

POSSIBILITIES OF DATA-DRIVEN CUSTOMER INSIGHT IN B2B
SERVICE DEVELOPMENT

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Abstract

The purpose of this thesis was to examine the possibilities of data-driven customer insight generation and leverage in business-to-business (B2B) service development. Previous research on data utilization in service development is scarce, and so, this study aimed to contribute to the building of theories on data and analytics leveraging. More specifically, the study concentrated on inspecting the direct and indirect benefits of data-driven customer insight for B2B service development as well as the related data management challenges and capabilities.

The study's theoretical framework was built on the interdisciplinary fields of service research, marketing, and management. To gain an extensive understanding of the phenomenon, the research followed a qualitative, multiple-case research design. The empirical research data was collected via case interviews in January 2023. Altogether, 17 experts working in eight different technology companies were interviewed for the study. The analysis of interview data was based on case and thematic analysis.

The findings of the study showed that data-driven customer insight has versatile direct and indirect benefits for B2B service development: continuous insight generation, more comprehensive customer understanding, ideation and validation, behavioral customer segmentation and comparisons, data-based decision-making, more efficient customer integration projects, deeper customer relationships, and strengthened organizational memory. At the same time, to be successful in data-driven insight generation, the organization needs to have certain data and analytics capabilities related to standardized data management processes, expertise on data and business, decentralized decision-making, and collaboration between different experts and teams. Additionally, data and analytics seem to improve the organization's customer insight generation as a dynamic capability.

As a result of the analysis and discussion, the study proposes a theoretical model on how data-driven customer insight can be generated and leveraged for B2B service development. The model considers different sources of customer-related data, data analysis, benefits of data-driven insights, data management challenges, and capabilities. Lastly, the research presents managerial implications: the implications cover, for example, the steering role of the service business strategy in customer insight generation. Future research should continue to further examine the topic in different industries, especially among data usage pioneers, utilizing a variety of case study data collection methods.

Keywords service development, data-driven customer insight, data management, data and analytics capabilities, dynamic capabilities



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Tämän tutkielman tavoitteena oli selvittää dataan perustuvan asiakasymmärryksen mahdollisuuksia business-to-business (B2B) palvelukehityksessä. Datan soveltamista palvelukehityksen tarpeisiin on tutkittu aiemmin vähän, joten tämä tutkimus pyrki osaltaan rakentamaan tieteellistä teoriaa datan ja analytiikan hyödyntämisestä. Tarkemmin sanottuna tutkimuksessa keskityttiin tarkastelemaan dataan perustuvan asiakasymmärryksen suoria ja epäsuoria hyötyjä B2B palvelukehitykselle sekä datan hyödyntämiseen liittyviä tiedonhallinnan haasteita ja kyvykkyksiä.

Tutkielman teoreettinen viitekehys perustui monialaiseen tutkimukseen, soveltaen palvelujen, markkinoinnin ja johtamisen tutkimuskirjallisuutta. Tutkimus toteutettiin laadullisena monitapaustutkimuksena, jonka tavoitteena oli tuottaa ilmiöstä laajaa, monipuolista tietoa. Tutkimusaineisto kerättiin tapaushaastatteluilla tammikuussa 2023. Haastateltaviksi valikoitui yhteensä 17 asiantuntijaa, jotka työskentelivät kahdeksassa eri teknologia-alan yrityksessä. Haastatteluaineistoa analysoitiin tapaustutkimuksen ja teemoittelun menetelmin.

Tutkimustulokset osoittivat, että dataan perustuvalla asiakasymmärryksellä on moninaisia suoria ja epäsuoria hyötyjä B2B palvelukehitykselle: jatkuva asiakasymmärryksen kerryttäminen, kattavampi asiakasymmärrys, ideointi ja validointi, käyttäytymiseen perustuva asiakassegmentointi ja -vertailu, dataan perustuva päätöksenteko, tehokkaampi kehitystyö asiakkaiden kanssa, syvemmät asiakassuhteet ja organisaation muistin vahvistuminen. Onnistuakseen dataan perustuvan asiakasymmärryksen hyödyntämisessä organisaatiot tarvitsevat tiettyjä data- ja analytiikkakyvykkyksiä liittyen tiedonhallinnan prosesseihin, data- ja liiketoiminta-asiantuntemukseen, päätöksenteon hajauttamiseen sekä asiantuntijoiden ja eri tiimien väliseen yhteistyöhön. Tulokset antoivat myös viitteitä siitä, että asiakasymmärryksen tuottaminen on organisaation dynaaminen kyvykkyys, jota data ja analytiikka parantavat.

Analyysin tuloksena tutkimus esittää teoreettisen mallin siitä, miten dataan perustuvaa asiakasymmärrystä voidaan kerryttää ja hyödyntää B2B palvelukehityksessä. Malli kattaa asiakasdatan eri lähteet, datan analysoinnin, datan soveltamisen hyödyt, tiedonhallinnan haasteet sekä kyvykkyudet. Tutkielman loppupuolella esitetään tuloksista johdettuja käytännön johtopäätelmiä: johtopäätökset käsittelevät esimerkiksi palveluliiketoiminnan strategian ohjaavaa roolia asiakasymmärryksen kerryttämisessä. Tulevien tutkimusten suositellaan jatkavan aiheen tutkimista eri toimialoilla, keskittyen erityisesti datan hyödyntämisen edelläkävijöiden tutkimiseen. Samalla voitaisiin hyödyntämään monipuolisesti erilaisia tapaustutkimukseen soveltuvia aineistonkeruumenetelmiä.

Avainsanat palvelukehitys, dataan perustuva asiakasymmärrys, tiedonhallinta, data- ja analytiikkakyvykkyudet, dynaamiset kyvykkyudet

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1 Introduction

A typical, customer-centric service development process consists of six steps: opportunity identification, customer understanding, concept development, process design, refinement, and implementation (Lim et al., 2018). This study focused on the second step of the process, customer understanding. Understanding the needs, requirements, and preferences of customers is said to be the cornerstone of any successful service business (Bharadwaj et al., 2012; Neu & Brown, 2005; Shah et al., 2006). For high-performing business-to-business (B2B) services, it is important to be both market and customer-oriented, so that the efforts are directed to understanding both the complex needs of the market as well as the unique business needs of individual customers (Neu & Brown, 2005).

Customer understanding, i.e., customer insight, is generated by collecting information on customer behavior, needs, and requirements, and then analyzing and transforming that information into actionable knowledge (Said et al., 2015). Developing the services and service offerings based on customer insight provides several benefits for a business, e.g., improved value proposition, better service quality, increased customer satisfaction, competitive advantage, and customer-oriented growth (Bharadwaj et al., 2012; Hartline et al., 2000; Said et al., 2015).

Traditional, most typical information collection techniques for customer insight have been observations, interviews, surveys, and periodic customer meetings (Edvardsson et al., 2012). Service development research in B2B services generally also describes methods to integrate customers in the development work, i.e., “customer integration”, as well as a close relationship and active dialogue between the service provider and customers (Alam & Perry, 2002; Edvardsson et al., 2012; Neu & Brown, 2005). For example, Neu and Brown (2005), recommend B2B service businesses develop learning relationships with individual customers to gain an understanding of their business needs. Traditional methods, however, have their limitations and challenges: The methods are often time-consuming, expensive, or not comprehensive (Timoshenko & Hauser, 2019). Moreover, traditional customer integration is often temporal, project-based work, and practitioners may withdraw from customer research even though it has been previously successful, due to high resource requirements (Hossain et al., 2019;

Olson & Bakke, 2001). These practical challenges in customer understanding directed me to this research topic. Namely, my employer wished to find other, more efficient ways to gain customer insight for service development and to learn how other B2B service businesses accumulate insight on customers.

Customer-related data and advanced analytics could offer pivotal opportunities for more comprehensive, efficient, and continuous customer insight generation, compared to traditional information collection techniques. Customer-related data, e.g., data describing purchases, communication, or application usage, reflects customers' needs and preferences for services without any cognitive transformation (Lim et al., 2019). At least theoretically, linking, integrating, and analyzing customer-related data from various sources would enable the identification of trends and patterns in customer behavior and hence offer both understanding of current and prediction of future behavior and decisions (Hartmann et al., 2016; Lim et al., 2018; Park & Lee, 2011). This data-driven customer insight could be then used, for instance, to improve the attributes of existing services and turn customer communication into new service concepts (Urbinati et al., 2019, p. 24). In my research, I wanted to examine what kind of possibilities data and analytics offer for B2B service development.

Initially, the idea to utilize data for service customer understanding stems heavily from the B2C context, where the use of data and analytics, especially for sales and marketing, is substantially ahead of B2B (Hallikainen et al., 2020). In B2C, data-driven insight is easily generated as a lot of marketing, sales, and communication happens online, and data offers significant efficiencies for operations and development in such a context with big numbers of end customers (Hallikainen et al., 2020; Iankova et al., 2019). The contexts of B2B and B2C are inherently different, but data may offer special benefits for service development in both business environments.

Yet despite such clear advantages and wide use of data in B2C, there is a lack of literature on data utilization in service development (Lim et al., 2018). Existing studies investigating, e.g., how different types of data are combined or how big data is used for innovation activities, are scarce (Lim et al., 2018; Urbinati et al., 2019). According to Lim et al. (2018), there is a particular lack of empirical studies on data use for service advancement in practice, but such research would be essential to build on theories and methodologies for practical implications. Regarding practitioners, instead, the collection and analysis of customer-related data for different service business initiatives would be

a natural trajectory and part of the overall extensive digital transformation (Urbinati et al., 2019). Nevertheless, it is a large-scale change initiative to start to utilize customer-related data for a service business, and service teams may lack the needed capabilities for such data collection, analysis, and application activities (Lim et al., 2018; Urbinati et al., 2019). There is both a clear gap in the literature, as well as a demand among practitioners for recommendations on data-driven insight for service development. Hence, I aim in this thesis to examine the possibilities of data-driven insight generation and leveraging in technology B2B service businesses via an empirical case study design, striving to offer both academic and managerial contributions.

1.1 Research Objectives, Scope, and Design

This study builds on the interdisciplinary fields of service research, marketing, and management. Drawing on the heterogenous body of past research, the purpose of this study is to investigate how contemporary B2B service businesses could generate and leverage data-driven customer insight for service development.

The main research question of this study is:

RQ: How can technology B2B businesses generate and leverage data-driven customer insight for service development?

To better understand the benefits of data in service development, data management, and the capabilities related to data utilization, the study includes the following sub-questions:

RQ1: How can service development benefit from data-driven insights directly and indirectly?

RQ2: How can businesses manage customer-related data collection and insight generation?

RQ3: Which organizational capabilities are related to data-driven insight generation and leveraging for B2B service development?

My research objective is to offer both academic and managerial contributions: Firstly, the study contributes to building academic literature on customer-related data utilization for service development and offers especially empirical implications to the topic. Secondly, the study offers managerial implications for data-driven customer insights in B2B service development.

This study is based on literature on service development research, data management, data and analytics capabilities, and dynamic capabilities. The research is conducted as an assignment for my employer, so the scope and studied industries take shape reflecting the industry and interests of the employer company. The scope of the study is, more specifically, B2B services in the industries of engineering, technology, software, data communications, and utilities – for short, I refer to all these as “B2B technology services” in this report. That is, the investigation is limited to B2B technology services, excluding e.g., B2C (business-to-consumer) services and other industries like health, professional services, or retail trade. In other respects, by concentrating on a delimited type of service business, I can draw more accurate implications both for theory and practice. The geographical scope of the study is global.

Following a qualitative, multiple-case research design, I examine the insight generation possibilities in the field of technology B2B services extensively (Eriksson & Kovalainen, 2011; Yin, 2002, p.4). The number of cases is 17 experts working in eight different companies. The research data was collected via semi-structured case interviews in January 2023 and analyzed via case study and thematic analysis, based on the literature by e.g., Miles and Huberman (1994) and Eisenhardt (1989). In this report, the findings are discussed and reflected from the perspective of the theoretical framework to first answer the sub-questions and eventually the main research question. Also, as a result of the analysis and discussion, the study proposes a theoretical model on how data-driven customer insight can be generated and leveraged for B2B service development.

This report is structured as follows: To conclude the introduction, I define service business terminology relevant to this study and the research context. The total report is structured into five chapters. Following the introduction, I cover previous literature for my study, laying a theoretical framework for the examination of data-driven customer insight generation and leverage within service development. In the third chapter, I present the research design and methodology in more detail. The chapter also describes the research context, cases, case selection, interviews, data analysis, and limitations and

ethical considerations of the study. The fourth chapter presents the findings of the data analysis conducted on the interview data. The fifth and final chapter of the report discusses the findings considering the theoretical framework, answers each research question, and presents managerial implications. Lastly, I give recommendations for future research and end the report with concluding remarks.

1.2 Service Business Terminology

The below terminology is relevant to the research context of the study, as it describes the features of many of the companies the interviewed experts were working in. The concepts themselves are more or less central in the theoretical framework, and they are presented here mainly to support the comprehensibility of the following report sections.

B2B – business to business. Business that offers products, services, or solutions to business buyers. The business buyers may be the end users, or instead, distributors selling the solution forward to other businesses or consumers (i.e., B2B2B or B2B2C). (Iankova et al., 2019.)

B2C – business to consumers. Business that offers products, services, or solutions to consumers (Iankova et al., 2019).

SaaS – software as a service. Software that the service provider delivers via the Internet and hosts, develops, and manages remotely (Oliveira et al., 2019).

Service business. Either a domain of the whole business supporting the use of the products, or the core business of the company. Compared to product businesses, service businesses tend to have more intimate relationships with customers due to longer customer commitment and types of delivery (Alam & Perry, 2002).

Solution. Bundle of a tangible product and service(s) for the product (Neu & Brown, 2005).

