

I as an interviewer I needed to encourage the interviewees to talk more about the incidents and hence to focus on asking open questions. These questions are used to support the flow of the interview and seek clarification of the incident-related context (Chell & Pittaway, 1998).

At the beginning of the interview, opening questions were asked about the interviewee's position in their institution and additional background information (e.g. years of working in the profession and years of working together with the service provider). This background information helps to relate to the interviewees' temporal experiences when discussing the data (Flick, 2018). The interview guide was than designed to follow with broad questions that let the participants start thinking about general current remote service joint problem-solving situations. In previous research, participants have been asked to elaborate on how, what, when, where, and why things occurred and who was involved (Lexhagen, 2009). To address the perceived value outcome, I asked value-oriented type questions to gain the individual perspectives of the radiographers. As a next step, the participants were asked about positive and negative perceived remote service joint-problem-solving encounter processes and outcomes to address the process of customer value co-creation. The radiographers were then asked to elaborate by asking questions based on the critical

incident style (Chell & Cassell 2004). The interviews were closed with a few final questions that sought radiographers' future expectations and thoughts on the development of remote service.

Gathering Data and Concluding the Interview

In total, 19 interviews were conducted in face-to-face meetings in the daily work environment of the radiographers from June to August 2020 in Germany (in the German language). The interview began with a welcome, an expression of thanks for the participant attendance, and an introduction, which took approximately took 10 to 15 minutes. Almost all participants voiced their time constraints because the interviews were conducted in parallel to their daily working routine. The participants needed either an organized contingency backup to cover the interview time or the participants planned for the interview to occur during a lunch break or extended their working hours accordingly to facilitate the patient schedule. The participants were asked for permission to record the interview according to ethical considerations, which were highlighted in a separate participant information sheet and consent form (Appendix II). The interviews were all recorded using a dictation device; in addition, any comments that arose for the interviewer were documented in handwritten form (Appendix III).

The interviews were typically concluded by the interviewer providing some summarizing statements from the participants' responses and then ended the recording. After the interview, a short conversation usually followed to again express appreciation for the effort of the radiographers; some participants also sought confirmation regarding whether their explanations were understandable and meaningful. After the first three interviews this feedback was used to adapt the question that was related to recall, 'THE most' significant positive and negative examples of remote service events. Even though the participants were

asked to identify the remote service events in advance, it became clear that the radiographers may have overinterpreted the questions and tended to think about 'THE' event for too long. The question wording was revised to identity only positive and negative remote service joint problem-solving situations. Overall, the interviews lasted between 50 and 90 minutes (recorded time).

3.5 Data Analysis

Table 4 shows the overview of 19 participants, interviewed in six different institutions (1–6) and eight different locations (a, b). The data revealed a huge spectrum of working experiences as radiographers (4–40 years), experiences on magnetic resonance imaging (MRI) systems examinations (1–31 years), and experiences working on the dedicated medical MRI provider company (1–31 years). The provided overview of the data from the participants and institutions indicates a range of experience and variety but without further categorization or segmentation of the first-order (individual interview) input data.

Table 4: *Overview of interviews conducted*

Customer	**Participant**	**Working experience in years**	**Working experience MRT in years**	**Working experience MRT- provider company in years**	**Region in Germany and Institution**
Customer 1	Participant 1	11	11	6	North-east, hospital, non-profit liability company
Customer 1	Participant 19	5	3	3	North-east, hospital, non-profit liability company
Customer 2	Participant 3	30	20	20	North-east, private imaging centre
Customer 2	Participant 2	35	23	23	North-east, private imaging centre
Customer 3a	Participant 4	11	11	11	North-east, private imaging centre chain, branch 1

Customer	**Participant**	**Working experience in years**	**Working experience MRT in years**	**Working experience MRT- provider company in years**	**Region in Germany and Institution**
Customer 3a	Participant 5	5	3	5	North-east, private imaging centre chain, branch 1
Customer 3b	Participant 6	4	4	4	North-east, private imaging centre chain, branch 2
Customer 3b	Participant 8	10	10	1	North-east, private imaging centre chain, branch 2
Customer 3b	Participant 9	10	1	1	North-east, private imaging centre chain, branch 2
Customer 3b	Participant 7	15	15	1	North-east, private imaging centre chain, branch 2
Customer 4	Participant 10	21	21	19	North, public university (medical education)
Customer 5a	Participant 12	31	31	31	North, private imaging centre chain, branch 1
Customer 5a	Participant 11	33	31	31	North, private imaging centre chain, branch 1
Customer 5b	Participant 14	10	7	4	North, private imaging centre chain, branch 2
Customer 5b	Participant 15	40	25	25	North, private imaging centre chain, branch 2
Customer 5b	Participant 17	11	11	7	North, private imaging centre chain, branch 2
Customer 5b	Participant 16	35	30	40	North, private imaging centre chain, branch 2
Customer 5b	Participant 18	35	32	24	North, private imaging centre chain, branch 2
Customer 6	Participant 13	25	25	25	North, public hospital

Given the decision to use semi-structured interviews within the CIT procedure, the approach to the data analysis also differed from the original work of Flanagan (1954). Nevertheless, the CIT provides enough flexibility to adapt different data-analytical methods.

As Gremler (2004, p. 79) outlined in his analysis of service research studies that used CIT, only seven out of 141 studies followed an interpretive approach for data analysis. Most used content analysis, which typically identifies the classification of critical incidents. Content

analysis is mostly used in its quantitative and deductive form, where it is assumed that the texts are the phenomena to be examined, and which provides the units of data generation (Neuendorf, 2002; Smith, 2000). Content analysis is often claimed to be objective, reliable, and replicable, and traits could be argued to follow a positivistic paradigm.

Because this study applied an inductive and interpretive approach, it followed the approach outlined by Braun and Clarke, (2006) to thematic analysis, which "can be a constructionist method, which examines the ways in which events, realities, meanings, experiences and so on are the effects of a range of discourses operating within society" (p. 81). Braun and Clarke (2006, p. 87) also highlighted the flexibility of the method and encouraged other researchers to acknowledge their active role in the data analysis and propose broad stages to pursue data analysis.

The form of thematic analysis offered here assumes that the recorded messages themselves (i.e., the texts) are the data, and the codes developed by the investigator, using close examination by identifying and analysing patterns of meaning in a data set, are salient themes that emerge inductively from the texts (Braun & Clarke, 2006). *Thematic analysis* has been defined broadly as "a way of seeing" and "making sense out of seemingly unrelated material" (Boyatzis, 1998, p. 4).

Nevertheless, is also argued that a purely inductive approach is not possible in practice because pre-understanding always exists (e.g. scrutinizing whether the phenomena are not overlooked in the literature [Eisenhardt, 1989; Fine, 2004]). Also, for this study prior knowledge was gained from the literature by reviewing relevant value co-creation concepts as "precursors" to explore and better describe the service recipient experiences in the research context (Gioia et al., 2014, p. 16).

Despite this, the approach to the data analysis was done in as an open a manner as possible, without ignoring the literature, and therefore followed an abductive approach.

Table 5: *Thematic analysis - adapted phases*

Phase	**Description of the data analysis process**
1. Familiarizing yourself with your data	First-order analysis preparation based on individual interviews. Listening to the audio recording, alignment with study notes, transcribing data, reading and rereading the data, making notes. Preparing to use qualitative analysis software, defining a priori codes, and maintaining a coding journal.
2. Generating initial codes	Using a priori codes: Holbrook's (1999, 2006) concept of consumer value (value types) to determine the perceived value outcome and Payne et al.'s (2008) elements for customer experiences (emotion, cognition, and behaviour). Systematic coding through the entire data set, ordering relevant data to each code. Inductive coding and developing subcategories of value types.
3. Searching for themes	Organizing codes for potential service recipient tasks, gathering process steps, identifying relevant data for different interaction in the process of the service encounter and customer process of value co-creation.
4. Reviewing theme:	Studying potential similarities of and differences between the service recipients and theme selection in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating an abstraction level of the service participants' experiences in relation to value outcome and customer value co-creation process.
5. Defining and naming themes	Refining the analysis and bringing the contextual aspects (spatial, temporal, relationship) of the remote interaction in the B-to-B environment to the fore.
6. Producing the report	Framing and visualizing the final analysis. Selecting phrases and extracting examples and addressing the variety of respondents. Referring back to the research questions and literature. Writing up the discussion and the findings of the data analysis.

Note. Adapted from "Using thematic analysis in psychology", by V. Braun & V. Clarke, 2006, *Qualitative Research in Psychology, 3*(2), p. 87. Copyright 2006 by Edward Arnold (Publishers) Ltd.

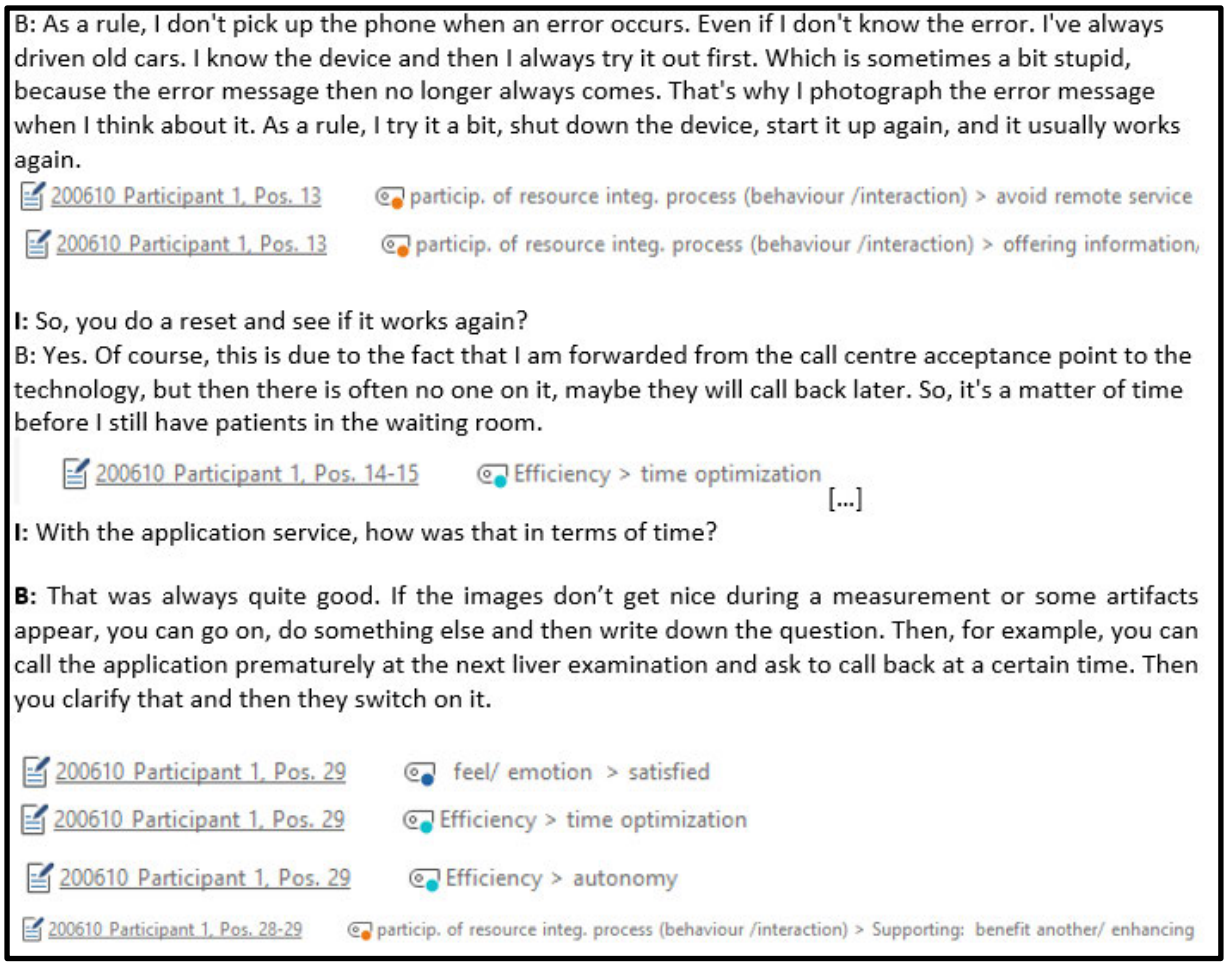
This is in line with the thematic analysis phases (see Table 6) described by Braun and Clarke (2006), and it seeks to utilize the relevant elements from Holbrook's (1999, 2006) and Payne et al.'s (2008) concepts to determine the perceived outcome and processes of value co-creation but without neglecting the study's experiential approach. Furthermore, Fereday and Muir-Cochrane (2006) called for a hybrid approach to thematic analysis, including both deductive and inductive coding, by using thematic analysis with a priori codes that recognize the pre-understanding of the research context and that maintains the flexibility to identify emergent themes. Table 5 provides an overview of the adapted data analysis stages from Braun and Clarke (2006, p. 87).

All interviews were conducted in the German language, and the transcribed data remained in my native language (German) and were analysed in German, to avoid any misunderstandings and translational losses from one medium and language to another (Halai, 2007; Lampert, 1992). The data analysis started with listening to the audio recordings intensively and reading from the notes taken during the interviews. The interviews were transcribed by a specialist company and transferred into an electronic document. The audio files were listened to again and compared with the transcripts to rectify some words (specialist terms) where necessary. Once the transcripts had been read and reread, the documents were transferred and uploaded to a qualitative data analysis software package (MAXQDA).

The software coding procedure started with documentation of an 'analytical journal' (Morrow, 2005, p. 259) and the definition of the a priori codes. Holbrook's (1999, 2006) value types and the customer experience elements (emotion, cognition, and behaviour) from Payne et al.'s (2008) framework have been used to deductively analyse the empirical data in response to the research questions. Furthermore, S-D logic, as introduced in Chapter

Two, was used as a 'heuristic tool' to facilitate theme development in the context of value co-creation (Vargo & Lusch, 2014, as citied in Jaakkola et al., 2015, p. 188). This resulted in a systematic coding approach to the entire data set, which was undertaken several times.
In addition, contextual (temporal–spatial and relational) aspects from the data emerged in relation to the process of the service encounter and the customer process of value co-creation. Inductive coding was followed to address the emergent value type subcategories as described in the context of the participants' service recipient tasks and other processes relevant aspects (e.g. different interaction points, participation behaviour).
Figure 2 illustrates an excerpt of the coding of the interview with Participant 1 (B). The example shows the categorized value type and subcategories according to their described relationship experience from remote service interaction with the service provider. The entire interview transcript of Participant B is provided in Appendix IV (German and English language).

Figure 4: *Translated coding example, excerpt from Participant 1*



Note. I = interviewer, B= participant 1

During this data analysis process, I intended to identify potential similarities and differences between the service recipients' perceived value types, experiences of resource integration, and service-for-service exchange processes for different tasks. Therefore, the radiographers' tasks, participation behaviour, and interaction points were abstracted to a second-order theoretical level to tentatively answer "What's going on here?" (Gioia et al., 2014, p. 20). The emergent themes were reviewed with the existing theoretical frameworks from Holbrook (1999, 2006) and Payne et al. (2008) to corroborate what was developed with the applied theory and identify points of divergence (Butterfield et al., 2005; Maxwell, 1992). By moving between the themes and literature, the analysis progressively brought the

contextual aspects (spatial, temporal, relationship) of the remote interaction in the B-to-B environment to the fore.

Thereafter, the work developed into a form to present the findings by framing and visualizing the analysed data into a synthesized framework of perceived value outcome and customer process of value co-creation in asynchronous remote interactions. Last, to facilitate and underpin the presentation of the findings and discussion (Chapter Four) in relation to Research Questions 1 and 2 (see section 2.6), participant quotes were selected and translated. Thereafter, all relevant participant quotations were verified and confirmed by a certified translator (see Appendix IV).

3.6 Research Quality

In this section, I use *quality* as an umbrella term for the approach to moving from forms of pre-understandings of the phenomenon in the process of interpretation and constructing reality, to a rigorous and trustworthy understanding of the phenomenon for use in theory and practice (Finlay, 2002, 2008, Flick, 2018). Here the term *phenomena* means what Orlikowski (2010, p. 30) describes as “the everyday doings … to understand activities in organizations from a particular participants perspective”. The remote service value co-creation experiences from the perspective of the service recipient at their workplace are loci of this research. However, as detailed at the beginning of the methodology, in this study I aimed to capture the perceptions and experiences of the individual service recipient by selecting an interpretivist approach, and it is therefore important to consider how the researcher is positioned to study these subjective experiences and constitute knowledge (Foote & Bartell, 2011).

Creswell (2013) called for thoughtful and detailed descriptions of the researchers' positionality when pursuing interpretative research. This means that the researcher needs to be aware and conscious of the biases, values, and experiences they will bring to the qualitative study (Creswell, 2013). Positionality is also used as a well-acknowledged concept in qualitative research more generally to address the trustworthiness of the research in a more transparent manner (Cousin, 2010; Creswell, 2013; England, 1994; Foote & Bartell 2011; Sultana, 2007). However, to locate the researcher's position in relation to the research inquiry may not be sufficient without describing the researcher's dispositions and reflections in the process of research (including the pre-research stage).

Boud et al. (1985) described reflection within the context of research as consciously looking and thinking about one's experiences, actions, emotions, feelings, and responses and then interpreting them to learn from them. Lincoln (1995) called for the researcher's reflexivity: "Such reflexivity is absolutely required to understand one's psychological and emotional states before, during, and after the research experience" (p. 283). Finlay (2008, p. 6) referred to different interpretations of the terms '*reflection'* and '*reflexivity'* and provided a simplified perspective as a continuum of terms, starting with reflection as "thinking about" something after the event" on one end of the continuum and reflexivity as "a more immediate and dynamic process which involves continuing self-awareness", on the other end. Finlay and Gough (2003, p. ix) alternatively suggested describing reflexivity as: "thoughtful, self-aware analysis of the intersubjective dynamics between researcher and the researched. Reflexivity requires critical self-reflection of the ways in which researchers' social backgrounds, assumptions, positioning and behavior impact on the research process". To capture my account and developed positionalities, I carried out reflexivity by maintaining a self-reflective journal throughout the enactment of the study (Cousin, 2010; Finlay, 2002,

2008). In the next section I describe my reflective practice, the power relations at play, and the outcome of my positionality on the production of knowledge and its impact in my seeking to "undertake ethical research" (Sultana, 2007, p. 382).

3.7 Researcher's Reflective Practice

3.7.1 Self-Development

As highlighted in the last section, my perspective as researcher needs to be acknowledged when approaching and representing the multiple perspectives of participants' lived experiences with remote service interactions with the provider. However, this perspective also includes my self-development because the design and process of research should not be considered as taken for granted, and perspectives may change over time. As recommended by Denzin (1986, as cited in Shankar, 2000, p. 36), "Interpretive research begins and ends with the biography and self of the researcher". To provide a starting point for the research inquiry and why my interest developed to study this specific phenomenon, in the next paragraph I detail what might be uncharitably termed the 'researcher's baggage'.

Researcher's Baggage

As Finlay (2003, p. 17) emphasized, "introspection and intersubjective reflection without critical self-analysis is … of limited value and open to the charge of self-indulgence". Therefore, I briefly share my "standpoint judgement" (Lincoln, 1995, p. 280) as a kind of quality criterion for this qualitative study and to provide the reader a better understanding of my personal context.

I was born, raised, and educated in Germany, and I started my professional career there. My career path progressed through multiple assignments and companies, whereas my work experiences have been always in the health care environment. I have worked in the health care industry for more than 20 years (the last 10 years in the Asia Pacific region) and have gained numerous practical experiences, which include the management of business operations, support functions, human resource, quality, and service marketing. My experiences included regular exchanges with customers and discussions of their experiences with the way the service activities were delivered. Overall, these experiences formed my way of thinking, and I wondered about the measurement of customer satisfaction 'scores' in relation to remote service provision. Before I began this study, customer satisfaction was something I construed in a broader sense; my trajectory was to approach the research inquiry from this position. To appreciate why this was the case, it is helpful to consider my initial (although then uncodified) philosophical underpinnings at that point in time.

3.7.2 Philosophical Underpinnings

Looking back in my research journal, I noted that I had embarked on this doctoral thesis to investigate the ambiguous usage of remote service from 'our' customers. Even in the early stage of my research process I noted in my journal: 'The benefit of remote services depends on the customer perception and their decision to use it.' However, I noticed strong positivist tenets when I was thinking about how I can contribute to the knowledge base. For example, I tended to administer surveys to customers but still struggled about what exactly I wanted to measure. Over the course of discussions with my learning peers and supervisors, I developed a better understanding of my research inquiry and acknowledged 'value' to be a

new theoretical aspect for me to pursue in my research. However, sharing my research ideas and inquiry with a wider audience, evaluating feedback, and learning from the academic literature and more experienced researchers has changed my philosophical underpinnings in terms how I seek to contribute to knowledge. Further assignments, group discussions, and presentations facilitated the progress of the research to gain a better understanding of customer processes and experiences. Nevertheless, the idea of being a researcher taking an active part in the research process was initially alienating to me. But maybe I was already part of the research?

A traditional positivist research paradigm has perhaps taught us to believe that what we are studying often has no personal significance. In my case, I argue that the decision to research customer benefits of remote service was already influenced by my personal beliefs. My initial pre-understanding of the topic and reason for choosing a positivist methodology is probably best explained from my practical experiences. However, the choice of what I wanted to explore was very much value laden and relates to the understanding of service recipients' behaviour when using remote service. The successive interplay between my practical experiences and the gained theoretical pre-understanding empowered me to set a new direction for my research. In other words, instead of somehow hiding behind an 'artificial' objectivity and neglecting my pre-existing knowledge and experiences, I embraced my opportunity to engage in the research process (Alvesson & Sandberg, 2022). An approach that is in the B-to-B marketing domain of value co-creation highly relevant but rarely 'co-accomplished' along the research process with the researcher. However, my approach to gaining an in-depth understanding of service recipients when consuming remote service with the provider at their workplace changed my philosophical underpinning for this research but also enriched my way of thinking overall. Nevertheless, the decision to

apply an interpretive view requires rigour to capture, analyse, and report the subjective recipient experiences (value outcomes and processes) in relation to myself as researcher and employee of the service provider company. To address the relational aspects between the participants and myself as researcher, I openly share my positioning along the research process.

3.7.3 Researcher's Positionality

I discuss my positioning as the researcher with regard to the nature of the participants and access to this group. I also take into consideration the power relations in regard to the study group in the data generation and interpretation.

Study Group

In this section, I describe my role as researcher by positioning myself through the process of reflexivity to the research group (radiographers). The radiographers' profession, expertise, and relationship to the patients have already been briefly described in the situational context (Section 3.1). The radiographers' workplace environment in health care institutions revealed a demanding daily practice that requires them to examine patients within strict temporal requirements. This pattern also affects the tempo of technological developments in their profession, which are needed to coordinate a continuously increased patient workflow. Working with patients and operating medical devices to achieve certain outcomes can be described as very challenging and is associated with a high level of responsibility.

The radiographers are major contributors to the overall success of patient treatments and the financial results of the health care institution. Hence, radiographers manage an

ambitious time schedule to examine patients, and on occasion unexpected interruptions complicate the daily work routine. These interruptions could be caused by device malfunction, preventive maintenance or system updates, and upgrades or operating inquiries, which could be partially jointly resolved remotely with the service provider. On the one hand, there is the increased opportunity to gain productivity (e.g. reducing the downtime of the system), and on the other hand there are considerations about the extent to which these activities should be performed by the radiographers and, therefore, their influence on the relationship with the provider. These concerns clearly also affect the provider and are addressed in the service literature, where it is suggested that the use of technology will depersonalize the service experience and frustrate customers (Walker et al., 2002).

However, as described in the context of this study, the contractual relationship between the customer and the service supplier company empowers the radiographer to decide to what degree they would like to participate in the troubleshooting or workflow-improvement process with the provider. The remote service literature highlights that service recipients in the B-to-B environment and B-to-B health care sector show ambivalent customer behaviour when using remote services (Paluch, 2011, p. 163; Wünderlich, 2010, p. 19).

Therefore, my effort as researcher, and as part of a service supplier company, is to shed light on the variety of service recipient behaviours, to better understand their perceived value when using remote services with the provider at their workplace. Whilst the service supplier company is present in multiple countries, this research did not seek to compare different countries or explore cultural differences. Instead, at the beginning my aim was to conduct the interviews in Germany to avoid language mistranslations or misinterpretations

when interacting with the participants during the interview and proceeding with the analysis of the research.

Thus, I would also like to mention my cultural experiences living and working in Germany but also living for the past 10 years abroad with no contact with the study group. However, that does not mean that I have an objective view of the research group, because I was in contact with this sector during my time working in Germany. Therefore, I adopted an insider–outsider positionality conceptualization from Banks (1998) to describe my degree of connection (close, insider-distant, outsider) to the research group.

According to Merton's (1972, p. 21) definition, "Insiders are the members of specific groups and collectivities or occupants of specified social status; outsiders are non-members". Therefore, I describe myself as an outsider without ignoring my technical background and experiences in relation to hospital operations. By describing my knowledge of the radiographers' practices and daily work challenges in the hospital environment, I would claim to have a pre-understanding without being an insider within the study group. I do not presume to judge the usage of remote services from the radiographers' perspective and, in particular, in relation to patient examination and postprocessing images workflows. Therefore, I would neither consider myself to be an insider or outsider but rather maintain that I'm somewhere in between.

There are various ways to argue the advantages and disadvantages of my position to the research group (Alvesson & Sandberg, 2022). Some advantages include the ability to understand the language (technical/operational), to ask more meaningful questions, and the ability to produce a thick description and understanding of the operator behaviour. On the other hand, it could be perceived that my role brings an external perspective to the process, and the operators may feel challenged and believe I possess more insider

knowledge and experiences than they do, or they may be concerned that the information will be later shared with others. As Hammersley (1993) stated, there are "no overwhelming advantages to be an insider or outsider" (p. 453). "The insider's strength becomes the outsider's weakness and vice-versa" (Merriam et al., 2001, p. 411); therefore, it seems more important to see the positions as lying along a continuum and consider the potential concerns of the research group before they are approached (Mercer, 2007).

Access

As an outcome of my decision to access radiographers' experiences with remote service, my primary selected source for data gathering was semi-structured interviews (described in Section 3.4). When investigating the value-in-use and customer process of value co-creation from remote service interaction with the service provider in the health care environment, it seemed important to select radiographers who had experienced remote service events in the past. Although the provision of remote service in the health care environment from the service provider company is more than three decades old, the planning procedure revealed that remote service events are hardly documented and, as such, there is limited access to documentary evidence. Therefore, I did not take it for granted that all radiographers already had the necessary experiences with the remote service, and therefore my approach was facilitated through various service provider company employee recommendations. This approach enabled access to perform the interviews with the initial radiographers included in the study, who then supported and provided additional opportunities to interview radiographers in other locations from the same customer (health care institutions).

Power

In respect to my role as a researcher and an employee, I need to consider my position of power in the different stages of the research process. First, I focus on power characteristics

in the data gathering via interviewing the radiographers and where I stand in relation to them. I then discuss my position in terms of data analysis and the presentation of the findings.

Generating Data

Because conducting interviews was my primary method of generating data for this qualitative study, I needed to consider my roles (researcher and employee of the service provider company) and how these roles might affect the interviewee and the answers they give. Brinkmann (2007, p. 129) emphasized the importance of considering power relations through dialogue because when conducting interviews, the researcher and interviewee can be perceived as evidencing an asymmetrical power. First, my role as researcher could imply that my pre-understanding of the research topic is more established than it is by the interviewees, which could raise their expectations and curiosity and suggest that they will receive additional information. My interview guide was designed to capture the participants' experiences without predefined categories of practices and ended with concluding questions about the participants' wishes and expectations. Nevertheless, the fact that the researcher is in charge of guiding the interview, and the interviewer's preparation are important parts of the overall success of the interview cannot be neglected (Hannabuss, 1996). Therefore, good interview preparation is needed; this also includes reflecting on the participant's expectations. The latter leads to my second role as employee of the service provider company.

Visiting customers, given my corporate role, might raise their expectations that this will immediately improve processes, products, or services. The radiographers might feel encouraged to address difficulties and their desire for an improved working situation outcome. Brinkman (2007) compared clinical therapeutic therapy that helped some patients

to change (e.g. emotional state) with research interviews in which a change in the interviewee is not desirable and can be interpreted as unethical. Even if the intended interview is not as impactful as clinical therapy, it could mislead the participants when I, as a researcher or as employee, start to speak on behalf of the service provider as a company. Scheurich (1997) proposed to make the 'researcher's baggage' visible and discussed during the research process. This also includes to inform the participants of my role as researcher and employee of the provider company (see section 3.7.4, Table 6).

In addition to the data generation process, which draws on both of my roles, is the power of the language that is used in both the questions sent (a priori) and in the interview. My researcher and employee baggage include: 'preconceived research terms' and 'technical' language, as well 'company abbreviations'. I need to be aware of these so that I can avoid using overly technical explanations, or the service company's internal nomenclature, or leading the interview to a specific conceptual framework or theories.

Data Interpretation and Reporting

The other asymmetric balance of power that needs to be discussed relates to data analysis and reporting. As my working experiences reveal, I am employed by the service provider, who delivers remote services for customers. Given this, a certain dependency cannot be neglected. My aim was to make the process of data analysis and reporting as visible and transparent as possible (MacNaughton et al., 2001). Integrity and acting in a transparent manner during my research process is important, and I have endeavoured to engage with this by continuously drawing on my reflective journals. My aim is to make my decisions, and the thinking, values, and experiences behind those decisions, visible to both me and to the reader. I acknowledge the tensions in my role as employee when reporting the outcome of my research.

Even as a “just” a researcher, the interviewer “upholds a monopoly of interpretation”, as Brinkmann and Kvale (2005, p. 165) stated. The research interviewer has the responsibility of interpreting and reporting what the interviewee ‘really’ meant. Also, Denzin and Lincoln (2000) highlighted the difficulties of separating the researcher and the researched and whose reality is represented in the research output. Qualitative researchers may consider counter strategies to interpret the participants’ realities truthfully. These kinds of activities could, for example, include the taking of a naive inquirer standpoint by asking the participant’s meaning during the data gathering process and being transparent regarding their own positioning as researcher.

Dutt and Grabe (2014) provided a comprehensive example process of analysis of the interviews they studied, and the procedures they used to assure a valid and trustworthy interpretation. Included in their description is a clear positioning of their social standing and reflection on their personal experiences and how these factors may have affected the analysis. I have also shared my standpoint in the preceding section, and my aim is primarily to understand the value creation of remote service.

Given that I work for the service provider, one could argue that my intent could be to emphasize the advantages of remote service and promote the utilization of remote service in the data representation phase—or, in other words, to foreground how successful the service provider is in creating value with the service recipient. I argue that following this interpretation could also be counterproductive in designing and co-creating value propositions for the company. Shifting the predominant current business model (selling service contracts that are mainly related to on-site service interventions) based on potentially misleading assumptions could equally jeopardize the company’s business results. However, changing the revenue intake from selling on-site service contracts to online

service contracts is also not realizable by my responsibility. Nevertheless, I assume that there is the possibility of value co-creation through remote service delivery, but the more concerning question is, what kind of value do the users derive from it? To answer this question, I aimed to shed light on the users' lived experiences rather than to elaborate on the advantages of remote service.

Another recommendation to improve the trustworthiness of the work was mentioned by Morrow (2005), who suggested that articulating a framework for the analytical process and documenting the progress in an analytical journal helps mitigate possible unrealized or concealed issues in the process. "An analytic journal, including theoretical or analytic memos, should be kept in concert with the research process and described in the report" (Morrow, 2005, p. 259).

Overall, as mentioned in Section 3.4 (data generation), my performed reflexivity practice, along with the adapted critical interview technique, were (re)evaluated along the different process steps and are summarized in the next section.

3.7.4 Researcher's Reflective Practice Summary

In these last sections, I described the access, power, data generation and interpretation, and reporting of the researcher's positionality in relation to the group of participants. I described the opportunities and challenges and addressed counterinitiatives to perform the research. Given that I am part of the service provider company it was important to self-reflect on my roles and how I have developed to position myself in the research process for this study (see Table 6).

Table 6: *Applied researcher positionality*

Researcher position	**Opportunities**	**Challenges**	**Counter initiatives**
Researcher employed by service provider company	Background and experiences allow specific insights into the service provider organization	Existing relationships could influence how the research could be designed	Establish full transparency along the research process and integrity in qualitative research (Creswell, 2013; Finlay, 2003, 2006, 2008; Maxwell, 1992; Tuval-Mashiach, 2017)
Study group	Enhanced understanding of radiographers' practices and daily activities, especially in joint problem-solving remote interactions	Potential bias from work relationships	Positioning in relation to the study group (role as researcher and employee) and being self-critical. Clear communication of the role as researcher and service provider employee
Access	Overview of remote service–documented incidents and usability of customer accounts Communication with radiographers is well well-developed	Potentially biased selection of preferred customers	Preselect customer accounts from various departments of the company (function and location) Enter the field and creating a checklist (Flick, 2018, pp. 161–170)
Power	Clear role distinction as researcher and employee	Potential bias	Clear communication of the role as researcher and service

Researcher position	Opportunities	Challenges	Counter initiatives
			provider employee (interview participant information sheet and consent form) Ask for permission (consent form)
Data generation	Research questions are developed to gain insight	Interviewees may feel encouraged to address product and software related issues and desire an improved working situation outcome later	Pilot interviews before interviewing radiographers Provide participant information sheet Reflect after the first interviews to adjust interview questions
Data interpreting and reporting	Pre-understanding of the research topic	Potential bias	Coding preparation (Boyatzis, 1998; Braun & Clarke, 2006; Neuendorf, 2019) Maintain an 'analytical journal' (Morrow, 2005 p. 259)

3.8 Ethics

The aim of qualitative research is to get closer to the subject and understand the participants' perspectives and experiences (Bryman, 1988). The decision to use semi-

structured interviews as a method was also supported by the ethical issues that might be raised if the participants were observed in their environment. According to the European Network of Research Ethics Committees (n.d.), currently no national ethics committee for medical research in Germany exists, and no ethical clearance was required for this study. Nevertheless, the research inquiry described included the pre-understanding that I was part of the setting, context, and social phenomenon that I aimed to explore (Alvesson & Sandberg, 2022; Schwandt, 2000). The interviews were conducted in the radiographers' daily environment (universities, public hospitals, and private imaging institutes in Germany); however, no vulnerable individuals were involved (Creswell, 2013), and no individual patients were discussed, identified, or considered in any manner. All informants were over the age of 18, were provided a participant information sheet and informed consent form (Appendix II), participated voluntarily, and were entitled to stop the interview at any time. The University of Gloucestershire (2008) ethical guidelines and General Data Protection Regulations were applied to this research. The confidentiality of the interviewees and others involved in the research, including organizations, was respected, and individuals' identities were protected (Chell & Pittaway, 1998).

4 Findings and Discussion

The previous chapter described the situational context and research methodology applied to understand the service recipient perceived value outcomes and value co-creation process experiences. To explore and make meaning of the experiences of the service recipients, the data were analysed and compared with the existing literature to locate the research finding within the extant domain. However, Chapter Four starts by pursuing research question one and applies Holbrook's (1999, 2002) value typology to address and determine the service recipient value types and tasks from the remote service joint problem-solving process with the service provider.

Section 4.2 concerns the responses to research question two and follows the framework from Payne et al. (2008) to describe the process of value co-creation and how service recipients are influenced when consuming a remote service (Helkkula et al., 2012). The data revealed different service recipient participation behaviours (see section 2.3) in the process of value co-creation, which have been contrasted in low-and high participation situations (Wells et al., 2015). The potential asynchronous remote interactions are illustrated and distinguished, according to the service recipients' experiences, at different remote interaction points, and supplemented with the derived value types. The integrated framework of the asynchronous process of value co-creation demonstrated the entanglement between the remote service value type outcomes and the process of value co-creation.

Thereafter, the emergent data were re-iterated and discussed with the literature and, subsequently, supplemented with components from the frameworks of Törnroos et al. (2017) and Corsaro and Anzivino (2021) to further compare the remote service system

characteristics. Finally, the work refers to elements from systems theory ('open systems' [Bertalanffy, 1968]) and relates this to the consequences of, in particular, situations from the service recipients' perspective, when consuming a remote service, or not.

4.1 Research Question One

This question sought to identify what value-types are perceived from remote service for the service recipient during value co-creation opportunities with the service provider.

This section aims to determine the value-in-use from the service recipients' perspective when remotely interacting with the service provider, by applying Holbrook's (1999, 2002) value typology. The research context focuses on how radiographers have experienced remote service interaction with the service provider and how they managed these situations. Based on the data analysis approach outlined in Chapter Three, the relevant activities of the service recipient during the remote joint problem-solving situation with the service provider have been identified.

These experiences resulted from the diverse tasks that the service recipient is expected to resolve in response to different problems and situations. In terms of the service recipients' activities, their tasks have been delineated to support a greater degree of analytic sophistication and to identify the derived value types for them in relevant situations. This approach aligns with the existing value co-creation literature, as it seeks to better understand the activities and most relevant tasks evident during value co-creation interactions in the B-to-B environment (Aarikka-Stenroos & Jaakkola, 2012; Gonçalves et al., 2019).

When radiographers seek the support of the service provider to ensure an effective patient examination, they predominantly described two broad tasks that impact their workflow. When the first task occurs it limits, or completely suspends, the functionality of the medical equipment (e.g.: system or software related malfunctions). These experiences are predominantly described by radiographers as 'technical related break-fix/system down' moments. As patients could be potentially harmed, the patient examination schedule (hereafter named patient workflow or workflow) is interrupted, and the radiographers immediately seek a solution:

> P15: That would be a point for me now because you are really under pressure. What happens next? What should I do? Why is it not working?
>
> P2: Of course, this is a special stress situation because the patient wants to know, is the device working, when can we move on?

These tasks are categorized as enabling tasks (Table 7).

The second task was described as 'application handling' related issues, where e.g. patient acquisition or post-imaging procedure inquiries appear to improve the patient examination outcome. In this context the need for immediate solution finding is usually less urgent and does not necessarily impact patient workflow:

> P1: If the images don't turn out well during a scan or if any artefacts appear, you can go on, do something else and then write down the question. Then, for example, you can call the application [the service provider expert] in advance for the next liver examination and ask them to call you back at a certain time. Then you clarify that and then they [remote service experts] also connect to it [medical device].

Thus, these tasks are categorized as enhancing tasks (Table 7).

Table 7: *Overview of categorized tasks for the service recipients during potential remote joint problem-solving situations with the service provider*

Service recipient categorized remote service tasks	Description	Examples	Potential contribution from the service the provider
Enabling tasks	From the service recipients' data, those tasks described as having high goal proximity and are a significant source of patient workflow interruptions have been categorized as enabling tasks, when interacting with the service provider.	Medical devices, malfunctions, breakdowns (e.g. hard-and software related).	Providing a swift resolution for service recipients through immediate access and potential redistribution of labour to offer predominantly technically related informational exchange to re-enable the workflow for the service recipient.
Enhancing tasks	From the reported data, such tasks that refer mainly to patient examination workflow incidents have been categorized as enhancing tasks.	Operational inquiries (e.g. pre- and post-imaging acquisition procedures).	Providing timely, adequate, predominantly patient examination related, knowledge to enhance the workflow for the service recipient.

Table 7 describes the differentiated categorization of the two major task types, namely enabling- and enhancing-tasks and offers typical examples of such incidents when interacting with the service provider. Table 7 also indicates that the service provider intends to jointly contribute and prioritize the tasks according to the remote incidents. As one participant mentioned:

> P4: One already has the impression that a clear path has been established that they check. That is the case. There definitely are procedures in place.

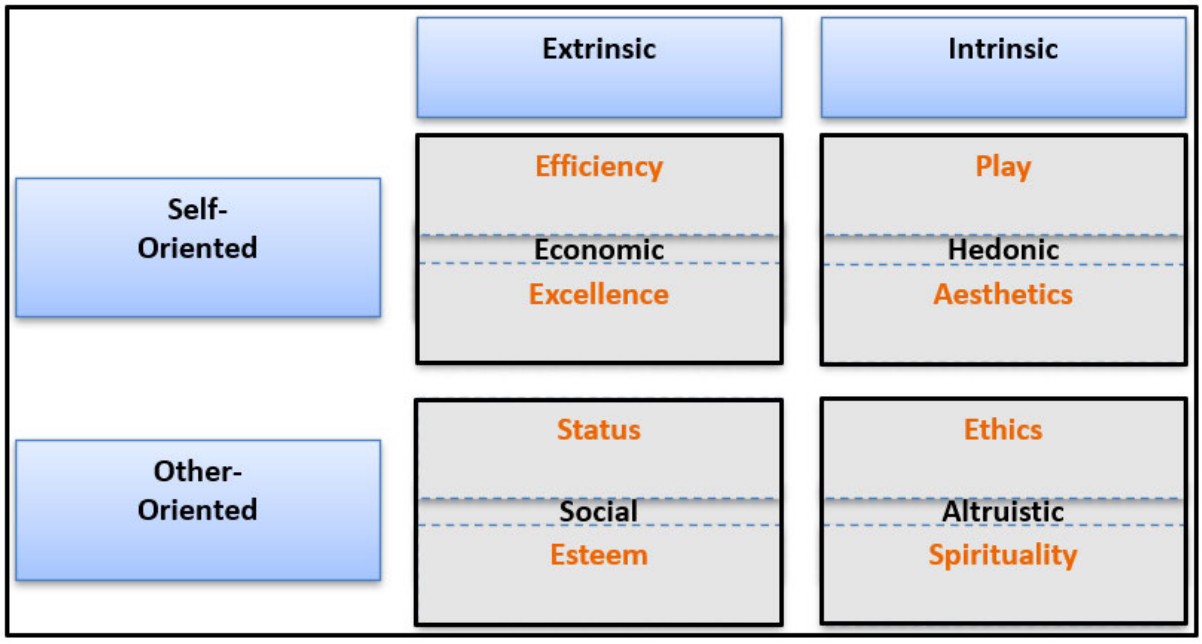
Overall, the broad identification of the enabling- and enhancing-tasks helps to address the different situations in which the service recipients find themselves and assists in describing and comparing their lived experiences.

As mentioned in the literature review, the perspective of the individual in the B-to-B environment in terms of value co-creation is rarely investigated, especially in terms of the individual perceived value-in-use experiences and behaviours they bring into the situational context. From the service-dominant logic view, value-in-use is created phenomenological, and the process of value co-creation is mainly related to the application of competencies (knowledge and skills) (Vargo & Lusch, 2004, 2008, 2016). Nevertheless, to understand the participant embeddedness in their environment, Gadamer (2004) highlighted that it is also important to consider their professional working past: “Individuals draw on their past during reflection as the pre-understanding and prejudice developed from previous experiences provide the frameworks that enable them to make sense of their world” (as cited in Akaka et al., 2019, p.469). Furthermore, Dawson and Sykes (2019) saw agency as a “social process situated in the flow of time where contingencies of the present are informed by the past (habitual aspects) and oriented to the future (opportunities and possibilities)” (p. 104). The interviewed participants differed in their levels of experience and knowledge – as evidenced in describing joint problem-solving situations with the service provider (Table 4 Chapter Three, working experiences, experiences working on MRT and working experiences working on service provider MRT).

In addition to their individual accumulated experience and “varying levels of knowledge” (Ravasi et al., 2019; p. 1537), their perspective concerning the derived value-in-use from remote service value co-creation opportunities over time might also have an impact. In other words, this also includes understanding what meaning the radiographer gives to their

interaction to enable them to believe “they are better or worse off” (Grönroos & Voima, 2013) when consuming a remote service or not using it at all (Sweeney et al., 2018, p.1087). The service recipients’ perception of the choice to utilize their resources, or not, depends on how they mentally frame themselves in their situational context and their potential actions (Dweck & Molde, 2008). Hence, the participants varied in their level of experience and existing knowledge. Therefore, the study embraces the variety of responses in the service recipients’ description of similar tasks (either enabling or enhancing) in remote interaction with the provider to determine the value outcomes from their perspective. To support this goal, and to identify the respective value types for the individual radiographers, Holbrook’s (1999, 2002) value typology was applied (Figure 5).

Figure 5: *Overview of the value dimensions and value types*



Note. Adapted from ”Consumption experience, customer value, and subjective personal introspection: An illustrative photographic essay”, by M. B. Holbrook, 2006, *Journal of Business Research, 59*(6), p. 715. Copyright 2006 by Elsevier Incorporated.

The concept of consumer value types (Holbrook, 1999; 2002) was introduced in the literature review and is an established method to determine value types in varying industries – and when considering goods and services in B-to-C and B-to-B (Coutelle-Brillet et al., 2014; Holbrook, 2002, 2006; Gallarza et al., 2017; Sánchez-Fernández & Iniesta-Bonillo, 2007). The following section presents the identified value types based on Holbrook's (1999) value type framework.

Economic value

Economic value is described in Holbrook's value typology as extrinsic and self-oriented, which incorporates two types of value: 'efficiency' and 'effectivity'.

Efficiency value type

In this study, efficiency is understood as an input and output ratio assessment of the service recipients' resource integration behaviour. In terms of efficiency, the radiographers generally perceive their daily operational routine as demanding in terms of the delivery of daily patient workflow targets. Most of the radiographers addressed the high number of patients to be examined and highlighted the impact of immediate system malfunctions on their workflow (enabling task). As the radiographers perceived 'intense' time pressure to meet the tight patient examination schedule, any interruption of this workflow was described by all participants as an unpleasant and stressful situation (linked to negative emotions) generating the intent to find a quick resolution:

> P15: It is simply that we need help quickly because we have so many patients. They're waiting for an examination. No waiting time. You're really under the gun. What happens next? What should I do? Why isn't it working?

Whether economic value (e.g. time) can be derived for the radiographer through an increased efficiency value type (time optimization) is highly dependent on the outcome

(successful/unsuccessful) of the remote joint problem-solving task. The remote interactions with the service provider could, potentially, lead to time optimizations for the radiographers' workflow, as enabling tasks have higher criticality and an immediate response is required. Even after successful remote clarification with the service provider to re-enable the workflow, the additional task reduces patient workflow efficiency and, eventually, impacts the radiographers' daily working hours and, therefore, also their private agendas:

> P6: Because when the system is working again, we always have a lot of work to do to accommodate the patients.
>
> P15: So, half an hour seems endless because you are under pressure and the patients are standing there. And you also know that this half-hour lasts the whole day.

In contrast, enhancing tasks typically provide the radiographers with more freedom to operate autonomously and self-determine the appropriate timing to address the incident to the service provider. This allows them to coordinate their time better and expend less effort and energy to organize their daily workflow and, potentially, derive greater efficiency.

> P2: I preferably call at off-peak times when you don't have that pressure from all sides. That's just the way it is.
>
> P14: The fact that the colleague [remote expert] can connect directly to the device, that I can show him images – it is much easier when he can see the image directly and can perhaps already determine from it what the problem is, than if I first have to describe it to him in detail and he then misunderstands it because I have to describe it to him.

Nevertheless, some radiographer explicitly mentioned the possibility of addressing their inquiries directly to an agent through the customer care centre hotline and, therefore, they derived the efficiency value type through 'convenience'.

> P19: On the phone I can still observe the patient, but when I'm typing on the PC, that's not possible, it's rather inconvenient for me.

Overall, the findings for efficiency as a value type revealed high task- and resolution output-dependency in remote joint problem-solving interactions. Enabling tasks are predominately perceived as a necessity and additional time and energy investment into the output is highly unpredictable, hence only limited economic value can be derived for the radiographers. Given the existing remote service literature (Paluch, 2011; Wünderlich, 2010), the perspective of the service recipients reveals new insights, as typically, a more generic customer perspective is taken, and this is primarily linked to monetary cost or time savings. In contrast, for most radiographers enhancing tasks create efficiency (time optimization and autonomy) in their professional practice and it seems to be deemed as an appropriate investment of their energy, saving them valuable time in their daily work operations.

Excellence value type

Holbrook (2002) related excellence to the concepts of quality and satisfaction. For this study it important to understand how the radiographers experience excellence through their remote service interactions with the service provider. As an important prerequisite for contact to address the service incidents and engage with the service provider, the participants named the consistent 'availability' of the customer care centre and the 'response' time of the remote service expert:

P1: The hotline [customer care centre] is always there. […] You get used to having to say the number and describe the problem. That is perfectly good and correct. You don't have the feeling that the information is lost or taken the wrong way.

P3: Of course, sometimes it takes a while until someone is free [remote service expert], that's clear. But I'd say, it's within a reaction time that I personally find to be mostly satisfying, in exceptional situations it's sometimes not, but it's normally good.

In general, the derived excellence value type through 'availability' and 'response' time was described as even more important for enabling tasks than for enhancing tasks. Nevertheless, excellence (availability and response) was derived for both task types. However, enabling tasks were predominantly perceived as the service provider's responsibility and, therefore, most of the radiographers perceived the excellence value type predominantly through the service provider's activities:

P3: So, there is a certainty that you know if there are problems, then you can call. As a general rule, the problem is dealt with promptly and help is provided. So, I find that reassuring and supportive.

P18: So there, I think, I assume that they decide internally what is necessary. So, I couldn't judge that at all now.

Contrary to enabling tasks, in enhancing tasks excellence is mostly derived by the informational exchange with remote service experts, who typically have previously experienced working as a radiographer. In these situations, a deeper informational exchange between the radiographer and remote expert was noticed. The radiographers chiefly described this exchange as consisting of an in-depth discussion with the remote service expert:

> P16: I have someone else qualified sitting on the other side. Then I say: "Good, then I simply need that". I think that's important.

Similar to the efficiency value type, the excellence value type revealed high dependency within the related tasks. Thus, all radiographers derive excellence through the 'availably of' and 'swift access to' the customer care centre and the 'response' of the remote service experts. The radiographers described the enhancing-task interaction with the service provider as more beneficial and invest more energy, relatively speaking, in this type of exchange.

Social value

Social value is described in Holbrook's value typology as extrinsic and other-oriented and includes the: 'status' and 'esteem' value types.

Status value type

In this context, status is related to the radiographers' consumption experience of remote joint-problem-solving to improve their professional reputation. The reported data showed very limited derived social value through status value type gains via enabling tasks. However, some radiographers derived status through the interaction with the service provider and felt encouraged to diagnose certain system - and device - functions before they contact the service expert in future incidents and, hence, identified that they had acquired new skills to better isolate possible malfunctions:

> P14: I was taught to carry out these quality tests on the coils myself, so to speak, via remote. And that gave me the advantage of being able to see for myself whether it's really the coil or some other problem. Which, of course, is also more helpful for [company name] employees in the long run.

As enabling remote service interactions are generally unpredictable in their outcomes, and mainly directed by the service provider, the radiographer's energy and time are not necessarily recognized by others in their organization.

> P3: Everyone [in the service recipient's institution] is happy when things move on. Most people are no longer interested in how it was done, I would say.

If the remote service interaction was judged to be successful, it still appeared to be important to regain the time invested, as described in the efficiency value type. In a remote service interaction with negative outcomes, the entire workflow is interrupted, and the radiographers need to communicate this message to the patients and their superiors and colleagues, which requires additional energy investment and may cause dissatisfaction for themselves and others.

Nevertheless, during enhancing tasks some radiographers highlighted that they derived social value through the status value type by addressing their responsibilities and skills to enact rarely occurring examinations, improving patients' image quality and were also proud of coordinating a high number of patients per day. The 'expertise' of the radiographers for certain patient examinations is appreciated by the radiologists and the service provider's remote service experts.

> P12: We have also had two or three cases where they have to do examinations that have not yet been done or are very rare, and especially with the application where you should think about how to do it beforehand. That's how it is. Then I know I can call.

From the radiographers' perspective, status is mostly a source of social value when consuming remote service interaction with the service provider during enhancing tasks. Yet they still invest their time and energy to allow themselves to demonstrate their

'radiography' skills to impress others and, therefore, potentially increase professional reputation. Based on the overall findings, status as a value type is an extremely limited source of social value for the radiographers when a consuming remote service.

Esteem value type

Esteem is defined as a more reactive appreciation to enhance one's reputation by receiving praise and achievements from others. The radiographers' esteem is typically gained for their performance in coordinating and executing patient examinations for enabling-and enhancing- tasks. Due to remote service remote technology, the service provider invites the radiographer to resolve (co-create) incidents beyond the daily scope of their work. Even so, radiographers describe positive and negative experiences when participating in remote service enabling- and enhancing- tasks; they perceived the conversation and feedback from the remote service experts as important, which then potentially increased or decreased their self-esteem. Some participants' self-esteem also suffered during a remote service interaction, e.g., when the communication with the remote expert was perceived as being too technical in its terminology for enabling tasks:

> P12: Well, I know that I also have colleagues who don't necessarily dare to call. Because they're afraid they won't understand. [...] Because it might get too technical. Or when they sit in front of the device and have to click on the individual functions, and they can't find them so quickly and so on.

In enabling remote service tasks, the interaction with the service provider expert is typically more technical and related to the medical device. In these situations, the radiographers are predominantly guided with e.g. system hardware related terminology by the remote expert to check, or execute, relevant functions.

In contrast, the terminology for enhancing tasks with the remote experts was described as 'expert talk' to examine patients and was perceived as an affirmation of their experiences and knowledge as radiographers:

> P2: It's a nice way of communicating with the other person and of course, it's something different from the daily routine. It's also nice to just talk business, for example.
>
> P8: Sometimes that's the way it is when you call. We recently had a knee examination where the measurement didn't work. And we then told the remote expert on the phone, "We did this and this." "Oh, that's exemplary." In that case, it was because we had already had this error once and had gone through all the possibilities. Of course, one is happy to receive such praise.

Generally, and independently from the tasks, some findings indicated that the radiographers derive social value through self-esteem and the consumed remote service interaction with the service provider. The radiographers offered a few positive examples where it was meaningful for them to invest their energy to derive self-esteem.

Hedonic value

The hedonic value type is defined as intrinsic and self-oriented and combines the value types of 'play' and 'aesthetic'.

Play value type

In this study, play is defined from the notion of 'interest', when the radiographer appreciates active involvement, or it facilitates the value co-creation process. More generally the interplay between patient and the medical device was highlighted by some radiographers, and that they felt positively challenged to facilitate the patient examination process:

P3: To be the mediator between patient and machine, I would say. Especially in MRI, it is always a very important aspect to take away the patient's fear and to integrate them into the system in a sheltered way. Yes, and of course an important prerequisite is that everything works and then[...]. A lot of things are fun[...].

The value type play was rarely identified for the enabling tasks. However, some radiographers described the challenge and excitement of finding a solution in enhancing tasks and described learning interactions with the service provider, as it brought them out of the daily routine work.

P1: I enjoy trying things out. Even without wanting to praise [name of the company], I really always do enjoy the application [service support] a lot.

P2: Yes, of course, it's nice to have someone on the phone who knows the subject very well. You learn something yourself. So, I like to call, and I also find it nice to communicate with [company name], because they always call back in any case, and I find that quite pleasant. And then you also have contact with the company, so to speak, which I also find very, very nice. Because otherwise a device will be left there and then, great. And so, the contact to [company name] is still there. So yes, it's good. It's really good, it's really nice. I've always enjoyed working with [company name] and that's really good.

In such cases, radiographers described these interactions as 'enrichment', where they acquired knowledge to either prevent incidents or they learned additional system- and software-related features that they can apply in the future. The radiographers appreciated such knowledge sharing with the remote service expert and derived, to some extent, hedonic value through play.

Nevertheless, compared to the overall amount of remote interaction, the situation where play can be derived from a remote enabling service interaction is relatively small. The perceived time pressure on radiographers' daily routine, and additional energy to synchronize with the remote service expert, primarily prevents the derivation of hedonic value through play. Therefore, the play value type was mainly identified during the enhancing remote service task.

Aesthetic value type

For this study aesthetic value is understood from the perspective of the radiographer as opportunities for joint problem-solving where there is more reactive consumption, nevertheless with appreciation, of the remote service interactions. All radiographers valued the possibility of the service being delivered remotely and perceived their overall experience in managing the service incident as very satisfying. Some radiographers identified that they derive the aesthetic value type when they perceive friendly and pleasant remote communication with the service provider:

> P5: The people are always friendly and nice on the phone. I never had a negative impression.

However, in enabling tasks in particular, radiographers derive aesthetic value through relatively passive behaviour. This is also interrelated to the economic value type, as it improves their convenience (less time and energy invested in the remote joint problem-solving), while the outcome is mostly delivered by the service provider. Some radiographers appreciate letting the service provider decide the steps during the service encounter and let them organize when the patient workflow can be resumed.

> P18: Well, I think I assume that they decide internally what is necessary. So, I couldn't judge that at all now.

Some statements referred to the “knowledgeable” remote expert and that these experts decide how to continue with the workflow, and, therefore, with scheduled patients. In this sense, the radiographer prefers to place their trust in service provider’s capabilities and lets them execute and conclude the remote service interaction. Whether this trust is the outcome of previous experiences with the remote service interaction, or developed through other antecedent activities, e.g. earlier on-site service interaction, cannot be clarified in this study. However, the process of value co-relation (see section 2.3) indicates that the building of a business relationship between radiographers and remote service experts through remote joint problem-solving interactions is relatively limited. Similar findings were evident in virtual organizations, where technology-mediated communications relationships were revealed as being less sustainable than face-to-face communications (Crossman & Lee-Kelley, 2004).

The possibility of remote service was generally appreciated by the service recipients. Specific examples of the aesthetic value type have also been rarely identified from the interviewees’ responses. In addition, the enabling tasks here have been identified as generating aesthetic value when radiographers invest their time and energy to care for the patients and manage workflow, rather than to engage actively when processing an enabling task. As patient coordination and execution are perceived as their core role and responsibility, aesthetic value might rather be accrued for some radiographers when the service provider is progressing the remote service interaction without them. This was also identified in relation to the efficiency value type, as some radiographers invested their time and energy to re-enable the patient workflow and therefore, potentially miss an opportunity for mutual appreciation with the service provider. Even if some radiographers

were able to derive the aesthetic value type in some enabling tasks, the enhancing tasks were described as better opportunities to accrue the aesthetic value type.

Altruistic value

Altruistic value is defined as intrinsic and other-oriented and integrates the value types of 'ethic' and 'spirituality'.

Ethic value type

In this study, the ethic value type is understood as the consumption experience of remote service interactions that will affect others or how they react. A salient theme for all radiographers when participating in a joint problem-solving situation is a swift response to incidents, or potential incidents, and therefore ensuring patient wellbeing. The radiographers named various situations where they cared for either a single patient, e.g. during interrupted examinations or multiple patients and needed to reschedule the daily workflow. Whilst it is self-evident that the radiographers' professional position is to care for patients' wellbeing, it is not clear to what extent this behaviour is only for the sake of the patients and intrinsically sourced. As social value (for others) might also impact the motivation to care for the patients' wellbeing, the ethic value type needs to be understood in the value co-creation process (see value co-creation process section) to differentiate the value types effectively. For most radiographers, ethic value can be derived from remote service interactions when patient safety is (potentially) at risk and when they contribute to the patient's wellbeing and experience of the examination:

> P3: Or if the patient receives an examination for the lumbar spine or a knee, for example. That's where they can be more flexible with the head. And with the lumbar spine you can say: "Okay. Lift up your chin! Ah! You can see out." Then they are always very enthusiastic.

Some radiographers described the situation where they reshuffled the patient schedule when they realized that certain examinations are required that go beyond their repertoire and arranged remote service support to proceed with this examination on the same day. These kinds of motivation have been reported as being for the sake of the patients. However, some radiographers described the increased stress from remote service interactions and stated difficulties in simultaneously coordinating joint problem-solving and patient wellbeing:

> P2: So, what doesn't work well is, for example, when we have to do things and have abdominal exams where breathing commands are being given when we really need to have a look at the image quality. Complex examinations and remote service don't mix. Because you have to concentrate equally on both, and I don't think anyone can multitask in that pronounced way. And of course, the patient wants to be looked after very well and they need a certain kind of care in the MRI, we have to make sure that the image quality is good.

Generally, the decision to engage in joint problem-solving and derive ethical value from consumption is accompanied by tensions. This tension is described further in the value co-creation process section 2.4 that discusses the radiographers' sensemaking behaviour.

However, some radiographers reported disappointment when the outcome of remote service interaction remained unsuccessful and they needed to manage expectations for some patients, therefore, potentially destroying ethical value.
Nevertheless, all radiographers positively highlighted interactions with the patients and generally shared the feeling of satisfaction when providing a convenient and comfortable examination and therefore, also derive ethical value, in general. However, as stated by the

radiographers, the consumption of remote service interactions has a relatively limited impact on the relationship with the patients.

> P10: Well, I don't know of any examples with even more remote services. What we have always used in the past is only in situations when errors occur. Otherwise not. That's why I don't have a comparison of what more could be done.
>
> P6: You don't have the time in your daily routine to have someone (remote service expert) always looking in on you. And I think that as an MTA you have to know roughly how to set it up. You can figure out small things yourself by trying them out, […].

Spiritualty value type

Spirituality for this study is related to remote service experiences where the radiographers perceive a 'magical' experience or some form of 'flow' state appreciation when interacting with the remote service provider expert (Holbrook, 1999). The reported data showed no indication for such an appreciation of remote service. As also stated by Holbrook, spirituality as a value type is rarely found in the literature. Nevertheless, some radiographers highlighted on-site instruction events with application training staff as an 'enlightening' experience and evidently indicated this in their preferences. This feeling was also linked to experiences from initial MR technology breakthroughs and that these times have faded as the technology has become more commonplace:

> P15: So basically, it's always nice to have some training now and then. [...] Mr. [name of the service provider field staff] used to do that whenever there were some innovations. He asked: "Ladies, how does it look, I'll come for an hour, I'll tell you about some new protocol features and processing". That was great. That was really great. We don't have that anymore.

P16: I would find it nice to have another small training session or something like that. So that you can find solutions in small groups. That would be quite interesting.

However, the radiographers did not describe such an inner feeling of flow when experiencing remote service interaction and therefore, spirituality as a value type does not contribute to derive the altruistic value type when consuming a remote service.

Summary research question one:

Research question one addressed the service recipients' derived value types in terms of different remote service tasks and consumption experiences. Generally, the findings revealed a mostly positively acknowledgement of the potential of remote service delivery itself. The appreciation of the remote service value co-creation opportunities from the perspective of the service recipients can be described as rather moderate and varied at the individual level. However, almost all of Holbrook's (1999) consumer value types have been found. One exception remains for the spiritualty value type, which was not evident in the participants' data. Similar difficulties in identifying the spiritual value types were described in the literature (Sánchez-Fernández et al. 2009). Similarly, the literature offers contested discussion of dimension selection for extrinsic vs. intrinsic value types (Holbrook, 1999), stating that it is not always straightforward to determine which is evident (Richins, 2002). In particular, the efficiency-and ethic-value types were difficult to differentiate. However, Holbrook (2002) emphasized that the dimensions should not be interpreted as dichotomy, but rather understood as a continuum. "Thus, a typology should not be misunderstood as delivering precise descriptions of different service processes but rather as a way to illustrate certain tendencies" (Engelhardt et al., 1993, as cited in Eichentopf et al., 2011, p. 657). In this sense, Holbrook's (1999) concept of consumer value provided meaningful insight to better understand the described experiences of the service recipients in this B-to-B context.

The categorization of the radiographers' tasks as enabling- and enhancing provided important insights into the situational context when remote service is consumed, and certain value types are derived. The identified value types revealed high dependency on the radiographers' accomplishment of the tasks. As a result, enhancing tasks predominately provide more variety of value types and potential value co-creation opportunities than enabling tasks.

However, independent of the task type, most of the identified value-types occurred within the remote service interaction with the remote service expert. Only efficiency- excellence- and aesthetic value-types have been identified during the remote service interaction with the customer care centre. The asymmetric distribution of value types at different interaction points within the same remote service encounter leads to further investigation of the value co-creation process itself. To understand the different conditions of operations to explore when, and how, these value types can be accrued, the value co-creation process of the remote service encounter is addressed by research question two.

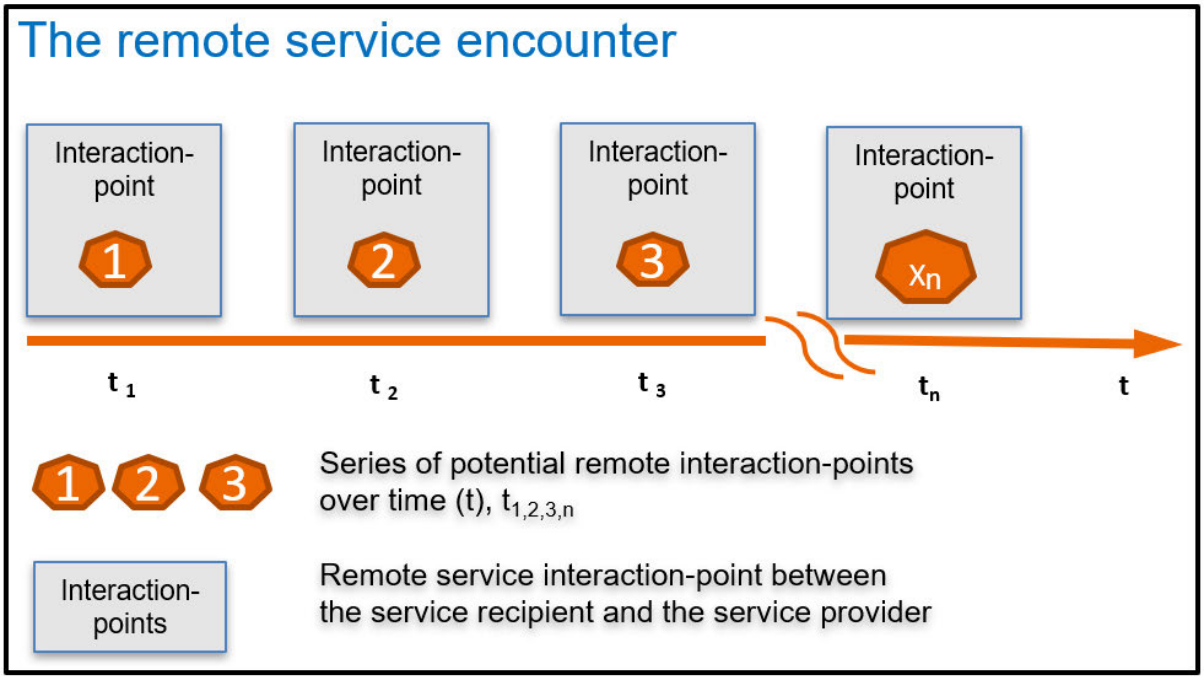
4.2 Research Question Two

The second research question aims to understand how the value co-creation process influences service recipient value when consuming a remote service interaction. The focus of this study is the perspective of the service recipient and how value is created, or not, when interacting with the service provider remotely. According to the framework from Payne et al. (2008), the customer process is conceptualized as the interplay between 'customer learning' and 'relational experience' (p.86). Payne et al. (2008) state that service recipients relational experiences from the service encounter process with the service

supplier are represented through emotional- cognition-and behaviour-elements. In addition, Payne et al. (2008) defined the service encounter as an opportunity to co-create value and, in learning, to form value propositions for the service supplier (p. 88). As this study follows the outside-in perspective, the opportunities to co-create value during a remote service encounter have been firstly recognized by the identified service recipients' tasks (enabling- and enhancing-tasks, see research question one).