2 Literature Review

This chapter of the study lays the theoretical foundation for my research. First, I cover three research traditions on service development and present a unified perspective to study customer insight generation for the development of services. Second, I discuss the traditional way of customer insight generation, i.e., customer integration. Also, I present the relevance of customer frontline employees in customer understanding. In the third section, I reflect on the possibilities of data-driven customer insights for B2B service development and discuss the direct and indirect benefits of data and analytics utilization. After that, I review common challenges in big data management. The fifth section of this chapter covers data and analytics capabilities needed in data-driven customer insight generation for service development. The sixth and final section discusses customer insight generation as the organization's dynamic capability.

As I developed the literature approach for this study, I started from the examination of service development research. I aimed to first understand how the development of services has been studied and how this research considers customer understanding. After identifying three different traditions – service design, new service development, and service innovation – I followed all of them to search for studies about data-driven customer insight. I soon discovered the lack of research on data use for service business and innovation (see Lim et al., 2018; Urbinati et al., 2019), so it was well reasoned to continue to cover any related literature from all three service development traditions. While reading through the existing literature, I apprehended the relevance of traditional customer integration in service design and innovation, and thus, shaped my research questions accordingly: Instead of focusing purely on the direct benefits of data-driven customer insight, I also analyzed the indirect benefits of data, e.g., how data can be used to foster customer integration or customer relationships.

To understand challenges and required processes and resources for data collection and insight generation, I also read literature on big data management and data and analytics capabilities. Additionally, I wanted to examine how customer insights help service development to adapt to changes in the market and hence read theories and studies about dynamic capabilities.

All in all, the selection of articles for the literature review was strongly based on the journals in which the articles were published. Before including any article in my study, I

reviewed the journal's impact factor. The limit value for impact factors was 3, however, most journals exceeded the factor value of 5. Many of the included articles were published in top-quality journals, such as the Journal of Service Research, Journal of Product Innovation Management, and Technovation. The selection of articles was thorough to support the development of a valid and credible literature review.

2.1 Service Development Research

The research of services is a large, heterogeneous, and fragmented field (Antons & Breidbach, 2018; Biemans et al., 2016). It is also multidisciplinary, as different disciplines, like service marketing, innovation management, and information systems research, examine services from their premises (Antons & Breidbach, 2018). As many as over 20 academic fields study service (Spohrer et al., 2014, p. 493), and thus, this study was built on multidisciplinary literature as well.

Service development, i.e., the process of developing new services and improving the current service offering or delivery, has been studied via three different research traditions: service design, new service development, and service innovation (Antons & Breidbach, 2018; Biemans et al., 2016; Gustafsson et al., 2020). Service design uses a human-centered perspective, design principles, and methods to understand customers, contexts, and customer interaction to advance service business (Antons & Breidbach, 2018; Gustafsson et al., 2020). New service development, in turn, concentrates especially on the process of developing a service for the market, whereas service innovation is most about the outcome of the development process, challenging the existing offering and markets (Gustafsson et al., 2020). The traditions use various methods to study the development of services, and service innovation relies more often on quantitative methods while service design utilizes predominantly qualitative and conceptual research (Antons & Breidbach, 2018). New service development and service design emphasize especially the use of customer knowledge to develop service offerings (Gustafsson et al., 2020). *Figure 1* presents distinctions between the three research traditions.

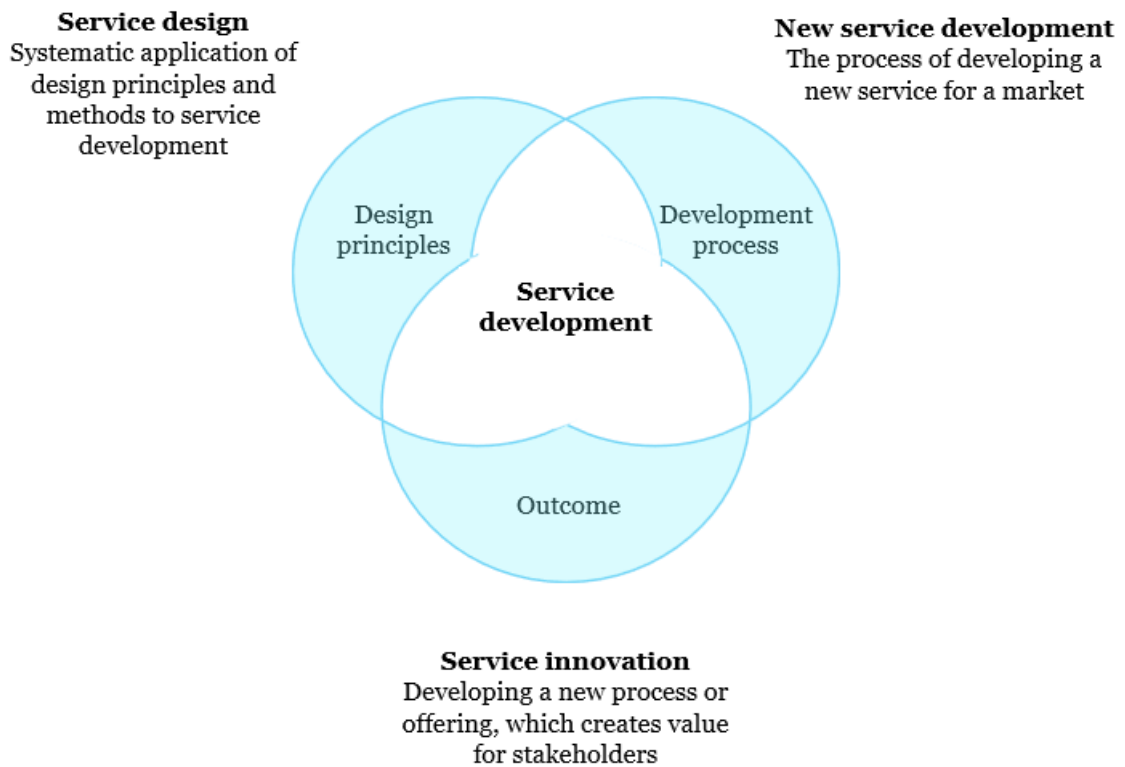


Figure 1. The distinction between service design, new service development, and service innovation (applied from Gustafsson et al., 2020).

Gustafsson and colleagues (2020) emphasize the importance of keeping the concepts of service design, new service development, and service innovation separate because with different focuses, goals, and methods the traditions yield distinctive knowledge on service development. This study respects this notion and utilizes literature from all three traditions to study the possibilities of customer insights and data in service development. Instead of concentrating on developing one of the traditions further, like Gustafsson and colleagues (2020), or treating the concepts interchangeably like Biemans et al. (2016), this study will utilize the knowledge from all the traditions while recognizing their distinctiveness. Also Antons and Breidbach (2018) argue for the integration of knowledge from different traditions to advance theoretical and normative insights. For example, service design offers creative potential in the form of prototyping, which may foster other research, like service innovation (Ostrom et al., 2015).

Notably, service development is a very practical topic, as practitioners utilize methods of service research in their development initiatives. Many businesses have specialist roles, such as service designers and service developers, that utilize formal knowledge from one or more of the service development research traditions in their work. In this case study, I aimed to reach a variety of service development experts in the case selections, so that I was able to build a comprehensive understanding of my research topic. To conclude, this research recognized the different traditions to study the development of services but used literature from all three traditions to build a theoretical understanding of customer insight generation for the development of services. Similarly, this report generally refers to the umbrella concept of “service development” when discussing the field of research and findings in general. Edvardsson et al. (2012) opted for a similar approach in their study, in which they review customer integration methods.

2.2 Customer Insight Through Customer Integration

Customer insight is knowledge about the customers that is a valuable, rare, and viable resource for business (Said et al., 2015). The objective of customer insight generation is to gain implications for product and service development as well as to help customer-oriented growth (Said et al., 2015; Urbinati et al., 2019). Customer insight requires first information collection on customer behavior, needs, and requirements, and then analysis and transformation of that information into actionable knowledge (Said et al., 2015).

The relationship between a service provider and a service customer in B2B context is oftentimes close, collaborative, and long-standing (Alam & Perry, 2002; Neu & Brown, 2005). Descriptive of these relationships is also the trust built between the parties: Trust is built in close collaboration, shared understandings of the customer’s business and operations, as well as in joint solution generation (Neu & Brown, 2005). The close provider-customer relationship is very fruitful for innovation, development, and improvement in the service business, as it enables the discovery of customer needs and requirements as well as the desired service value (Alam & Perry, 2002; Jaakkola & Alexander, 2014). This study used the term “customer integration” to describe and analyze the active inclusion of customers within service development, similar to Edvardsson et al. (2012). The phenomenon has been studied via other concepts and

focuses as well, e.g., co-creation (see Jaakkola & Alexander, 2014), customer engagement (see Jaakkola & Alexander, 2014), and voice of the customer (see Bharadwaj et al., 2012).

Information on customers' experiences, behavior, needs, and desired value can be transformed into customer insight (Said et al., 2015). Utilization of customer integration and hence, insight, can gain a business competitive advantage, better service quality, improved value proposition, and increased customer satisfaction (Bharadwaj et al., 2012; Hartline et al., 2000). Correspondingly, a lack of customer integration and information often leads to services not meeting customer needs or being too complicated (Edvardsson et al., 2012). According to Edvardsson and colleagues (2012), the selected customer integration methods crucially affect the quality of gained customer information.

2.2.1 Customer Integration Methods

Customer integration methods can be divided into reactive and proactive dimensions (da Mota Pedrosa, 2012). Reactive integration means the identification of expressed needs, while proactive customer integration enables the identification of unexpressed, i.e., latent, and future customer needs (Narver et al., 2004). The former refers to customer-initiated communication on their service needs, and the latter covers collective exploration and the provider's initiation of knowledge co-creation (da Mota Pedrosa, 2012). The examination of both expressed and latent needs is critical for innovation, and, for instance, concentrating purely on expressed needs leads to a lack of accurate, complete, and actionable customer insight (da Mota Pedrosa, 2012; Edvardsson et al., 2012).

Traditional reactive customer integration covers the development activities initiated by customer feedback, complaints, and support requests (Park & Lee, 2011). Proactive integration methods, instead, are versatile and differ between the domains of B2B and B2C (Edvardsson et al., 2012). Edvardsson and colleagues (2012) reviewed and classified proactive customer integration methods within service development. As a result, they identified four integration methods used in B2B service contexts. All the methods - lead user method, living labs, information acceleration, and free elicitation - include direct dialog with the customer, test situations, and activity from customers (Edvardsson et al., 2012). In practice, all methods consisted of different information collection techniques,

most commonly some form of interviews, observations, and periodic meetings (Edvardsson et al., 2012).

Lead user method focuses on exploring trends among lead users to forecast the future needs of the wider mass of users (Edvardsson et al., 2012). Lead users' present needs will become general in the market during later stages, and thus, their knowledge and experiences can be utilized as a "need-forecasting" laboratory (von Hippel, 1986). Leading-edge customers can also participate in product or service ideation and conceptualization (Olson & Bakke, 2001). In practice, lead users participate very actively in the service development process and collaborate with the development team (Edvardsson et al., 2012).

Living labs are a set of methods that construct a physical or virtual innovation environment, where ordinary users can participate in the development and prototyping of a service early on (Edvardsson et al., 2012; Schaffers et al., 2007). The work in living labs is creative collaboration and validation, and simulated situations are used to generate customer-driven information (Edvardsson et al., 2012). One example of living labs methods is the recruitment of a user panel with specific characteristics to develop and test new services (Hossain et al., 2019).

Information acceleration is used in constructed virtual buying environments or test studios, and the purpose is to generate information on the customer, their preferences, and intentions (Edvardsson et al., 2012; Proff & Fojcik, 2015). The customers are being offered information about the service by simulating the information available in a real purchase situation (Edvardsson et al., 2012). The customer then gets to use the service in the test environment so that developers see if some changes regarding usage should be made before the market launch (Edvardsson et al., 2012; Proff & Fojcik, 2015). The main purpose of the information acceleration method is, however, to prospect sales (Edvardsson et al., 2012).

Free elicitation method refers to the customer expressing their feelings and preferences related to a service by voicing the first thought that comes to mind (Edvardsson et al., 2012). Practically, the method is about associations and gives little information on latent customer needs or innovative ideas, but on the other hand, it is a relatively easy measure to generate information differences between customer groups (Edvardsson et al., 2012; Reilly, 1990). Free elicitation is especially suitable for the implementation of gradually developed services, e.g., service upgrades (Edvardsson et al., 2012).

These four customer integration methods generate valuable information for service development, but they also have limitations and challenges. They are mostly carried out outside of a real use situation (except for the lead user method and some instances of living labs) (Edvardsson et al., 2012), which means that even though customer integration is proactive, the information is collected in situations that are simulated and where customers know themselves to be under observation. Consequently, it is likely that a set of latent customer needs, or behavior, is not identified in the test settings, which may translate to services not creating the needed value in the use context (see Edvardsson et al., 2012).

A prevalent challenge in proactive customer integration is high resource requirements. User recruitment, and especially lead user identification for development, is difficult and time-consuming (da Mota Pedrosa, 2012; Edvardsson et al., 2012; Hossain et al., 2019). Also, the methods are often expensive and not scalable, since only a few users can be included in development due to coordination challenges (da Mota Pedrosa, 2012; Edvardsson et al., 2012). Moreover, proactive customer integration is temporal, project-based work, and practitioners may withdraw from customer research even though it has been previously successful, due to high resource requirements (Hossain et al., 2019; Olson & Bakke, 2001). These challenges and limitations of customer integration methods in service development call for continuous, less demanding customer insight generation practices that capture the information from the real-life behavior of users.

2.2.2 The Role of Customer Frontline Employees

In a B2B service business, employees with direct customer contact, i.e., customer frontline, are responsible for turning the customer-oriented strategy into quality service (Hartline et al., 2000). Consequently, they may grow a learning relationship with individual customers as they collaborate to meet the customers' needs over time (Neu & Brown, 2005).

Customer frontline often has a good understanding of current customer business problems and needs (da Mota Pedrosa, 2012). The information that customer frontline accumulates in their daily work makes these employees a key organizational resource both for the success of B2B services and the development of services (da Mota Pedrosa, 2012; Neu & Brown, 2005). Therefore, consulting customer frontline or integrating them

into development processes increases the probability of successful service development (da Mota Pedrosa, 2012). Within-company collaboration is very crucial in development activities so that the collective business intelligence of the organization can be evolved (see Neu & Brown, 2005). Service developers and designers know the methods and tools for customer integration, while the customer frontline has information on the customers accumulated over a long-term period.