When considering the service encounter for remote service delivery, the service provider has designed remote services as a series of different interaction points for joint problem-solving (see Figure 6 below). Therefore, the nature of the interaction is, potentially, asynchronous.

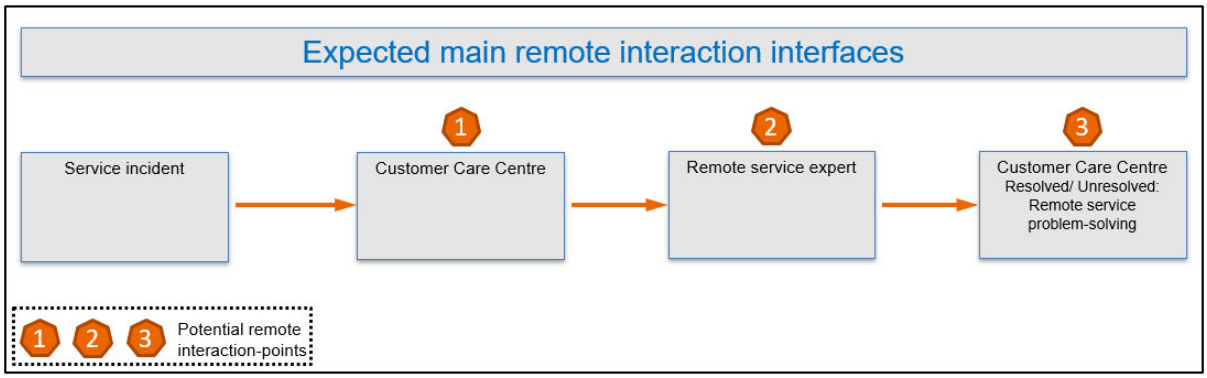
Figure 6: *The remote service encounter, a series of interaction points*



The findings from the radiographers' descriptions of the remote service encounter provide an overview of the potential remote service interaction points with the service provider. When the radiographers encounter enabling- or enhancing-tasks, they often anticipate a

flow of interaction points: Customer care centre, remote service expert, customer care centre (as shown in Figure 7).

Figure 7: *Service recipients expected main remote interaction interfaces*



When the radiographer is reaching out to the service provider, the remote service expert will follow a script and use prompt questions to narrow down the nature of the problem situation:

> P14: You are first directed to a call centre where you have to give them the medical device identification number. They then record the error, and a technician usually gets back to you as soon as possible.

The remote service experts are encouraged to ensure that no patient harm has happened and attempt to categorize the criticality of the incident. Some radiographers described the procedure as taking too long and shared their intention to advise the remote expert what needs to be done to quickly find a solution:

> P4: He [the remote service expert] looks at it from a different perspective than I do. One already has the impression that a clear path has been established that they check. That is the case. There are definitely procedures in place. And I would wish

> that sometimes there would be a quicker open communication about what the problem actually is and whether we can continue or not.

When the escalation is addressed in the call centre and the return call is initiated, radiographers partially shift to a joint problem-solving task with the service provider. However, radiographers retain the responsibility for how to continue with the remaining patient examinations and continuation of activity is expected by superiors, colleagues, and patients alike. The internal- and external communication required necessitates quick decision making and, in most cases, when the remote service has not started:

> P3: So yes, because in the meantime everything is rushing at you - doctors, patients, registration staff. What is it now and can we continue, is it completely defective, do I send the patients home, do we make another appointment, or should they wait? You have to balance it out a bit and stay calm and always put them off, waiting for a call-back. And only then can you make a meaningful statement about it, everything else is speculative. In that way, that can sometimes be a tense situation.

Once the remote service expert interacts with the radiographers, a more prescribed standard of troubleshooting will be applied. This process has been described by some as being thorough, and sometimes too detailed, as some might perceive that the process restarts instead of following their suggestion to solve the problem. And, hence, some radiographers like to guide the remote expert immediately to solve the problems:

> P3: And sometimes on the phone you have the feeling that you are not assessed professionally in such a way that you have already tried everything possible up to a certain point, but then you go on to chew over everything that is self-evident, which you actually thought you had already said.

> P12: I say, for heaven's sake, these are basics now. And we've been doing it for a few years. Of course, we do that.

However, the data revealed that radiographers have different remote engagement strategies for joint problem-solving during the service provider's remote service activities:

> P19: To be honest, I don't really know. At some point it worked again. But I think I was then left on the phone because we then restarted again, I think, but then it worked again. I don't know what he [the remote service expert] did, but he got it working.
>
> P1: As a rule, I don't pick up the phone when an error occurs. Even if I don't know what the error is. I've always driven old cars. I know the device and then always try it out first.
>
> P14: I also want the problem to be found quickly. And if I can help by doing a five-minute coil test, then I'll do it […] I mean, I was taught to be able to carry out these quality tests for the coils myself via remote. And that has already given me the advantage that I can first see for myself whether it's really the coil or some other problem. Which, of course, is also more helpful for [service provider company] employees in the long run.

The different participation behaviour, i.e., how the radiographers contribute during the service encounter, have been contrasted through the lens of high- and low participation-levels in alignment with the existing value co-creation- and customer participation-literature (Dong and Sivakuma, 2017; Mustak, 2019; Mustak et al., 2016; Yi et al., 2011).

The participation allows the radiographer to engage in the remote service process to improve the potential outcome. The decision surrounding to what extent the radiographer participates in the joint problem-solving situation can be described by their different

process behaviour (offering information, offering an opinion, seeking information, contributing, accepting direction, etc.). Recent service studies showed a positive impact on customers' perceived value when the participation level is higher (Ng et al., 2016; Sweeney et al., 2018). Nevertheless, little is known about the service recipient's participation in different tasks in a service encounter with several interaction points. As the findings from research question one highlighted, the differences between the service recipients' tasks, enabling- and enhancing, needs to be considered, the different engagement behaviour from the perspective of the radiographers needs to be explored (Aarikka-Stenroos & Jaakkola, 2012).

To further understand the phenomenon of how the radiographers operate in their workplace when encountering remote service value co-creation opportunities with the service provider, the remote service value outcome (value types) and value co-creation process are addressed in one framework. The diagram below broadly presents, who, what, how and when remote joint problem-solving interactions occurs (Mencacelli & Rivière, 2015).

Figure 8: *General overview of potential service task for the service recipient with different participation rate*

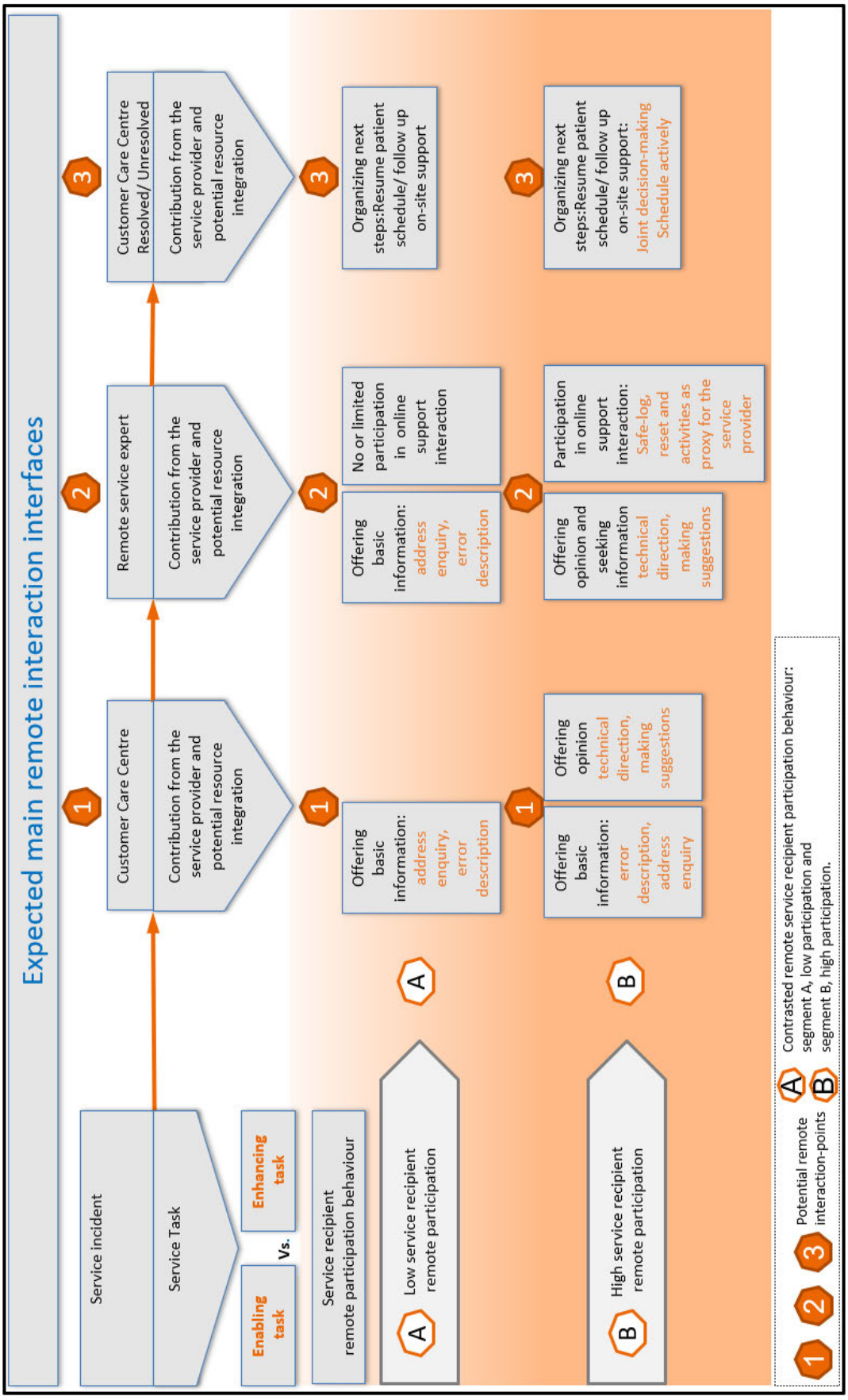


Figure 8 begins with the service incident and the resulting categorized tasks (enabling- or enhancing) from the perspective of the radiographers and is followed by the radiographers' anticipated different remote interaction points when seeking to jointly resolve the problem with the service provider. The typical sequence of the different interaction points in the remote service encounter are broadly labelled as first: 'customer care centre', second: 'remote service expert' and third: 'customer care centre'. The figure reduces the number of the remote service interactions to a minimum for the sake of clarity, but it is worth remarking that several loops of remote interaction may occur between the initiated service incident and the mutually agreed resolution of the incident:

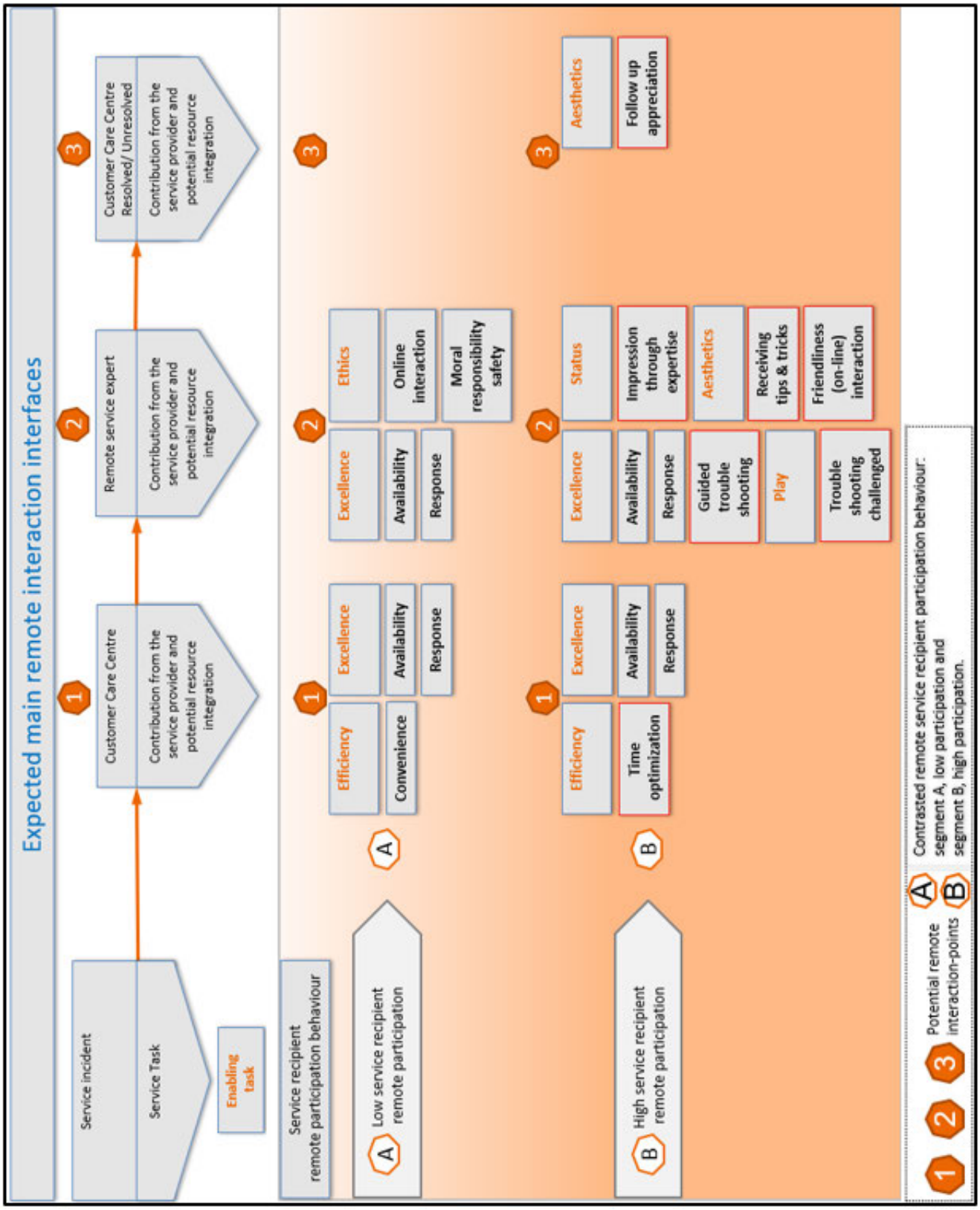
> P7: We had the medical device not reconstructing certain sequences or not letting you send them. And this happens over days. One day it's once, the next eight times, then fifteen times. That he could follow this in order to narrow down the error a bit or to say: The software is on the edge of not working again.

The figure also identifies the contribution and potential resource integration of the remote service provider staff, which is illustrated at the different interaction points. In addition, to broadly address the variety of the service recipient remote participation behaviours, the participation level has been contrasted in segments A: low participation behaviour and B: high participation behaviour. The distinct segments (A and B) contrast the different service recipients' engagement behaviour during the remote service encounter (interaction points 1-3). The illustrated interaction points (1-3) support the idea of determining when certain value types (as addressed in research question one) might be derived when consuming remote service. Therefore, Figure 8 holistically integrates and supports the examination of the derived value type outcomes at different interaction points in the value co-creation process.

Such findings are rarely described in the literature as value outcome determination and the process of value co-creation is typically discussed separately (Gummerus, 2013). However, recent literature supports the finding that value outcomes are interconnected, and this should be considered, rather than treating them in isolation (Fuentes et al., 2019). Based on the developed framework (Figure 8), the next pages explore the value outcome and the process of value co-creation entanglement.

Firstly, the work explores the accrued value types at different interaction points for enabling- and enhancing tasks and different remote service engagement behaviour. Figure 9 illustrates the remote service participation and derived value types at the different interaction points (1-3) for the enabling tasks.

Figure 9: *The service task 'enabling' with Holbrook's consumer value types and derived subcategories at different remote service interfaces*



Enabling tasks require a swift problem resolution either by radiographers themselves, by mobilizing their existing knowledge or skills to solve the issue, or by contacting the service provider immediately (see Table 7). As one participant reported, this often relates to the sensitivity of the situation with the patient when unexpected events occur:

> P1: The biggest challenge is actually the patient. The diameter of the gantry is very small and the gantry is very long. But you never know how the patient will react. There may be contrast medium incidents. You also need a relatively long time if the patient panics, until you can get in and get the patient out. It can take almost a minute. If you imagine yourself being trapped in a situation like that for a minute, that's a long time. If you notice that the patient is unsafe, then you are usually already a bit stressed yourself.

The situation described above also reveals the ambiguity that radiographers may need to anticipate when encountering severe patient exam interruptions. Patients may also react differently during diverse patient studies. However, the radiographers are asked to reach out to the service provider by, firstly, contacting the customer care centre to address their inquiry.

Enabling task remote interaction point 1

The first potential interaction point with the service provider stresses the importance of immediately addressing the service incident to the customer care centre. The derived value type outcome, 'excellence', was identified as essential to initiate the remote service interactions. This study revealed the excellence value type, and its subcategories: 'availability' and 'response' time, as salient to pursue within the remote joint problem-solving situation. Generally, radiographers' perceived access to the service provider at the first interaction point – the 'availability' of the hotline and 'response' time (within a couple

of seconds) –as predominately sufficient to address their inquiries. Nevertheless, some radiographers expressed potential concerns that the 'availability' of the hotline is not sufficient during the weekend or after 'normal' working hours:

> P1: The hotline is always there. […] You get used to having to say the number and describe the problem. That is perfectly good and correct. You don't have the feeling that the information is lost or taken the wrong way.
>
> P2: Honestly, sometimes I'm here at six o'clock in the morning and that's actually quite nice, or when you leave later at 8 P.M. or 10 P.M., and you still have someone. I'll say that it's the same with the bank. With an online bank, I can call them around the clock. Not at three o'clock in the morning, of course, but I wouldn't have any problem having someone on call until midnight if I'm studying or other things, that's not bad, a kind of on-call service somewhere.

However, the participation behaviour of the radiographers differs when interacting with the customer service centre. Whilst the data revealed low-and high-participation behaviour to derive economic value through the efficiency value type, some radiographers with less participation engagement derive efficiency through convenience. Convenience in enabling service tasks is understood as radiographers partially shifting the joint problem-solving task to the service provider. However, the internal- and external communication requires quick decision making and, in most cases, whilst the remote service has not started the radiographers tend to invest their energy in focusing on the communication with the patients:

> P15: Patients are waiting for an examination. No waiting time. Many are afraid and of course, that is also the case nowadays. It was different twenty years ago; you had more time. But now you have to be friendly, be quick, be good, take decent images.

> P16: First of all, it is important to perceive the patient as such. In other words, as a person. I think that is very important to the patient. You have to approach him with friendliness, because he is ill. The patients don't come here for fun. It's really the case from front to back that you have to make sure that you handle it accordingly. Of course, the times are sometimes very tight. But you have to take five minutes for the individual to discuss questions with the patient or to help with something. The patients attach a lot of importance to that. Also with positioning: here a pillow, there a pillow. It is very important to respond to the needs.

Once the contact to the call centre has taken place, the call agent will attempt to link the radiographer with the remote expert or ask them to wait for the return call of the remote expert. In enabling workflow situations, most radiographers described this waiting time as very critical and that it is perceived to "take forever". As expressed by the radiographers, the return call occurs in approximately 10 minutes if the system is not operational. However, the radiographer needs to decide if the patient examination could be continued or if there is a need to re-coordinate the remaining patient schedule for the day. Potentially longer working hours for the radiographer might be a consequence, as the scheduled patient examination should proceed once the remote service interaction solves the issue or it remains unsolved for the day and a service intervention occurs on-site. As the patients in the waiting area do not know the reasons behind the additional waiting time, they might wonder why they no longer see progress in the workflow. As unexpected waiting times for the patients may lead to frustration, some studies have revealed that radiographers are also confronted with violence (Caruana, 2005; Ng et al., 2009). In addition, some radiographers expressed difficulties in the remote service interaction by having to explain their inquiry and

were annoyed by repeating the same information or felt that they had not been taken seriously:

> P8: Well, maybe when we had some problem with the table. We somehow had a little bit of a feeling that some technicians thought: “The radiographer has now pressed something wrong or something”.

This may lead to the perception that their professionalism and ability to show sovereignty might be undermined and, perhaps, also noticed by others. This could be perceived as their having lost control of the situation and therefore, potentially reduce or destroy social value. Before the insecurity of the situation is noticed by others, the radiographer may tend to come to a quick decision rather than to engage in a joint troubleshooting interaction that may seem to them to result in the same outcome.

Conversely, radiographers with high participation behaviour derive efficiency as value type through improved time optimization, especially in terms of their invested energy to prepare themselves better and narrow down the possible root causes of the unexpected interruption. This revealed their engagement in joint remote enabling service tasks. Another counter activity that reduces the time in joint problem-solving interactions is attained by providing precise error descriptions from the medical device. Consequently, some radiographers take notes or pictures to communicate efficiently:

> P1: That’s why I take a photo of the error message when I think of it. I usually try it out a bit, shut down the unit, start it up again and it usually works again.
>
> P15: You just have to say that (laughs). I love calling a technician [service provider field staff] where I know he can help me.

Whether these pre-service encounter activities are considered to avoid, or reduce, the time for remote joint problem-solving with the service provider is not the subject of the study.

However, the activities have resulted from previous remote service interactions and become additional skills and knowledge to enable radiographers to manage tasks at their workplace.

Enabling task remote interaction point 2

Generally, enabling tasks with the remote service expert were described as very uncertain and as being almost unpredictable in terms of the outcome for the radiographer and were, therefore, primarily perceived as stressful (Table 7).

> P15: And then it's always a bit difficult. So, you call [name of the service provider], go to a customer care centre, say: "Device blablabla". And then they say: "Yes, the colleague will get back to you in a moment". And of course, that is sometimes a bit difficult for us, because we have a quarter-hourly cycle. Then we wait.
>
> P3: So yes, because in the meantime everything is rushing at you - doctors, patients, registration staff. What is it now and can we continue, is it completely defective, do I send the patients home, do we make another appointment, or should they wait? You have to balance it out a bit and stay calm and wait for... Always put them off waiting for a call-back. And only then can you make a sufficient statement about it, everything else is speculative. In that regard... Yes, but that can sometimes be a tense situation.

Similar to remote interaction point 1, excellence value was derived in low- and high remote participation behaviour for the service recipients at remote interaction point 2.

> P3: So there, I think, I assume that they decide internally what is necessary. So, I couldn't judge that at all now.
>
> P9: Everything is fine from the point of view of the process. I'm not going to say that [company name] has to act in a completely different way or come up with something

else. They are always looking internally and then they send people. You don't have to worry about that. That's perfectly fine.

Although the investigation of technical equipment errors is usually not described as the area of the radiographer expertise, some showed more engagement to act with the remote service expert to resolve the problem than others. Bandura (1997) defined self-efficacy as an individual's confidence in their ability to organize and execute a given course of action to solve a problem or accomplish a task. Bandura further argued that some people have stronger self-efficacy beliefs than others. In addition, Eccles and Wigfield (2002) argued that self-efficacy belief and expectations of certain outcomes are also related to the relevant task. In the context of remote service Wünderlich (2010) additionally found that customer participation is influenced by self-efficacy beliefs and that these affect their attitude to joint remote service.

The present study has shown that it is important to consider the professional skills of the service recipients with the required skills of the remote task to be done and in which context (temporal- spatial and relational) this should be carried out. As described above, the radiographers' competences are less important and developed in relation to their ability to analyse medical device malfunctions in enabling tasks. This may also influence the decision making to participate in an enabling task situation. Bandura (1997) argued that even when people believe the outcome can be influenced it does not necessarily mean that they exercise control or initiate a response unless they believe that they are capable of it. This may influence some radiographers to follow a rather limited or low participation behaviour strategy in enabling remote joint problem-solving situations. In this sense, the radiographer perceives the external uncertainty as uncontrollable, and that the negative events could lead them to abandon attempts and create passivity in their behaviour (Skinner, 1996).

Ellen et al. (1991) argued that technology innovations are more likely to be successful if the individual perceives that they have the required skills to realize the change. Self-efficacy involves the individual assessment of personal capabilities and access to available means to exercise control over, and subsequently, influence goal-setting (Bandura, 1997). Therefore, some radiographers derive excellence through delegating the responsibility to the service provider and then withdraw from the joint problem-solving process by relying on the competencies of the remote service experts. In contrast, in the cases where radiographers have a low participation rate, the ethic value type was identified. Predominantly, the ethic value type was derived during the remote service interaction with the service provider through moral and safety aspects (see discussion of ethic value type above).

However, some radiographers with high participation behaviour demonstrated they derive more overall value co-creation opportunities and accrue more value types. The excellence value type was appreciated through guided troubleshooting with the service provider. Some felt personally challenged to proceed with the troubleshooting activities and were able to derive 'play' as value type:

> P5: By being able to prepare images before I share them with someone where the error is clearly visible, which they can then look at in detail. I find that to be a support and a relief.
>
> P3: And I particularly love such challenging examinations where you programme the protocols with the company, which we fortunately often do here. Cardiac examinations or angiographic imaging, where you have to provide a bit more input and where it's a bit more exciting than a routine knee or spine examination.

Another value type that was derived is the aesthetic value type through remote interaction with the remote expert by 'friendliness in online interaction' and 'receive tips and tricks', to

learn new skills to further investigate potential root causes or malfunctions and gain new experiences. As described above ‘friendliness of online interaction’ was less specifically commented upon and rather addressed to the service provider in general. However, to ‘receive tips and tricks’ the service recipients rather interacted with the on-site field staff rather than during a remote service interaction.

Alternatively, some radiographers prefer to conserve their energy in terms of joint remote service interaction and subsequently participate less. They do this by anticipating their experienced service from previous experiences when remote service was less effective. In addition, it might be also due to experiences from less successful joint problem-solving incidents, which probably lower their expectations. To reduce the uncertainty in the current enabling situation, they tend to extend their prior experience to evaluate their effort. Comments that referred to previously experienced service interventions with on-site field staff reveal that they prefer this service:

> P14: The company was also contacted because we could no longer operate the equipment. And they couldn’t solve the problem remotely because they said it was the electrician’s problem and the electrician couldn’t find a solution. So, it took quite a long time until we had electricity again, which would actually have been a matter of half an hour.

In the remote service interaction with the experts, the radiographers tend to ensure straightforward communication. To avoid potentially misleading technical descriptions or terms. The radiographers also use communication strategies such as, taking pictures, screenshots or making exact notes of error messages before they reach out to the service provider.

Enabling task remote interaction point 3

The third interaction point is described as the conclusion- and final decision-making point, and centres most often on whether service intervention (online or on-site) is needed, or not. In the case of system recovery, radiographers with a lower participation strategy are principally focused on regaining the time lost to again meet their patient schedule and therefore, pay less attention to further communication with the remote expert or customer care centre. As the system usually needs to be tested for full functionality the remote connection will be terminated and, in most cases, so will the call. Consequently, any potential mutual appreciation rarely happens immediately after the incident is resolved. Either the radiographers are asked to call again and signal that the problem is not resolved, or the remote experts call later to ensure that the system is working normally. Nevertheless, some radiographers mentioned a follow-up call after the joint remote troubleshooting and perceived this as a 'moment of appreciation' for themselves and were grateful for the support, as an outcome of their participation. Therefore, the aesthetic value type has been identified as relevant for the service recipients, as it provided an additional opportunity to jointly conclude and mutually appreciate the invested energy by both sides:

> P6: You get the impression that they are also interested in a quick solution. In this respect, one gains an appreciation for the joint work on the problem.
>
> P8: When the device is working again, so we always have a lot of work to do to accommodate the patients. So, we don't call back and say it's working again, and everything was fine. When the technicians are on-site, sure, we still communicate, they usually stay to see if it's really working. But not by phone.

Summary enabling task remote interaction points 1-3

The different value types for each remote interaction point in enabling tasks have been identified. The examples of the contrasted participation rate of the radiographers identified more derived value types in the high participation rate than in the low participation rate. The co-created value types within higher participation rate have been described and are highlighted in Figure 9. When actively engaging with the remote service provider, the value type subcategories: 'time optimization' at the first interaction point; 'guided troubleshooting', 'impression through proactiveness', 'troubleshooting challenged' at the second remote interaction point and 'follow up appreciation' at the third interaction point have been derived.

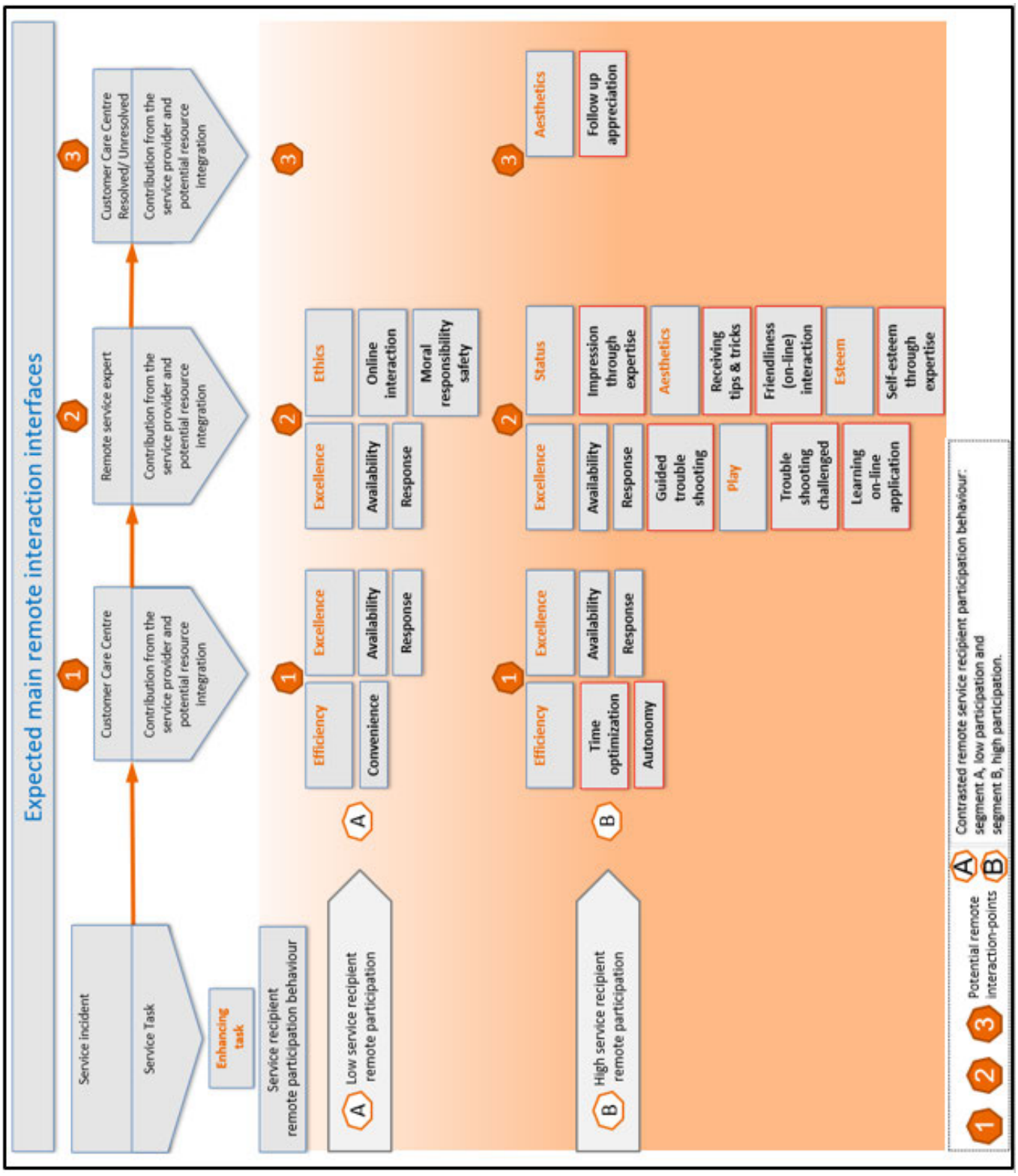
However, for the enabling value co-creation process, all radiographers confirmed the importance of temporal aspects (especially 'response' time and 'availability') of the service incident in their remote interactions with the service provider. Heinonen (2004) demonstrated that temporal dimensions have even more impact on perceived value than do the functional- or technical dimensions and referred to the notion of hygiene factors (Herzberg, 1968). In the context of this research, it could be confirmed that the 'availability' of the customer care centre and the 'response' time of the remote expert in enabling tasks are crucial and are more often described as 'a necessity' to address the service incident. To what extent the absence of 'availability' or 'response' time might translate into the overall satisfaction of the remote service encounter is not part of this study. However, Norman (2001, p.27) described the degree to which resources are accessible in a specific constellation (situation, time, space, actor) as "density" and concluded that the higher the density of potential resources, the higher the opportunity to derive value. Whilst this assumption is rather general, the constellation for this study confirms the need for higher

density in enabling remote problem-solving situations. More specifically, the timely requirement in terms of 'response' time and 'availability' are evident in the situational constellation of time and actors.