2.3 Data-Driven Customer Insight in B2B Service Development

Customer-related data, particularly data on customer activity (e.g., purchases, application usage) or system operation, can be a significant source of customer insight (Lim et al., 2018; Timoshenko & Hauser, 2019). These digital traces reflect customers' behavior, needs, and preferences without any cognitive transformation (Lim et al., 2019).

A growing number of businesses no longer have customer data in a traditional, structured form, but in the form of unstructured, big behavioral data (Urbinati et al., 2019). According to Gartner (2022c): "Big data is high-volume, high-velocity, and high-variety information assets that demand cost-effective, innovative forms of information processing. Big data enables enhanced insights, decision-making, and process automation." In other words, these kinds of data sets are very large in volume, are created quickly, and have diverse data sources and types (Urbinati et al., 2019). Additionally, big data is often described with two other words "veracity" and "value", referring to the exactness and accuracy of automatically generated data and the unique value it offers (Hartmann et al., 2016; Jin et al., 2016; Mishra et al., 2019). Big data in service businesses can offer also new revenue streams in the form of data reuse and data reselling (Opresnik and Taisch, 2015).

The type and sources of customer-related data in businesses vary greatly, depending on e.g., industry, service offering, systems, customer management processes, and sales processes. In the context of B2B technology product companies, customer data may include data on, for example, customer accounts, sales, digital marketing, customer surveys, technical support inquiries, customer service, installation or usage environment, application usage, and system or process operation. The data on the

businesses' customers can also be complemented with external data, like data on the market or competitor's customers.

Linking and integrating data from various sources could enable the identification of trends and patterns in customer behavior (Park and Lee, 2011; Hartmann et al., 2016). More specifically, the analysis of customer-related data can enable both understanding of the current and prediction of future decisions and behavior, which is crucial for customer-oriented business growth (Lim et al., 2018; Said et al., 2015). Big customer-related data offers insight into, for instance, emerging sales trends, viable service attributes, and preferred customer communication (Urbinati et al., 2019, p.24). Based on this insight, the business can improve its services and service offering accordingly (Urbinati et al., 2019).

Both Ostrom et al. (2015) and Lim et al. (2018) argue for the distinctive and complementary perspectives that data-driven and traditional customer insight methods offer for service development. For example, customer integration via lead users or living labs advances co-creative service innovation, i.e., the ideation of new service offerings and ways to create value for stakeholders (Gustafsson et al., 2020; Hossain et al., 2019; Olson & Bakke, 2001). Analyzing customer behavior data, in turn, enables the efficient identification of latent customer needs and requirements regarding services, and this knowledge can be used to improve service attributes and offerings (Urbinati et al., 2019). That is, different insight generation methods seem to have their application areas, and they can be combined to understand the customers as well as possible (Lim et al., 2018).

Indeed, data and analytics offer certain direct customer insight, but data-driven insight may also support traditional customer insight generation methods. While examining the possibilities of data use for service development, it is interesting to consider both the direct and indirect benefits of data-driven customer insights. What kind of direct and indirect benefits do data-driven customer insights offer for service development? There is little research on data utilization in service development, which makes answering especially the question of indirect benefits challenging (see Lim et al., 2018; Urbinati et al., 2019). For that reason, this empirical study aimed to examine the topic and generate new understanding of it.

2.3.1 Direct and Indirect Benefits of Data-Driven Customer Insight

The literature presents versatile direct benefits of data-driven customer insight, which could be utilized for B2B service development: Insights can be generated continuously from natural behavioral records instead of setting up customer research or co-creation projects, and data insights can be used in real-time decision-making (Lim et al., 2018; Urbinati et al., 2019). Data offers a comprehensive view of the needs of the customer base and enables effective segmentation and comparisons between customer groups (Jin et al., 2016; Lim et al., 2019).

Considering the ability to continuously monitor behavioral data, another direct benefit could be stated to be ideation, as changes in behavior can be investigated further and turned into service development ideas. Additionally, data can be used in validation, as different kinds of development ideas can be validated through data (Urbinati et al., 2019).

Previous studies present vaguely any indirect benefits of data-driven customer insight, e.g., possibilities for data to foster traditional customer integration. However, according to Urbinati and colleagues (2019), big data and advanced analytics can, for example, identify customers that are best prepared to act as lead users, reporting on the origins of emerging needs and trends. Applying this idea further, practitioners could possibly use data to identify points of improvement in the service offering, which could then be investigated more specifically in customer collaboration or co-creation. Moreover, Ostrom et al. (2015) describe how big data presents opportunities for deeper customer relationships through the building of new value networks and service ecosystems.

Another indirect benefit of customer data could be strengthened organizational memory. Organizational memory means the organization's shared knowledge, which has been accumulated via past experiences (Walsh & Ungson, 1991). As discussed, much of the customer understanding in certain industries is qualitative and stored within the customer frontline (da Mota Pedrosa, 2012; Lim et al., 2018). However, if the qualitative insights were actively documented or quantified into numerical formats, the information previously resided within individual employees would turn, instead, into organizational memory and shared longitudinal knowledge. This would significantly support the usage of customer understanding in service development.

In this study, I aimed to discover whether practitioners would describe the kinds of direct and indirect benefits of data-driven insights for service development, as I have discussed above, or whether the interviews would reveal something new or different.

2.4 Big Data Management for Customer Insight Generation

Data-driven customer insight generation would require appropriate big data management, meaning the access, diagnosis, and integration of information, which is gathered from various data sources and in different data forms (Urbinati et al., 2019). That is, companies need to gather relevant data on customers, store it, and transform it to be able to perform data analysis, and then apply necessary analytics methods to generate valuable insight on customers (Hartmann et al., 2016; Lim et al., 2018). The process from data collection to insight generation involves common challenges and pitfalls that must be considered (Lim et al., 2018). *Figure 2* presents the common big data management challenges regarding insight generation for service development.

In their action research study, Lim and colleagues (2018) joined practitioners and participated in five service development projects to identify data utilization challenges to advance service business. As a result, they recognized six common challenges in customer-related data collection and use: Collecting the relevant data, facilitating easy and spontaneous data collection from customers, managing the quality of data, planning data analytics, integrating different data from various sources, and following data usage regulations and protecting customer privacy (see *Figure 2*). In my empirical study, I wanted to find out how practitioners in B2B services consider and would manage these challenges.

1. Collecting the relevant data for service development

Current technology businesses have a variety of big data on their customers. Yet, the currently collected and stored customer-related data does not necessarily support service development initiatives (Lim et al., 2018). If data collection has been initially started to serve, e.g., product development, it will likely not describe, for example, customer behavior regarding product maintenance. In case customer-related data is recognized to

be limited in terms of service development, it is crucial to identify what kind of data needs to be collected and prepared to better understand customer behavior, needs, and preferences regarding services (Lim et al., 2018). Correspondingly, if the organization already holds some appropriate data for service development, there is no need to start gathering the same information in a different organizational unit.

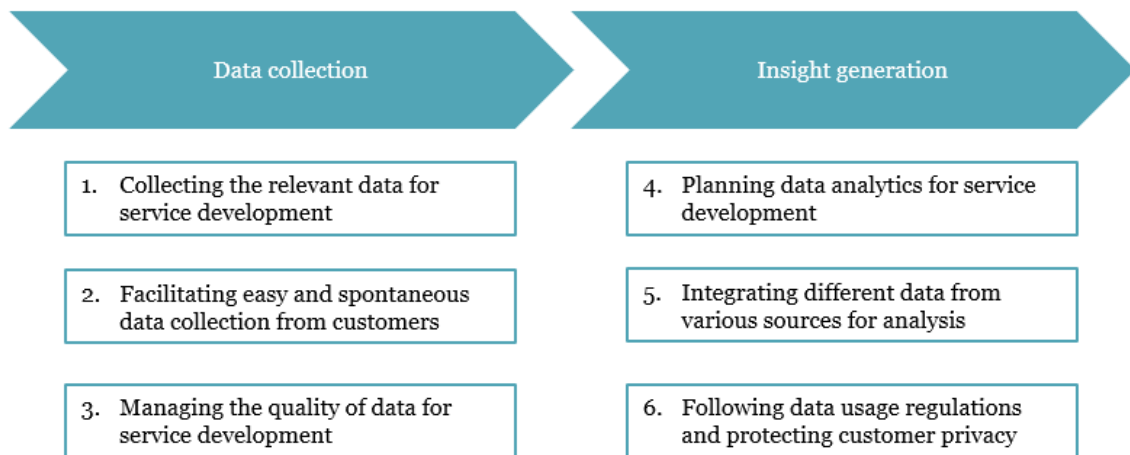


Figure 2. Big data management challenges in customer insight generation for service development (applied from Lim et al., 2018).

2. Facilitating easy and spontaneous data collection from customers

The level of automation in data collection varies across businesses and types of information (Lim et al., 2018). For example, information on service purchases and interaction with marketing assets can be recorded automatically, whereas the collection of customer satisfaction and feedback requires deliberate action from customers. Lim et al. (2018) describe how data collection can be time-consuming and annoying for customers, which likely leads to incomplete or insignificant customer-related data. Hence, whether some data collection needs deliberate action from customers, the identification of user-friendly methods or incentives is critical (Lim et al., 2018). The objective of user-friendly and incentivized data collection applies internally within an organization as well because some roles may require the employees to record information on customers manually, e.g., to CRM systems.

3. Managing the quality of data for service development

Quality is an important prerequisite for data applied to any business incentives (Lim et al., 2018). If some data is missing or strange, or the data format varies between records, the analysis of the data will result in incorrect or incomplete customer insight. Lim and colleagues (2018) highlight the importance of data quality evaluation as well as the designing of such data collection processes so that data quality can be ensured or improved. In practice, this may be achieved e.g., via more automatic data collection and standardized data collection techniques.

4. Planning data analytics for service development

Lim et al. (2018) state that ideal data analytics for service development are challenging to plan because of constraints related to resources, the quantity of appropriate data, and data quality. Despite that, practitioners should not be oppressed by the challenge but explore the opportunities by listing possible data analytics scenarios, developing reliable plans for service development purposes, and implementing the plans that are feasible for the time being (Lim et al., 2018).

When planning data analytics for service development, the forms of the available customer-related data need to be considered. Data can be in the form of, e.g., natural language, text, or statistics, and some data needs to be transformed into other forms of data, for example from text to numerical data, to be analyzed more efficiently. Furthermore, the goals of the analysis should significantly steer the planning of data analytics. The analysis of customer-related data can be descriptive (explains the past), predictive (forecasts the future), or prescriptive (forecasts future outcomes and suggests decisions) (Hartmann et al., 2016).

In practice, data analytics means statistical and mathematical methods that cluster, segment, score, and predict the most likely scenarios (Gartner, 2022b). Different analytics software, coding languages, and tools (such as BI tools) can be utilized in the analysis of customer-related data. Current data analytics tools enable, for example, the identification of relationships between customers' purchasing behavior and product features, based on their preferences and dislikes for aspects of the product (Urbinati et al., 2019). The most advanced applications and tools use advanced analytics techniques, such as machine learning, and network and cluster analysis, to autonomously discover

insights and make predictions from data (Gartner, 2022a). *Table 1* presents some relevant advanced analytics vocabulary and differences between the terms.

Table 1. Advanced analytics vocabulary.

Term / Concept	Definition	References
Advanced Analytics	Autonomous or semi-autonomous examination of a variety of data to discover actionable insight, make predictions, or generate recommendations.	Gartner, 2022a; Kitchens et al., 2018
Machine Learning	An area of artificial intelligence, concerned with the development of algorithms. Can improve algorithm performance independently from experience or previous encounters with data.	Gartner, 2022e; Pustejovsky, 2012
Natural Language Processing	Machine learning technology. Analysis, structuring, and categorization of text or audio speech.	Gartner, 2022f; Pustejovsky, 2012
Data Mining	Identification of patterns and trends in data, utilizing pattern recognition, statistical, and mathematical technologies.	Gartner, 2022d; Park & Lee, 2011
Text Mining	Discovering meaningful patterns in large quantities of unstructured, textual data.	Park & Lee, 2011, p. 10639
Sentiment Analysis	An instance of text analytics, aiming to understand the nature of commentary (e.g., positive or negative review).	Gartner, 2022g

The table is not an all-encompassing description of advanced analytics techniques, but it exemplifies how the analysis of customer-related data can be automated.

For one thing, a business may apply advanced data analytics to make sense of unstructured data, like written customer feedback, chats, or phone calls. Machine learning algorithms and technology, such as natural language processing, can be used to structure data autonomously and to process it into informative, non-redundant content (Park & Lee, 2011; Timoshenko & Hauser, 2019). Secondly, data and text mining can be used to recognize trends and patterns in the data to model the current customer needs and forecast the future (Park and Lee, 2011; Hartmann et al., 2016). Sentiment analysis, in turn, interprets the nature of feedback (e.g., positive or negative review) (Gartner, 2022g). Advanced analytics also enable comparisons between individual services and validation of existing insights (Urbinati et al., 2019).

5. Integrating different data from various sources for analysis

A true understanding of customer behavior, preferences, and decisions can be seldom achieved via analyzing one type of customer-related data only, like, for example, sales data. Lim and colleagues (2018) explain that the key point of value creation is connecting big data from different sources to deliver high-level information and insight. For example, to be able to figure out why certain customers buy certain services, the analysis can integrate data from various sources like sales, customer accounts, customer feedback, support inquiries, or product usage. Thus, when starting to utilize data to better understand the service customers, a company needs to first identify a list of useful customer-related data for analysis (Lim et al., 2018).

However, establishing connections between different data sources can be difficult because of the high-volume, high-velocity, and high-variety big data (see Lim et al., 2018). In practice, data often has different structures and is in separate databases within the organization (Lim et al., 2018). Also, data owned by a certain team or unit may not be accessible to other teams and employees. Therefore, to best benefit from all the customer information within a company, data structures would need to be standardized and data integrated within one database (Lim et al., 2018). The plans and practices for data integration need to be established or otherwise, the analysis of data is technically impossible.

6. Following data usage regulations and protecting customer privacy

Lastly, it needs to be ensured that the data utilization practices and employees adhere to regulations related to data use and customer privacy (Lim et al., 2018). Regulations differ globally and are modified periodically: For example, in 2018 EU introduced the new General Data Protection Regulation (GDPR), which, for instance, requires cookie compliance, data transmission justification, and the right to data erasure (GDRP.EU, 2023). Depending on the industry, customers may be hesitant to share their data, especially if they have concerns with privacy issues, so it is important to communicate about privacy and data regulation adherence to customers (Lim et al., 2018). If a business violates the GDPR, it can be fined by the national data protection authority (GDRP.EU, 2023).

To conclude, in this empirical study, I aimed to understand the relevance of these data management challenges in the context of B2B service development. Also, I strived to see how practitioners describe different challenges and discuss managing those.

2.5 Data and Analytics Capabilities

Big data management and data-driven customer insight application to service development would require a variety of resources from the business (Lim et al., 2018). With appropriate capabilities, i.e., data and analytics capabilities, customer-related data can be utilized for the competitive advantage of the service business (see Mishra et al., 2019). Capabilities can be defined to be organizational processes and routines rooted in knowledge (Cepeda & Vera, 2007). If there is a lack of certain capabilities or no knowledge about which capabilities would be needed, the leap to data utilization is impossible (Lim et al., 2018; Urbinati et al., 2019). Summarizing literature by Bharadwaj et al. (2012), Lim et al. (2018), Mishra et al. (2019), Neu and Brown (2005), Shah et al. (2006), and Urbinati et al. (2019), it seems that the needed capabilities for data and analytics application to service development include, at least, data and analytics expertise, data management processes, and a certain organizational structure.

Expertise as a capability represents the ability to accomplish and coordinate tasks in operational activities (Mishra et al., 2019). A company generating data-driven customer insight needs expertise in data analytics and data insight application, also because the

right expertise moderates the inevitable challenges related to big data and analytics (see Mishra et al., 2019). For example, efficient discovery of trend changes in big data is difficult in the presence of information overload, and businesses can even suffer from data-driven decisions if the gathered data is not the right data or the teams do not have the right critical thinking capabilities (Urbinati et al., 2019). The needed human expertise includes, at least, expertise in information systems, data analytics, and the service business in question (see Lim et al., 2018; Mishra et al., 2019). Collaboration between various experts is crucial because a successful service business and data insights are multidisciplinary work (Neu & Brown, 2005, p. 9).

Regarding data management processes, there should be set processes for customer data collection and leveraging, which are related and in line with other customer-oriented business processes within the company (Bharadwaj et al., 2012). Shah and colleagues (2006) write about essential customer relationship processes, such as the information-management process and the performance-assessment process. The first process includes data collection and data analysis functions, and the latter ties the business activities to business performance (Shah et al., 2006). These kinds of processes, if already defined in the organization, would steer the development of any new data utilization processes.

Additionally, the structural form of an organization seems to affect how the business succeeds to form a service business strategy that satisfies the complex B2B market needs (Neu & Brown, 2005). Neu and Brown (2005) argue that an appropriate organizational structure would have integrated business unit responsibilities, internal and external collaboration, and decentralized decision-making processes. Vertically decentralized decision-making is especially important in customer insight application to B2B service development: Lower-level managers are likely closer to customers and better able to understand their service needs, and hence, decision-making authority regarding service development should be allocated much to them (see Neu and Brown, 2005). Also, with expert knowledge of customer needs, people in direct customer contact, i.e., customer frontline, can critically evaluate the insights from data analytics and should be included in decision-making (see Urbinati et al., 2019). Senior-level managers, in turn, need to endorse the decisions visibly and actively as well as facilitate the adaptation of the organizational structure according to business needs (Neu & Brown, 2005).

This study aimed to examine, whether the theoretical reasonings and literature on data and analytics capabilities, i.e., human expertise, processes, and organization structure, apply to practice and explain the required capabilities for data-driven customer insight generation.

2.6 Customer Insight Generation as Dynamic Capability

Teece and Pisano (1994), as well as Teece et al. (1997), argue that a resource and process-based strategy of accumulating valuable technology and intellectual property – or setting up fixed processes – are not enough in business environments of rapid change. Instead, most successful firms respond to environmental changes by innovating rapidly and coordinating and redeploying internal and external skills, resources, and functional competencies (Teece & Pisano, 1994). This adaptation, integration, and reconfiguration of competencies is called dynamic capabilities (Eisenhardt & Martin, 2000; Teece et al., 1997; Teece & Pisano, 1994).

Originally, dynamic capabilities were defined to be based on firm-specific assets, organizational routines, and processes, which are difficult or impossible to imitate or transfer (Teece et al., 1997). The assets and processes were considered non-tradable because they are built on the values, culture, and organizational experience of the company (Teece & Pisano, 1994). However, Eisenhardt and Martin (2000) contradict the original conception, as they observed specific dynamic capabilities to have common features across companies. These so-called “best practices”, for example, in service development, arise as there exist more and less effective ways to deal with organizational and technological challenges (Eisenhardt & Martin, 2000). Eisenhardt and Martin (2000) continue to define that, for example, the product development process is an important dynamic capability, which typically involves the participation of cross-functional teams and a combination of expertise.

Customer insight generation and insight application to service development seems to be a dynamic capability in itself. Namely, it is about monitoring environmental changes and adapting the development of services based on that. Also, customer insight generation corresponds, e.g., to quality management as a dynamic capability (Teece & Pisano, 1994):

Both are driven by special organizational routines of information gathering, processing, and linking of customer experiences to product, or service, design.

Hence, based on the literature, the utilization of customer data and analytics for customer insight generation seems to most likely improve and foster customer insight work as a dynamic capability. This is because data-driven insight generation enables the constant monitoring of the environment and the whole customer base. For example, data enables constant customer re-segmentation to match the business to shifting customer demands (Eisenhardt & Martin, 2000). In my empirical study, I aimed to find out whether the cases would also describe customer insight generation and leverage to be a dynamic capability and whether they would see data and analytics to improve the ability to adapt to the changes in the environment.

2.7 The Theoretical Framework

The theoretical framework for this study is presented in *Figure 3*. The framework was shaped based on the literature review and it includes the following aspects: data and analytics capabilities, customer-related data, data analysis, data management challenges, benefits of data-driven insight, and dynamic capabilities. All six aspects support me in my study, in which I aimed to understand how technology B2B businesses can generate and leverage data-driven customer insight for service development.

Figure 3 brings forward also the relations between capabilities, data, analysis, and benefits. The relations were discovered via the examination of past research, e.g., Urbinati et al. (2019) and Lim et al. (2018). As the figure shows, data and analytics capabilities act as data-driven insight enablers, steering the other aspects of the framework. *Figure 3* also presents different sources of customer-related data and practices of data analysis. Some data management challenges concern both the collection of data and the analysis of data. Yet, the successful combining of data and analysis leads to direct and indirect benefits for service development. Additionally, as *Figure 3* showcases, the benefits of data-driven insight improve customer insight generation as the organization's dynamic capability.

The theoretical framework covers the research sub-questions in the following way: The first research sub-question “*How can service development benefit from data-driven*

insights directly and indirectly?” focuses on the benefits of data-driven customer insight. The second sub-question “*How can businesses manage customer-related data collection and insight generation?”* concentrates on the different challenges of data and analytics management. Lastly, the third sub-question “*Which organizational capabilities are related to data-driven insight generation and leveraging for B2B service development?”* covers both the required data and analytics capabilities as well as how the data use improves the organization’s customer insight generation as a dynamic capability.

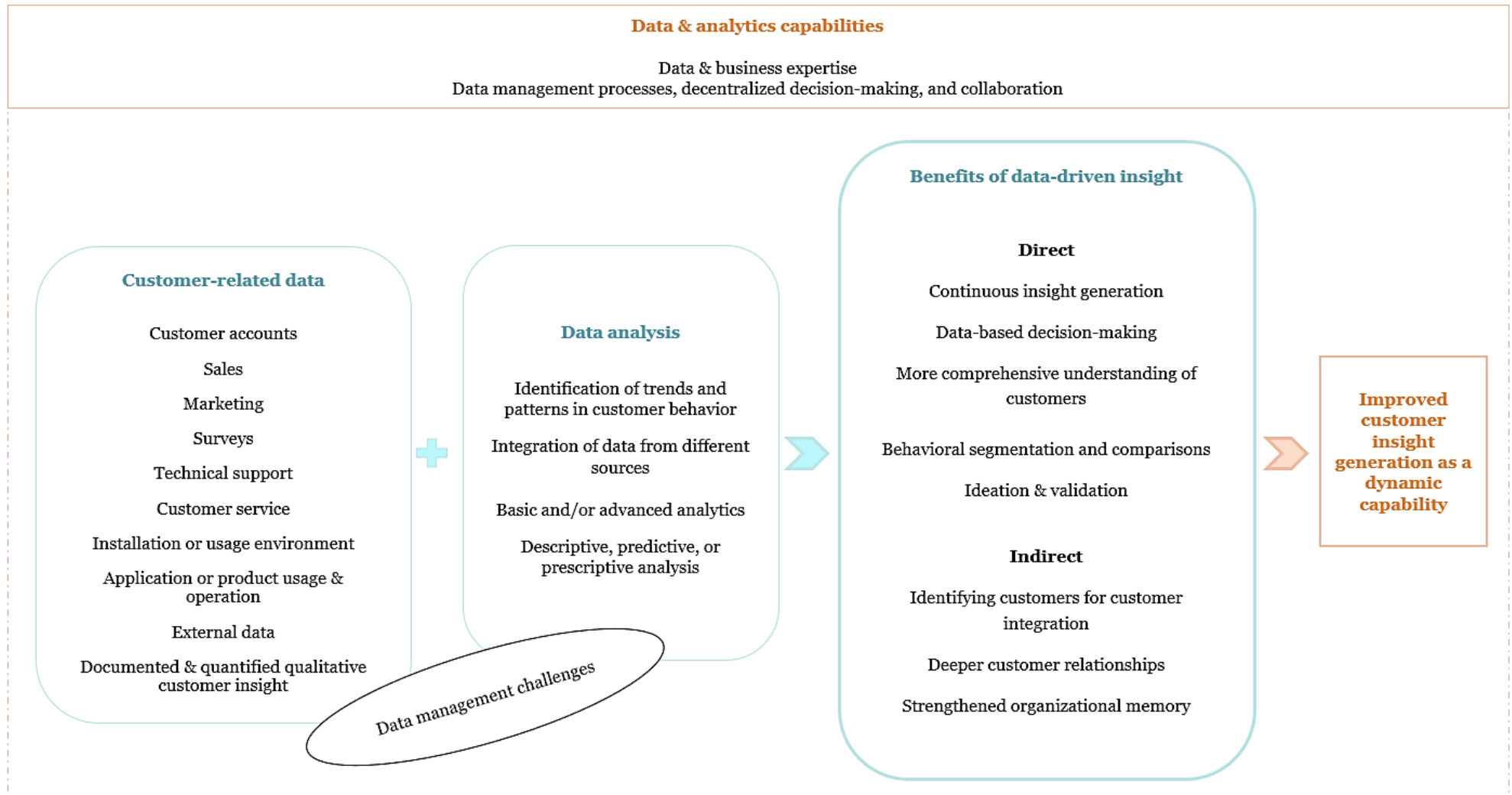


Figure 3. The theoretical framework. Own illustration.

3 Research Design and Methodology

This chapter describes the research design and methodology of the study and justifies the made choices. First, I present the research design together with the aims and objectives of the research. After that, I will introduce an overview of the research context and cases. The chapter will also cover the methods used in the data collection and analysis. Finally, I will discuss the limitations of the data and the research process.

3.1 Research Design

My study aimed to examine the possibilities of data-driven customer insight generation leveraging in technology B2B service businesses, striving to offer both academic and managerial contributions. The main research question of my study was:

RQ: How can technology B2B businesses generate and leverage data-driven customer insight for service development?

To better understand the benefits of data in service development, data management, and the capabilities related to data utilization, the study included the following sub-questions:

RQ1: How can service development benefit from data-driven insights directly and indirectly?

RQ2: How can businesses manage customer-related data collection and insight generation?

RQ3: Which organizational capabilities are related to data-driven insight generation and leveraging for B2B service development?

At the beginning of the research process, a qualitative research design was identified to be the most suitable option to understand the phenomenon that had not been much studied before (see Eriksson & Kovalainen, 2011). As noted, there was a lack of empirical studies on data use for service development (Lim et al., 2018). Also, research concentrating on customer insight in service development seemed to be scarce (Antons & Breidbach, 2018; Biemans et al., 2016). Due to the lack of studies on my research topic, the goal of my work was to gain an initial, extensive understanding of data-driven customer insight generation and leveraging for service development in B2B services. This goal made my research inductive, as I aimed to offer new theoretical and practical reasonings about the topic (Eisenhardt & Graebner, 2007; Eriksson & Kovalainen, 2011).

More specifically, this thesis study was a multiple-case study. Via a multiple-case study research design, I was able to examine the phenomenon of customer insight generation extensively (Eriksson & Kovalainen, 2011; Yin, 2002, p.4). Also, the multiple-case study design suited my research topic well because case-study research works especially in new research areas or topics that seem to have inadequate theoretical background (Eisenhardt, 1989). In my study, each interviewee represented one case ($n = 17$). The initial idea was to have the companies that the individuals were working in as the units of analysis ($n = 8$). However, during data collection, the practices in the biggest, global companies were identified to be so versatile between different units and teams that reducing those to one individual case was not seen as appropriate. Analyzing individual informants as cases was found to be more relevant considering the aim to study the phenomenon as extensively as possible. Due to the decision to analyze individual experts as separate cases, the study was able to utilize informant knowledge also from their previous roles.