With regard to space, the study sought to only investigate the remote service encounter. However, the work refers below to some comments from the radiographers that indicated pre-remote service encounter activities that have been realized in a different 'space' than the described remote interaction points (1-3). Therefore, the constellation of the situational context is further discussed.

Figure 10 illustrates the remote enhancing task for the process of value co-creation with the service provider and contrasted service recipient behaviour levels (low-and high-participation). In addition, the most relevant identified derived value types and derived subcategories from Holbrook's (1999) concept are visualized at the remote interaction points (1-3). The red-framed sub-categories of the different value types indicate the additional value co-creation opportunities when actively engaging (high participation) in the remote joint problem-solving process.

Figure 10: *Service task 'enhancing' with Holbrook's consumer value types and derived subcategories at different remote service interfaces*



The nature of the enhancing task is described in Table 7. Yet, radiographers described enhancing tasks as being less stressful, as they have typically more time to plan their activity with the service provider. Thus, such problem-solving interaction might be postponed or scheduled to occur in non-peak working hours, which provides the radiographer with “more freedom to act”:

> P1: If the images don’t turn out well during a scan or if any artefacts appear, you can go on, do something else and then write down the question. Then, for example, you can call the application in advance for the next liver examination and ask them to call you back at a certain time. Then you clarify that and then they also connect to it (medical device).
>
> P13: We once urgently needed a sequence for the MRI and the contact person configured it for us remotely. That helped us a lot because it worked fast and on short notice.

Additionally, most radiographers provided clear expectations and assessed the enhancing tasks as typically being more successful in terms of achieving the desired outcome. Nevertheless, from the perspective of the radiographers, the enhancing remote service encounter is similar to the enabling task, in that it is designed to start with the customer care centre.

Enhancing task remote interaction point 1

Similar to the enabling task at the remote interaction point 1, the excellence value type (‘availability’ and ‘response’ time) was derived in low- and high remote participation behaviour for the service recipients. As, also with the enabling task, in low participation behaviour ‘convenience’ and in high participation behaviour ‘time optimization’ have been realized to derive efficiency as a value type. However, as described by Participant 1 some

radiographers invest their energy to determine the timing for their enhancing task inquiry to demonstrate autonomy and derive economic value through the efficiency value type:

> P6: If you somehow had an examination that you either haven't done for a long time or haven't done so often, that you could possibly call for a proposal protocol, one day, two days earlier or so. You don't get that from one day to the next, that you might have a contact point where you could say, do you have an idea for a protocol.
>
> P13: For special examinations, which we only do every six months, it definitely helps if there is telephone support, so that someone can say straight away: When this appears, you have to press there.

Deci and Ryan (1991; 2000) linked higher task interest and performance to autonomous behaviour and distinguished internally- (autonomous) from externally controlled behaviour. Weinstein and Ryan (2010, p. 224) linked the individual experience of autonomy as "truly self-initiated" activities and a feeling of being free over time. The radiographers evidently described the opportunity to self-initiate the service incident event and, therefore, some embrace the determining of the timing of the first remote interaction point. This contrasts with the described value co-creation opportunity for the enabling task at remote interaction point 1. However, to ascertain if this behaviour is internally autonomous and potential "truly self-initiated" or externally controlled was not the aim of this research. Nevertheless, the radiographers shared experiences that evidenced their ability to self-initiate, and thereby determine the timing in enhancing task and derive 'autonomy' as a subcategory of the efficiency value type.

Enhancing task remote interaction point 2

In general, the level of radiographer participation in an enhancing task with the remote expert is described as being higher in comparison to those within an enabling task.

However, the low participation behaviour in both enabling- and enhancing tasks revealed that no relevant differences in deriving different value types within each participation context. However, the enhancing remote interaction point 2 revealed the most value co-creation opportunities for the radiographers when actively engaging with the remote service expert. As identified for the enabling tasks with high participation behaviour: 'guided troubleshooting' interaction releases excellence as value type; 'receiving tips and tricks' can been seen as an aesthetic value type; 'impression through expertise' and 'impression through pro-activeness' can been classified as being forms of the status value type. In addition, the enhancing tasks revealed more engagement from some radiographers' comments as they derived hedonic value through 'play' as value-type when pursuing 'learning opportunities' and felt positively challenged in troubleshooting interactions:

> P13: For example, and then I get connected to someone (remote expert) who really knows about it, I like that quite a lot. You learn something yourself. It's nice to communicate with the other person and, of course, it's a change of pace from the daily routine.

The described nature of the enhancing tasks provides the radiographer with more time to engage and anticipate the outcome of the interaction with the remote expert. A few radiographers even mentioned that they self-initiate the remote service interaction with service provider staff to maintain a more personal business relationship with them. This was especially the case when seeking to address their issues to the same person from the service provider, who has previously had a regular personal presence at the services user's site, and here some the radiographers shared their daily operational experiences and inquiries to feel connected with that specific service provider staff member:

P1: I really do enjoy the application (company application staff) all the time. I like learning new things. Our boss is very open-minded, so we can try out everything.

For some participants, such knowledge sharing, and "expert discussion" are particularly appreciated and perceived as beneficial. This might also be due to the enhancing task situation, as the conversation with the remote expert was shaped mutually and was better 'synchronized'. As stated by Leroy et al. (2015) synchronization occurs in social interactions due to their "[…] temporally fit […]" and "[…] congruent temporal patterns (Arrow, McGrath, & Berdahl, 2000; McGrath & Kelly, 1986)" (p. 760). The authors, furthermore, described synchronization as emergent and relational when individual temporal behaviours are met. However, the tempo of the remote interaction between some radiographers and the remote experts seemed to resonate more than in the enabling tasks described. Therefore, some participants enjoyed increasing their competencies, beyond their daily activity and sought to acquire additional capabilities.

Furthermore, some comments disclosed that the radiographers' 'self-esteem through expertise' had been positively impacted and, therefore, supported them in deriving social value through esteem:

P11: A large part is experience, because there are recurring mistakes. But there are also error situations where I at least know where to start.

P12: So, because I've been around a bit longer, when I need support, I call. I find that I have it in my own hands. I know, I also have colleagues who don't necessarily dare to call.

Whereas, in the framework from Holbrook (2002) esteem is conceptualized as 'other oriented', self-esteem is in this study understood as self-oriented. Gummerus and Pihlström (2011) confirmed the limitations of the Holbrook concept, in that the esteem value type

may also be self-oriented rather than being other-oriented, specifically when negative evaluations about the self might occur. This might also be related as some remote interaction with the remote service expert might have been initiated by the radiographers at the behest of their superiors to resolve dedicated examination requests:

> P12: Our boss [radiologist], was not so happy with one particular thing. He always said, “I can’t really assess that”. And because we couldn’t think of anything else, we called the remote service. And they were able to explain to us quite well and quite quickly why that was the case. And how to fix it. [...] That was a small thing for them. But we wouldn’t have thought of it ourselves. And that’s what we did. And he was also very satisfied.
>
> P3: I then sent the application experts a few more things by phone and [messenger service name], photos and so on. And that always goes well. So, I’ve had a connection there for years and I know some of the technical staff and managers, so maybe it’s a bit easier.

The examples provided describe positive outcomes from the remote interaction with the service provider, which can be sub-categorized as ‘self-esteem through relations’ to manage an extraordinary workflow situation. However, as Lönnqvist et al. (2009, p.4) described: “The theme that underlies most conceptions of self-esteem is that it generally refers to a person’s evaluation of, or attitude, toward him- or herself (Baumeister, 1993; James, 1950)”. Corvington (1992, 1998, as cited in Eccles & Wigfield, 2002, p. 122) argued, that to establish or maintain a sense of self-worth it is necessary to protect your own belief in your competencies. In this sense, the service recipient tends to increase or, at a minimum, maintain, their sense of self-worth by either leveraging their relations to the service provider staff, increasing their experience and knowledge of service incidents or limiting

their individual participation to fit within the scope of their individual understanding and assessment of remote service interactions. Some radiographers also evaluate complexity and limit their synchronization with the remote expert at remote interaction point 2, when patient examinations are proceeded (see ethic value-type).

Enhancing task remote interaction point 3

As described above the third interaction point is understood to conclude the outcome of the remote service encounter and is the space in which it is decided if further a service intervention (online or on-site) is needed or not. In an enhancing task this decision is less time critical and mostly made between the radiographer and the remote expert. Thus, often the follow-up call between the service recipient and the customer care centre will be omitted, as the remote expert informs the customer care centre separately. However, for the sake of consistency, the enhancing task remote interaction point 3 remains as it reflects the service provider's official process.

Enhancing tasks are typically centred on a demand that is more reflective of the employee's area of expertise to serve a patient- or supervisor-request. As described in the interaction point 2, the remote interaction provides (immediately) opportunities to mutually discuss the service incident. Therefore, the joint problem-solving remote interaction in enhancing tasks principally provides the opportunity to resolve uncertainty in the sense of offering reinsurance in the service recipient's opinion from the remote expert:

> P1: As an operator, you are never sure what the problem is. Whether it is an operating error, whether it is a technical limitation of the device, or whether it is a general problem with the technology.

This enables the radiographers to ensure that their opinion is aligned with that of the remote expert, and this enables the service recipient to derive social value through status

and self-esteem. The radiographers potentially demonstrate ‘impression through pro-activeness’ and increase the level of their experience, which might help them to derive social value as well. In situations where service recipient expert knowledge is required, the alignment with the service provider is perceived as supportive, as it allows the radiographers to further guide and provide direction for their stakeholders.

Summary enhancing task remote interaction points (1-3)

The presence of Holbrook’s (1999) value types in enhancing tasks have been identified at each remote interaction point (1-3). Relatively, the service recipients demonstrate a higher participation rate in enhancing tasks than in enabling tasks. According to the findings more value co-creation opportunities and derived valued types can also be identified in enhancing tasks. The value type subcategories for the radiographers with higher participation behaviour have been highlighted in red (Figure 10). However, enhancing tasks have been typically described as being less urgent in terms of enquiry initiation timing and in respect of determining when contact with the remote service expert is sought. Additionally, the outcome of the remote interaction to provide a solution to examine patients can be better assessed and anticipated by the radiographers.

Especially, at remote interaction point 1, some radiographers revealed self-initiated behaviour and therefore directed the timing of potential service incidents. The most relevant interaction point is probably remote interaction point 2, as it revealed a more synchronized tempo and closer interaction with the service expert, which led in some cases, to expanding the competencies of the radiographers. However, the constellation of potential resources, ‘time, space, and actors’ concerning enhancing tasks revealed a higher potential to derive value for the radiographers. Predominantly, the constellation of temporal requirements in enhancing tasks seems to resonate more for some radiographers,

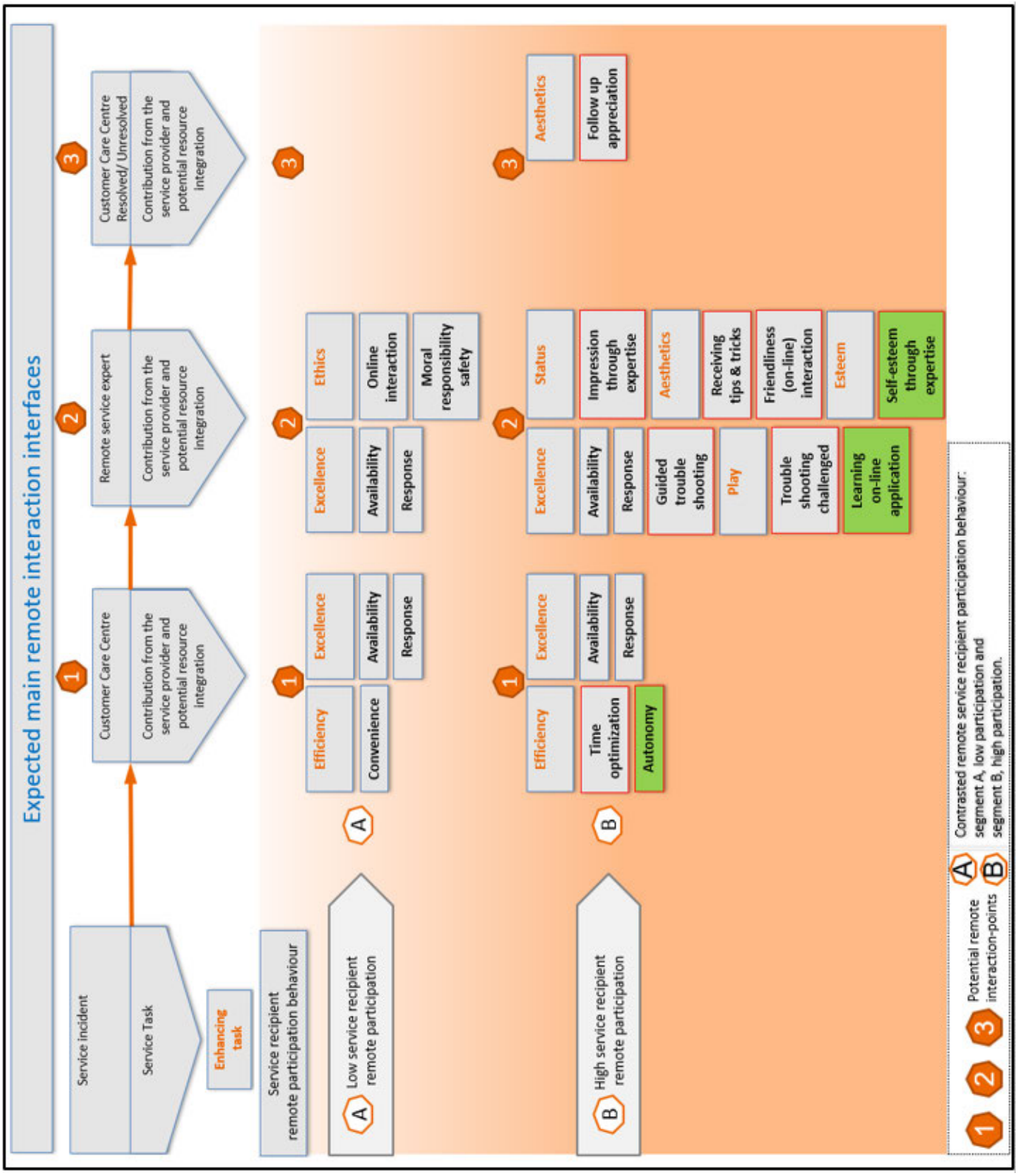
as it enables them to connect more actively with the service provider to the extent that new value types emerged. In addition, the remote interaction with the remote service expert discloses a more 'connected' business relationship for the enabling tasks.

Thus, in terms of constellations and the density of potential resources, the enhancing tasks disclose a dependency on the personal relationship of the radiographers and how they maintain this with the individual remote service expert, rather than the 'quantity' or 'availability' of an actor. As highlighted by Storbacka et al. (2012), density can be viewed from different perspectives. For this study the view from the service recipient is taken to investigate potential resources in the value co-creation process and derived value types that are relevant for them (Storbacka, 2019).

However, whilst the illustrated overviews exposed what type of value was derived, when it occurred, who participated and how value was created (Mencacelli & Rivière, 2015) other issues remain. Polese et al. (2021) further emphasized the need to investigate the temporal and spatial dimensions from the perspective of 'emergence' as an outcome of system components to better understand the impact of the service ecosystem. The authors highlighted that emergence in the transition phases of service ecosystems are always present and therefore there is a need to devote more attention to this (Polese et al., 2021). Verleye et al. (2017) also highlight the value co-creation opportunities for the individual actor to pursue their tasks and, therefore, derive value for their own, or others, well-being (Verleye et al., 2017). So far, the findings have not revealed for whom value is created and what kind of properties constitute the emergent value types when a consuming remote service interaction.

When comparing the identified value types (in enabling-and enhancing tasks) some value types, in terms of their meaningfulness, are more salient for the radiographers during the remote service interactions points.

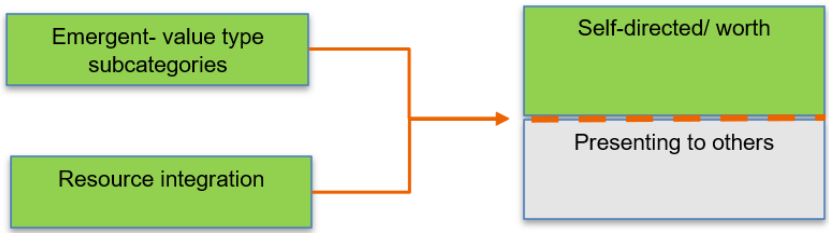
Figure 11: *Service task 'enhancing' with Holbrook's consumer value types and derived subcategories at different remote service interfaces. In green, the emergent subcategories, allocated to the value types and remote interaction point*



As described in the findings above, the service recipients' feelings of comfort to initiate the service incident, the assessment and anticipation of task outcomes, learning activities and personal relations, seems to be most relevant for them to proactively address, and participate extensively in, remote service incidents. Figure 11 highlighted (in green) the emergent subcategories of value types: efficiency, 'autonomy', esteem, 'self-esteem through expertise' and, play, 'online learning activities'. For those radiographers who derive these salient subcategories of value types, remote service interactions seem more valuable and worthy of investment of their energy to accomplish their expected outcome, certainly more so than for other value types.

To pursue the question of the beneficiary, Holbrook's (1999) dimensions of self-directed and other-directed are expanded according to the proposal from Coutelle-Brillet et al. (2014), as discussed in the literature review. The authors examined the value creation process by addressing the complexity in B-to-B interactions and, therefore, distinguished the 'other-oriented'-dimension from Holbrook's (1999) framework in terms of: 'organization as a whole' and 'external stakeholder' as value recipients (Coutelle-Brillet et al., 2014, p. 169). In this context, the additional recipients of potential value are categorized as other-oriented: external stakeholders, namely patients, and as internal stakeholders as e.g. superiors, staff-members.

Figure 12: *Service recipients potential self-oriented / directed value co-creation opportunities*



However, the green highlighted emergent subcategories: 'Autonomy'; 'self-esteem through expertise' and 'online learning activities' can be broadly summarized with the common denominator as self-oriented / directed for the service recipients.

Figure 12 illustrates the emergent subcategories and the emergent properties of potential resource integration to determine the direction of derived value types. In this context, the emergent- value type subcategories are identified as self-directed to address the beneficiary. Hence, when the radiographers deriving these emergent value types-subcategories, self-oriented / directed properties describe one spatial dimension, to whom value is co-created when consuming remote service interactions.

In the sense of Holbrook's (1999) multidimensional concept of consumer value, the other dimension to broadly describe the space where value is experienced, is constituted of extrinsic- versus intrinsic- value. In relation to the dimension of extrinsic versus intrinsic the emergent value type-subcategories are understood as a continuum support to visualization of the trend when consuming a good or a service (Eichentopf et al., 2011; Holbrook, 2002). Whereas the emergent subcategory 'online learning activities' was derived from the 'play' value type, with predominately a source of intrinsic value, the emergent subcategory 'autonomy' (derived from efficiency) and 'self-esteem through expertise' (derived from esteem) are originally categorized in Holbrook's conception (1999) as being extrinsically value driven.

When deriving 'self-esteem through expertise' the radiographers described examples where they in particular managed workflow situations through relations and established connections with the service provider (field) staff. The service recipients' evaluations to potentially increase their competences and derive self-esteem through the remote service interaction are directed toward to the service provider. As discussed above, when

radiographers derive ‘autonomy’, in the described context of an enhancing task, they rather move away from an imposed task to a self-initiated one to gain more control of the timing for the initial remote interaction point and therefore act intrinsically. To what extent the derived subcategories are extrinsically- versus interracially- driven is not focus of the research. However, the described spatial aspects of the emergent self-directed subcategories are also highly dependent on the temporal aspect.

The emergent temporal properties for remote joint problem-solving interaction in the value co-creation process with the service provider are predominately, timing (proactive and self-initiative) and the tempo to synchronize with the service provider (Table 8). Storbacka et al. (2016) identified the temporal properties (duration, frequency and regularity) to discover that different engagement behaviour varies in time, and which then might go on to influence the business relationship as well. For this study the enhancing task remote service interaction is also utilized to stay connected with the service provider remote expert and reduce the ‘distance’ in a business relationship.

Davis et al. (2011) examined emotional intensity in relation to the concept of psychological distance and noticed a reciprocal relationship. How the service recipients framed their psychological distance -as a form of a spatial property- to the service provider relationship depends significantly on their individual experiences and might vary over time and even within the service encounter process itself.

Ballantyne and Varey (2006, p. 337) described a business relationship as being, emergently shaped over time and highlighted that “it is the quality of the relationship that can be ‘managed’, not the relationship as such, and this is a common misconception”. In this sense the quality of the relationship is dependent on the temporal- and spatial-properties of the

interactions between the service recipient and the service provider. The Table 8 summarizes the spatial- and temporal- aspects of the self-directed emergent value type subcategories.

Table 8: *Overview and aspects of emergent value type-subcategories*

Emergent value types-subcategories	**Task and location**	**Emergent spatial aspects**	**Emergent temporal aspects**
'Autonomy'	Enhancing task at remote interaction point 1	Set direction to the service provider.	Control timing to initiate contact with the service provider
'Self-esteem through expertise'	Enhancing task at remote interaction point 2	Non-physical proximity with the service provider	Control the tempo and timing to synchronize with the remote expert
'Online learning activities'	Enhancing task at remote interaction point 2	Non-physical proximity but potentially maintain established relations with the service provider	Control tempo and timing to synchronize with the remote expert

Whereas the focus of this study is on the remote service interaction, the business relationship between service recipients and some service provider staff was also established due to earlier personal service encounters and interactions. Thus, it becomes more evident that the remote service encounter is also interwoven with face-to-face service encounters with the service provider-staff:

> P6: We have a technician here, [name of the technician], who is mainly with us. He has deposited his telephone number, which he has for work purposes. We can send him photos via [name of the messenger service] when there are error messages, and he gives us feedback and calls us back.
>
> P8: If you somehow had an examination that you either haven't done for a long time or haven't done so often, that you could possibly call for a proposal protocol, one

> day, two days earlier or so. You don't get that from one day to the next, that you might have a contact point where you could say, do you have an idea for a protocol.

When the service recipient decides to invite the remote expert to discuss and resolve specific workplace questions, it also shapes the business interaction outcome in the form of a more personal relationship. While the 'prescribed' service incident process (escalation and documentation) specifies contacting the call centre, some radiographers "shortcut" this and call or message the field service technician/application employee directly. As described above some radiographers tend to directly escalate incidents to field service technicians and directly to the service provider's application staff, or in parallel engage with the call centre escalation process. While remote experts usually remain anonymous, most of the relationships between the service provider field staff and radiographers have been established over many years. Whilst the overall technical competencies of the remote expert have been described as good and satisfying, some radiographers seek support from the field staff. They justify their activity as a possible process accelerator to find a solution and, therefore, rely on their interpersonal bonds.

> P15: You just have to say that (laughs). I love to call a technician directly where I know he can help me.

Therefore, the study offers more insight on complexity in the service delivery process rather than just limiting itself only to the remote service interaction. As remote service interactions also have their origins in accompanying on-site service delivery rather than being considered as an isolated/standalone service, it is important to consider the broader relation between service recipients and the service provider. As Corsaro and Anzivino (2021) argue, especially in digital B-to-B value creation processes, there is a need to consider the relationship context and: "[…] the influence of alternative and interconnected value processes that occur

in the same context" (p.26). As also highlighted and defined by Holbrook (1999, 2002), value determination has comparative and preferential characteristics. Whilst most remote service delivery from manufacturers is limited to their own medical devices, the remote service interactions themselves could be compared between the companies. Nevertheless, the study focuses on only one manufacturer/service provider company and the findings show that the radiographers mostly compared the remote service interaction with the on-site service interaction from the same company. Some radiographers described clear preferences to maintain their relationship with the on-site staff and, therefore, avoid synchronizing their activities with the customer care centre and remote expert:

> P2: In the past, it was simply nicer, for example, you could reach a technician directly. I thought that was nicer because you knew the person, you had a direct contact person and then, over time, a relationship of trust developed, which is, of course, different now via a hotline, when you always have someone else there.

The comments also described the perceived transition from personal interaction with the field staff to an expansion of engagement with remote service delivery and the rather 'anonymous' remote interactions with the service provider.

However, the temporal development of remote service delivery and individual radiographers' preference for contacting the service field staff are difficult to reflect within Payne et al.'s. (2008) framework. Pre- and post-encounter (temporal) activities are not explicitly mentioned in Payne et al.'s (2008) framework but are important to understand the individual service recipient rather than the service encounter itself (Chandler & Vargo, 2011). Nevertheless, extending the view of the remote service encounter to pre-and post-encounter activities might affect the use of potential new resources needed and remote service interactions. Here, additional resources can be differently combined and integrated,

which otherwise might be overlooked in the value co-creation process as important findings to determine the value-in-use of remote service for the radiographers. Similar findings have been also addressed by Holmqvist et al. (2020), as the service encounter also contains activities that are important before, and after, the service encounter to co-create value. The authors revised the value sphere model from Grönroos and Voima (2013) by complementing activities that refer to the pre- and post-encounter activities.

Figure 13: *The expanded context of the remote service encounter*

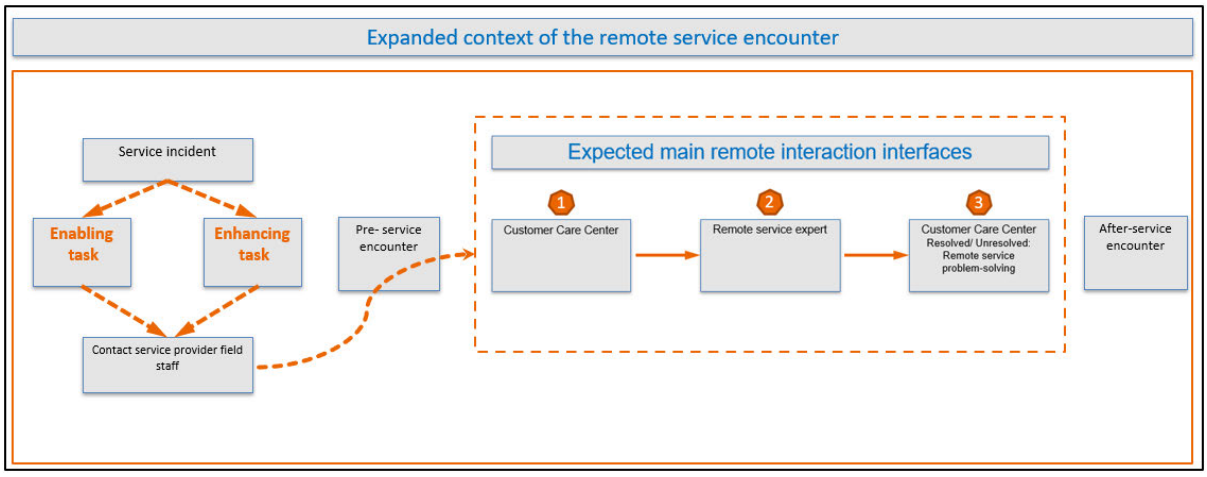


Figure 13 draws together the online- and onsite activities and value outcome and process of value co-creation. The additional activities from the service recipients that move beyond the pure remote service encounter to resolve the tasks at the workplace have been summarized as pre- and after-service encounter activities.

Pre-service encounter

Particularly for enabling service tasks, almost all radiographers preferred to pre-clarify, or resolve, the uncertain situation by themselves before they contact the service provider.

> P2: We do what we can, of course. If it doesn't work, there are these little errors where you can try to shut down the system and start it up again.

A similar ‘preparation’ activity was described in relation to retrieving the error log file (save log), as most radiographers are trained to do this activity by themselves and, therefore, initiated the download once they reached out to the call centre to save, and to optimize, their time:

> P15: So, if something ominous or terrible happens, I try to make a savelog immediately. We have already been briefed on this, because of course we didn’t do that in the past. Because first we called [service provider company] and said: “It’s not working.” And then they couldn’t understand it. So, the savelog thing is really baked in now, I’d say.

Learning from previous physical- and remote service interactions e.g. system reset, log file, pre-clarification of defective parts, would not be reflected in the situational context if the study limited its scope to the remote service interaction itself. Over time, these activities have been shown as an opportunity for the service recipients to increase their own self-efficacy and reduce the uncertainty of the problem-solving situation. The radiographers learned new skills to master the situations, rather than investing their energy and time to synchronize the interactions with the service provider. For some radiographers, it could also be argued that they do this to try to increase their problem-solving knowledge and avoid remote service interactions with their ‘cumbersome remote troubleshooting procedures’ in the future:

> P9: There are tips and tricks that you use, where you know that, next time, you have to do this and that to make it work again. So that you don’t have this procedure again.
>
> P15: And then [initiate the call to the customer care centre] it’s always a bit difficult. So, then you call [service provider name], call the call centre and say: “Device blah

> blah blah". And then they say: "Yes, the colleague will get back to you in a moment." […] And then you first have to describe it to the gentleman. And then he already says: "I'll connect myself to it." Something like that. That's what happens. And you stay on the phone. […] And then sometimes there is silence, but sometimes there is a question: "Did this and that happen?" "What did you do?" But I am also an old-school radiographer. I just have to say that. I love to call a technician who I know can help me. So, for example: (name of the technician).
>
> P3: I then sent him (the technician) a few more things by phone and [name of the messenger service], photos and so on. And that always goes well. So, I've had a relationship with him for years and I know some of the technical staff and managers, so maybe it's a bit easier.

However, for some radiographers it was still a common practice to contact field service staff to coordinate the service incidents, instead of complying with the 'prescribed' incident process. In this sense, the transition from physical to non-physical service delivery was not adopted by the service recipient and old processes were not 'unlearned' due to radiographers' value judgement (Komulanien, 2010).

The quotes revealed the positive business relationship with the service provider field staff, and, for some the radiographers, this is an important contact to coordinate their inquiries. Whilst the radiographers accumulated business relationship experience which the service provider field staff has established over the years, the decision to contact field service staff remains an important component for the radiographers to resolve service incidents at their workplace. Some radiographers addressed their past service encounters with the service provider as more convenient, especially when remote service was less dominant:

P15: You also talk to the technicians when there's maintenance or something, and when they come. And that is also quite pleasant. That you know their face. That you know whom to call. Personally, I find that totally good in this world that is shrinking more and more (laughs) to digital.

Post-service encounter

Nevertheless, not only are the pre-service encounter activities of the radiographers relevant to describe the context, but so too are the post-service encounter activities, as they also typically differ from face-to-face interactions. This is particularly the case in the remote joint problem-solving situations where the interaction is terminated prematurely (see enabling remote interaction point 3), as the mutual appreciation present in a physical service encounter is absent:

P3: In some cases, there were a few hours of downtime that had to be compensated for somehow. You had to postpone patients or, yes, turn the whole schedule upside down and rearrange it. I also had to work overtime myself, and yes, that's just unpleasant, of course. I have to justify myself to my bosses and the patients and at the same time negotiate with the company and somehow try to make the best of it, so I am the interface.

P6: When they [field service staff] are on-site, sure, we still communicate, they usually stay to see if it is really working. But not on the phone.

In addition, some radiographers indicated there were now expectations that had developed in the past from physical service encounter interactions that were no longer met.

P16: Mr. [name of the service provider staff member] used to do that whenever there were some innovations. [...] And with a calmness and with an understanding that we all understood it. That was nice.

Nevertheless, some radiographers mentioned an appreciation call after joint remote troubleshooting and perceived this as a "moment of appreciation" for themselves and noticed the service provider being grateful for the support, as outcome of their participation.

> P6: You get the impression that they are also interested in a quick solution. In this respect, one receives an appreciation for the joint work on the problem.

Overall, the reported data showed that the radiographers not only relied on the provided remote service interaction with the remote experts but also learned new skills to resolve uncertain situations by themselves and relied on the relationship with the service provider's field staff. For some radiographers, remote service interaction has been utilized to maintain a professional relationship with the field staff. These relationships have been established over time, mainly through face-to-face interactions at the customer site, and are common at the B-to-B micro-level.

Although the focus of the study is on the perceived remote service interaction from the perspective of the radiographers, the dependencies between the service provider field staff and face-to-face service encounters (a different space) cannot be neglected. Håkansson, et al. (1995) highlighted the development of trust and commitment between individual actors in B-to-B relations and the fact that these actor bonds are connected. As also highlighted by Lyons and Brennan (2019, p.28) in the B-to-B context: "Temporal factors are also embedded in relationship value as it considers accrued value from past exchange episodes (Ravald & Grönroos 1996) and future anticipated value that the relationship will enable (Hogan 2001)". Davis et al. (2011) investigated, in experimental trials, emotional regulations through mental representations of events in relation to their psychological distance. They concluded that through an increased psychological distance of an event, the emotional

intensity reduces and vice versa. Andersen et al. (2020) also emphasized the temporality and spatiality of interaction, which might lead to perceived changes in the business relationship.

However, the examples provided by the service recipients revealed their invested energy in the business relationship and the entanglement of the face-to-face and remote interactions with the service provider in joint problem-solving situations. To address the relational context of remote service delivery, the aspects of time and space play an important role in the value co-creation process. Therefore, this research expands to consider the temporal dimensions and activities of the radiographers, which also changes spatial dimensions as well.