The research design was open-ended, exploratory, and flexible in nature, typical of qualitative and case studies (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Eriksson & Kovalainen, 2011). The initial research questions were broadly scoped to offer the project flexibility and the possibility for redirection based on the knowledge generated in the data collection (Eisenhardt & Graebner, 2007). The onto-epistemological background of my study was moderate constructivism, as it considers the multiple perspectives on the reality that different businesses and communities have (Järvensivu & Törnroos, 2010). Namely, in my research, I was not searching for one true way that B2B businesses generate customer insight for service development, but I began my work with the conception that the used methods are very context and expert-related, and

people might have very differing opinions on what is being done or what should be done. Consequently, the research aimed to create new knowledge on the topic and bring to light the variety of practices and views in the field (Järvensivu & Törnroos, 2010).

3.2 Research Procedure and Context

This study was conducted as an assignment for a global, listed industrial technology company. The company has headquarters in Finland and over 2000 employees in 28 offices around the world. The business is product-led, but the company also offers services, e.g., maintenance, calibration, and technical support, for their devices, systems, and solutions. The service business has huge growth potential, and the current strategic priorities of the business are related to digital services, scalability, and specification of the service offering.

The employer company wished through research to gain an understanding of how other businesses in the B2B field accumulate customer insight for service development, especially through data. They were interested in knowing about the practices of other B2B technical product companies as well as companies specializing exactly in digital or SaaS services. This initial interest in certain B2B service industries offered the foundation for the research context and steered the study's case selection.

The scope of the study came to be B2B services in the industries of engineering, technology, software, data communications, and utilities. Hence, the identified practices describe the best customer insight generation in these fields, even though some of the results may apply to other industries as well. By narrowing down the scope to specific industries, and aiming to reach cases that were similar enough, I strived to generate valid theoretical implications (Eriksson & Kovalainen, 2011). The geographical scope of the study was global.

3.3 Case Selection and Description

Case selection for the thesis study was based on the initial idea of having companies as the units of analysis. It was clear that the employer company would make one of the case companies, and in addition to them, the plan was to recruit 4-10 (see Eisenhardt, 1989) other companies. In practice, I selected individuals to be interviewed from the selected case companies and contacted them personally. The original idea was to reach 2-3 employees from each company to be able to conduct within-case analyses. During the data collection process, however, it was decided to treat individual experts as cases instead because of generalization challenges within big case companies. Nevertheless, the company-based thinking continued to also clarify the subsequent selection of cases.

I started the interviews by interviewing cases from the employer company and two other companies. The selection of new cases happened gradually as I started to see what kind of data the interviews generated. Before each new selection, the incremental contribution was considered (Eisenhardt, 1989). This means, that I first considered whether a new informant company would add something new to the understanding of data-driven customer insight generation and help to answer the research questions (Eriksson & Kovalainen, 2011; Yin, 2002, p. 26). I then also considered which kind of cases (e.g., individual experts) would offer new data on the topic.

As can be seen, the case selections were twofold: First, I chose an informant company, and second, I chose 2-3 cases from within the company to be interviewed. In practice, I drafted a list of potential informant companies based on discussions I had with my thesis supervisor, the employer company, and my connections. To extend the list of companies, I did online research about businesses operating in Finland in the industries of engineering, technology, software, data communications, and utilities. The cases working in informant companies were discovered through the social media platform LinkedIn, through my personal connections, or via snowball sampling, which means the recruitment of informants via other informants (Patton, 1990). Around every third contacted expert agreed to participate in the study.

Eriksson and Kovalainen (2011) write that case selection should be based on the objectives of the research. The researcher may do selections so that the cases are similar enough to generate new theory, and that there are also differences between the cases so that theoretically meaningful comparisons are possible (Eriksson & Kovalainen, 2011).

Also, Eisenhardt and Graebner (2007) highlight the importance of having diverse informants to prevent informant bias and retrospective sensemaking. Consequently, I pursued both similarity and diversity between cases in the case selections. Adequate similarity was ensured by choosing to study exactly B2B service development (cf. B2C or product development) in specific industries. A specified population like this “constrains extraneous variation and sharpens external validity” (Eisenhardt, 1989, p. 533). As for diversity, I first familiarized myself with possible differences there may be between service businesses that may affect the methods of service development. I then chose the four most relevant company difference factors that I considered when selecting new informant companies for my study: product- or service-led company, type of service, size of the whole business, and globality of the organization. Also, in the selection of the cases, I aimed to choose people from various roles related to data, customer insight, and services, as well as from all organizational levels. If possible, the cases from the same companies were selected from different units or business areas. For instance, one of the interviewed experts worked in a unit that had some start-up features in their ways of working, even though the unit was part of the company’s main business.

The final number of cases was 17 experts working in eight different companies. The cases and the companies are anonymized in this paper. *Table 2* presents the cases.

As can be seen in *Table 2*, the study included cases that had expertise in e.g., services, service development, and service design, as well as customer insights, analytics, solutions, digital services, and marketing. The job titles of the cases are not presented as some individuals could be recognizable because of title originality. *Table 2* presents the current expertise of the cases, but many of the cases shared also significant knowledge on customer insight generation that they had accumulated in their previous roles. For example, one of the cases had previously led a software start-up and shared their learnings from that time.

A remarkable connective feature among the cases was their organizational position. Most of the cases were in some manager, leader, or director position. In the case selection, employees from all organizational levels were targeted more evenly, but it was revealed to be challenging to recruit less experienced employees from lower organizational levels. The more experienced and the higher in the organizational hierarchy a contacted expert was, the more likely they were to agree to participate. I first presented the aims, background, and confidentiality of my study when contacting new cases, and if there was

interest on their part, they could ask for more information before a time for an interview was jointly agreed upon. One person, who refused to participate after some lengthy discussions might have explained the central reason for refusal for most of the younger employees: He was uncertain whether he was allowed to participate in a study that was conducted as an assignment for another company, even though the two companies were not in a competitive position.

Table 2. Case descriptions.

Case #	Current expertise	Industry
1	Growing regional service business	Engineering
2	Directing service business	Engineering
3	Leading customer insights and customer experience	Data communications
4	Service design	Utilities
5	Service business development	Utilities
6	Offering management	Software
7	Directing business development	Software
8	Directing service business	Software / Consultancy
9	Directing product development & business	Software / Consultancy
10	Leading the development of analytics solutions	Engineering
11	Leading the development of analytics solutions	Engineering
12	Heading service offering management & analytics	Engineering
13	Digital portal and e-commerce management	Engineering
14	Heading service design	Engineering
15	Heading digital marketing	Engineering
16	Directing global service business	Engineering
17	Solution management	Engineering

Table 2 also presents the industries that the cases were working in at the time of the interviews. Engineering (i.e., industrial or technology) made the biggest industry, but being a broad category, it included somewhat different, tightly specialized businesses. Again, it is notable that some of the interviewees had previously worked in other industries, and knowledge from there was also discussed in the interviews. Mostly, however, the experience was from industries that were in the scope of this thesis.

The nationality of the interviewees was mostly Finnish. All but two of the companies operated globally, one operating in the Nordics, and one in Finland. Six of the companies were large, one medium-sized, and one small (based on market value, or revenue if the company was not listed). Four of the companies were classified to be “traditional product companies” meaning that the business had originally grown around the product and the service business has been started later. The four other companies were classified to be either service or solution companies, meaning that services had been at the core of the business since the beginning. Naturally, these kinds of classifications are not black and white – for example, one of the cases was working in a traditional product company, but in a very solution-oriented business area.

3.4 Case Interviews

The research data was collected via case interviews. Interviews were considered to be an appropriate method for data collection in my case study, which aims to understand the phenomenon via empirical evidence and include many individual cases in the analysis (Eriksson & Kovalainen, 2011; Järvensivu & Törnroos, 2010).

The interviews were held in January 2023. In practice, the discussion took place via the video conferencing tool Microsoft Teams, except for the employer company’s interviews, which were held face-to-face at the office in the Helsinki area. The conversations were recorded for later analysis, and I also made notes during the meetings. One interview was not recorded due to the request of the interviewee. The length of the meetings ranged from 40 to 90 minutes, depending on the schedules of the interviewed experts, the median being 60 minutes. The Teams software transcribed the discussions in real-time and it was able to also transcribe pre-recorded voice recordings from the face-to-face

meetings. However, the transcriptions needed some corrections, so each transcription was scrutinized manually for mistakes soon after the interview.

The interview themes and questions were pre-defined, but simultaneously there was room for emphasizing certain themes depending on the interviewee's expertise. That is, the interviews were semi-structured, utilizing both "what" and "how" questions, and allowing topics to be raised by the interviewees (Eriksson & Kovalainen, 2011). The chosen interview design supported the aims of constructionist interview research: the goal was to understand the phenomenon from the viewpoint of the interviewees (Eriksson & Kovalainen, 2011).

The interview questions included two background questions about the interviewee's work and current strategic priorities. After that, the questions aimed to discover the available customer-related data and the current and ideal practices of customer insight generation and leveraging for service development. The latter set of interview questions concentrated on capabilities and learnings: The interviewees were asked to describe the capabilities needed for data utilization in service development and to reflect on the challenges and learnings they had gotten from data or service development.

3.5 Data Analysis

Typical of inductive qualitative research, the collection and analysis of the research data was an iterative process, and the analysis of the first interviews significantly steered the later data collection (e.g., re-framing of the research and interview questions) and case selection (Eriksson & Kovalainen, 2011). The aim of my analysis was to gain an understanding of the benefits of data-driven customer insight generation and leveraging for service development, the challenges of data management, and the related capabilities. In practice, the goal was to find out themes, categories, and patterns related to these questions from the case interview data (Eriksson & Kovalainen, 2011).

The first step of the data analysis, within-case analysis, took place separately for each case after the interview. This step was crucial because within-case analysis familiarizes the researcher with the data and enables preliminary theory building (Eisenhardt, 1989). I went through the transcriptions by coding the text. The coding system was based on the

research sub-questions and the interview data itself, which is typical of grounded theory approaches (Eriksson & Kovalainen, 2011). I used different primary colors to code the text to the categories of the research sub-questions: 1) benefits of data-driven insights, 2) challenges of data management, and 3) related capabilities. Through iteration, I identified themes within these three categories which I then coded with different shades of the primary colors. Additionally, I wrote a tight description of each of the cases and drafted links between the themes to gain a clearer, solid picture of each case.

The second step of the analysis was a cross-case comparison, in which I utilized the work of Miles and Huberman (1994). The idea in cross-case comparison is to, through structured ways, go beyond the initial findings and improve the likelihood of accurate and reliable theory (Eisenhardt, 1989). In practice, I summarized the data from individual cases to a matrix to compare the similarities and differences in the identified case themes (Miles & Huberman, 1994, pp. 177–183). The objective was to map common patterns and properties across cases, and hence, do a synthesis of the findings (Eriksson & Kovalainen, 2011; Yin, 2002, pp. 116–137).

The next steps in the analysis were inductive. I did a thematic analysis of the common themes identified in the previous steps, defining the findings into stabilized themes and categories. That is, I was able to answer all three research sub-questions with my data. To sharpen the conclusions and ensure internal validity, I compared the emergent themes and patterns to each case to see whether all cases supported the general findings or not (i.e., replication logic), and thus, I re-formulated the findings so that those described the empirical data as precisely as possible (Eisenhardt, 1989).

Also in inductive studies, it is essential to link findings to past literature. I used previous research to describe and analyze the results of the analysis, and to discuss the findings on customer insight generation. Eriksson and Kovalainen (2011) call this step “sensitizing concepts”, as the theoretical concepts cannot be used straight to confirm or challenge the empirical results and made conclusions, but they will give reference for the analysis. The past literature is tightly woven into the presentation and discussion of the study’s findings in Chapter 4.

3.6 Limitations of the Study and Ethical Considerations

Constructivist research often follows postmodern evaluation criteria instead of the classical evaluation of reliability and validity (Järvensivu & Törnroos, 2010). Many researchers have developed new conceptions to measure the “goodness” of qualitative research (Eriksson & Kovalainen, 2011). In my study, I followed one of them – the concept by Lincoln and Guba (1985), which includes four aspects: dependability, transferability, credibility, and confirmability.

Dependability means logical, traceable, and consistent research documentation (Lincoln & Guba, 1985). In my work, I sought dependability via a transparent research process and documented the process in detail, e.g., by presenting the development of the literature review, transcribing the interviews, elaborating on the case selections and methodological choices, and untying the reasonings in my analysis. Also, Eisenhardt and Graebner (2007) highlight the role of precise language and thoughtful research design in successful case studies.

Transferability refers to the applicability to other contexts (Lincoln & Guba, 1985). According to Eriksson and Kovalainen (2011), transferability can be achieved by connecting the study to past research and results. This was a somewhat challenging task in my thesis due to the lack of research on data utilization in service development. Nevertheless, I built a comprehensive literature review and used concept sensitizing to give reference for my study’s analysis. Another means to pursue transferability is thick description, i.e., describing the phenomenon in sufficient detail so that it is easier to evaluate how the conclusions can be transferred to other times, settings, situations, or people (Lincoln & Guba, 1985). In Chapter 4, I balance between extensive case study design and presenting and discussing the findings in the manner of thick description.

Credibility in qualitative research means confidence in the “truthfulness” of the findings (Lincoln & Guba, 1985). Credibility can be analyzed by evaluating, e.g., the sufficiency of data and repeatability of findings. Regarding data, the number of cases in the study was high ($n = 17$). A sufficient number of cases increases the plausibility of the results, as researchers are less likely affected by “information-processing bias”, i.e., premature conclusions based on a limited amount of data (Eisenhardt, 1989). However, the number of my cases could be viewed to be too high, as Eisenhardt (1989) has recommended the maximum number to be ten. Piekkari and colleagues (2009) warn that a big number of

cases may challenge the reporting of results. As I did not want to discard any valuable data, I included all 17 cases in my analysis but concentrated especially on the exactness of the cross-case analysis and considered different options for results reporting. The reporting had to balance between thick description and a big number of cases.

Another viewpoint to consider regarding the credibility of my study is the case selection and whether the findings would be repeatable with different selections. Accessibility constraints affected the selection of my cases, as I was able to recruit people mostly from manager positions and companies of Finnish origin. It may be that some customer insight generation methods would have been emphasized more if there was more variety in the organizational position and company origin (company origin might affect e.g., the company's data literacy). Even so, I believe that with a big number of cases working in different companies and businesses, I did not miss any big category of customer insight generation.

Confirmability refers to the unbiasedness and neutrality of the researcher's interpretations (Lincoln & Guba, 1985). The findings should be shaped by the cases, not the researcher's imagination (Eriksson & Kovalainen, 2011). Confirmability and clarified findings can be pursued via, for example, triangulation and reflexivity (Eriksson & Kovalainen, 2011; Lincoln & Guba, 1985). Triangulation of methods, data, and researchers would have required more resources than I had as a master's student, whereas triangulation of theories, i.e., the use of several theories to analyze cases, was achieved in the multidisciplinary theoretical background of this study (see Eriksson & Kovalainen, 2011). Reflexivity, in turn, was pursued in this study via expressing the motivations and the researcher's background through the report, as well as by aiming to minimize the impact of those on the analysis of the findings.

In addition to the four evaluation criteria by Lincoln and Guba (1985), one could also evaluate the *generalizability* of my thesis study. Eriksson and Kovalainen write (2011) that extensive case studies cannot produce statistical generalizations, meaning that I cannot make generalizations about how customer insights are or should be generated over the industries in the scope of my study. Therefore, it should be highlighted, that instead of aiming for generalizable findings, the goal of this study was to provide new knowledge on the topic from multiple perspectives (see Järvensivu & Törnroos, 2010).

Ethical considerations of my thesis relate especially to my responsibilities towards the research participants. As I considered ethical concerns in my study, I followed the

guidelines by Eriksson and Kovalainen (2011). In the recruitment of the research participants, I expressed the voluntary nature of the research at the same time as I presented my topic, the aims of my study, and my background. I explained that I was conducting the study as an assignment to my employer, but that the employer company was not able to access the interview material or know the identities of the cases or the case companies. I waited for a response and consent to participate before proceeding, and before we agreed on the interview, I discussed more with many of the people and answered any of their additional inquiries.

At the beginning of each interview, I presented my aims again and told how and why I identified the interviewed expert as a good informant for my study. At this point, I also addressed the confidentiality and anonymity of my work: The interview material was only visible to me and my thesis supervisor, and all the material would be destroyed once the thesis process came to end. The case companies and cases were anonymous to each other, to my employer, and in the written report. I clarified that naturally, some descriptive information would be used to present the cases in the report, but the cases would not be identifiable through that. Before starting with the actual interview questions, I asked for the interviewee's consent for the discussion to be recorded and videotaped (in the case of Teams interviews), as well as asked if they had something to ask or comment on before we began. After the interview, I established that I would send the finished thesis to all interviewees later in the spring and that they could contact me in the meantime if they would have anything to ask or comment on.

Regarding professional integrity in my research process, I aimed to report my results according to the standards of scientific research, by citing adequately, and avoiding plagiarism by rephrasing the work of other researchers (see Eriksson & Kovalainen, 2011). Throughout the writing of the thesis, I pursued transparency and reflected on ethical concerns.

4 Findings

This chapter of the study presents the empirical findings resulting from the analysis of case interview data. Following the design of an extensive multiple case study, the chapter aims to build an extensive understanding of the topic of data-driven insight generation and leverage for service development.

This chapter proceeds as follows: First, I present the customer-related data the interviewed cases described their organization to collect and utilize. After that, I analyze the current practices of customer insight generation among the cases. Thirdly, I discuss the direct benefits of data-driven insights, followed by the indirect benefits. In the fifth section, I analyze the data management challenges expressed by the cases. After challenges, I cover the required data and analytics capabilities for data-driven insight generation and leverage in service development. Finally, I discuss whether the interviewed cases described customer insight generation and leverage to be a dynamic capability and whether they saw data and analytics to improve the ability to adapt to the changes in the business environment.

4.1 Customer-Related Data in B2B Technology Service Businesses

The 17 interviewed cases described a variety of data that the technology businesses, in which they were working, have on their customers. To begin with, B2B technology companies document information on customer accounts (e.g., industry, size of the company, and contacts), sales leads, and sales (e.g., transactions per customer, sold products, sold services, and contracts). Another commonly described form of customer-related data was data from digital marketing, as companies track, for example, the website traffic and customer online behavior on online offerings and different marketing assets. Over half of the cases mentioned some type of customer surveys to be in place to record customer satisfaction, net promoter score (NPS), customer experience, perceptions, or feedback after every transaction. Cases working especially in service management roles highlighted technical support and customer service data (via different channels like calls, tickets, chats, or chatbot). Cases working in product companies also talked about remote monitoring data (software and IoT products) and information about the product's operating environment. Some cases told that they regularly follow external data on the market, industry trends, or evolving quality requirements.

The answers in total accentuate the high volume and variety of customer-related data, how it is collected from multiple sources, and scattered around the organization. These findings align with the theoretical definitions of big data (Gartner, 2022c; Urbinati et al., 2019). Interviewees typically classified data based on the data source or business unit owning the data, for example, the phrases “marketing data” and “sales data” came up in seven interviews. Depending on the role of the interviewee, the described data was highlighted very differently. Some interviewees discussed data relevant to their work, for example, case #3 working in customer insights talked about the survey data their team collects, whereas some people in director positions discussed a variety of customer-related data, but on a very high level. Cases #10 and #11 described their use of marketing and sales data, as well as analytics solutions, in much detail. All in all, having a big number of cases to interview enabled me to identify a variety of data collected and analyzed in B2B technology businesses.

In addition to automatically generated customer-related data and other numerical data, I asked the interviewees about practices of documenting or quantifying qualitative customer understanding within the organization. As discussed in the literature review, especially customer frontline employees accumulate a good understanding of customers in their daily work, and this resource could be better utilized in many organizations (da Mota Pedrosa, 2012; Neu & Brown, 2005). A couple of cases answered my inquiry by describing their concrete ways to document or quantify qualitative customer insight:

Case #4 told that their team of service designers and developers collect 5-10 top customer problems from customer service agent "super users" in monthly meetings. However, they also recognized the need to include a wider set of people in the development projects and added:

I say also why, why don't we involve these young customer service or salespeople, who concretely work with the customers? I think we need to improve the processes, and this is actually a way to improve our continuous interaction with customer service. – case #4

Case #13, instead, presented their network of key internal users and champions as a way to collect input for digital customer portal development in a global organization. They

told how champions help people on the country level and deliver input to regions. Regions capture the insight, and region heads deliver the development ideas to the digital portal development team. The development team can then record and quantify the number of similar types of requests coming from around the organization. Furthermore, case #13 introduced another way they quantify qualitative customer understanding within the organization: Polling and surveying employees. They explained:

So we can also poll the internals being like, hey, do you think the customers would be interested in this feature? And then they can answer how many customers they have that would be interested in the feature. So that way we can get some sort of feel for what the feeling is in the market. – case #13

Table 3 summarizes the data sources and types of customer-related data discussed in the case interviews. The presentation is not an all-encompassing list of customer-related data that B2B technology service businesses have, but it offers a conception of the variety of data B2B businesses collect and generate. Also, the identified customer-related data strongly matched the initial ideas of different, possible customer-related data sources, presented in the theoretical framework (see *Figure 3*).

To conclude, when discussing the most valuable type of data to understand customers as well as possible, some interviewees named certain kinds of data sources, but most people spoke in favor of integrating different kinds of data. In fact, many cases emphasized data integration to be the most central condition for valuable customer insights. Also, previous literature, e.g., Park and Lee (2011) as well as Hartmann et al. (2016), states how data integration enables the identification of insightful trends and patterns in customer behavior. Case #16, a service business director, said:

The data itself is not a key to success. It is about how you use it. And merge it. – case #16

Table 3. Sources and types of customer-related data.

Data source	Customer-related data
Customer accounts	Industry, size of the company, contacts
Sales	Sales leads, transactions per customer, sold products, sold services, contracts
Marketing	Digital marketing data, customer online behavior on the website, online store, or marketing assets
Surveys	Customer satisfaction, NPS, customer experience, perceptions, transactional feedback
Technical support	Support requests per customer, support requests per product or service
Customer service	Feedback, questions, support requests
Installation or usage environment	Environment or processes the product is part of, used in or installed in
Application or product usage & operation	Remote monitoring or IoT data
External data	Market trends, industry trends, quality requirements
Documented & quantified customer insight	Development ideas, customer needs and interest

4.2 Current Practices in Customer Insight Generation for Service Development

When discussing ways to collect customer insight for service development, the cases emphasized mostly traditional customer integration methods of customer collaboration, interaction, user studies, and interviews. In other words, the cases rarely presented to generate any data-driven insight for service development. An exception to this was, however, survey and feedback data: Most interviewees mentioned that their business collects data on, e.g., NPS, general customer satisfaction, customer effort, transactional satisfaction, or customer interest, which can be utilized in service development processes.

Regarding the utilization of the survey data, a couple of cases described concretely their use of survey information in service development. Case #3, an expert in customer insights, explained how their team follows the NPS rates to understand customer satisfaction with their services. If there were a change in NPS, the experts would seek explanations for that from other data, such as open-text survey answers, technical product data, or pricing, to be able to act on the situation.

When something happens in NPS, for instance a negative change, then we see the free text answers, if those would tell us what the cause is, or would direct us to check a certain data source. So then we often go to other data sources, such as technical data, and see if there is something in the technical metrics happening that explains the drop in the NPS. ... But the explanation is not always found in technical data, it can also be changes in pricing, like price increases.

– case #3

Case #5, instead, explained how their team uses surveys to validate customer interest and needs for new service development. Additionally, as presented earlier, case #13 told to survey internals in the organization also to validate customer interest.

We send out individual surveys to our customers as well. ... So, we might have identified that the customer would probably like something like this, and then we try to validate that: Hey, we are thinking about launching or creating this type of service. Do you find it interesting? Do you understand it? Would you pay for it?

– case #5

Altogether, though, the interviewed cases reported conducting little data-driven customer insight generation exactly for service development purposes, compared to the variety of customer-related data the companies have. Drawing from the theoretical benefits of data-driven insight, this result was a bit surprising (see Hartmann et al., 2016; Lim et al., 2018; Park & Lee, 2011). At the same time though, the cases reported that the businesses use customer-related data to advance other initiatives than the development of services or service offerings. Customer-related data was used in the companies, for instance, to advance sales, customer experience, product development, and digital services, e.g., predictive maintenance.

Why was customer-related data not widely used for B2B service development among the interviewed cases? One clear reason was explained by case #6, an offering manager in a SaaS business: They explained the lack of data utilization in service development via the characteristics of B2B operations and marketing.

In B2C sales and marketing processes, everything is run online, so it is much more data-driven. ... So B2C and B2B are very different, on the B2B account-based marketing side the data needs are maybe much more limited. – case #6

This reasoning by case #6 matches the theoretical descriptions of the differences between B2B and B2C operations and data (Hallikainen et al., 2020; Iankova et al., 2019), and explains, in part, why technology B2B service businesses may rely more on customer integration methods to understand their customers. However, this study hypothesized that data would offer special benefits specifically for B2B service development and that

those benefits should be further explored via research. Namely, it may be that the possibilities for data in B2B are not as limited as thought.

For some businesses, in turn, the reason they are not leveraging customer-related data in service development may be due to data management challenges or lack of capabilities, discussed in the following parts of this report. In addition to the above two reasons, case #3 pointed out a possible third reason, the challenge of conflicting targets. According to them, customer insight might be, in some instances, just “nice to know” information, if the decision must be made between customer-oriented development and profit. Derived from this conception, a conclusion could be made that customer insight is only seen as valuable if it brings profit or other value, i.e., efficiency, for the business, more than it requires resources. Consequently, a business might not want to invest in setting up data-driven customer insight generation processes if there is no certain value, even profit, to be yielded.

If there is a problem, the problem typically comes from conflicting targets. So you know, we want to understand the customer and be super customer-oriented, but in the end, sales and revenue matter more. So it might be that some of the customer insight is very nice to know, but when there is a choice to make – profit is important, revenue is important – and CX is in the third place. – case #3

As this report proceeds, the direct and indirect benefits of data-driven customer insight for service development will be discussed. This report aims to offer ideas and concepts for practitioners on how data-driven insights could be applied to service development so that the insight truly brings new value to the service business.

4.3 Direct Benefits of Data-Driven Customer Insight

Instead of concentrating on the current data practices, many interviews turned into a discussion about the possibilities that the cases saw in the application of data-driven customer insight to service development. The discussed possibilities were mainly derived from the analogies of other data initiatives already in use in the case companies. All in all, most cases expressed their interest to apply data-driven customer insight into service development, like described by case #2: “At the moment, we use less data to identify customer problems, but that is what we are planning to do in the future.” The case interviews brought forward many of the same possible benefits of data and analytics as identified in the literature (see Jin et al., 2016; Lim et al., 2019; Urbinati et al., 2019).

Continuous insight generation on the current service offering. Three cases pointed out how data and analytics enable continuous customer insight generation and continuous market intelligence, instead of e.g., individual market studies, just like discussed by Lim et al. (2018) and Urbinati et al. (2019). Case #4, a service designer, elaborated on how their business currently searches for new ways to speed up the gathering of customer needs and generate continuous customer insight. This far their most prevalent method had been heavy research projects. They explained further that the plan was to next set up a discovery team to start testing and piloting different methods and integrating data from different sources:

We have been pretty good at involving customers and understanding customer needs. However, the projects are heavy. But what about ongoing discovery? How can we incrementally, and continuously track customer experience and customer insight? So, right now we are also looking into creating like a discovery team and setting up a new way of working. ... It will include a lot of testing with data. For example, we have a lot of different customer insights from different software. – case #4

Some cases emphasized that customer-related data, such as NPS, technical support inquiries, and service sales, describes especially how the users act on and react to the

current service offering. Case #10 explained that data indicates whether the current service offering is relevant to the customers' needs:

Our data of course shows what we have offered to the customer and how they reacted to it. ... So, it's maybe more about what we are offering, does it fly it? Does it spark an interest in the customers? Which kind of features or which kind of solutions get the highest heat rates? It's more from that perspective. – case #10

In contrast, the cases did not view data to be a source of innovation for new service development, as could be comprehended from some past literature. Rather, a couple of cases stated that they see data as a tool for incremental innovation only, since data will not demonstrate if there is a service missing. Case #10 specified that they believe new services to be ideated mostly in discussions with customers and that salespeople probably know the best, for example, which features the business usually loses to competitors.