As argued by Corsaro and Anzivino (2021), the traditional conceptualization of value creation in business relationships (in physical space) does not reflect the complexity of value creation in a digital space. The authors applied the "model of network space" provided by Törnroos et al. (2017) to explore digital value creation in the B-to-B context. Törnroos et al. (2017) proposed a multi-dimensional (structural-, mental- and relative network) concept of space with the inclusion of a dynamic perspective (relational dimension) to study business networks. In alignment with the work from Corsaro and Anzivino (2021), this study follows the approach to describe the relational context of remote service delivery, from the perspective of the service recipient. The authors theorized a second-order construct that defined different dimensions and sub-processes of the value creation process in the B-to-B environments. Based on the framework of Törnroos et al. (2017), Corsaro and Anzivino (2021) identified two processes, 'specifying network boundaries' and 'defining resource combination', to explore the structural network dimension. Törnroos et al. (2017, p.12) defined the structural dimensions as: "[…] network dimension that includes the nodes, links,

ties and bonds forming a connected network configuration in geographical space". Specifically, the authors introduced the concept of "distance" to analyse "different spatial-based constraints" and potential "frictions in interaction" in the B-to-B environment (Törnroos et al., 2017, p. 16).

For this study, the structural network dimension differentiates the 'space' at the time of the non-physical remote service interaction with the remote expert, from other spaces (and times), which are also relevant for the service recipients. Whereas, up to this point, this study has mainly focused on the remote service encounter interaction with the remote service expert, the following context expands the view of the spatial- and temporal-dimensions for the physical- and non-physical- service delivery from the provider. As Törnroos et al., (2017, p.14) state: "…that business actors produce a network space by forming spatial patterns through their relational investments.". Unfortunately, the service- and value co-creation-literature is less specific on the individual formation of 'spatial patterns' through actors' 'relational investments'. S-D-logic describes more broadly the space of generic actors as interacting and including the exchanging of energy with the environment and offers less specific description on the micro-level context. Vargo and Lusch (2016) introduced the term 'service ecosystems' as "dynamic, value-cocreating systems of mutual service provision. We use the term 'ecosystems' to identify these systems because it denotes actor–environment interaction and energy flow" (p. 16).

However, as Polese et al. (2020) highlighted, "the service ecosystem is a more general concept than service system" (p.1637), which is well-established in service science. As intensively discussed in the service science literature, service ecosystems and service systems are similar concepts with overlapping viewpoints, communities, and languages (Ng et al., 2019). The systems approach is endorsed by some authors to model and understand

complex situations and offers a way forward to profound knowledge in service science (Barile & Polese, 2009; Barile et al., 2016; Golinelli, 2010; Ng et al., 2011). Polese et al. (2020) underscored the role of emergence as a construct from systems theory and emphasized focusing on new system properties and their viability. More recently this perspective has been expanded and combined with the marketing- and system theory-literature through the viable systems approach (VSA) (Barile et al., 2012; Ciasullo et al., 2021; Polese et al. 2020).

The viable systems approach (VSA) refers to systems theory and draws from the contributions of von Bertalanffy (1968) to open systems. Von Bertalanffy (1968) provided an interdisciplinary approach to connect classical physical systems e.g. laws of thermodynamics with systems theory in social science to explore and explain a complex context as a whole. Whereas von Bertalanffy postulated that the first law of thermodynamics might be described as a closed system in physics, such a view is not applicable for living things. He introduced the theory of open systems by referring to the dynamics of energy and the second law of thermodynamics. A particular analogy between energy and information exchange with the environment can also be found in the S-D logic. As highlighted by Löbler (2019): “A service ecosystem as a living system of process (Lusch and Vargo, 2014) that are executed by actors with agency so that it needs matter, energy and information as a source for resources” (p. 365). Löbler also emphasized that this energy is essential to perform the required resource integration processes. Furthermore Godsiff et al. (2019, p. 218) highlight the possibility to utilize systems theory to describe complex phenomena and how systems operate and change to describe general concepts e.g.: “[…] viewpoint, boundaries, feedback, mechanisms, hierarchy, control, purpose, viability, transformation, information and adaptation; […]”.

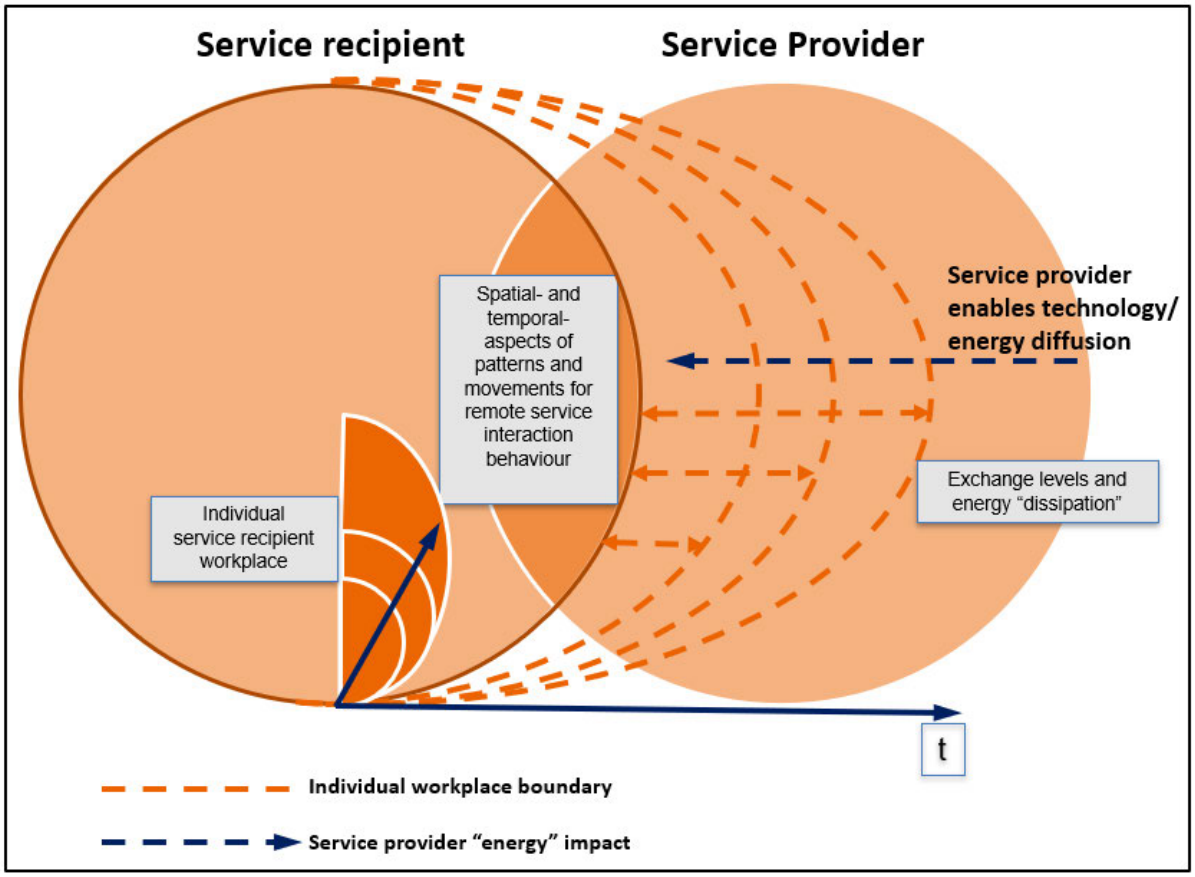
The representation of energy transformation has also been considered earlier in the service science literature. Bogazzi et al. (1998, p. 19) highlighted the expected emotions in the form of intentions and decisions to expand energy in service exchange to attain a goal. The authors emphasized the motivational aspects and the required investment of physical and mental energy to strive for certain objectives. Kumar et al. (2019, p. 151) also described expended 'mental energy' as affective effort during the service experience. Additionally, in the value co-creation literature, energy is frequently addressed to customers' inputs or costs before gaining benefits (Aarika-Stenroos & Jaakola, 2012; Smith & Colgate, 2007).

For this research, the analogy of open systems is used to describe the exchange of energy between the service recipient and the service provider in the value co-creation process. Therefore, the language of the viable systems approach is partially applied to describe the service delivery process, focusing specifically on the emergent properties in the asynchronous system. As this research context revealed, the service recipients are strongly reliant on the service delivery input of the service provider to resolve their inquiries. This can be described as an open system with asymmetric competencies and on other environmental or, economic, decisions to consequently import "energy" from the service provider. The service recipient predominantly invites the service provider to enact this 'energy-exchange'. However, the service provider could also initiate interactions with the medical device directly. Either machine-to-machine or human-to-machine interactions occur but, usually, as a rule, in agreement with the service recipient. Nevertheless, typically the imported energy is initially provided via remote service technology from a distance between different physical locations.

Firstly, the physical separation could be illustrated as a boundary between the service recipient and the service provider. Once the remote interaction has been established, the

potential exchange of energy between the service recipient and provider can 'move' in a non-physical space, based on the value sphere model from Grönroos and Voima (2013). Figure 14 visualizes the intersection of a Venn diagram as a potential space to exchange energy.

Figure 14: *Service recipient boundary spanning to the service provider*



Note. Adapted from "Critical service logic: Making sense of value creation and co-creation", by C. Grönroos & P. Voima, 2013, Journal of the Academy of Marketing Science, 41(2), p. 141. Copyright 2012 by the Academy of Marketing Science.

The overlapping closed curves of the two circles represent the properties of the exchanged energy between the two parties in remote interactions within the value co-creation process. While outside of the intersection, the properties of the potential value co-creation remote interactions, opportunities remain, and energy is present as 'potential energy'. However, this perspective does not reflect the energy investment from the service provider to move

energy into the (open) system. The service provider utilizes remote (including robotic, artificial intelligence, virtual reality, etc.) technology to set the direction towards the space of the service recipients. Over the last few decades there has been a tendency to invest energy to move into the customer sphere and change the pattern of service delivery from face-to-face- to non-physical- interactions, which has been well recognized in the service sciences literature. In this research context the resource provision as e.g. availability of the customer care centre and 'response' time from the remote expert, has been given as examples of the invested energy from the service provider to offer the service recipient an adequate channel to address and resolve their inquiries.

Nevertheless, the decision to expand energy into the 'others' space needs to be mutually accepted. As this research focuses on the perspective of the service recipient, the question is to what extent do the radiographers invest energy to expand and move into the sphere of the service provider. The dotted ellipsoid shaped lines illuminate different potential movements towards the service provider sphere as different potential energy exchange 'boundaries'. The bidirectional dotted arrows indicate the possible direction, over time, in which the boundary might move. The identified findings revealed certain patterns within the service recipients to expand their energy toward the service provider and achieve more proximity via remote service interaction. Nevertheless, the exchange of energy varies at the level of the individual. The data shows different reserves of capacity (stock of knowledge and experience) in the form of potential energy and whether the participant chooses to invest energy, or not. Secondly the expansion of energy is highly dependent on the task. The enabling- and enhancing tasks have different patterns of participation (low-and high participation), and, in general, most energy is invested for an enhancing task. Thirdly, the

most meaningful derived value types are summarized as self-oriented and identified the direction for the beneficiary of the remote service value co-creation process.

Nevertheless, when the service recipients enter the space to connect with the service provider the potential energy that might be transferred is accompanied with described constraints (e.g. time pressure, patient safety, etc.). As portrayed above, the radiographers encounter situations where they might perceive stress and are less flexible with their timing and tempo to coordinate tasks. If considered as an analogy to open systems and thermodynamics, this process can be described as energy dissipation. Energy dissipation occurs when energy is transformed from one system to another by losing the capacity of the initial form. The service recipients detailed critical service situations where their emotional and physical energy was needed to interact with the service provider and resolve inquiries. Their decision making to set a course to the service provider sphere includes consideration of the investment of their potential energy and the need to transform energy with the provider to attain certain outcomes (e.g. value types). This process of remote service value co-creation is influenced by their individual reflection on the encountered event and to what extent energy dissipation is tolerated.

As also observed in the context of thermodynamics, the tempo of transformed energy decreases over time until equilibrium is accomplished. Whereas temporality is linear, the invested energy and movement might follow a nonlinear and bidirectional course. As highlighted by Adam (2013), temporality follows a unidirectional and irreversibility (linear) approach and describes events in the present that are also related to past-, present- and future-events as well. In regard to thermodynamics, the direction of time also flows in one direction (time arrow), whereas time in this sense indicates the direction to complete the process of movement and attain a final state of equilibrium.

In the situational context of this research some parallels are discernible. The illustrated boundaries of the service recipient revealed patterns and movements to exchange energy in a bidirectional and nonlinear remote service interaction with the service provider. The participants comments demonstrated different examples of invested energy to learn new skills (software-hardware-testing, error log retrieving, etc.) in interactions with the service provider and, therefore, investing their energy in a non-linear manner. Additionally, the imported energy in the form of resource provision from the service provider also changes over time, which might also affect the service recipients' decision making. As remote service technology has its origin predominately in enabling tasks, the service provider invested additional energy over time to offer more potential resources (remote service experts for patient workflow related inquiries) in the form of enhancing task support. This additional value co-creation opportunity also revealed the impact of the radiographers' behaviour to expend their energy toward the service provider in comparison to enabling tasks. However, energy is a double-edged sword, as it allows the service recipient to invest (expend) and divest (retract). As highlighted in the value co-creation literature, perceived value changes over time and sometimes depreciates, and hence the invested energy might also change over time (Chandler & Vargo, 2011). As argued above, the overall remote service provision is dependent on the permeability of the individual boundaries and energy dissipation evaluations to separate from, or connect with, the service provider remotely. The study demonstrates that some radiographers' have preferences to reserve their energy in remote service interactions and rather mobilize their energy to resolve their inquiries by themselves (also through remote service-learning experiences) or expand their boundaries toward the service provider field staff. These assessments are based on avoiding remote service energy transformation. In the value co-creation literature, Peters (2019) termed the

unrealized potential value co-creation opportunities as an 'absence' of value. Whereas the absence of value does not imply that value is destroyed, forms of value co-destruction could also be present in the researched context. The service recipient's expended- or retracted - energy at discrete interaction points also reveal different anticipated value outcomes, which might also direct the (psychological) spatial distance to the service provider (Van Boven et al., 2010).

The notion of bidirectional boundary movements in a remote service interaction also indicates potential value depreciation and the co-destruction of value (Echeverri & Skålen, 2011; Plé & Cáceres, 2010). For this study, some of the radiographers' comments illustrated rather low participation behaviour and less attentional focus in remote service interactions with the service provider. However, the focus of the research was to identify the emergent properties and value co-creation opportunities between the service recipient and provider. Nevertheless, in the sense of energy transformation, energy is not lost in the system but rather conserved or allocated elsewhere based on the individual service recipient's intention and execution. Therefore, the remote service energy-exchange enactment is identified as dissipative, bidirectional, and nonlinear over time.

Summary findings and discussion

Chapter Four started by addressing research question one to identify the derived value types for the service recipients when a consuming remote service. Firstly, and based on the described experiences, two broader tasks have been categorized for the service recipients: enabling- and enhancing tasks. Consequently, Holbrook's (1999) concept of consumer value was utilized and demonstrated as an adequate 'tool' to identify the different value types in this research context. The majority of the value types have been found in the context of remote service in a B-to-B environment. However, the derived value types were highly

dependent on the different tasks the radiographers intended to execute remotely. As a result, the enhancing tasks provided more value co-creation opportunities to derive more value types. As an additional finding, the located value types presented different remote interaction points and underlined the potential asynchronous interactions with the service provider to further investigate the process of remote service interactions.

Consequently, Chapter Four continued to pursue research question two and examined the process of remote service co-creation by applying the framework from Payne et al. (2008). Based on the radiographers' perceived remote asynchronously interactions, the framework was adapted by the identified remote service interpoints (1-3) to reflect the service encounter process from Payne et al. (2008). The categorized value types were assigned to the identified remote interaction points for enabling-and enhancing tasks. In addition, the overall participation of the radiographers was contrasted with high-and low-participation rate. As a result, the individual participation rate differed based on the service recipient's behaviour and task. Overall, enhancing tasks demonstrate the highest participation rate and relative more value types, especially during the remote interaction with the remote expert (remote interaction point 2).

These findings provide an interim framework for the process of value co-creation within remote service interaction. However, the framework visualized the entanglement of value types as an outcome and the process of value co-creation in the sense of becoming. The findings demonstrate the interrelation of value types and processes for asynchronously remote service interactions. Insofar as the adapted framework of Payne et al. (2008) supported answering the questions of: Who, what, how and when value was co-created; some value types have been perceived as more salient and to answer the question of the beneficiary, Holbrook's framework of value types has been adapted according to Coutelle-

Brillet et al.'s (2014) suggestions to better reflect the B-to-B environment. The beneficiaries of derived value were categorized as being self-oriented, the 'organization as a whole' and 'external stakeholders'.

However, the analysed data reveal a further need to return to the service science literature and reflect on the activities of the service recipients in the space of remote service delivery. Thus, the framework from Payne et al. (2008) was complemented with elements from Törnroos et al.'s (2017) framework to address interrelated value co-creation processes in the situational context. The examples provided by the service recipients revealed pre- and post-service encounter activities, which exposed additional opportunities for some service recipients to connect with the service provider field staff. Their invested time and energy to synchronize their activities with the service provider field staff outweighed the anticipated dissipation of energy to pursue remote joint problem-solving with the customer care centre and the remote expert. In addition to the framework from Törnroos et al. (2017), application of recent work from Corsaro and Anzivino (2021) allowed insights to be gained in terms of 'specifying network boundaries' and 'defining resource combinations' from the relational dynamic between the service recipient and the service provider. The potential boundaries and emergent properties for remote service delivery have been visualized in alignment with the value sphere model from Grönroos and Voima (2013).

At the same time, to describe the holistic perspective from the service recipient and reflect the face-to-face service and resource integration with the service provider, the analogy taken from von Bertalanffy (1968) of an 'open system' and elements from the VSA (Viable Systems Approach) were selected (Polese et al., 2021). This approach supports the explanation of the transition from physical- to non-physical-service provision systems as one service ecosystem (Ciasullo et al., 2021). As discussed above, S-D logic provides rather a

broad description when using the term "[…] 'service ecosystem' to identify the particular kind of critical flow – mutual service provision" (Peters, 2019, p.342). As the critical flow in mutual service provision can be seen from a different point of view, the work seeks to contribute to an explanation for the transitioning and entangled service delivery from the perspective of the service recipients.

The next chapter puts forward the conclusion of this research and discusses the key theoretical contributions, managerial implications, and recommendations for future research.

5 Conclusion

The chapter firstly begins by answering the research questions (Sections 5.1 and 5.2). Secondly, Sections 5.3 and 5.4 detail the theoretical contribution to knowledge and the managerial implications of the research. The last Section 5.5 finishes the thesis with an outlook of future research.

5.1 Research Question One

S-D logic asserts that value is always co-created, and a beneficiary is always a co-creator of value because value can only be "[…] created with and determined by the user […]" (Lusch & Vargo, 2006, p. 284). Therefore, research question one targets the individual perceived value of remote service delivery of service recipients in the B-to-B constellation (Gonçalves et al., 2019). Based on the value co-creation literature outlined in Chapter Two, this study followed an idiosyncratic- and experiential-view on value to reflect the perceived remote service experiences from the individual actors (Medberg et al., 2016; Ranjan & Read, 2016; Vargo & Lusch, 2008). Through this research question one was addressed:

> RQ1: What value types are perceived from remote service for the service recipient during value co-creation opportunities?

Seeking to capture the multidimensional view of value from the service recipients' perspective as an experience outcome from remote service interactions with the service provider led to the consumer value framework from Holbrook (1999, 2001). This is in alignment with the B-to-B and B-to-C value co-creation literature as highlighted by Mencarelli and Riviere (2015). However, firstly to understand the service recipients'

embeddedness in the B-to-B environment, this research followed the work from Aarikka-Stenroos and Jaakkola, (2012) to incorporate, and distinguish, the joint problem-solving situations of the service recipients when they potentially resolve their enquiries remotely. The described interview data revealed two broadly different tasks, which has been categorized as enabling- and enhancing-tasks. Based on the distinguished tasks, Holbrook's (1999) value typology was applied as a conceptual tool to determine the outcome of value types for each task. Tables 9 and 10 summarizes the derived value types, and their subcategories, in the context of the enabling task. In addition, the tables show the potential 'energy dissipation' for the service recipients when the constraint has prevented the derivation of value types. Whilst all radiographers recognize remote service as a supportive possibility, enabling them to receive relatively swift support from the service provider, the findings also revealed a high task dependency, which is confirmed in the value co-creation literature (Aarikka-Stenroos & Jaakkola, 2012).

Enabling tasks

The situational circumstances described for enabling tasks in the previous chapter, lead to a need to react quickly and perceived time pressure to resolve the inquiry was highlighted. The interview data revealed that the radiographers followed different strategies to resolve the enabling task with the service provider together and achieve the desired outcome for their inquiries.

Table 9: *Summarized overview of derived value type, potential constraints for remote service enabling tasks*

Enabling tasks Value types	Subcategories and context of the derived value types	Potential energy dissipation
Efficiency	• 'Convenience' (delegate service incident to service provider) • 'Time optimization' mainly for other	• Time pressure • Difficult to predict outcome • Asynchronously interaction
Excellence	• Good 'availability' of the customer care centre • 'Response' time of the remote expert	• Not available during weekend and after normal working hours • Peak-time (high volume of calls)
Status	• Impression through acquired 'expertise'	• Difficult to predict outcome • Not necessarily recognized by others in their organization • Radiographers need to communicate this message to the patients and their superiors and colleagues
Self esteem	• Potential praise from others but very limited examples	• Too technical in its terminology and potentially decreases self-esteem
Play	• Mediator between patient and machine, excitement in 'troubleshooting' to acquire additional knowledge, but limited examples evident	• Time pressure • Difficult to predict outcome • Not necessarily recognized by others in their organization
Aesthetics	• Perceive an overall 'friendly and pleasant' remote communication with the service provider • Appreciate letting the service provider decide the steps during the service encounter and let them organize when the patient workflow can be resumed the service provider is rather progressing the remote service interaction without them	• As some radiographers invested their time and energy to re-enable the patient workflow and therefore potentially missing an opportunity for mutual appreciation with the service provider
Ethics	• Ethic value can be derived from remote service interactions when patient safety is (potentially) at risk and when they contribute to the patient's wellbeing and experience of the examination	• Decision to engage in joint problem-solving and derive ethical value from consumption is accompanied by tensions
Spirituality	• Not identified	• No identified

As an example, the radiographers described the efficiency value type as by being achieved by following different ways of coordination and interaction with the service provider. Some radiographers derived efficiency through 'convenience' as they mainly invested their energy in coordination with the patient workflow and, therefore, interacted less with the service provider. Other radiographers derived efficiency through 'time optimization' as they preferred to actively engage with the service provider expert to jointly resolve their inquiries. Additionally, some radiographers have not derived any efficiency value type, as they might have engaged in the remote service interaction unsuccessfully, and the invested energy might be perceived as dissipative. However, the derived efficiency value type through 'time optimization' and 'convenience' are, in this context, categorized as other oriented instead of self-oriented (as they are classified in Holbrook's conception).

The value creation literature provided an adapted framework (Coutelle-Brillet et al., 2014) to address the value recipients in the B-to-B context. The adapted framework from Coutelle-Brillet et al. (2014) supports more clearly the question of the beneficiary of the derived value types and was also utilized later in understanding the process of value co-creation and for whom value is co-created. In the example of the derived efficiency value type in enabling tasks, the findings revealed very limited opportunities to derive the efficiency value type for the radiographers themselves. Their invested time and energy to resolve an unexpected interruption, which usually causes delays for their patient workflow, seems to provide an important new insight into the use of remote service.

Therefore, the findings provide additional insight to the remote service literature, as the perspective of the service recipients has received limited attention and efficiency was mostly positively addressed as benefits for the recipient company, service provider and other beneficiaries e.g., patients (Paluch, 2011; Wünderlich, 2010). However, deriving the

excellence value type in enabling tasks showed the importance of providing potential resources from the service provider e.g., 'availability' of the customer care centre and 'response' time of the remote service expert. The social value types: status and self-esteem, provided limited opportunities to derive value for the service recipients. In terms of status, only a few examples were named to accrue status as value type by impressing others through acquired knowledge. The constraints in enabling tasks to derive social value were related to the unpredictability of remote service interactions, coordination, and planning requirements in parallel and to the overly technical used terminology when interacting with the remote expert. These findings also provided new insights from the perspective of the service recipients when using remote service.

In terms of the hedonic value types: play and aesthetic, the remote enabling tasks also provided only a few examples. Whereas in general, the radiographers showed an enjoyment in acting as a mediator between patient and machine, the excitement to derive play as value type in remote enabling tasks with the service provider was rarely highlighted. On the other hand, the aesthetic value type was addressed by some radiographer when they perceived pleasant communication and also in some cases when some decisions (e.g. when the patient workflow might be resumed) were predominately decided on by the remote service experts. However, time pressure and potential synchronized remote interactions (potential waiting time) mostly prevented radiographers from deriving the play and aesthetic value types for the enabling tasks. In relation to the altruistic values: ethic and spirituality, the remote enabling task was also rarely identified. However, the ethical value type was understood (according to Holbrook's framework) as being other oriented and relates to how remote interactions affects others when consuming. For this study, the effect on patients is salient when the radiographers are interacting with the service provider. A few examples revealed

the ambiguous considerations of some radiographers in relation to when the remote service should be used, or rather avoided, to derive the ethical value type for the sake of other patients. As an example, the ethical value type was derived for some radiographers by expressing the joint-problem limitations and practicability of remote service to manage the remote interaction with the provider and simultaneous care of the patients and, therefore, led these radiographers to withdraw their energy. In addition, some radiographers perceived it as difficult to judge the service provider expert's competences in enabling tasks, as the interactions are also associated with unpredictable outcomes. Based on the radiographers' answers the spirituality value type was not identified.

Enhancing tasks

According to the enhancing tasks the service recipients perceived (in comparison to the enabling tasks), these were seen to exhibit less time pressure and more flexibility to determine the timing when reaching out to the service provider. Overall, the radiographers derived relatively more value types when joining the remote service encounter with the service provider. Table 10 summarizes the findings of the derived value type and subcategories when interacting with the provider in enhancing service tasks.

Table 10: *Summarized overview of the derived value type, potential constraints for remote service enhancing tasks*

Enhancing tasks Value types	Subcategories and context of the derived value types	Potential energy dissipation
Efficiency	• 'Time optimization' mainly for other • 'Autonomy' (self-oriented)	• See enabling tasks
Excellence	• 'Guided troubleshooting' through informational exchange.	• See enabling tasks
Status	• Impression through 'expertise'. Enact responsibilities and skills for rarely occurring examinations and improving patients' image quality	• Not necessarily recognized by others in their organization • Radiographers need to communicate this message to the patients and their superiors and colleagues
Self esteem	• Described as expert talk to examine patients and perceived as an affirmation of their 'experiences'.	• Not identified
Play	• 'Learned on-line' additional system- and software-related features	• See enabling tasks
Aesthetics	• Perceive an overall 'friendly and pleasant' remote communication with the service provider	• See enabling tasks
Ethics	• See enabling tasks	• See enabling tasks
Spirituality	• Not identified	• Not identified

As an additional potential source (in comparison the enabling task) to derive efficiency as a value type in the enhancing tasks, some radiographers showed 'autonomous' behaviour to coordinate the interaction with the service provider. Some radiographers described determining the timing of a remote interaction and also expressed a clear expectation of the desired outcome for the remote joint problem-solving. Furthermore, the expectation of the service provider to offer immediate access to the remote service expert was not mentioned. Some radiographers even showed an understanding of when they had to wait longer

because of other customers. In terms of the excellence value type, some radiographers showed appreciation of the interaction with the remote expert in guiding them through the troubleshooting process. They highlighted a better understanding of the remote service activities in enhancing tasks and described this interaction more as informational exchange. However, one radiographer also mentioned some experiences referring to a relatively new remote application expert that resulted in no, or a limited, outcome. In regard to the social value, the status value type was often derived when rare examinations had to be executed and the remote service provider provided additional information and experience on how to accomplish this. In addition, some radiographers derived self-esteem through the communications with the remote service expert, as they also perceived the communication as mutual exchange and that their knowledge is also in demand to enrich the remote service expert's knowledge. Only one radiographer stated there was almost no remote service in their radiology department because the issues were too complex to be answered remotely and, therefore, usually only on-site support was provided when they had questions. Despite the on-site preferences, the energy dissipation was very limited. In terms of hedonic value, the value type play was mentioned by some radiographers, as they described positive learning experiences with the remote service expert. One radiographer mentioned that their superior encouraged them to try new measurement methods and they perceived the interaction with the service provider as a joyful experience. In addition, some radiographers appreciated the 'expert talk' and described the interaction as an enrichment in an otherwise routine working day. Also, in comparison to the enabling task, the enhancing tasks also provides relatively more opportunities to derive the aesthetic value type. However, the situation in enhancing tasks facilitates a mutual appreciation when the inquiry was jointly resolved. As an example, no radiographers mentioned the time pressure in an enhancing

the situation when interacting with the remote expert. In regard to altruistic value, enhancing tasks provide very limited additional sources of potential value when compared to the enabling tasks. The ethic value type was derived when the remote interaction was used to interrupt for the sake of the examining patient (e.g. claustrophobia) or other patients (waiting time).

Overall, in enabling- and enhancing tasks, service recipients identified almost all value types in their consumption experiences of remote service interactions (except spirituality). As described in the literature review, the individual view of the service recipient in the B-to-B environment is rarely addressed in service science and therefore little is known about their perceived value. The application of Holbrook's (1999) framework supported a micro-level view on individual value experiences, as the data revealed a variety of reasons why certain value types has been derived and why not. Surprisingly, the most advocated efficiency in the remote service literature could not be evidenced from recipients' perspective in the enabling task. Although, the service provider, recipient institution and others, including patients, benefit from the remote service interaction, the service recipients do not necessarily derive economic value.

However, the data revealed a high task dependency in the present study when service recipients derive value. In this sense, Holbrook's (1999) concept of consumer value facilitated the identification of the major radiographers' preferences when consuming remote service for different tasks. Additionally, Holbrook's framework brought value types to the fore, namely social, hedonic, and altruistic that had not previously been addressed in the domain of remote service provision. Whilst Larivière et al. (2017) addressed the role conflict between customers and service provider employees in the service science literature

in general, this study focusses on the service recipients' perspective and distinguished the remote service tasks.

The findings revealed the capacity of the individual service recipients to resolve their inquiry but also underpins the preferred usage of remote service in enhancing tasks. The remote enhancing task offered relatively more opportunities to derive social and hedonic value types for the service recipients. Although the consumer value literature has concerns in relation to Holbrook's (1999) framework, specifically in its ability to distinguish individual value types, through the intrinsic versus extrinsic dimension (Richins, 2002), this study follows the recommendation from Holbrook (1999) to consider this dimension as a continuum. In this sense, Holbrook's conception was supportive to identify the salient value types of the different remote service interactions from the radiographers' perspective. As an example, the derived value type 'play' in enhancing remote service interactions can be considered. The interaction with the remote expert has been perceived by some radiographers exclusively in enhancing tasks and potentially provides fun and may also provide more possibilities for the service provider to co-create value with the radiographers. In contrast, but also related to the intrinsic value dimension, the altruistic value type revealed only limited possibilities to derive value with no differences of the tasks. On the other hand, the extrinsic derived value (economic and social) was more evident in remote enhancing tasks. In relation to Holbrook's value concept, the dimension of self- versus other-oriented derived value types in the B-to-B environment was resolved through the adapted framework from Coutelle-Brillet et al. (2014).

Overall, the concept of consumer value from Holbrook (2002) was an adequate tool to identify service recipients different value types from remote enabling-and enhancing-tasks. Nevertheless, based on the service recipients selected strategy, the findings indicated

different participation behaviour, which is also identified in the customer participation literature (Mustak, 2019; Mustak et al., 2016; Yi et al., 2011). As addressed in the methodology chapter, the radiographers' participation is expected to be voluntary, and they assess each situation according to their individual evaluation (Yi & Gong, 2013). Customers decide to what extent they participate in the service process and broadly categorized their participation behaviour and citizenship. Therefore, some radiographers gave their activities different meaning to others engaged in similar tasks. Chapter Four addressed most of the value types and tasks, as well as the different behaviours chosen when engaging in remote problem-solving situations to derive value or not. However, why service recipients decided to invest their energy as source to derive certain value types in remote service interaction has been further investigated in the process of value co-creation (research question two).

5.2 Research Question Two

The literature review introduced the process of value co-creation in Chapter Two and the framework from Payne et al. (2008) was identified to investigate how the individual actors (service recipients) co-create value when engaging with the service provider, remotely.

> Research question two: How is the process of value co-creation influencing service recipient derived value when using remote service at their workplace?

Payne et al.'s (2008) framework allows the application of an outside-in-perspective (from the supplier-to-customer) to enhance the understanding of the individual experiences of the customer. This work mainly applied the framework elements: "Emotion, cognition and behaviour" to reflect the "relationship experience" from the remote service encounter from the service recipients' perspective (Payne et al., 2008, p. 88). However, for this research, the

potential asynchronous form of interaction required the development of a framework to reflect the remote service encounter at different remote service interaction points. Following the proposal from Mencarelli and Riviere (2015) to answer the questions: Who, what, how, when value is co-created the framework incorporated the derived value types from research question one. In addition, and following service recipients' different participation behaviour as indicated, the work contrasted low-and high-participation behaviour for enabling-and enhancing-tasks. This is in alignment with customer participation literature described earlier and addresses service recipients' different sensemaking behaviour evident during remote problem-solving interactions described across interaction points in enabling- and enhancing tasks (Dong & Sivakuma, 2017; Mustak, 2019; Mustak et al., 2016; Yi et al., 2011).

Remote interaction point 1

Remote interaction point 1 refers to the first remote interaction with the service provider, namely the customer care centre. Contact to the customer care centre was described independently from the task as the first contact point to address the service recipient inquiries. Table 11 summarizes the derived value types and their subcategories, the enabling and enhancing tasks and the different participation of the service recipients at remote interaction point 1.

Table 11: *Remote interaction point 1, derived value types with subcategories, tasks and participation behaviour*

Remote interaction point 1		
Enabling tasks	Derived value types	Value type subcategories
Service recipient: Low participation	• Efficiency	'Convenience'
	• Excellence	'Availability' and 'response' time
Service recipient: High participation	• Efficiency	'Time optimization'
	• Excellence	'Availability' and 'response' time
Enhancing tasks	Derived value types	Value type subcategories
Service recipient: Low participation	• Efficiency	'Convenience'
	• Excellence	'Availability' and 'response' time
Service recipient: High participation	• Efficiency	'Time optimization' and 'autonomy'
	• Excellence	'Availability' and 'response' time

As discussed in the previous chapter, for the enabling task, particularly the need for immediate response from the service provider, was highlighted by the interview respondents. Remote interaction point 1 for enabling remote service interaction has been demonstrated to offer limited possibilities for service recipients to derive value types. However, the channel to address service incidents via phone (direct contact to a call agent) was described as being 'sufficient'. Some comments even highlighted issues of patient safety when a different, more asynchronous channel, such as: e-mail, replaces the existing

hotline. In addition, some findings mentioned suggestions to further extend the operating hours of the customer care centre. Therefore, the availability and the response time of the customer care centre was discussed as essential for the enabling remote service encounter, with almost no service recipient tolerance for delays. The participation of the radiographers varied mostly in terms of the informational exchange to address their inquiry, either to delegate the task to the service provider or even propose suggestions and give direction to resolve the incidents.

In enhancing remote service interactions, the time required to resolve the service incidents were described as less critical. In addition, in relation to the opportunity to derive the efficiency value type in enhancing tasks, some radiographer described their behaviour as more autonomously to determine to the time when the service provider should be contacted. One of the most important sources for the decision of recipients to direct their energy towards the service provider was the possibility to determine the timing of the remote interaction.

Nevertheless, remote service interaction point 1 seems to reveal only opportunities to derive economic value. From the service recipient's perspective, the experiences from the enabling tasks seldom derive economic value for themself, the tasks do seem to have a considerable potential to frustrate the recipient if the minimum requirements are not met. Only, the enhancing task provided the opportunity for some radiographers to derive the efficiency value type for themselves, as they have been able to invest more energy to coordinate the remote interaction with the service provider. Hence, understanding the service recipients' perspective at the first remote interaction point seems to be important as the consequences might affect the subsequent remote interactions.

Remote interaction point 2

Table 12: *Remote interaction point 2, derived value types with subcategories, tasks and participation behaviour*

Remote interaction point 2		
Enabling tasks	Derived value types	Value type subcategories
Service recipient: Low participation	• Excellence	'Availability' and 'response' time
	• Ethic	'Online interaction' and 'moral, responsibility and safety'
Service recipient: High participation	• Excellence	'Availability', 'response' time and 'guided troubleshooting'
	• Status	'Impression through expertise'
	• Play	'Troubleshooting challenged'
	• Aesthetic	'Receiving tips and tricks' and 'friendliness (online) interaction'
Enhancing tasks	Derived value types	Value type subcategories
Service recipient: Low participation	• Excellence	'Availability' and 'response' time
	• Ethic	'Online interaction' and 'moral, responsibility and safety'
Service recipient: High participation	• Excellence	'Availability', 'response' time and 'guided troubleshooting'
	• Status	'Impression through expertise'
	• Esteem	'Self-esteem through experience'
	• Play	'Troubleshooting challenged' and 'learning online application'
	• Aesthetic	'Receiving tips and tricks' and 'friendliness (online) interaction'

The second remote interaction point was identified as the remote joint problem-solving with the remote expert. As already emphasized in research question one, the opportunities to derive certain value types at remote interaction point 2 are highly dependent on the task and the participation behaviour of the service recipients. Table 12 assessed the different tasks- and participation of the radiographer at the second remote interaction point. Remote enabling interaction point 2 provided additional opportunities to derive the ethical value type for some radiographers, evidenced in their capacity to express the importance of remote service consumption as a consequence for (their) patients. In other words, the ethical value type was derived as a decision to take care of the patient's needs rather than the remote service interaction with the provider. Subsequently, the participation with the remote service expert was reduced or even completely suspended. On the other hand, the service recipients with higher participation in enabling remote interaction were able to derive relatively more (other) value types and subcategories, such as: Status ('impression through expertise'), play ('troubleshooting challenged') and aesthetic ('receiving tips and tricks' and 'friendliness [online] interaction'). As discussed in Chapter Four, the higher participation provided more opportunities to accomplish successful remote service interactions with the remote expert (the inquiry is mutually considered as resolved). Remote interaction point 2 in the enhancing tasks evidenced higher participation rates in comparison to the enabling tasks. However, no different derived value types between low participation in enabling- and low participation in enhancing- tasks were found. However, for those radiographers who participated extensively with the remote expert in enhancing tasks, remote interaction point 2 provided the most meaningful experiences to derive multiple value types. Subsequently, most value types were identified in the enhancing tasks with the remote expert. In addition to those value types identified for an enabling task, the

following value types and subcategories were also identified in enhancing tasks: Self-esteem ('self-esteem through experience') and play ('learning online application').

Overall, remote interaction point 2 seems to provide the most relevant remote interactions to derive multiple value types for the service recipients. Both task types revealed possibilities to derive extrinsic- and intrinsic- and self-oriented- and other-oriented value types. However, the enabling tasks exhibited several constraints, which some radiographers needed to overcome in the form of energy dissipation to jointly resolve remote service incident. The temporal requirement to resolve the remote interaction quickly and minimize the potential asynchronously interaction with a remote expert who was perceived as 'anonymous' was salient. In addition, the difficulty to judge the performance of the remote service expert and sometimes the overly technical terms used caused some radiographers' additional uncertainty. This curtailed their participation in the remote problem-solving task. In contrast, the remote enhancing tasks demonstrated more energy transfer between radiographers and the remote service expert. The radiographers demonstrated to derive most value types during that interaction and showed a better understanding of the enhancing task to be accomplished. The recipients, by the nature of the task, had relatively more freedom to coordinate the flow of work for themselves and others and an opportunity to accumulate new skills. The potential derived value types could relate to intrinsic-and extrinsic value. The enhancing task is bringing the intrinsic value type play to the front, as some radiographers also felt the conversation (without mentioning the outcome) with a remote expert was enjoyable and described this mutual exchange as a deepened business relationship.

Remote interaction point 3

Remote interaction point 3 was identified as a mutual decision making in terms of the outcome from the remote joint problem-solving with the remote expert. Table 13 represents the derived value types and subcategories for the enabling- and enhancing task with the different forms of radiographers' participation in the remote interaction with the service provider.

Table 13: *Remote interaction point 3, derived value types with subcategories, tasks and participation behaviour*

Remote interaction point 3		
Enabling tasks	Derived value types	Value type subcategories
Service recipient: Low participation	Not identified	
Service recipient: High participation	• Aesthetic	'Follow up appreciation'
Enhancing tasks	Derived value types	Value type subcategories
Service recipient: Low participation	Not identified	
Service recipient: High participation	• Aesthetic	'Follow up appreciation'

As discussed in Chapter Four, remote interaction point 3 provides a rather limited opportunity to derive multiple value types. However, radiographers explained by that their low participation with the customer care centre or follow up call with the remote expert (mostly for enabling tasks) was primarily used to resume the patient examination and again meet the desired schedule. However, in some cases the aesthetic value type was derived in relation to both enabling-and enhancing tasks, as an appreciation for the remote joint problem-solving. Nevertheless, independent from the outcome of the remote service interaction, the service encounter usually ends after the call for the service provider, whereas the coordination, examination, communication and planning is further managed by the radiographers.

Overall, during all remote interaction points the findings revealed a relatively higher participation rate from the radiographers in remote enhancing task than in an enabling task. Additionally, as addressed in research question one, relatively more value types were identified in remote enhancing tasks (especially at remote interaction point 1 and two) than in the enabling tasks. However, in this study the process of value co-creation and the derived value types at different remote interaction point seem to be entangled and provided new insights for the value co-creation literature as value outcome and the process of value co-creation are primarily addressed separately (Gummerus, 2013).

The process of value co-creation and the derived value outcomes in remote service distinguished relevant remote interaction points with different importance for the service recipients. By distinguishing the different remote interaction points from the process of value co-creation, the value outcomes (research question one) identified the most meaningful remote interaction for the radiographers as this study focused on why service recipients perceive some remote joint problem-solving interaction points as more

meaningful for them. The findings revealed the self-directed emergent value types and 'subcategories': Efficiency, 'autonomy'; esteem, 'self-esteem through expertise'; and play, 'online learning activities'.

This study further sought to explore the spatial- and temporal- aspects of the most relevant value types for the service recipients during the proofs of value co-creation (Polese et al., 2021; Storbacka et al., 2016; Verleye et al., 2017). Firstly, for remote interaction point 1 in enhancing service tasks, the radiographer derived efficiency through autonomy, mainly by controlling the timing to initiate the service incident and set the direction to resolve their inquiry with the service provider. Secondly at remote interaction point 2 in enhancing tasks, self-esteem was derived through the expertise of the radiographer by synchronizing (tempo and timing) with the remote service expert to achieve non-physical (digital) proximity. Lastly at the same location and task, the radiographer synchronized their remote interaction to remotely connect and potentially maintain their relationship with service provider staff. Therefore, this study also revealed from the service recipients' perspective, that more relational relevance in predominately enhancing remote service interactions, as the opportunity to increase or maintain their relationship with the service provider staff was often established through earlier face-to-face interaction at their workplace.

However, service recipients' lived experiences demonstrated the inseparable experience between the non-physical and physical (face-to-face) service delivery at their workplace. Therefore, this study expanded the spatial dimension of on-site service delivery to provide a holistic view of remote service in the context of an overall multi-dimensional service delivery value proposition by applying Törnroos et al.'s (2017) framework. This finding is in alignment with the B-to-B service science literature, which addressed the multi-dimensional

service delivery value proposition and interrelationship of different actors in the B-to-B environment (Corsaro & Anzivino, 2021; Håkansson et al., 2009).

To further provide an explanation of sensemaking behaviour and how service recipients integrate their resources, this work refers to the service science literature that draws on notions of systems theory and the analogy of open systems from von Bertalanffy (1968) (Barile et al., 2016; Ng et al., 2011; Polese et al., 2020). This approach seems to provide common ground to describe the service ecosystem from the service recipients' viewpoint when investing (or not) and expanding their energy toward the service provider. Figure 14 (Chapter Four, Service recipient boundary spanning to the service provider) illustrated the capacity of service recipients to span and move their boundaries towards the service provider. However, the movements of the service recipients' boundaries are shown as being bidirectional, as the transformed energy to achieve their desired outcome might also change direction over time.

As also highlighted in Chapter Four, the service exchange needs to be mutually accepted and might occur with energy dissipation in accordance with the analogy of energy transformation in thermodynamics. Conversely, the invested energy of the service provider is expanding in the direction of the service recipient' sphere. At least for this study, the service provider demonstrated investments in value co-creation opportunities and expanded energy to bring in potential resources into the open-systems. However, the providers' invested energy to proceed with a transition from a physical to non-physical-service delivery model was embarked upon decades ago and can be fairly named as a pattern to make use of further technology enhancements and gain productivity. As the findings in this research revealed, for the service recipients, the transition of service delivery remains an inseparable experience. Whereas, in thermodynamics, the transformation of

energy might lead to a certain equilibrium and movements might end as no other energy is 'located', little is known about the extent to which the service recipient, or the service provider, might be 'better-off' should this transition develop further.

5.3 Contribution to Knowledge

This thesis is the first investigation of value co-creation with individual radiographers in the context of remote service interactions with the service provider. This study contributes to an understanding of the relationship between radiographers as a service recipient and the provider of medical equipment and how they co-create value through B-to-B remote interactions. In particular, this study reveals how:

(i) Radiographers differently derive and co-create value at discrete interaction points and experience, value-outcome and-process as being entangled rather than separately and as discussed in the in marketing- and value co-creation-theory.

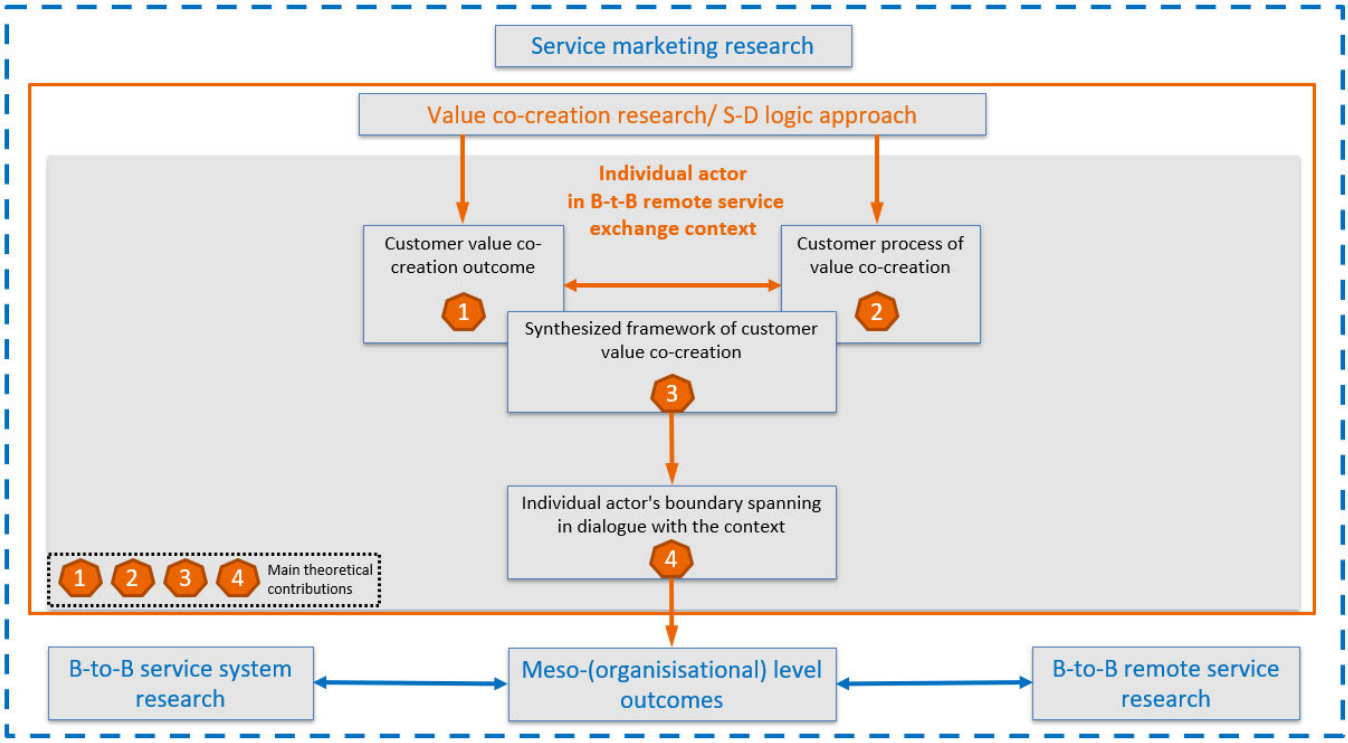
(ii) Radiographers perceive contextual aspects in remote interactions with the service provider on the micro-level, leading to different meso-level outcomes.

(iii) Value outcomes may differ from the remote value propositions and are dependent on the individual radiographer's resource integration (or not) enactment.

This section firstly begins with the overview of focal actors, the theoretical-context, and the foundation of this study. Secondly, it refers to the main constructs (value-in-use and the process of value co-creation) as the essential theory-building blocks, and their theoretical contribution to this study, to address the specific phenomena and answer the research questions [RQ1: Value-in-use determination and RQ2: How the process of value co-creation

impacts the service recipient]. Thirdly, it presents a framework for value co-creation in asynchronous remote interactions to describe the relationship between the constructs. Fourthly, it elaborates how the study explains and interprets the service recipients' perspectives through an expanded view of the customer value sphere and the different meso-level outcomes in the broader context of service marketing research. Figure 15 provides an overview of the theoretical contributions of this thesis.

Figure 15: *Overview of the theoretical contribution of the thesis.*



The recipient perspective specifically explores the nature of tasks that need to be jointly resolved with the service provider, the perceived value outcomes and how recipients are influenced by contextual aspects during the process of value co-creation. This address, the call from the service- and value co-creation literature to further explore individual level value co-creation interactions to investigate why actors mutually exchange services (or do not) (Aarikka-Stenroos & Jaakkola, 2012; Storbacka et al., 2016; Vargo & Lusch, 2016).

Specifically, in the B-to-B context, the lens of the individual actor, consideration of how they are influenced by the institutional logics of their ecosystem, and how they shape their relationship over time are rarely investigated (Gonçalves et al. 2019). Additionally, B-to-B service providers designing their service provision and value promises do so primarily on a meso-level, rather than on the micro-level. In the case of remote service especially, the benefits of remote service technology are usually addressed for the client company in general (e.g. ensuring higher productivity of an operating asset) rather than for the individual recipient.

Therefore, the aim of the research was to attain an understanding of the service recipients' sensemaking perspective of remote service value co-creation, with the service provider, in the transformation of service delivery in a B-to-B context (ecosystem). Thus, this study investigates the service recipients' remote service lived experiences in their work environment and how they make sense by acting on value co-creating opportunities. As such it represents a rarely investigated perspective from the individual actor in a B-to-B system. In addition, Kohtamäki and Rajala (2016) highlighted that, research in B-to-B value co-creation is predominantly "… based on realist ontologies and positivist epistemologies …" (p.10) whereas B-to-C value co-creation research more commonly applies subjective epistemologies to reflect the individual perspective. This study contributes to bridging this gap by embracing the subjective experiences of the service recipients in a B-to-B environment and contributes by applying the selected methodology to enrich the value co-creation literature (Kohtamäki & Rajala, 2016). Specifically, this study emphasized the subjective experiences through 19 semi-structured interviews with service recipients from different companies in the B-to-B environment when jointly using remote services with the provider.

The S-D logic applied in this research offered a lens to understand and answer its research questions (RQ1: What types of value are perceived from remote service for the service recipient during value co-creation? and RQ2: How the process of value co-creation impacts the service recipient derived value when using remote service) from the perspective of the individual actors (service recipients) when interacting both asynchronously and remotely with the service provider. This study provides novel insights from the service recipients' perspective on how these constructs are related, and specifically when deriving value from remote service interaction with the service provider at their workplace.

The exploration of research question one was theoretically framed by Holbrook's (1999) consumer value typology to pursue a multi-dimensional approach to perceived value and accommodate the idiosyncratic view of value (Vargo & Lusch, 2016). Additionally, to investigate the potential value outcome for the service recipients when consuming remote service, the study considered the work of Aarikka-Stenroos and Jaakkola (2012) to identify the joint problem-solving solutions from their perspective. In this study, two different tasks, enabling- and enhancing, have been broadly categorized and showed a relatively high degree of task dependency when service recipients engaged with the service provider remotely. By doing so, the study also followed the call from Mencarelli and Riviere (2015) to apply Holbrook's (1999) consumer value typology in a B-to-B environment. Almost all value types have been identified in remote service interactions with the service provider. Through the inductively generated value type subcategories, it was possible to identify the different behaviour of the recipients for relatively similar tasks. This abductive approach was helpful to gain further understanding of the different participation behaviour within the process of value co-creation (Alvesson & Sandberg, 2022).

However, this study follows Holbrook's (2002) recommendation to see the dimensions as a continuum instead of rigid boundaries. As an example, the distinction between intrinsic and extrinsic value dimensions was less obvious in the case of the ethical value type in the B-to-B healthcare environment. The self-oriented-versus other-oriented dimension was relatively easily discerned, and further findings in the B-to-B value co-creation literature facilitated the decision to distinguish the other-oriented value recipient category in 'organization as a whole' and 'external stakeholder' and, therefore, also supported the identification of the beneficiary (Coutelle-Brillet et al., 2014).

The adapted framework from Coutelle-Brillet et al. (2014) provided a clear approach to discern for whom value was derived when interacting with the service provider. The applied consumer value typology provided a useful tool to identify the resulting value types for the service recipients in this study. By distinguishing between the two remote tasks (enabling and enhancing), it was possible to demonstrate the different value types derived for the two task types. It became evident that more value types were developed for the enhancing remote service task, in relative terms. Foremost, this study supports the practicability of Holbrook's (1994, 2006) consumer value concept in a B-to-B environment to facilitate and capture a multidimensional approach to value and identifies the different value outcomes in remote service interaction from service recipients' perspectives. Therefore, this study first contributes by:

> Presenting from the viewpoint of service recipients, an empirical framework in B-to-B to determine multidimensional value types and the tasks when consuming remote service interactions with the service provider.

This framework is theoretically important as it provides a more sophisticated understanding of the individual actor by categorizing their tasks to be resolved and their derived value

outcome. In addition, the framework was useful to identify subcategories of value types (autonomy, self-esteem through expertise and online learning activities) to recognize the service recipients' consumption preferences. These were relevant for this research to enable further investigation of the emergent properties of value creation.

Thus, this approach reveals the perceived tasks preferences that might also contribute to an improved role understanding of the individual actor, as the value co-creation and remote service literature consistently highlights ambiguous participation behaviour in value co-creation and the need for further clarification (Chowdhury et al., 2016; Paluch, 2011; Yi & Gong, 2013). Service providers offer multidimensional value propositions that are jointly shaped with the customer. Nevertheless, implications for managers are hard to identify without deeper understanding of the individual context-related aspects of value co-creation, which also includes establishing the potential preventing factors for the non-use in relation to certain tasks.

Research question two investigated the process of value co-creation from the service recipients' perspective and how they are impacted by remote service interactions with the service provider. This study applied the framework from Payne et al. (2008) as a foundation to frame the customer and remote encounter processes to capture the experience service recipients' remote service interactions with the service provider. However, the overall perspective follows an outside-in-perspective, which is also encouraged by Payne et al. (2008) to investigate the value co-creation opportunities for the service provider from the perspective of the customer. Therefore, primarily the components of the relationship experience (emotion, cognition, and behaviour) and the service encounter process were utilized to capture the experiences of the service recipients and frame their experience in the research context.

However, for this study the relational components of the relationship experience from Payne et al.'s (2008) framework proved to be particularly useful to capture the richness of the respondents' experiences and provided further insight into the (customer) process of value co-creation for the categorized tasks. In addition, the variation of service recipient value co-creation participation has been identified and contrasted (high-low) in this study. However, Payne et al.'s (2008) framework predominantly considers the service encounter as a whole, whereas this study demonstrated that the asynchronous nature apparent in this context makes it sensible to focus more closely on the different interactions within the service exchange (Langley, 1999). It was evident that the service recipients assessed, and acted, differently to resolve their task when interacting remotely within the service encounter process. Therefore, to reflect the entire remote service encounter process more accurately, service recipient anticipated remote service interaction episodes with the service provider were subdivided into discrete remote interaction points. Subsequent consideration of discrete interaction points disclosed different participation behaviour when jointly resolving their tasks remotely. Consequently, additional illustrative adaptions of the framework as 'different participation behaviour of the service recipients' and 'different task' (RQ1) allowed a more comprehensive investigation of the customer process of value co-creation.

The second theoretical contribution is:

> The framework provides a lens for potential asynchronously (remote) service interaction by distinguishing discrete interaction points in the process of value co-creation and focusing on the service recipients' most important task and their participation behaviour.

This perspective provides deeper insight into aspects of the service recipients' context and describes the customer process of value co-creation in a new way to capture asynchronous value co-creating interactions at discrete interaction points. Specifically, the perceived variety from the service supplier provided potential resources, and their density for different tasks, appeared to be a deciding aspect for the recipients when engaging at the discrete interaction points. This is an important consideration for the service provider when designing their remote service provision (e.g. access, availability, etc.) for different tasks, as service providers are highly dependent on the level of participation to derive their own productivity gains. A further application is that the service provider might utilize the framework to identify already established customer co-creation practices that are learned and established from previous remote interactions.

The service recipients' experiences described led to an additional adaption of the framework to address more holistically the perspective of the service recipients in the context of remote service. Therefore, the service recipient's pre- and post-service encounter activities led to an expanded framework. For this study, the service recipient's pre-encounter activities demonstrated important reflective learning from previous episodes, which potentially reduce and/or facilitate future-oriented joint remote problem-solving, especially for enabling tasks. Similar findings have been made in the value co-creation literature by expanding the value process into before- and after interactions according to a customer – or service provider – perspectives (Holmqvist et al., 2020).

In the process of theorizing, when the derived value types and the process of value co-creation were combined, this established the foundation for explaining the phenomenon further. This synthesized framework of derived value types and the process of co-creating value has shown that, from the perspective of the recipients, value creation seems to be

entangled at, or between, the discrete points of interaction rather than being perceived as separate constructs.

First, the different interaction points showed, as addressed in research question one, a high degree of task (enabling and enhancing) dependency, with comparatively more participation and more derived value types for enhancing tasks. Secondly, the potential to derive relatively more value types at certain interaction points corresponded to higher participation behaviour. Therefore, some derived value types were only identified with the higher participation behaviour of the service recipient with a specific task and at a specific interaction point. Subsequently, the work further explored of the process of value co-creation, and why the service recipient felt encouraged to engage with the service provider via remote service technology and derived, for themself (self-oriented), the most significant value types and subcategories.

The study identified the main temporal-, spatial- and relational aspects of asynchronously remote interaction to facilitate the synchronization between the service recipient and the service provider. Namely, the timing and tempo of the remote interaction were deciding factors in synchronizing the remote interactions with the service provider to achieve non-physical proximity. In addition, the usage of remote service technology was also positively related to the recipient's knowledge exchange with service provider staff to initiate, and maintain, their business relationship. In contrast, a rather low level of participation revealed relatively fewer opportunities to derive value types and sub-categories but provided meaningful insight into potentially why the service recipient rather seeks to derive another value type (e.g. ethic value type). Overall, the synthesized framework facilitated explanation of the phenomenon by addressing the variety of respondents experiences and why service

recipients acted on resources to create- and derive value (or did not). Therefore, the third and primary theoretical contribution is the:

> Empirical framework to explore multidimensional value co-creation in asynchronous remote interactions in B-to-B, from the perspective of the service recipient.

Marketing - and value co-creation-theory typically distinguish value co-creation outcome and processes, whereas from the individual perspective, value-outcome and-process are experienced as being entangled rather than separately (Corsaro & Anzivino, 2021; Grönroos & Voima, 2013; Gummerus, 2011, 2013; Vargo et al., 2023). The entangled customer view of the relationship between derived value outcome and the process of value co-creation at discrete interaction points provides a novel way to conceptualize customer perceived experiences. This is in alignment with the value (co)-creation literature, as value (co)-creation is broadly acknowledged as a process and conceptualized as, 'longitudinal'- 'dynamic'- or 'non-linear'- processual experiences of the customer (Echeverri & Skålen, 2011; Grönroos & Voima, 2013; Polese et al., 2021; Storbacka et al., 2016).
However, this study magnifies the view of the service recipient and of the customer co-creation process as part of value (co)-creation during the service encounter within a confined framework – this results in a more insightful understanding. Previous value co-creation literature has not empirically explored the constellation and variety of perceived value types, how they emerge (or do not) and changes within the service encounter itself. The capturing of these changes (dynamics) is an important theoretical contribution to confirm the dynamic of the customer value co-creation process within the service encounter. Subsequently, it allows for reflections on the service provided, and on the tendencies and patterns of the service recipients' behaviour.

Through the entangled view of the recipients at discrete point of interaction, the service provider might be able to unlock distinct potential resources and facilitate value co-creation to offer reinforcing remote service provision. This might lead to a more meaningful step forward for the service provider to increasingly develop and deliver further remote value proposition enhancements together with the customer.

Hence, this study advances the understanding of the service recipient's perspective in the context of remote service as it addresses the enabling- and enhancing value proposition and relationship experience from value co-creation at discrete (virtual) interaction points.

However, it was evident from the findings that the service recipients varied in their perceptions and enactments to resolve the identified task and shaped their sensemaking behaviour over time (recipients working experience). For some recipients this perceived reality, in terms of sensemaking behaviour, also resulted in low participation. Whilst service providers', might recognize service recipients' different degrees of participation behaviour relatively easily, the next section seeks a more sophisticated explanation from the recipients' perspective to further consider aspects of individual service recipient 'capacity' in relation to the service provider.

To bring in all relational experiences into the context of remote service exchange, the study moved back to the literature and incorporated elements from systems theory to provide a holistic view of remote service as a part of an overall service ecosystem. The work from von Bertalanaffy (1968) on 'open systems' and 'system viability' provided a useful analogy for this study to interpret, abstract and explain the sensemaking behaviour of the service recipients (Ciasullo et al., 2021, p. 155).

Within this research the customer processes are described as an open system with potential energy exchange with the service provider processes during the service encounter. Based on

the service recipient's sensemaking and understanding of remote service, and depending on situational context, their energy will either be transferred towards the service encounter or will remain potential energy. The identified constraints to pursuing remote service along the service encounter are described as energy dissipations, which have also been differently assessed and experienced at the discrete interaction points.

To address the spatial dimension of the research context and 'where' the potential energy transfer, dissipation or potential energy occurs (or does not) Törnroos et al.'s (2017) framework and Corsaro and Anzivino's (2021) work was utilized to determine the locality of potential joint value co-creation interactions. Corsaro and Anzivino (2021) developed two second order processes, 'defining resource combination' and 'specifying network boundaries', that also include the multi-spatial service provision dimension.

However, this study primarily focused on the remote service provision and contributes through the perspective of the service recipient to confirm the different potential resource constellations, and their sensemaking enactment, at different interaction points. In a more extended sense, and through the potential energy transfer between the remote point of interactions, the service recipients are shaping their own 'locality of energy transfer' in the form of a boundary, or sphere, in relation to the service exchange. This view represents the recipients' sensemaking behaviour and locality of energy transfer by directing (expanding or contracting) their sphere at the discrete interaction points. As service recipients attain certain value types and resolve their tasks accordingly along the service encounter interaction points, the proximity to the service provider is shaped by their own value sphere. Therefore, the fourth theoretical contribution refers to:

> The direction of the customer value (co)-creation sphere in relation to the service provider (expanding or contracting) during asynchronous interaction is dependent

on the value proposition, potential and transferred energy at discrete interaction points.

Based on the previous theoretical contributions, the study provided, with the support from additional value co-creation literature, a new approach to conceptualizing the customer value sphere in asynchronous remote interactions for discrete interaction points by relating these to energy transformation in open systems. This view is theoretically important as the idea of potential transfer of energy reflects the sensemaking behaviour as an outcome and as capacity (potential energy) of the individuals and, therefore, contributes to a more sophisticated perspective for the value co-creation literature.

The study revealed, beyond the recipients' enactment on potential resources (or not), different capacity characteristics (e.g. experiences from professional work, with medical equipment, service provider relationships or self-efficacy beliefs) that also influenced the process of value co-creation. Service providers may additionally want to consider the variety of capacity of service recipients, when inviting them to engage in value co-creation opportunities. Relatively unexperienced service recipients might shape a different value sphere and transfer energy at discrete interaction points to more experienced recipients. In addition, the notion of energy dissipation at a single point of interaction moves beyond the mere notion of recipients' participation behaviour, as it might prompt the questions of where else, or instead, does the service recipient prefer to transfer their energy (e.g. service ecosystem).

This study provided an insightful explanation of the service recipient 'remote'- value sphere by presenting the temporal-, spatial-and relational aspects for each remote interaction point with the service provider at their workplace. Drawing on the applied S-D logic (Vargo and Lusch, 2016), this work emphasized the perspective of the service recipient and made the

relation between value outcome and customer value processes, more explicit. The entangled view on value co-creation (outcome and process) at discrete interaction points from the perspective of the recipient is a theoretical contribution to S-D logic (Vargo & Lusch, 2016). This entanglement is probably more noticeable and amplified through the nature of remote interactions than in other forms of interaction. However, when applying the S-D logic this study emphasized the importance to distinguish discrete interaction points when investigating value co-creation and therefore potentially facilitates contextual transferability for other researchers.

Overall, this research has contributed to theory in the domain of value co-creation and specifically to S-D logic by revealing a novel way of understanding the interrelatedness between the individual service recipient and their perceived contextual aspects (Corley & Gioia, 2011). This research empirically showed that the individual frames their activities according to the perceived context and that the context (e.g. task dependency) forms the outcome of the interaction and, therefore, shapes their experiences. As the bi-directional relationship between the service recipient and service provider in the B-to-B context were evident in value co-creation (remote) opportunities, this thesis argues for a dyadic and reciprocal relationship between the individual and the context.