More comprehensive understanding of customers & potential customers.

In B2B, it is important to understand both the variety of customers in the market as well as the individual business customers (Neu & Brown, 2005). Past literature presents the idea that data would offer insight into a wider set of customer needs compared to customer integration methods (Jin et al., 2016; Lim et al., 2019). This benefit seemed to be valued at least by some of the cases: Cases #11 and #12 brought forward the benefit of a more comprehensive customer understanding, as they reflected during their interviews the huge sizes of some of their customer organizations (for example, a global retail business with units in hundreds of locations). According to case #11, the varying needs of huge customer organizations are likely best recorded by analyzing customer-related data. Certainly, it may be quite challenging to identify the variety of these needs in customer integration projects only.

We have very different needs within, like the customer organization, related to the same exact product: buyer, constructor, owner, or operator. Also, the operator can also change over time. Having to work in a changing environment like that is a challenge. – case #11

Additionally, case #15 presented the ability to study potential service customers via data. The behavior, needs, and preferences of potential customers are highly valuable to understand, as the insight may, in part, enable customer acquisition in these segments. Case #15 elaborated that in their business, not all product customers are their service customers, but via e.g., surveying the segments of potential customers, analyzing the data, and comparing the data to service attributes and other customer segments, the business might be able to grow the service customer base.

We do not reach all our potential service customers, which are our product customers, and it's a tricky thing to find out what is preventing them from buying our services. ... Something that could help with this challenge is customer surveys throughout the engagement with us. It would be very interesting, in all stages, to know the customer experience and engagement, from the website awareness and evaluation stages, moving on to product purchase, and hopefully coming back for services. So any kind of measurable feedback we get there could help us. – case #15

Ideation and validation. According to past literature, data and analytics can be used for ideation and validation (Urbinati et al., 2019). The interviewed cases highlighted these same direct benefits of data-driven customer insights: For one, data can be used in ideation, as customer-related data can indicate when some service should be improved. The generated ideas can then be studied in more detail using a variety of quantitative and qualitative methods. Case #14 elaborated on the topic:

We do incremental improvements based on customer feedback. So, for example, we collect feedback on our digital services, and if someone is saying that, hey, this function doesn't work. It should work better in this space. So that is one way to identify ideas for service development. ... And as we are seeing some opportunity, a use case, then we can start investigating the topic more widely. –

case #14

On the other hand, data-driven methods can be used for validation, meaning that a business can, for example, validate customer interest via surveys, or change some service attributes and then track how customers react to the changes in the service. Case #17 told: “Then what we could also look at is, if we are actually making improvement with our releases, when we do like a new software release. ... How does the usage change after the release?”.

Also, data-driven methods can be used to validate concepts from qualitative studies. For instance, case #4, a service designer, explained how they originally discovered through customer interviews that their offering presentation on the website was too complex. They developed a new way to present the offering and partnered with marketing to validate via A/B testing the functioning of the new service offering presentation.

Behavioral segmentation and comparisons. Five interviewed cases discussed data-based segmentation of customers. Indeed, customer segmentation is a regular marketing activity, as the customer base is typically clustered based on e.g., industry, product purchases, or size of the company. The most interesting segmentation-related practices discussed by the cases were, however, segmentation based on customer behavior and comparisons between segments. Past literature has also discussed both – data and advanced analytics enable the automatic segmentation of individuals based on behavioral data and then effective comparisons between customer groups (Gartner, 2022b; Jin et al., 2016; Lim et al., 2018).

Case #5 elaborated that they segment customers based on customers’ consumption behavior in the utilities industry. This kind of tighter segmentation based on e.g., service

history, support requests, or activity on online offerings would possibly offer a better understanding of the variety of customer needs in other industries as well.

The consumption profile or consumption information is very valuable information. When we look more into it, we can see how relevant some type of service could be based on the customer's consumption. Like if you consume very little then maybe you have a need for a certain type of service. But then if you are a large consumer, you might have needs for different services. – case #5

Case #13 pointed out that tighter, automatic, behavioral segmentation enables personalization, for example, in an online store. Case #15, a digital marketing manager, mentioned that digital customer portals make tighter segmentation possible based on online activity, because digital persons can be identified and tracked in the websites after users have logged in to the portal.

Regarding efficient comparisons between segments, in turn, case #17 told that in service or SaaS product development, the changes in behavior between segments could be analyzed after something in the solutions or offerings has been improved. That would be a way to measure the success of development and gain an understanding of different customer preferences:

Then what we could also look at is, if we are actually making improvement with our releases, when we do like a new software release. ... How does the usage change after the release? And related to customer cohorts – how does the usage change between customer cohorts due to the release? – case #17

Data-based decision-making. The ability to predict customer behavior is even more crucial for customer-oriented business growth than the understanding of current behavior (Said et al., 2015). When future behavior can be predicted, the data can also

give recommendations for the business, i.e., the business can practice data-based decision-making. In the case interviews, prediction and forecasting activities were clearly stated to be an advantage that practitioners would seek from data-driven customer insights. Cases #13 and #16 both expressed their curiosity towards predictions on customer purchase interest to support decision-making:

As the customer has certain products and has purchased certain services in the past, what should they be offered next? – case #16

Combined with tight customer segmentation, the predictions could also be segment-based. The literature describes how advanced analytics techniques, such as machine learning and cluster analysis, can make predictions from historical data, predicting, for instance, emerging sales trends, viable service attributes, and preferred customer communication (Gartner, 2022a; Urbinati et al., 2019, p. 24).

4.4 Indirect Benefits of Data and Analytics for Service Development

Altogether, the work for deep customer understanding for service development currently seems, in many B2B technology businesses, to be based strongly on customer integration or the close service provider-customer relationships. Customer integration takes shape, for example, in co-creation, user studies, and workshops with customers or partners. Case #3 talked about their customer panel -community, a form of living labs (see Hossain et al., 2019), which was available on a platform and used for ideation and quick validation. Case #12, in turn, mentioned that they collaborate with some customers to have them test the newest solutions and give feedback on them, which, theoretically, sounds like an instance of the lead user method (see Edvardsson et al., 2012). When it comes to customer relationships, the interviewed cases highlighted that a lot of their customer understanding comes from “ongoing discussion”, “intimate customer relationship”, “being connected with customers”, or “frontline experience with customers”.

At the same time, the 17 interviewed cases viewed, overall, data-driven customer insight and traditional customer integration to be complementary means to understand the customers for service development, just like Ostrom et al. (2015) and Lim et al. (2018). Even though customer surveys were the only, widely used data-driven customer understanding method currently used for service development, many cases expressed to see value in incorporating data-driven insight generation in their customer-oriented service business. In my study, I aimed to examine the indirect benefits that data-driven insight would offer to traditional customer integration and customer relationships, and hence, to the development of services.

Derived from the interviews, customer-related data and analytics would offer at least four different kinds of indirect benefits for service development:

Identifying customers for customer integration. Urbinati et al. (2019) discussed the idea to use data to identify lead users for service development. Case #7 discussed, quite similarly, how customer-related data could maybe help identify key decision-makers in customer organizations:

Yeah, in my project especially, for us to understand the customer, the most important thing we would need is identifying the key decision-makers in the customer organizations. – case #7

Even though the cases did not bring up explicitly the benefit of identifying lead users from customer-related data, the interview with case #7 demonstrates that data-based identification of key decision-makers or lead customers would be a substantial benefit for businesses. Most likely, data-driven selection of customers would ease the challenging and time-consuming lead-user recruitment (see da Mota Pedrosa, 2012; Edvardsson et al., 2012; Hossain et al., 2019).

Using data as a tool for ideation, validation & facilitation in customer integration projects. As distinguished earlier, data can indicate topics or improvement points to be studied further in development projects, and data-driven methods can be used to validate concepts from qualitative studies. In addition to those benefits, data could be used as a facilitation tool in customer integration projects: Behavioral customer-related data could be used to facilitate discussion and innovation in customer workshops. Data related to, e.g., solution usage or support inquiries could be analyzed in customer integration projects, to examine how the services work currently, what could be improved, or what else would be needed.

The possibility of using customer-related data as a facilitation tool in customer integration projects stemmed from the interviews with cases #8 and #9, who worked in software business and co-created new solutions in tight collaboration with customers:

Kind of historically, you know we have had very customer-intimate operations. So we have been implementing our software with shorter or longer projects, so it's been really kind of very intimate. We have together kind of figured out you know what is the challenge of the customer and then we have developed the software. – case #9

Then we, of course, have data on how the customer's business is running. As we, kind of help them monetize and automate the process. So we do have quite detailed data about our customers and how their business is running. – case #8

Cases #8 and #9 used the specific customer's data to co-create with the customer, but similarly, the data from the whole customer base could be used to develop the general services in customer integration projects. Customer-related data is oftentimes handled only internally, but including data in customer integration could offer new kinds of grounds for service innovation as well as ease the starting of customer integration work, which may be challenging to some organizations.

Deeper customer relationships. Ostrom et al. (2015) describe how big data presents opportunities for deeper customer relationships through the building of new value networks. Both literature and practice show how B2B technology businesses increasingly share data with customers, offer digital and data services, and personalize services based on customer behavior. Six interviewed cases described these kinds of development plans to be included in their current service development strategy.

And another focus area is digital services, which is about using digitalization as a leader to create business. I think every company has now similar plans. – case #2

As industrial companies set up ways to offer data-driven value in the form of, e.g., digital service, process optimization, and prolonged product life cycles, the relationship and trust in the service provider's expertise will likely strengthen.

Also, any data-driven personalization in the solutions would likely enhance the customer's feeling that they are deeply understood by the service provider, building on the relationship quality. In B2B, the nurturing of this close, collaborative, and long-standing relationship between the service provider and a service customer is fundamental (Alam & Perry, 2002; Neu & Brown, 2005). In certain kinds of industries, solution personalization and tailoring may be very important for customers, as described by case #8: "You will need certainly a certain level of tailoring for the customer so that it really kind of fits their needs, and this brings a lot of value to the customer."

Strengthened organizational memory. Overall, the cases recognized the challenge presented by literature that a lot of their customer understanding is stored within individual employees, and how it would be very beneficial to share that information inside the organization. Case #14 elaborated:

It might be that some customer is describing, for example, a problem related to process x and it's not in our research at this point. But then it might be that we are interested in these problems later on and want to remember that development idea. ... And also sharing all insights across the organization would be important, as it might be that there's someone else needing this information or willing to, for example, understand just some basic processes, like how customers are making purchase decisions. This is quite a general need that many people in the organization are having. – case #14

Cases #4 and #13 described their concrete ways to document or quantify qualitative customer insight. The presented practices were recurring meetings, a network of key internal users and champions, and surveying the internal customer frontline. With their examples, cases #4 and #13 demonstrated the benefit of strengthened organizational memory via data: The information, which originally resided within individual employees, was turned into shared knowledge, which could be used in service development.

As we have the development ideas coming from the champion network, we can quantify those. So, like ok, now we have 10 similar requests from Europe, five requests from the USA, and 50 requests from the Asia Pacific for this type of feature. And then we can see, ok, so now would be the time to allocate time for this. And then we write up a business concept and check whether it's sensible, then request funding, and start developing it. -case #13

To conclude the findings on the direct and indirect benefits of data-driven insights for service development, *Table 4* lists the benefits identified in the case interviews.

Table 4. Benefits of data-driven insight.

Direct benefits	Continuous insight generation on the current service offering
	More comprehensive understanding of customers & potential customers
	Ideation & validation
	Segmentation and comparisons
	Data-based decision-making

Indirect benefits	Identifying customers for customer integration
	Using data as a tool for ideation, validation & facilitation in customer integration projects
	Deeper customer relationships
	Strengthened organizational memory

4.5 Big Data Management Challenges

When discussing the challenges related to customer-related data collection and insight generation, all the interviewees were able to identify some challenges based on their previous experiences with data application, or their general knowledge of the topic. None of the cases gave all-encompassing descriptions of the data management challenges, but together the answers build a picture reflecting the challenges identified in the empirical study by Lim et al. (2018). In the following, I analyze the case answers utilizing the six separate data collection and insight generation challenges, determined by Lim et al. (2018). Through the analysis, I aimed to understand how B2B businesses can manage customer-related data collection and insight generation.

1. Collecting the relevant data for service development

The cases differed substantially in their views on whether their current customer-related data was enough for service development initiatives. Some cases expressed that they have “big data coming from everywhere, in different formats, from different sources” and that “the data itself is not the issue”, while others recognized the need to start collecting either some specific customer-related information or any information related to customers. Case #5, a service developer, reflected on their need to gather more feedback at different points of the customer journey as well as basic information related to their business customers, e.g., the size of the business. Case #2, a service business director, said they would benefit from information on the whole system that their equipment is part of, i.e., how the process performs with the product in it. Case #15, a marketing manager, suggested setting up surveys to study potential customers. In turn, case #17, a solution manager of a relatively new solution, highlighted the importance of starting to gather any data in the first place. According to them, a business needs to have a big history of data for analytics, so even if in the beginning there are no known application points for data, there will later be and then all the historical data will prove to be much needed.

*It is so important to just start gathering data, any data, even though
you would not know what to do with it. – case #17*

As described in the literature, it is crucial to evaluate whether the business has the relevant data for its development targets and then to identify what more data would be needed to collect (Lim et al., 2018). Looking at the case interviews, the data collection needs to align with the service business strategy, as some data may be just “nice to know” while some other may support service development and generate value. Also, when analyzing the data needs within the organization, it is beneficial to include a variety of expertise in the discussion, as different people may have different understandings of the data needs for service development.