The different personal reactions of the radiographers in remote joint problem-solving situations with the service provider in their context revealed different meso-(organizational) level outcomes. These differences are addressed by explaining the service recipient boundaries and their relationship to the context. In this sense, the applied S-D logic provides ‘utility’ by centring the perspective of the individual in dialogue to their perceived context for value co-creation (Corley & Gioia, 2011).

However, in terms of 'the beneficiary of value' S-D logic evidenced some limitations when trying to reflect the more relational perspective of the service recipient and their understanding of the value beneficiary when interacting remotely with the provider. By drawing on S-D logic and a service system of micro-level interactions, the perspective is primarily focused on the bi-directional actor-to-actor (entities). Through this the dyadic view between the service recipient and the service provider staff are framed as (fixed) entities. More specifically, this research has utilized the concept of service systems to provide an exchange platform and connect the entities, namely the 'service recipient' (radiographer) and 'remote expert'. This systemic view was used to understand the radiographer's remote interaction and their consumption practice at their workplace. Yet, the study showed how individual radiographers (as entity) sometimes perceived legal and regulatory constraints in their specific context with patient examinations when interacting with the provider remotely.

Therefore, radiographers acted adaptively along the value co-creation process to derive value for themselves or others. The relationship to 'their' patients as value beneficiaries was salient in the customer process of value co-creation and supersedes the applied dyadic micro-level perspective between the service recipient and the provider. Drawing on S-D logic, the reciprocal relationship between actively engaged actors to co-create value does not account for the patient with limited agency in the actor-to-actor constellation. Therefore, a systemic view seems less supportive to conceptualize other value beneficiaries in a broader relationship to other actors at the micro-level (Kelleher et al., 2020). More recently Kelleher et al. (2020) provided the 'markets-as-practice' and the relational perspective to focus on multiple actors who coordinate value co-creation as an inter-defined concept (p. 213).

Therefore, this thesis theoretically contributes to service system theory by to emphasizing the changing role and agency for the individual actor in the customer process of value co-creation B-to-B context. This study views the individual meso-level outcomes as practises in a broader interplay of different systems than fixed and aggregated institutions (Kelleher et al., 2020).

However, this work has also contributed to the domain of remote service research by an improved understanding of the remote recipient value co-creation in the B-to-B context. Previous remote service literature has highlighted the ambiguous use of remote service by B-to-B customers (Paluch, 2011; Wünderlich, 2010) and called for an improved understand of remote service value co-creation (Grubic, 2014). This study focused on the remote service recipient and experientially approached their remote service value co-creating experiences in the B-to-B environment. The applied concepts from Holbrook (1994; 2006) and Payne et al. (2008) in this study enabled to capture the complex and rich remote value co-creation experiences of service recipients and provided novel insights to understand the recipients behaviour at their workplace context. By relating to energy transformation in open systems von Bertalanffy (1968) the additional literature enhanced the explanation of the different remote service practices from the service recipient. Therefore, this work reveals a more sophisticated account of the service recipient in their B-to-B “lifeworld”, when deriving value (or not) from remote service interaction with the supplier (Alvesson & Sandberg, 2022; Gonçalves et al., 2019; Kohtamäki & Rajala, 2016). This provided lens has conceptualized and explained the variations of remote service recipients value co-creation behaviour and potentially unlocked further remote service research, of how individual accounts are investigated in their B-to-B environment.

Nevertheless, this study has not neglected the absence of remote value co-creation interaction at discrete interaction points and provides an explanation that the energy from the service recipient is not lost in the system but rather conserved or allocated elsewhere. Due to the multi-spatial service delivery by the service provider, this study has shown that the relationship with the service provider is not experienced by the service recipient as a distinct experience of the remote interaction itself, but rather within a broader total experience (multidimensional service delivery value proposition). More recent value co-creation research in B-to-B context stressed the multidimensional service delivery value proposition and acknowledged different customer preferences to engage with the supplier company for the same or similar tasks (Ciasullo et al., 2021; Corsaro & Anzivino, 2021). This study confirmed the multi-spatially energy transfer in value co-creation interactions from the recipients at their workplace, which is further discussed in the managerial implications in the next section.

5.4 Managerial Implications

The relationship experience of the service recipients revealed important implications for the service provider when delivering a remote service. First, the different remote task inquiries identified and discussed by service recipients seem to significantly develop an understanding of radiographer reality. To further engage radiographers in remote joint problem-solving interactions, the service provider should be aware of the potential resources it may need to invest to facilitate shared value creation tasks for itself and others. This means that the recipients' remote service consumption experiences were essential to further developing an understanding of their sensemaking behaviour at their workplace and when they invested their energy in remote value co-creation or did not.

However, this study revealed the entanglement from the derived value types and the process of value co-creation along the entire remote service encounter and demonstrated the importance of distinguishing the different relevant interaction points in potential asynchronous interactions. The first point of remote interaction revealed that it is essential to ensure the temporal requirements for enabling tasks to access the service and process service requests to stimulate efficiency. Subsequently, in the case of time-sensitive service, the service recipient demands almost immediate access and response to their service request from the service provider. Given the potential patient safety issues, escalation via the telephone to make contact was felt to be adequate. For the enabling task in this study the resource density (e.g. call agents) at remote interaction point 1 needs to be high to avoid discrepancies. If the recipient is confronted with waiting times, the described citizenship behaviour of the recipient to participate in a remote service could be at peril. However, as the data revealed that for some recipients, it seems important for them to act

more autonomously and determine the timing of when to escalate an incident without interrupting their own workflow. Therefore, it might be that for other tasks (e.g. enhancing), or that remote service recipients in other industries, might perceive another communication medium that is more asynchronous (e.g. e-mails), as being sufficient.

Consequently, multi-dimensional service delivery value proposition of escalation seems to be meaningful, which potentially also addresses the radiographer remote pre-service encounter activities. Most radiographers showed initiatives to resolve their task inquiries before they contacted the service provider. A digital communication platform may allow the addressing of the pre-encounter activities from the recipients in advance to avoid repeating explanations to the customer call agent or to the remote expert. Self-initiated activities might be better documented and probably positively foster a sense of self-efficacy as, from the perspective of the radiographer, the service encounter starts with their activities to resolve the problem. Proactive activities, such as screenshot, photos, downloads from error-logs, system-tests and resets, etc., might have already happened before the first remote service contact was initiated and may help the remote service expert to react with more empathy to the situation and more sensitively plan joint activities at the next remote interaction point.

Remote interaction point 2 was defined as the interaction with the remote expert, for enabling- and enhancing tasks. Since one of the main concerns for energy dissipation among service recipients remains evident within this remote interaction point, the waiting time is a contributing factor. The ‘response’ time of the remote expert in the remote enhancing tasks is also perceived as sensitive with little tolerance shown by the radiographers. In this sense, the service provider needs to ensure a sufficient resource density of remote experts according to the temporal requirements. Some radiographers mentioned ‘peak-hours’ e.g.

in the morning and on Friday afternoon, where a longer ‘response’ time of the remote expert was perceived. The service provider might need to expand, or further balance, the service task volume according to the demand and perhaps adjust the service provision by a more rigid prioritization between enabling-and enhancing tasks.

As several radiographers admitted, the root cause of the service inquiry (mainly operator issues or systems malfunctions) is sometimes difficult to differentiate. However, some radiographers mentioned the unpredictability of the remote service outcome and difficulties in judging performance, which may also influence their self-efficacy beliefs to actively participate in the remote enabling tasks. Uncertainty about interrupting the patient's workflow was salient in enabling tasks, and it is to be expected that a timetable from the remote expert would be found very helpful in anticipating further planning of the patient's examination. Even if the remote service professional is not able to complete all remote service activities, a communicated ‘objective’ time for completion of the intervention supports and aligns the expectation of the remote service duration with the perceived time of the service recipient.

As an additional potential constraint, some radiographers mentioned that some remote experts use technical terms to resolve enabling tasks which had the potential to decrease their self-esteem and, as consequence, they hesitate to participate more fully and limiting their energy to avoid an in-depth remote interaction. Therefore, radiographers’ pre-remote service encounter activities (see remote service interaction point 1) could be interpreted as a joint problem-solving avoidance strategy in enabling tasks, as the invested energy might not lead to the desired value type. This behaviour rather limits the potential to garner deeper business relationships between the remote expert and the service recipient and, therefore, the (technical) remote expert remains predominately anonymous.

Despite the potential constraint in enabling tasks, some radiographers utilized remote interaction point 2, to derive additional value types (compared to remote interaction point 1). Some perceived an aesthetic value when they received 'tips and tricks' to resolve their inquiries on their own. In addition, these acquired new skills might also support the generation of status as value type, as some radiographers might seek to impress others through their expertise. Therefore, the remote interaction point 2 seems to provide an opportunities for the service provider to further train and prepare radiographers for enabling tasks. The acquired knowledge might support an increase in their self-efficacy beliefs and potentially enable them to swiftly resume the patient workflow for the benefit of the patients, institutions and for the service provider. Additional productivity gain for the service provider might be achieved through saved costs for service interventions. However, learning new competences has been mostly described in enhancing tasks with the (application) remote expert.

Hence, Remote interaction point 2 revealed the most derived value types and was perceived with less time pressure. Some radiographers mentioned increasing their self-esteem through communication with the remote expert as the 'expert talk' was perceived as a mutual exchange which enriched each other's competencies. The process of value co-creation and the learning of new competences 'on-line' was also related to the play value type. Some radiographers described the remote interaction with the remote expert as a joyful experience, especially when this remote interaction was happening with already a familiar (through earlier face-to-face interventions) service provider staff member.

As the data revealed the on-site staff played a major role in the perception of the service recipients when considering the overall service provision. This study focused on the remote service derived value types and how the recipients are affected during the remote value co-

creation process, the data showed a more entangled (physical and non-physical) service provision perception. Remote service interaction point 2, revealed a clear preference from the radiographers to transfer their energy and rely on earlier established business relationships. This was also underpinned by some radiographers' comments concerning their preference to initiate service inquiries with the on-site service provider field staff instead with the customer care centre (the prescribed process). This behaviour demonstrated strong bonds between the service recipients and the on-site staff. Therefore, the established business relationship should not artificially be separated between physical and non-physical, as service provision is not only determined by the service provider.

The service recipient demonstrated being able to transfer their energy multi-spatially and actively manage the transition of the service provision at their workplace. In particular, past energy investments between the recipients and on-site staff through jointly problem-solving situations should not be neglected. This could serve as a capacity for the service-recipient and provider to transfer the service interactions into a non-physical space and develop the relationship beyond the physical service experience. To advance the mostly perceived anonymous remote interactions, it might be sensible to let the on-site staff from the provider integrate in the remote service provision process to maintain and expand their business relationship. Another initiative might, to let the technical remote expert visit some customers and service recipients to overcome the anonymity.

This might also impact remote service interaction point 3, which was described as a rather limited opportunity to derive value types (especially in enabling tasks). However, a mutual appreciation was mentioned by some radiographers and provides an opportunity to derive the aesthetic value type for them. Whereas this experience is more standard in physical service interventions, in remote inventions the opportunity is rather seldom seen.

Therefore, a joint retrospective on what has been achieved is mostly non-existent. To acknowledge the service recipient's participation, even if they are busy, and to resume and expedite the patient's workflow immediately after the remote interaction, the service provider can send an email to express their gratitude. This email might be personalized (picture of remote expert, duration, key measures) to make the remote intervention more memorable and facilitate the coordination and communication of effort to the superiors of the recipients.

Overall, to facilitate synchronization between the service recipient and the service provider in B-to-B remote service interactions, the service provider might first gain a multi-layered understanding of customer processes, tasks and their temporal and spatial aspects when designing service delivery and considering the density of potential resources. Secondly, this study has highlighted the B-to-B relationship aspects that particularly influenced the individually created hedonic value type-in-use (or not) for joint remote problem-solving as well. A service providers might want to view the customer sphere more holistically and not simply just as a standalone (remote) service delivery as the service recipient chooses to invest their energy in the remote service encounter process. Over more than three decades the multidimensional value proposition of service delivery has resulted in a variety of individual value-in-use and requires further research to make remote service more receptive at the workplace of the recipients.

5.5 Future Research

This section offers four possible avenues of further research. Firstly, the perspective of the service recipient on the micro-level provides further possibilities to explore different situational and contextual insights in the same industry and opportunities to transfer this study to other B-to-B industries. Secondly, the perceived value for the service recipient in regard to the service provider's multi-dimensional service delivery value propositions. Thirdly, a quantitative approach to the measurement of the different value types at different interaction points could be undertaken. And lastly, to expand the perspective taken in the research by the service provider to explore the value-in-context of remote service interactions.

The applied S-D logic allowed this study to focus on dyadic remote service interaction (service recipient and service provider), from the focal perspective of the service recipient. Hence, this study delimited the situational context (as described in Chapter Two) to achieve adequate theoretical reproducibility. Further research might want to explore the remote service context and experiences from the service recipient perspective in other contextual conditions, as well in relation to other medical devices. Possible other contextual areas for investigation might specifically focus on the differences between service recipient institutions (e.g.: Public-versus private-hospital) or contractual arrangements between the service provider and the customer. Service agreements with risk- and profit-sharing seem to be relevant for further study from the service provider's perspective, as they could have an impact on the voluntary participation behaviour of service recipients. However, the potential asynchronous form of interaction and the associated remote interaction points with their entangled process-and outcome of value co-creation, might be usefully

transferred to capture the context and remote service experiences of service recipients in other B-to-B industries.

This study highlighted that technological advances are associated with a more demanding work schedule for the radiographer, with less time for each patient, and that remote provision tends to accelerate the trend in the mastery of their tasks at their workplace. As this study revealed that some service recipients tend to handle their task inquiries directly with the service provider staff, further investigations should include the multi-dimensional service delivery value proposition when determining the perceived value and process of value co-creation at the identified interaction points. The asymmetric distribution of derived value types in remote service interaction might be perceived differently when compared with physical service provision from the service provider field staff. The dynamics between the multi-dimensional service delivery value proposition and value creation from the service recipient perspective seems another promising area for future research and how this trend perhaps evolves over the long-term.

Future research into potential quantitative measurement might further investigate the distribution of value types with multiple possibilities of analysis and comparisons (e.g. different countries).

Nevertheless, further research might need to extend the perspective of the service provider staff and incorporate the provider processes. For this study, the identified remote interaction points also invite the determination of the perceived value types and process of value co-creation from the remote service provider staff, and consequently the broader investigation of value-in-context.

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Appendix I Blank interview protocol (English & German)

English:

Welcome and introduction of informed consent form

Welcome & Thanks

Recording Permission

Notes: *in this study:*

- *a remote technology-enabled service encounter focuses on interactions that involve people*
- *a joint problem-solving service encounter, includes both proactive (service recipient-initiated) and reactive activities (including those that are part of the service provider's contact or that are a reaction due to machine malfunction)*
- *the service provider is [name of the company]*
- *to enable easier comparison of service recipient experiences, [provider name] portfolio is limited to MRT imaging modality*
- *the Researcher's role is to avoid expectation for intervene in current products and services.*

Opening questions:

How long have you been working as a radiographer?

Can you tell me, in general terms, about what your work entails?

How long have you worked with the MRT [provider name] System?

And for how long have you engaged with provider remote services?

What do you enjoy the most about working as radiographer?

Thinking about a situation where a problem occurs with the MRT System that you cannot resolve on your own, can you talk me through what you would do to solve the problem?

What are the most challenging aspects of problem-solving when using the [provider name] remote service in such situations?

How would you describe your role in terms of engaging in joint problem-solving situations with the [provider name]?

Participants will be asked to elaborate on how, what, when, who, where and why things occurred (Lexhagen, 2009).

What function does the service [provider name] play / how do you perceive that role?

Value related questions:

(economic, social, hedonic and altruistic values)

To what extent do you think [provider name] provided actives are personally valuable for you in terms of the time/effort/ Why?

How do you feel [Name des Unternehmens]- remote service affect your performance as a radiographer? Why?

What do you think patients expect from examinations? Why?

As a radiographer, to what degree do you feel the [provider name] remote service supports your interactions with patients? Why?

Thinking about [provider name] remote service, how do you feel they affect the service that patients experience? And why?

Questions are then asked about general process and outcome of remote service joint-problem-solving encounter.

If we now turn our attention to the recent events that you were asked to identify before this interview as being as positive and negative examples for remote service events…

Starting with whichever one you prefer; please could you describe this remote service event process from your perspective?

Please describe how the information was provided by [provider name] (e.g. verbally, written, automated etc.)

Critical incident style (Chell 2004)

- What happened next?
- Why did it happen?
- How did it happen?
- How did you cope with?
- What tactics did you use?
- Would you do anything differently?
- What did you feel you learnt from the incident?

Would you like to go through another positive or negative example of remote service joint problem solving?

Closing questions:

How does remote service joint problem-solving make you feel? And is it appreciated (service provider/organization) and is that important for you? Why?

At the end of the interview, the radiographer is asked to state their desires and expectations about the future development of remote service.

Thank you

and I'll provide further Information or transcript sharing, if needed/ or result presentation sharing.

<u>German:</u>

Begrüßung und Einführung der Einverständniserklärung

Willkommen & Danke

Erlaubnis zum Aufzeichnen

Anmerkungen: in dieser Studie:

- konzentriert sich eine technologiegestützte Ferndienstleistungen und Interaktionen, an denen Menschen beteiligt sind.
- eine gemeinsame Problemlösungs-Dienstbegegnung, die sowohl proaktive (vom Dienstleistungsempfänger initiierte) als auch reaktive Aktivitäten umfasst (einschließlich solcher, die Teil des Kontaktes des Dienstleisters sind oder die eine Reaktion aufgrund einer Maschinenstörung darstellen)
- der Dienstleister ist [Name der Firma]
- Um einen leichteren Vergleich der Erfahrungen der Leistungsempfänger zu ermöglichen, ist das [Name des Unternehmens] Portfolio auf die MRT-Bildgebungsmodalität beschränkt.
- Die Rolle des Forschers besteht darin, die Erwartung zu vermeiden, in aktuelle Produkte und Dienstleistungen einzugreifen.

Start recording:

Einleitende Fragen:

Wie lange arbeiten Sie schon als Röntgenassistent?

Können Sie mir ganz allgemein sagen, was Ihre Arbeit beinhaltet?

Wie lange arbeiten Sie schon mit dem MRT [Name des Unternehmens]-System?

Und wie lange arbeiten Sie schon mit den [Name des Unternehmens]-Ferndienstleistungen?

Was macht Ihnen an Ihrer Arbeit als Röntgenassistentin am meisten Spaß?

Wenn Sie über eine Situation nachdenken, in der ein Problem mit dem MRT-System auftritt, dass Sie allein nicht lösen können, können Sie mir sagen, was Sie tun würden, um das Problem zu lösen? Schritt für Schritt, bitte

Was sind die schwierigsten Aspekte der Problemlösung, wenn man in solchen Situationen den [Name des Unternehmens]-remote service in Anspruch nimmt?

Wie würden Sie Ihre Rolle des Dienstleisters [Name des Unternehmens] in Bezug auf gemeinsame Problemlösungssituationen beschreiben?

Die Teilnehmer werden gebeten, zu erläutern, wie, was, wann, wer, wo und warum Dinge geschehen sind (Lexhagen, 2009).

Welche Funktion hat der Dienstleistungsanbieter / wie nehmen Sie diese Rolle wahr?

Wertbezogene Fragen:

(wirtschaftliche, soziale, hedonische und altruistische Werte)

Inwieweit glauben Sie, dass die von der [Name des Unternehmens] zur Verfügung gestellten remote service dienstleistungen für Sie persönlich wertvoll sind in Bezug auf Zeit/Aufwand/Warum?

Wie wirkt sich der [Name des Unternehmens]-remote service Ihrer Meinung nach auf Ihre Leistung als Röntgenassistent aus? Wie werden Sie davon beeinflusst? Und warum?

Was erwarten Ihrer Meinung nach die Patienten von den Untersuchungen? Warum? Wie kommt es dazu?

Inwieweit glauben Sie als Röntgenassistent, dass der [Name des Unternehmens]-remote service Ihre Interaktionen mit Patienten unterstützt? Und warum?

Wenn Sie über den [Name des Unternehmens]-remote service nachdenken, wie wirken sich diese Ihrer Meinung nach auf die Dienstleistung aus, den die Patienten erleben? Und warum?

Anschließend werden Fragen zum allgemeinen Ablauf und zu den Ergebnissen der gemeinsamen Problemlösungsbegegnung mit dem Ferndienst gestellt.

Wenn wir uns nun den jüngsten Ereignissen zuwenden, die Sie vor diesem Interview als positive und negative Beispiele für [Name des Unternehmens]- remote service Ereignisse nennen sollten...

Beginnen Sie mit dem, den Sie bevorzugen; könnten Sie bitte diesen Prozess der remote service aus Ihrer Perspektive beschreiben?

Bitte beschreiben Sie, wie die Informationen von [Name des Unternehmens] bereitgestellt wurden (z.B. mündlich, schriftlich, automatisiert etc.)

Stil des „Critical Incident Technique (Chell 2004)

- Was geschah dann?

- Warum geschah es?

- Wie geschah es?

- Wie sind Sie damit umgegangen?

- Welche Taktiken haben Sie angewendet?

- Würden Sie irgendetwas anders machen?

- Was haben Sie Ihrer Meinung nach aus dem Vorfall gelernt?

Würden Sie gerne ein weiteres positives oder negatives Beispiel für die gemeinsame Problemlösung aus dem Bereich remote service durchgehen?

Abschließende Fragen:

Wie fühlen Sie sich bei der gemeinsamen Problemlösung durch den remote service? Und wird sie geschätzt (Dienstleister/Organization) und ist das wichtig für Sie? Warum?

Am Ende des Interviews wird der Röntgenassistent gebeten, seine Wünsche und Erwartungen an die zukünftige Entwicklung des remote service darzulegen.

Danke.

und ich werde bei Bedarf weitere Informationen oder den Austausch von Protokollen oder Ergebnispräsentationen zur Verfügung stellen.

Appendix II Informed consent form

UNIVERSITY OF GLOUCESTERSHIRE
at CHELTENHAM and GLOUCESTER

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Informed consent form

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Supervisor:
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Head of Marketing and Retail Analysis Research Centre,
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[redacted]

Value co-creation in business-to-business remote service

Dear participant,

I'm a service marketing doctoral researcher at the University of Gloucestershire and employed by Siemens Healthineers. I would like to invite you to take part in a research study. **The purpose of this study is to explore value co-creation in business-to-business remote services, from the radiographer's perspective.**

I would like to invite you to participate in an interview and share your experiences of Siemens Healthineers remote service, specifically those you have encountered in relation to MRT imaging. By taking part in this study, you may help other radiographers and Siemens (the service provider company) develop their knowledge and skills.

The study is voluntary, and you will only be included if you provide your permission. There are no known risks associated with taking part in this study. By agreeing to participate you are also providing your consent for the interview to recorded and acknowledge that data in this recording will be analysed as part of the study.

I will ensure that all data is treated as confidential and managed in the following ways:

- It will be kept in a locked office on a password protected computer and only the research team will have access to the data.
- Information on participant identity will be stored separately to interview data. The interview data will be labeled using a generic participant identifier (e.g. participant 1) to enable data reporting.
- We will keep data for five years after the study has finished. After five years, we will destroy the data.
- Once we have finished the study, we will present the results at conferences and publish in academic journals. When we publish the results, no participant will be named or identifiable through the disclosure of information related to their job title or place of work and therefore the specific work locations of participants will not be mentioned.

The University of Gloucestershire has approved this study's approach to research integrity and ethics through its doctoral research proposal processes. If you have any concerns, please contact Dr Philippa Ward, Head of Marketing and Retail Analysis Research Centre in the School of Business and Technology at the University of Gloucestershire (Email:pward@glos.ac.uk).

If you would like to participate in this study, please read and sign this informed consent form

Many thanks

Hagen Weissapfel

I wish to take part in this study:

Printed Name: _____

Signature: _____

Date: _____

Appendix III Interview protocol documentation sheet (German)

German:

Begrüßung und Einführung der Einverständniserklärung

Willkommen & Danke

Erlaubnis zum Aufzeichnen

Anmerkungen: in dieser Studie:

- konzentriert sich eine technologiegestützte Ferndienstleistungen (remote service, ff.) und Interaktionen, an denen Menschen beteiligt sind.
- eine gemeinsame Problemlösungs-Dienstbegegnung, die sowohl proaktive (vom Dienstleistungsempfänger initiierte) als auch reaktive Aktivitäten umfasst (einschließlich solcher, die Teil des Kontaktes des Dienstleisters sind oder die eine Reaktion aufgrund einer Maschinenstörung darstellen)
- der Dienstleister ist [Name der Firma]
- Um einen leichteren Vergleich der Erfahrungen der Leistungsempfänger zu ermöglichen, ist das [Name des Unternehmens]-Portfolio auf die MRT-Bildgebungsmodalität beschränkt.
- Die Rolle des Forschers besteht darin, die Erwartung zu vermeiden, in aktuelle Produkte und Dienstleistungen einzugreifen.

Start recording:

Einleitende Fragen:

Wie lange arbeiten Sie schon als Röntgenassistent?

Können Sie mir ganz allgemein sagen, was Ihre Arbeit beinhaltet?

Wie lange arbeiten Sie schon mit dem MRT [Name des Unternehmens]-System?

Und wie lange arbeiten Sie schon mit den [Name des Unternehmens]- remote service?

Was macht Ihnen an Ihrer Arbeit als Röntgenassistentin am meisten Spaß?

Wenn Sie über eine Situation nachdenken, in der ein Problem mit dem MRT-System auftritt, dass Sie allein nicht lösen können, können Sie mir sagen, was Sie tun würden, um das Problem zu lösen? Schritt für Schritt, bitte

Was sind die schwierigsten Aspekte der Problemlösung, wenn man in solchen Situationen den [Name des Unternehmens]-remote service in Anspruch nimmt?

Wie würden Sie Ihre Rolle zum Dienstleister [Name des Unternehmens] in Bezug auf gemeinsame Problemlösungssituationen beschreiben? Die Teilnehmer werden gebeten, zu erläutern, wie, was, wann, wer, wo und warum Dinge geschehen sind (Lexhagen, 2009).

Wie

Was

Wann

Wer

Wo

Warum

Welche Funktion hat der Dienstleistungsanbieter / wie nehmen Sie diese Rolle wahr?

Wertbezogene Fragen:

(wirtschaftliche, soziale, hedonische und altruistische Werte)

Inwieweit glauben Sie, dass die von der [Name des Unternehmens] zur Verfügung gestellten remote service dienstleistungen für Sie persönlich wertvoll sind in Bezug auf Zeit/Aufwand/Warum?

Wie wirkt sich der [Name des Unternehmens]-remote service Ihrer Meinung nach auf Ihre Leistung als Röntgenassistent aus? Wie werden Sie davon beeinflusst? Und warum?

Was erwarten Ihrer Meinung nach die Patienten von den Untersuchungen? Warum? Wie kommt es dazu?

Inwieweit glauben Sie als Röntgenassistent, dass der [Name des Unternehmens]-remote service Ihre Interaktionen mit Patienten unterstützt? Und warum?

Wenn Sie über den [Name des Unternehmens]- remote service nachdenken, wie wirken sich diese Ihrer Meinung nach auf die Dienstleistung aus, den die Patienten erleben? Und warum?

Anschließend werden Fragen zum allgemeinen Ablauf und zu den Ergebnissen der gemeinsamen Problemlösungsbegegnung mit dem Ferndienst gestellt.

Wenn wir uns nun den jüngsten Ereignissen zuwenden, die Sie vor diesem Interview als **positive und negative Beispiele** für [Name des Unternehmens]- remote service Ereignisse nennen sollten...

Beginnen Sie mit dem, den Sie bevorzugen; könnten Sie bitte diesen Prozess der remote service aus Ihrer Perspektive beschreiben?

Bitte beschreiben Sie, wie die Informationen von [Name des Unternehmens] bereitgestellt wurden (z.B. **mündlich, schriftlich, automatisiert** etc.)

Stil des „Critical Incident Technique (Chell 2004)

Positives Beispiel: **Negatives Beispiel:**

- Was geschah dann?

- Warum geschah es?

- Wie geschah es?

- Wie sind Sie damit umgegangen?

- Welche Taktiken haben Sie angewendet?

Positives Beispiel: **Negatives Beispiel:**

- Würden Sie irgendetwas anders machen?

- Was haben Sie Ihrer Meinung nach aus dem Vorfall gelernt?

Würden Sie gerne ein weiteres positives oder negatives Beispiel für die gemeinsame Problemlösung aus dem Bereich remote service durchgehen?

Abschließende Fragen:

Wie fühlen Sie sich bei der gemeinsamen Problemlösung durch den remote service? Und wird sie geschätzt (Dienstleister/Organization) und ist das wichtig für Sie? Warum?

Am Ende des Interviews wird der Röntgenassistent gebeten, seine Wünsche und Erwartungen an die zukünftige Entwicklung des remote service darzulegen.

Danke.

und ich werde bei Bedarf weitere Informationen oder den Austausch von Protokollen oder Ergebnispräsentationen zur Verfügung stellen.

Appendix IV Interview transcript example (English and German)

English:

Name of file: 200610_Participant 1

I: May I ask you how long you have been working as a radiographer?

B: You're starting with a very difficult question. I've been here with MRI for six years now. I didn't do anything for twenty years before that and before that I was already employed as an X-ray assistant for five years. A total of eleven years, but with an interruption of twenty-five years.

I: These six years were already on the [company name] system?

B: Yes.

I: Generally speaking, what are the biggest challenges in everyday life? What makes the work a bit more critical?

B: With the device?

I: Yes. Later, perhaps, also with the patients.

B: Okay. The biggest challenge is actually the patient. The diameter of the gantry is very small and the gantry is very long, which also speaks for the quality of our images. But you never know how the patient will react. There may be contrast injection incidents. It also takes a relatively long time if the patient panics until you are in and can get the patient out. This can take almost a minute. If you imagine yourself to be trapped in such a situation for a minute, that's a long time. If you notice that the patient is unsure, then you are usually a bit stressed yourself. The second biggest challenge is that you always assume that nothing happens on the device itself. We keep doing updates or emergency tests, but that always wears off a bit. If something were to burn now, I'm a bit afraid that I wouldn't react properly. Although I am the one who has the most experience.

I: Are there also situations where the work can be fun?

B: Yes, I really like doing it. I enjoy the device. The device takes really good pictures. I enjoy trying something out. Even without wanting to praise [company name], the application really always gives me great pleasure. I like learning new things. Our boss is very open to the fact that we can try everything.

I: In situations where MR is causing problems, what motivates you to request remote support or to get in touch with [company name]?

B: As a rule, I don't pick up the phone when an error occurs. Even if I don't know the error. I've always driven old cars. I know the device and then I always try it out first. Which is sometimes a bit stupid, because the error message then no longer always comes. That's why I photograph the error message when I think about it. As a rule, I try it a bit, shut down the device, start it up again, and it usually works again.

I: So, you do a reset and see if it works again?

B: Yes. Of course, this is due to the fact that I am forwarded from the call centre acceptance point to the technology, but then there is often no one on it, maybe they will call back later. So, it's a matter of time before I still have patients in the waiting room.

I: If this is forwarded from the hotline to the [remote] technician, are there different experiences? Or do you think it takes too long?

B: Most of the time I am not forwarded at all. Sometimes they check whether a line is free. If no line is free, I am told that someone from the [remote] technician will call me back. They don’t ask how urgent it is, or whether patients are already waiting. I say that and actually they should know it anyway,

but it can also take up to half an hour for someone to call back. And of course, that's too long.

I: Is that one of the most difficult situations, that you don't know what to do next?

B: It doesn't happen very often. And actually, we can solve most problems by shutting down and restarting the device. But if the error still occurs two or three times, then I’ll call [company name] and report that the error has already occurred three times, tell them what exactly the error is. But then the problem is often that the device is running normally. Then the urgency and necessity is not there to get to the bottom of the problem. Because then they also like to switch it on.

I: And the switching on happens quite quickly?

B: Exactly. If it's the technician is on the line and we can describe the problem properly, then it goes very quickly.

I: If you had to describe the joint problem solving, how does the service provider, i.e. [company name], react in the interaction with you? Starting with the call centre, is that adequate in terms of time?

B: Yes. You get used to having to say the number and describe the problem. That is perfectly good and correct. You don't have the feeling that the information is lost or received incorrectly.

I: Is it then the case that you work things through like on a checklist? Or is it rather the case that you can already address what you actually want? Or do you have to go through different questions again?

B: You call and after the greeting I briefly say my name and the device number. Then they click on it and tell me the location where I am. Then they ask what they can do for me. So, it’s not like they're going down a checklist. As a rule, they ask whether there is more of an application problem or a technical problem. I then have to answer the question.

I: With the application service, how was that in terms of time?

B: That was always quite good. If the images don’t get nice during a measurement or some artifacts appear, you can go on, do something else and then write down the question. Then, for example, you can call the application prematurely at the next liver examination and ask to call back at a certain time. Then you clarify that and then they switch on it.

I: Were there any differences between application problems or technical problems when dialling in?

B: No.

I: When was the last time remote intervention was necessary?

B: About two or three months ago.

I: We have a few more questions. To what extent do you think that remote service performance could also support you personally? Do you see an advantage that instead of just calling a hotline and saying: "I have a problem here now", you have the possibility of saying: "I now have the option of Remote Service supporting me here in my daily work."

B: I don't understand that.

I: So, you have an alternative and don't have to wait for someone to come by if there is a technical problem. It could then be that you would have to wait several hours until a technician arrives. As an alternative to remote service, you might then get immediate support from the service provider.

B: Online, via video?

I: Yes, they could switch it on or just give telephone support. That would also be remote, remotely, that you are supported there.

B: That would be nice. (Laughs) As an operator, you are never sure what the problem is. Whether it is an operating error, whether it is a technical limitation of the device, or whether it is generally due to the technology. I think it's a pity that you have either an applicant or a technician on the line. If you explain to the technician that something at the (? Vibe) does not work, then he says: "What is a (? Vibe)?" It would be nicer if that were rounded off. At the moment, you only get part of the problem answered, but not the whole.

I: Are there situations in the daily workflow where it would make more sense from your point of view to have a technician switching it on? Or do you decide on your own initiative that the technician cannot solve the problem remotely and should come immediately?

B: It depends on the problem. If I find out for myself that, for example, a coil is broken, or something has broken off that we already had, then I assess for myself whether I can solve the problem over the phone or not. We are only advised that someone will come when we can no longer measure. This is a financial and time question. If I let a technician come by for every mistake that I could actually clarify over the phone, and therefore one or two patients cannot be examined, then this can lead to a problem. If someone has to come to us on site, it must always be planned in advance over the long term. The fact that a technician has to come by directly after a phone call is rather impractical. I hope that I have answered correctly what you want to know.

I: There is no right or wrong. Are there situations where you immediately decide for yourself that it makes sense to discuss the problem remotely before coordinating with a technician to join you on side to the device?

B: Yes, we decide. Against the background of whether it can be reconciled financially, personally and with the patient.

I: Along with the time component.

B: Yes. It's always about time, money, and personnel. If a technician comes and we are therefore an hour late, then I need staff, which then will remain an hour longer afterwards.

I: Does Remote Service affect the workflow?

B: Of course. Even when I'm on the phone with a technician, I can't get the next patient or place a needle, for example.

I: Is there a contingency concept for MR examinations here in the hospital?

B: No. We also only have one device.

I: Okay, I didn't know that. When we talk about patients, what do they expect from the examination?

B: They expect it to happen quickly, because they want to put it behind them. Also, it shouldn’t hurt. And they want a good result. Overall, that they are treated decently.

I: At the beginning you also described the situation where it can also happen that an interaction with the patient can take place. What are ways to support the patient so that he knows what is happening to him?

B: It's usually about empathy. That you assess the patient whether he wants to have more or rather little information. Some are overwhelmed with too much information, often even older patients. It is important that, as an examiner, you radiate that you know what you are doing. We convey to the patient that we use the technology and that it follows us. We convey that we know exactly what we are doing and are very calm and relaxed. That is the most important thing. We show that we know medically why a patient is there. It's not just head, arm, or stomach. Knowledge is therefore also important. It is also important that you have a process. If you get into a situation where you realize that it could be difficult because the patient has claustrophobia, is very big or has already reacted to contrast fluid injections, it’s important that you yourself have routine processes. You have to know, for example, how to position a patient or place a needle. And through that you provide calmness.

I: Can Remote Service perhaps help to bring calmness to the situation?

B: No.

I: Why not?

B: I can't imagine it. Because that just wouldn't work in terms of the energy or the relationship.

I: So, the interaction between humans and humans is more important then?

B: Yes.

I: I called last week and asked if there was an event you could remember in particular. Positive and negative.

B: Exactly. That's what I wrote down. We had a message on our console every morning. We bought two new sequences in March this year, March 2020. An SWI sequence and a Native. We then tested them on March 14 with Ms. [company employee]. They were played the day before. Three months later, in mid-May, every morning after the device was launched, a message popped up that the license for the Native was expiring. Then I called the service call centre about 4 weeks ago and registered there. Then someone called me back and I communicated the error message and also photographed it. Then the technician said that he would take care of it. I've never heard of it again. Two weeks later, I told Ms. [company employee] that the error message was still appearing. Ms. [company employee] then reported this again. Since then, the error message no longer comes, but I have never received an answer as to what exactly happened, or what the problem was. I would be interested to know how the booking finally proceeded commercially.

I: So that's still not clear.

B: No. Only the error message is gone.

I: Probably solved remotely, right?

B: Exactly. But we didn't get any feedback.

I: Definitely a negative example. How would you assess this critically?

B: I find that interesting. I don't know if you understand what I mean. As a sequence, you can first get a test sequence for three months. After that you can buy them. I have the feeling that in the commercial department of [company name], this is first used as a test sequence and then booked as a purchased sequence. When it was realized that I had actually bought the sequence, I have the feeling that there was a bit of booking going around. I don't think that went quite right at the time. I once studied business administration. (laughs)

I: I have to say something again afterwards. Thank you very much for the example. Is there a positive example where Remote Service helped you with a critical event?

B: No, I can't say at the moment. But I also have to say that it hasn't been really critical until now. I'm thinking back to the beginning.

I: Then the critical cases were solved separately with the patient?

B: Exactly.

I: In retrospect, is there anything about Remote Service where you would say that you would do something completely differently? This can be positive or negative.

B: I spoke to my colleague, who comes from Brandenburg. For example, she really has problems with the dialect. The colleague was there when the sequences were relayed and really had problems understanding the colleague. I used to live in Munich, so it didn't bother me. But the colleague really had problems understanding Franconian. Another negative example is that if you call because you really can't get anywhere, it can sometimes take half an hour or three-quarters of an hour. That is difficult. Then we just try it out like an old Beetle, so that we can get the device back into operation. Shift down and take it from the top. This is sometimes a bit difficult. Most of the time it’ll stat up again, then the technician calls and you have a queue of patient data, and you don't even have the time to go through the whole thing. I always find that a bit difficult. As a remote technician, you would have to ask: "When do you have time for us to be able to go through the problem again together?" Maybe that should be offered to people. That would only take ten minutes. For us, it's the time we put on at the end. That's not so good when one of the assistants says: "Yes, well, I'll dial in to it, what was the error message?", and you think: "Oh, it’s all taking too long."

I: There are a lot of people waiting for their examination.

B: Exactly. And they should simply offer whether you want to talk it through again.

I: Yes, good suggestion.

B: Actually, you have to make two appointments. First of all, you have to describe the problem exactly. What I think is stupid is when you're told to do it online or by email. You don't have time for that. You should get the right answer. Maybe the remote employee also needs a moment.

I: And then it would be helpful to get a catalogue of possibilities so that you can learn from it?

B: Yes, exactly. Enquiries, generally.

I: Is there perhaps a positive example where remote service was helpful?

B: When we started here, we worked a lot with the application. And they helped us a lot and were always friendly. That was great.

I: Was it also the case that the control was taken over remotely?

B: Yes. And our service technician, Mr. [company employee], does his job well. You know him.

I: But on the hotline, you probably know the people less well?

B: You know them less well. We are fortunate that our company pays us for this application four times a year. I don't know what kind of deal they have, but I don't care. But that's great, because then we can and do discuss things with Ms. [company employee]. We can then also ask, for example, how we can clean the coil belts. Private practices that cannot invest enough money in such applications cannot do this. So, it's everyday problems. It would perhaps also be nice if we were asked if we have problems somewhere. Especially with these hardware issues, with the coils, with the coil tapes, with the storage cushions, with the pads, that is always swept a bit under the table. I think that's a pity. The service should ask if we need anything. Or they should make offers to us or something like that.

I: So, something proactive.

B: Yes, exactly.

I: And is it also going in the direction of creating a better working environment through this exchange of information?

B: Yes, of course. This also makes you safer when you know that everything is there and that everything is working properly. That everything is also clean and tidy. Especially during the COVID era, so that everything is hygienic. That's what I want. Sometimes they could be a bit more active. You could also set it up, for example, where a service employee would call us once a month and ask if there is something to do or if there are any problems somewhere.

I: Okay. Once again, I've got a question about appreciation. Do you feel valued when you have worked with [company name] to solve a problem together?

B: Yes. I've also asked a lot of stupid questions. And they were always friendly and patient.

I: What about the hospital itself? Is there any feedback or appreciation when you solve a mistake together via remote service?

B: That is fully respected. And that's where we are also trusted to assess problems correctly. That is in our hands. We're more likely to say, "Man, then go call [company name]." It's not that you think: "Call [company name] now, that's no use." It definitely isn't.

I: Okay, very good. Do you have any other wishes or expectations of [company name] when working with Remote Service? What could be improved?

B: It would actually just be a summary. Which would be good if you call and want a callback, that you could then get a time indication when the callback will take place. With a clear time announcement, I could simply better inform the patient, or unsubscribe, or reorder.

I: Okay, I'll summarize again. If you call the hotline, you don't have the problem that you can't reach anyone, right?

B: No. The hotline is always there.

I: Then you go on to the technical department, once you have described your problem. And it would be desirable if you could get a time indication.

B: Exactly. As a rule, when I call, I don't immediately get someone from the technical department. The service employee then informs that someone will call back, but I do not know when exactly. So a time would be nice. I don't know if people always ask if we can investigate. This is an important question, because then you could be divided into red, yellow, or green, so to speak. I don't know how that works.

I: That's how it should be. The first question should also be whether a patient has been harmed and whether there is a risk. And whether the system is still working or not.

B: Exactly.

I: Then I wrote down that proactive calls would be desirable. In addition, it would be nice if the knowledge about some mistakes could be shared. A retrospective perspective so that you can learn from it for the future. Are there any other expectations?

B: No.

I: Okay, good. Thank you.

B: Please, please.

<u>German:</u>

Name der Datei: 200610_Participant 1

I: Darf ich Sie fragen, wie lange sie schon als Röntgenassistentin arbeiten?

B: Da fangen Sie aber mit einer ganz schwierigen Frage an. Ich bin jetzt hier am MRT seit sechs Jahren. Ich habe davor 20 Jahre lang nichts gemacht und davor war ich auch schon fünf Jahre als Röntgenassistentin beschäftigt. Insgesamt also elf Jahre, aber mit einer Unterbrechung von 25 Jahren.

I: Die sechs Jahre denn dann auch schon an dem [Firma] System?

B: Ja.

I: Was sind allgemein beschrieben die größten Herausforderungen im Alltag? Was macht die Arbeit ein bisschen kritischer?

B: Mit dem Gerät?

I: Ja. Später vielleicht auch mit den Patienten.

B: Okay. Die größte Herausforderung ist eigentlich der Patient. Der Durchmesser der Röhre ist sehr klein und die Röhre ist sehr lang, was aber auch für die Qualität von unseren Bildern spricht. Aber man weiß nie, wie der Patient reagieren wird. Es kann eventuell Kontrastmittelzwischenfälle geben. Man braucht auch eine relativ lange Zeit, wenn der Patient in Panik gerät, bis man dann drin ist und den Patienten rausholen kann. Das kann fast eine Minute dauern. Wenn man sich selbst vorstellt, dass man eine Minute in so einer Situation gefangen ist, dann ist das eine lange Zeit. Wenn man merkt, dass der Patient unsicher ist, dann ist man meist selbst auch schon etwas gestresst. Die

zweitgrößte Herausforderung ist, dass man immer davon ausgeht, dass am Gerät selbst nichts passiert. Wir machen zwar immer wieder Aktualisierungen oder Notfalltests, aber das lässt immer ein bisschen nach. Wenn jetzt etwas brennen würde, habe ich ein bisschen Angst, dass ich nicht richtig reagieren würde. Obwohl ich diejenige bin, die am meisten Erfahrung hat.

I: Gibt es auch Situationen, wo die Arbeit Spaß machen kann?

B: Ja, ich mache das total gerne. Mir macht das Gerät Spaß. Das Gerät macht wirklich gute Bilder. Mir macht es Spaß, etwas auszuprobieren. Auch ohne [Firma] loben zu wollen, macht mir die Applikation wirklich immer große Freude. Ich möchte gerne etwas dazulernen. Unsere Chefin ist da sehr offen, dass wir auch alles ausprobieren können.

I: Bei Situationen, in denen der MR Probleme macht, was bewegt Sie dann dazu, Unterstützung aus der Ferne anzufordern oder mit [Firma] in Kontakt zu treten?

B: In der Regel ist es so, dass ich erst mal nicht zum Hörer greife, wenn ein Fehler auftaucht. Auch, wenn ich den Fehler nicht kenne. Ich bin immer alte Autos gefahren. Ich kenne das Gerät und probiere dann immer erst mal aus. Was dann manchmal ein bisschen blöd ist, weil die Fehlermeldung dann nicht mehr immer kommt. Deswegen fotografiere ich die Fehlermeldung ab, wenn ich dran denke. In der Regel probiere ich ein bisschen aus, fahre das Gerät runter, fahre es wieder hoch und es geht meistens wieder.

I: Also einen Reset durchführen und schauen, ob es wieder funktioniert?

B: Ja. Das liegt natürlich daran, dass ich von der Callcenter Annahmestelle an die Technik weitergeleitet werde, dann ist da aber oftmals keiner dran, vielleicht rufen die dann später erst zurück. Also ist es eine Frage der Zeit, wenn ich dann noch Patienten im Wartezimmer habe.

I: Wenn das von der Hotline weiter an die [remote]Technik geleitet wird, gibt es da unterschiedliche Erfahrungswerte? Oder dauert das nach Ihrem Empfinden zu lang?

B: Meistens ist es so, dass ich gar nicht weitergeleitet werde. Manchmal wird geguckt, ob eine Leitung frei ist. Wenn keine Leitung frei ist, wird mir mitgeteilt, dass mich jemand von der [remote]Technik zurückrufen wird. Es wird nicht gefragt, wie dringend es ist, oder ob Patienten schon warten. Ich sage das dann zwar und eigentlich müssten die es ja sowieso wissen, es kann aber auch bis zu einer halben Stunde dauern, bis jemand zurückruft. Und das ist dann natürlich zu lang.

I: Gehört das dann mit zu den schwierigsten Situationen, dass man dann nicht weiß, wie es weitergeht?

B: Es kommt nicht sehr häufig vor. Und eigentlich können wir die meisten Probleme dadurch lösen, dass wir das Gerät runter- und wieder hochfahren. Wenn der Fehler aber trotzdem zwei-, dreimal auftaucht, dann rufe ich [Firma] an und berichte, dass der Fehler jetzt schon dreimal vorgekommen ist, teile mit, was genau der Fehler ist. Dann ist aber oft das Problem, dass das Gerät natürlich läuft. Dann ist die Dringlichkeit und Notwendigkeit nicht da, dass dem Problem so richtig auf den Grund gegangen wird. Weil die sich dann ja auch gerne draufschalten.

I: Und das Draufschalten passiert dann recht schnell?

B: Genau. Wenn der Techniker dran ist und wir das Problem ordentlich beschreiben können, dann geht es sehr schnell.

I: Wenn Sie die gemeinsame Problemlösung beschreiben müssten, wie verhält sich dann der Service-Anbieter, also [Firma] im Umgang mit Ihnen? Angefangen mit dem Callcenter, ist das zeitlich adäquat?

B: Ja. Man gewöhnt sich dran, dass man die Nummer sagen und das Problem beschreiben muss. Das ist vollkommen gut und korrekt. Man hat nicht das Gefühl, dass die Information verloren geht oder falsch aufgenommen wird.

I: Ist das dann so, dass man die Dinge wie nach einer Checkliste abarbeitet? Oder ist es eher so, dass man schon gleich das adressieren kann, was man eigentlich möchte? Oder muss man noch mal verschiedene Fragen durchlaufen?

B: Man ruft an und nach der Begrüßung sage ich kurz meinen Namen und die Gerätenummer. Dann klicken die das an und sagen mir den Standort, wo ich bin. Dann fragen die, was sie für mich tun können. Also ist es nicht so, dass die eine Checkliste abgehen. In der Regel wird gefragt, ob eher ein Applikationsproblem oder ein technisches Problem vorliegt. Die Frage muss ich dann beantworten.

I: Bei dem Applikationsservice, wie war das da zeitlich gesehen?

B: Das war eigentlich immer ganz gut. Wenn bei einer Messung die Bilder nicht schön werden oder irgendwelche Artefakte auftauchen, kann man ja weiter machen, etwas anderes machen und sich dann die Frage aufschreiben. Dann kann man beispielsweise bei der nächsten Leberuntersuchung vorzeitig die Applikation anrufen und darum bitten, zu einer bestimmten Uhrzeit zurückzurufen. Dann klärt man das und dann schalten die sich auch drauf.

I: Gab es beim Draufschalten Unterschiede zwischen Applikationsproblematiken oder technischen Problemen?

B: Nein.

I: Wann war das letzte Mal, dass remote eingegriffen werden musste?

B: Circa vor zwei, drei Monaten.

I: Wir haben noch ein paar Fragen. Inwieweit glauben Sie, dass die Remote Service Leistung Sie auch persönlich unterstützen könnte? Sehen Sie da einen Vorteil, dass man die Möglichkeit hat, anstelle einfach nur eine Hotline anzurufen und zu sagen: „Ich habe hier jetzt ein Problem.“, dass man sagt: „Ich habe jetzt die Möglichkeit, dass Remote Service hier mich unterstützt in meiner täglichen Arbeit.“

B: Das verstehe ich nicht.

I: Dass man die Alternative hat und nicht darauf warten muss, wenn ein technisches Problem existiert, dass jemand vorbeikommt. Es könnte ja dann sein, dass man mehrere Stunden warten müsste, bis ein Techniker kommt. Als Alternative beim Remote Service hätte man dann vielleicht sofort Unterstützung vom Dienstleister.

B: Online, per Video?

I: Ja, dass der sich draufschaltet oder eben telefonische Unterstützung gibt. Das wäre ja auch remote, aus der Ferne, dass man da unterstützt wird.

B: Das wäre schon schön. (lacht) Man ist als Bediener nie sicher, woran ein Problem liegt. Ob es ein Bedienungsfehler ist, ob es eine technische Einschränkung des Gerätes ist, oder ob es generell an der

Technik liegt. Ich finde es schade, dass man entweder einen Applikanten oder einen Techniker in der Leitung hat. Wenn man dem Techniker erklärt, dass etwas bei der (?Vibe) nicht funktioniert, dann sagt er: „Was ist eine (?Vibe)?“ Es wäre schöner, wenn das abgerundet wäre. Man bekommt derzeit immer nur einen Teil des Problems beantwortet, nicht aber das Ganze.

I: Gibt es im täglichen Arbeitsablauf Situationen, wo es aus Ihrer Sicht mehr Sinn machen würde, einen Techniker draufschalten zu lassen? Oder entscheiden Sie von sich aus schon, dass der Techniker das Problem nicht aus der Ferne lösen kann und sofort kommen soll?

B: Das hängt von dem jeweiligen Problem ab. Wenn ich selbst herausfinde, dass beispielsweise eine Spule kaputt ist, oder irgendetwas abgebrochen ist, was wir auch schon hatten, dann schätze ich selbst ein, ob ich das Problem über das Telefon lösen kann oder nicht. Wir sind nur dann drauf eingewiesen, dass jemand kommt, wenn wir nicht mehr messen können. Das ist eine finanzielle und zeitliche Frage. Wenn ich bei jedem Fehler, den ich eigentlich auch übers Telefon klären könnte, einen Techniker vorbeikommen lasse und deswegen ein oder zwei Patienten nicht untersucht werden können, dann führt das zu einem Problem. Wenn jemand zu uns vor Ort kommen muss, muss das eigentlich immer vorab langfristig geplant sein. Dass ein Techniker direkt nach einem Telefonat vorbeikommt, ist eher nicht praktikabel. Ich hoffe, dass ich das, was Sie wissen wollen, richtig beantwortet habe.

I: Da gibt es kein richtig oder falsch. Gibt es Situationen, wo Sie sofort für sich entscheiden, dass es Sinn macht, dass man das Problem erst mal remote bespricht, bevor man einen Techniker zu sich on Side zum Gerät bestellt?

B: Ja, das entscheiden wir. Vor dem Hintergrund, ob es sich finanziell, personell und mit dem Patient vereinbaren lässt.

I: Zusammen mit der zeitlichen Komponente.

B: Ja. Es geht immer um Zeit, Geld und Personal. Wenn ein Techniker kommt, und wir deswegen nachher eine Stunde im Verzug sind, dann brauche ich Personal, was dann nachher eine Stunde länger bleibt.

I: Beeinflusst Remote Service den Arbeitsablauf?

B: Natürlich. Auch wenn ich mit einem Techniker telefoniere, kann ich in der Zeit nicht den nächsten Patienten holen oder beispielsweise eine Nadel legen.

I: Gibt es hier im Krankenhaus ein Ausfallkonzept für MR Untersuchungen?

B: Nein. Wir haben auch nur das eine Gerät.

I: Okay, das wusste ich jetzt nicht. Wenn wir über die Patienten sprechen, was erwarten diese dann von der Untersuchung?

B: Sie erwarten, dass es schnell geht, weil die das ja hinter sich bringen wollen. Auch, dass es nicht weh tut. Und, dass sie ein gutes Ergebnis haben. Insgesamt, dass man sie anständig behandelt.

I: Sie haben anfangs auch die Situation geschildert, dass es auch vorkommen kann, dass eine Interaktion stattfindet mit dem Patienten. Was sind denn Möglichkeiten, um den Patienten zu unterstützen, damit er weiß, was mit ihm passiert?

B: In der Regel geht es um Empathie. Dass man den Patienten einschätzt, ob er eher viele oder eher wenige Informationen haben möchte. Manche sind mit zu viel Information überfordert, oft auch

ältere Patienten. Es ist wichtig, dass man als Untersuchender ausstrahlt, dass man weiß, was man tut. Wir vermitteln dem Patienten, dass wir die Technik bedienen, und diese uns folgt. Wir vermitteln, dass wir genau wissen, was wir tun, und sind dabei ganz ruhig und entspannt. Das ist das Wichtigste. Wir zeigen, dass wir medizinisch darüber Bescheid wissen, warum ein Patient da ist. Es ist nicht nur Kopf, Arm oder Bauch. Wissen ist also auch wichtig. Außerdem ist wichtig, dass man einen Ablauf hat. Falls man in eine Situation kommt, wo man merkt, dass es schwierig werden könnte, weil der Patient Platzangst hat, sehr groß ist oder schon mal auf Kontrastmittel reagiert hat, dass man selbst routinierte Abläufe hat. Man muss wissen, wie man beispielsweise einen Patienten lagert, oder eine Nadel legt. Und dadurch bringt man eine Ruhe rein.

I: Kann Remote Service dazu vielleicht einen Beitrag leisten, Ruhe reinzubringen?

B: Nein.

I: Warum nicht?

B: Ich kann es mir nicht vorstellen. Weil das einfach von der Energie oder der Beziehung nicht funktionieren würde.

I: Also ist die Interaktion zwischen Mensch und Mensch dann wichtiger?

B: Ja.

I: Ich hatte ja letzte Woche angerufen und gefragt, ob es ein Ereignis gibt, an das Sie sich besonders erinnern können. Positiv oder negativ.

B: Genau. Das habe ich mir aufgeschrieben. Wir hatten auf unserer Konsole jeden Morgen eine Meldung. Wir haben im März diesen Jahres, März 2020, zwei neue Sequenzen gekauft. Eine SWI-Sequenz und eine Native. Die hatten wir dann am 14. März mit Frau [Firma Mitarbeiterin] getestet. Die wurden am Tag vorher aufgespielt. Drei Monate später, Mitte Mai, poppte jeden Morgen nach dem Start des Gerätes eine Meldung auf, dass die Lizenz für die Native abläuft. Dann habe ich vor etwa 4 Wochen in der Servicestelle angerufen und mich dort angemeldet. Dann hat mich jemand zurückgerufen und ich habe die Fehlermeldung mitgeteilt und auch abfotografiert. Dann hat der Techniker gesagt, dass er sich darum kümmern wird. Ich habe davon nie wieder etwas gehört. Zwei Wochen später habe ich Frau [Firma Mitarbeiterin] mitgeteilt, dass die Fehlermeldung immer noch auftaucht. Frau [Firma Mitarbeiterin] hat das dann auch noch mal gemeldet. Seitdem kommt die Fehlermeldung nicht mehr, ich habe aber nie mehr eine Antwort erhalten, was genau passiert ist, oder was das Problem war. Mich würde schon interessieren, wie letztlich kaufmännisch die Verbuchung abgelaufen ist.

I: Das ist also bisher immer noch nicht geklärt.

B: Nein. Nur die Fehlermeldung ist weg.

I: Vermutlich dann auch durch die Ferne gelöst, oder?

B: Genau. Aber wir haben keinerlei Feedback bekommen.

I: Definitiv ein negatives Beispiel. Wie würden Sie das kritisch einschätzen?

B: Ich finde das interessant. Ich weiß nicht, ob Sie verstehen, was ich meine. Man kann als Sequenz zuerst eine Testsequenz für drei Monate bekommen. Danach kann man sie kaufen. Ich habe das Gefühl, dass in der kaufmännischen Abteilung von [Firma], dieses erst mal als Testsequenz ist und dann als gekaufte Sequenz verbucht wird. Als damals gemerkt wurde, dass ich die Sequenz eigentlich

gekauft hatte, wurde da ein bisschen rumgebucht, habe ich das Gefühl. Ich glaube, dass das damals nicht ganz richtig gelaufen ist. Ich habe mal Betriebswirtschaft studiert. (lacht)

I: Da muss ich nachher noch mal etwas zu sagen. Vielen Dank aber schon mal für das Beispiel. Gibt es denn auch ein positives Beispiel, wo Ihnen Remote Service bei einem kritischen Ereignis weitergeholfen hat?

B: Nein, kann ich jetzt nicht sagen. Ich muss aber auch sagen, dass es bis jetzt noch nicht richtig kritisch war. Ich denke jetzt mal in die Anfänge zurück.

I: Dann sind die kritischen Fälle direkt mit dem Patienten separat gelöst worden?

B: Genau.

I: Gibt es im Nachhinein etwas bei Remote Service, wo Sie sagen würden, dass Sie etwas komplett anders machen würden? Das kann positiv oder negativ sein.

B: Ich habe mit meiner Kollegin gesprochen, die kommt aus Brandenburg. Die hat beispielsweise wirklich Probleme mit dem Dialekt. Die Kollegin war dabei, als die Sequenzen überspielt wurden und hatte wirklich Probleme, den Kollegen zu verstehen. Ich habe mal in München gewohnt, deswegen störte mich das nicht. Aber die Kollegin hatte wirklich Probleme, das Fränkische zu verstehen. Ein anderes Negativbeispiel ist, dass, wenn man anruft, weil man wirklich nicht weiterkommt, es manchmal eine halbe oder dreiviertel Stunde dauern kann. Das ist schwierig. Dann probieren wir halt so rum, wie bei einem alten Käfer, damit wir das Gerät wieder in Betrieb bekommen. Runterfahren und noch mal alles von vorne. Das ist manchmal etwas schwierig. Meistens geht es dann wieder, dann ruft die Technik an und man hat aber derweil eine Schlange von Patientensätzen, dass man dann schon gar nicht mehr die Zeit hat, das Ganze mal durchzugehen. Das finde ich immer ein bisschen schwierig. Es wäre schon, dass man als Remote Techniker fragt: „Wann haben Sie denn Zeit, dass wir das Problem noch mal zusammen durchgehen können?“ Das sollte vielleicht den Leuten angeboten werden. Das würde nur zehn Minuten dauern. Für uns ist es die Zeit, die wir am Schluss dranhängen. Das ist dann weniger gut, wenn einer der Assistenten sagt: „Ja, gut, ich schalte mich mal drauf, wie war denn die die Fehlermeldung?“, und man denkt sich: „Oh, das dauert alles zu lang.“

I: Es warten eine Menge Leute auf ihre Untersuchung.

B: Genau. Und es sollte einfach angeboten werden, ob man es noch mal durchsprechen möchte.

I: Ja, guter Vorschlag.

B: Eigentlich muss man sich da zwei Termine nehmen. Erst mal muss man das Problem genau beschreiben. Was ich blöd finde ist, wenn einem gesagt wird, dass man es online oder per E-Mail machen soll. Dazu hat man nämlich auch keine Zeit. Man sollte da eine richtige Antwort bekommen. Vielleicht braucht auch da der Remote Mitarbeiter auch einen Moment.

I: Und dann wäre es hilfreich, wenn man einen Katalog an Möglichkeiten bekommt, damit man daraus lernen kann?

B: Ja, genau. Nachfragen, übergreifend.

I: Gibt es vielleicht doch noch ein positives Beispiel, wo Remote Service hilfreich war?

B: Als wir hier angefangen haben, haben wir viel mit der Applikation gearbeitet. Und die haben uns sehr viel geholfen und waren immer freundlich. Das war super.

I: War es denn auch so, dass aus der Ferne die Steuerung übernommen wurde?

B: Ja. Und unser Service-Techniker, der Herr [Firma Mitarbeiter], der macht seine Arbeit gut. Man kennt ihn.

I: Aber aus der Hotline kennt man die Leute wahrscheinlich weniger?

B: Die kennt man weniger. Wir haben das Glück, dass unser Haus uns viermal im Jahr diese Applikation bezahlt. Ich weiß nicht, was die da für einen Deal haben, ist mir aber auch egal. Aber das ist super, weil wir dann eben auch Dinge mit Frau [Firma Mitarbeiterin] besprechen können und dürfen. Wir können dann beispielsweise auch fragen, wie wir die Spulenbänder reinigen können. Sowas können niedergelassene Praxen, die nicht genug Geld in solche Applikationen stecken können, nicht machen. So Alltagsprobleme. Es wäre vielleicht auch schön, wenn mal nachgefragt werden würde, ob wir irgendwo Probleme haben. Gerade mit diesen Handwerkssachen, mit den Spulen, mit den Spulenbändern, mit den Lagerungskissen, mit den Auflagen, das wird immer so ein bisschen unter den Tisch gekehrt. Das finde ich schade. Der Service dürfte ruhig nachfragen, ob wir etwas benötigen. Oder, dass uns mal Angebote gemacht werden oder sowas.

I: Also etwas Proaktives.

B: Ja, genau.

I: Und geht es auch in die Richtung, dass man sich ein besseres Arbeitsumfeld schafft durch diesen Informationsaustausch?

B: Ja, klar. Dadurch wird man ja auch sicherer, wenn man weiß, dass alles da ist und dass alles richtig funktioniert. Dass alles auch sauber und ordentlich ist. Gerade in Zeiten von Corona, dass alles hygienisch ist. Das will ich ja auch. Manchmal ein bisschen etwas Aktiveres. Man könnte ja beispielsweise auch sagen, dass ein Servicemitarbeiter einmal im Monat bei uns anruft und nachfragt, ob etwas zu tun ist, oder ob es irgendwo Probleme gab.

I: Okay. Noch mal eine Frage zu der Wertschätzung. Fühlt man sich wertgeschätzt, wenn man mit [Firma] zusammengearbeitet hat, um ein Problem gemeinsam lösen zu können?

B: Ja. Ich habe auch schon viele doofe Fragen gestellt. Und es war trotzdem immer freundlich und geduldig.

I: Wie ist es vom Krankenhaus selbst, gibt es da ein Feedback oder eine Wertschätzung, wenn man gemeinsam über Remote Service einen Fehler löst?

B: Das wird vollkommen geachtet. Und da wird uns auch vertraut, dass wir Probleme richtig einschätzen können. Das liegt in unseren Händen. Da wird dann eher gesagt: „Mensch, dann ruf doch [Firma] an.“ Es ist nicht so, dass man sich denkt: „Jetzt bei [Firma] anrufen, das bringt doch nichts.“ Das ist es definitiv nicht.

I: Okay, sehr gut. Haben Sie vielleicht noch andere Wünsche oder Erwartungen an [Firma] in der Zusammenarbeit mit Remote Service? Was könnte man da noch verbessern?

B: Es wäre jetzt eigentlich nur eine Zusammenfassung. Was gut wäre, wenn man anruft und einen Rückruf möchte, dass man dann eine Zeitangabe bekommen könnte, wann der Rückruf erfolgen wird. Ich könnte mit einer klaren Zeitansage den Patienten einfach besser informieren beziehungsweise abbestellen oder umbestellen.

I: Okay, ich fasse noch mal zusammen. Wenn man die Hotline anruft, hat man nicht das Problem, dass man keinen erreicht, richtig?

B: Nein. Die Hotline ist ja immer da.

I: Dann geht es weiter an die Technik, wenn man sein Problem beschrieben hat. Und da würde es wünschenswert sein, wenn man eine Zeitangabe bekommen könnte.

B: Genau. In der Regel kriege ich, wenn ich anrufe, nicht sofort jemanden von der Technik dran. Die Service-Mitarbeiterin teilt dann mit, dass jemand zurückrufen wird, ich weiß aber nicht, wann genau. Eine Zeitangabe wäre also schön. Ich weiß gar nicht, ob immer gefragt wird, ob wir untersuchen können. Das ist eine wichtige Frage, weil man danach ja sozusagen in rot, gelb, oder grün eingeteilt werden könnte. Ich weiß nicht, wie das läuft.

I: Sollte so sein. Die erste Frage sollte auch sein, ob ein Patient geschädigt wurde und ob ein Risiko besteht. Und, ob das System noch arbeitet oder nicht.

B: Genau.

I: Dann hatte ich mir noch aufgeschrieben, dass proaktive Anrufe wünschenswert wären. Außerdem wäre es schön, wenn das Wissen über manche Fehler geteilt werden könnte. Eine Retroperspektive, damit man daraus für die Zukunft lernen kann. Gibt es sonst noch andere Erwartungen?

B: Nein.

I: Okay, gut. Danke.

B: Bitte, gerne.