2. Facilitating easy and spontaneous data collection from customers

As covered in the literature review, data collection requiring deliberate action from customers, or internal employees, is often challenged by inadequate and incomplete responses (Lim et al., 2018). Case #5 discussed the challenge of low response rates in B2B customer surveys and how their team has been working to improve them. This far, they had tried to improve the open rate, and consequently the response rate, by sending out surveys via SMS in addition to e-mail, including the first question already in the invite message, and having only three mandatory questions in the form. A couple of other cases discussed the challenges of manual data recording by e.g., sales agents or field engineers: “It is overall a challenge to get sales agents to document data. They do not find it relevant, and it is manual work.” Case #13 emphasized the importance of educating people on data management and collection processes as well as setting key performance indicators (KPIs) for data collection. Case #16, instead, expressed the best practice to be the shift to advanced installed base data, with automatically generated data instead of manual documentation.

A distinctive customer data collection issue, which was not covered in the literature but was discussed in the interviews, was the lack of access or contact to end customers. Commonly in B2B2B sales channels, where businesses operate via partners, the provider company might not always know who the end customer is. Case #2 explained this in more detail, telling how their service business sometimes tries to directly contact the end customer to collect customer information or offer their digital services to the customer. They also mentioned that they had new tools under development to collect data from end customers.

The channel issue that we have, is that customer data is normally with partners. They are not sharing data with us. So basically we have only sold to-information. We know which product, to which customer, and which date we sold. All other information is disappearing and that's why we sometimes try to directly reach our end customers so that we can first collect certain information, enhance our existing information, and then we could start offering them digital services. – case #2

This finding exemplifies how the business model affects the methods and possibilities of customer insight generation too.

3. Managing the quality of data for service development

Five cases discussed data quality management in their answers. Case #10, an analytics solution developer, said that “I’ve seen this so often that you, you stumble upon those data quality problems only once you actually start using the data.” According to them, bad quality data often leads to faulty conclusions, and people around the organization need to be trained about data quality. Also, cases #13 and #14 pointed out how manual documentation is a common cause of quality issues, and that issues in data quality have previously disrupted pilots of data integration solutions.

I've seen this so often that you, you stumble upon those data quality problems only once you actually start using the data. – case #10

In line with past studies (Lim et al., 2018), case #12 commented that to improve data quality, the processes of data creation and maintenance need to be improved. Case #13 continued to emphasize the role of KPIs to measure the quality of data and the processes around data utilization. Both cases #12 and #13 spoke about entrusting data process improvement to certain individuals in the organization. Several cases referred to the significance of educating businesspeople about data quality, collection, and formats.

4. Planning data analytics for service development

Depending on the interviewee, there was a lot of variety in how they discussed data analytics that are in use, or could be utilized, to analyze customer-related data in B2B technology service businesses. All in all, however, the answers matched the theoretical propositions of the data format and the goals of the analysis steering the selection of data analytics techniques (see Hartmann et al., 2016). The cases discussed both the analytics to make sense of unstructured data as well as the techniques to understand and predict

customer behavior. Much of the used vocabulary was familiar from the literature (see *Table 1*).

Some cases had less knowledge of data analytics and referred to general business intelligence when asked about ways to analyze customer-related data. People working with survey data or analytics solutions described, in turn, some advanced analytics solutions they had been using. Cases #3, #10, and #12 talked about sentiment analysis of open-text answers, categorization of sentiments, and analysis of the sentiment connections to NPS and other metrics. Case #3 also mentioned that they use natural language processing to analyze customer service calls. Case #10, an analytics solution developer, continued to further explain how they use statistics to cluster data based on, e.g., market segments, size of the company, and country, and then analyze, for example, sales data based on clusters to determine which services are relevant to which clusters. They also gave examples of other AI initiatives in use in their organization: opportunity scoring, price recommendations, and risk ranking.

Case #5 concentrated on discussing how they should develop their use of analytics for service development in the future. They considered conducting AI-based trend analysis on survey data, calls, sales discussions, and chatbot discussions, as well as using learning algorithms to analyze customer consumption behavior.

We could, I think, use a learning algorithm to analyze consumption profiles. It would be interesting to learn how different customer categories behave in terms of their consumption. Is there anything that we can learn from that? Is there clearly something they need more or are lacking? – case #5

Some interviewees highlighted the planning of data analytics to be one of the easiest steps of data application. They spoke about the wide availability of different kinds of advanced analytics technology in the market, with a big variety of service providers and experts. This view partly contradicted the theoretical proposition that the lack of resources would be one of the most common factors that challenge the planning of data analytics in a business (Lim et al., 2018). As the referenced literature is already around five years old, this discrepancy between literature and empirical findings can be likely

explained by the advancements and growth in technology solution markets. With more and more options in the market, the most established businesses will likely nowadays find solutions for data analytics externally, without resource constraints. Instead, the broader processes, responsibilities, and concepts to be established for data-driven insight generation can consume a lot of business resources. Case #14 told:

Companies are not lacking new ideas. I think ideas are quite easy to generate, but then there is a lack of resources to develop those further into concepts and ways to develop the concepts further. – case #14

To summarize, there seem to be similarities between businesses in their methods to automate data structuring and clustering (e.g., sentiment analysis and NLP). Because of varying service business targets, however, the techniques to analyze data to understand and predict customer behavior are more versatile between businesses.

5. Integrating different data from various sources for analysis

The key question is: How to merge data in order to have a 360-degree view of the customer? This makes the difference! – case #11

Eleven of the study's cases underlined the ability to integrate customer-related data from various sources to be the key to the most valuable customer insight. Some of the interviewees gave specific examples of data integration possibilities in their business, for example, case #1, a service business manager in the field of engineering, said that their service development would benefit from connecting installed base information to service history and data about the customer's industry and business. Case #17, a solution manager, explained that an important point of development for them would be not to treat sales, marketing, and product data as separate instances but have them "in the same funnel". Case #8, a service business director from the software industry, said that combining different customer success metrics, e.g., service purchase history and

customer's revenue increase, would offer a lot of value for the business. In the B2B2B or B2B2C settings, the partner businesses in the middle might often have more data on the end customer, and hence, case #7, a business development director, stated that they see much potential also in the cross-utilization of data with partner companies.

Case #11, an analytics solution developer, explained: "The key question is: How to merge data in order to have a 360-degree view of the customer? This makes the difference!" They continued to describe that, to have a 360-degree customer view, they thought that data needs to be integrated from different interaction points during the customer life cycle – starting from the identification of the digital person browsing the company website, continuing to purchases, service agreements, and customer loyalty. Namely, collecting data from different interaction points would enable the measurement of the correlation between different activities and decisions. Also, as pointed out by cases #11 and #12, customer needs are in constant change and may evolve during the customer life cycle. This outlook offered complimentary remarks to the theoretical framework of the study. To add to the literature by Park and Lee (2011) and Hartmann et al. (2016), it seems that, in practice, to understand customer behavior as deeply as possible, businesses should integrate customer-related data both from different data sources as well as from various instances during the customer life cycle.

Yet, in practice, data integration can be very difficult. Five cases addressed integration challenges in the interviews, and the discussed challenges were the same ones identified in the study by Lim and colleagues (2018). First, the cases described how data is often scattered to different sources around the organization, making certain data available only for specified groups of experts. Secondly, the cases stated the problems of different data formats, data points, and differences in language, which can make the integration of data technically very challenging or even impossible. Cases #6 and #13 described these issues to be due to the siloed structure of businesses: "many established companies have very siloed systems" and "big companies suffer from silos". Case #6 continued to explain: "Start-ups have most probably already created the company and the IT technologies in the data era, so they are kind of data native in a sense that they have integrations in place. ... Old-fashioned companies, who have very siloed systems, their terminologies are different, and the way they collect data points is completely different. I guess especially the industrial segment is struggling because that is a huge work to modernize. ... I think the main critical issue is that the data collection should be happening the same way, using the same principles in every system."

Start-ups have most probably already created the company and the IT technologies in the data era, so they are kind of data native in the sense that they have integrations in place. – case #6

As expressed by case #6, as well as case #13, and discussed in the literature (Lim et al., 2018), fluent data integration would require standardized data formats and collection principles. Additionally, all customer-related data should be stored ideally within one database (Lim et al., 2018). This fact was brought up in the interviews by case #13, and case #6 referred to this kind of development step as well, as they mentioned that their business should set up a customer master database to improve the visibility of customer-related data across all functionalities. For newly established companies, the ability to build the organization on this kind of seamless data integration is a powerful asset. Instead, for older, established companies, the change to standardized data collection and combined databases is a huge organizational development project. To cope with the current integration challenges, some of the interviewees told that they have strengthened the collaboration between experts and teams: For example, case #3 described how they use within-organization collaboration to identify and access needed data sources and hence, merge their NPS data to other customer-related data. According to them, improving internal capabilities helps with the challenges of data integration.

6. Following data usage regulations and protecting customer privacy

Five of the interviewed cases mentioned how data regulations, security, and customer privacy are critical aspects of data collection and application, and how regulations and legislation challenge or restrict work around data. For instance, case #9 commented that due to regulation, all the data that would be useful cannot be collected. One of the cases addressed the challenge of global differences in legislation and another the changing regulations (see GDRP.EU, 2023): Case #6 said:

Well, luckily in the EU we have one data privacy law, but then the Americas has one, and Asia has another one. – case #6

Case #15, in turn, described how the change in cookie compliance (GDPR) law had challenged their website data collection. Now that B2B customers can deny cookies, retargeting of visitors and customer segmentation has become more difficult. Therefore, new ways need to be explored to generate customer insight, and case #15 mentioned that they see, for example, their digital customer platform as a new means for customer data generation and segmentation, as customers' web activity can be connected to authenticated users.

Additionally, case #6 emphasized the role of justifying all data collection and application: "We need to be very crystal clear on the data that we collect, it will have to benefit the customer. And we need to be able to provide an audit trail that we have collected this from here and there, and we are not using it for shady marketing business, but for actually bringing value to the customer. ... While you're building the data architecture and setting in the KPIs, there need to be crystal clear justifications regarding data privacy and why we are collecting the piece of data." These comments highlight that the justifications need to be in place already before the start of certain customer data collection.

4.6 Data and Analytics Capabilities for Data-Driven Insight Generation

The third research sub-question of this study concentrated on examining the capabilities related to data-driven insight generation. In total, the cases described a variety of expertise, processes, and organizational practices they saw to be required in data-driven insight generation and leveraging for B2B service development.

Data, business, and data architecture expertise. To summarize the required expertise, the interviews emphasized three different types: data analytics skills, service business and business context knowledge, and data architecture expertise. Data analytics skills are an axiomatic requirement for data insights generation and leverage, and likely due to that, not so many cases concentrated on data analytics when discussing the needed capabilities. Regarding data analytics expertise, however, case #12 pointed out the importance of understanding the maturity model of analytics – from descriptive analytics to predictive and prescriptive analytics. According to them, work on analytics needs to be started from the basics, advancing to more mature modes as the basics are in order. Cases #13 and #14, in turn, described the operation of data science laboratories

in the organizations, and how experts should team up in those to solve e.g., data integration issues and how to generate customer value with data.

Ten interviewed cases highlighted the role of business understanding in data-driven customer insight generation and leveraging, because, according to many, data insights need to be interpreted and validated by the service business and compared to internal customer knowledge. Also, many cases pointed out that business understanding is needed to turn data into service business initiatives. Case #3 added that the business needs to have answers to the following kinds of questions:

*What is the key insight? What is really the important thing here?
How do we get the business to do something with the insight? These
decisions can never be outsourced to an external service provider. –
case #3*

Cases #7, #8, and #9 all said that the business needs people who can “ask the right questions”, which the data can then answer. Case #6 encouraged service development to go “business first”, meaning that the organization should first define what they want from customer insights, and then think about the technology to accomplish that. Case #10 said, correspondingly:

*It is important to have very concrete and clear use cases for data.
You must know what you want to do with it. – case #10*

The third type of required expertise identified from the interviews was “data architecture” expertise, as stated by case #6. Multiple cases described the need to have people in between data and the service business, in kind of translator roles in the organization, who can support teams in data modeling, visualization, and decision-making. Data architects would also be knowledgeable of data structures, models, quality, and discrepancies. Case #12 elaborated on this topic, being the head of this kind of a team who supports units with data analytics: “Even if business owns the data, it doesn't mean that they are experts in the data modeling or even have the full understanding of the

nature of the data and the data processes. Data is really, of course, in the heart because any analytic solution, whether it's just visualization or optimization, starts with the data. So, we have a kind of a more solid understanding of what data is needed to get what the business is aiming at. And then again, we know how analytics work – so what type of helping solutions could we offer the business." Case #13, in turn, highlighted the role of operational excellence teams in onboarding people to the use of data and data management processes, especially in big companies with long processes.

*A critical person is some sort of like, I would call it a data architect.
So not an IT or systems architect, but a data architect, who knows
the business side of things and is able to talk to the technology
people. – case #6*

In relation to past literature (see Lim et al., 2018; Mishra et al., 2019), the interviews offered deeper insight into the required expertise in data-driven insight generation and leveraging for B2B service development. The three domains of required expertise emerged clearly from the answers and explain the required capabilities on a higher level compared to professional or role-based expertise. Also, the answers demonstrated that individual experts and the acquiring of talent or analytics solutions are not bottlenecks, but instead, the challenges lie in processes and collaboration. In addition to collaboration between experts (see Neu & Brown, 2005, p. 9), collaboration is much needed between teams and units.

Data management processes. Regarding data management processes as a capability, many cases noted throughout the interviews how the organization needs to have standardized processes for data collection. Cases #6 and #13 both also called for KPIs to measure the performance of data processes and to support decision-making. These findings match the theoretical contributions made by Shah et al. (2006), who defined essential customer relationship processes to include an information-management process and a performance-assessment process.

So one of the important things is that, not only that you have the tools, but you have the people onboarded into the processes properly and you have operational excellence teams, process teams that follow up and have KPIs on everything. ... For example, when our technicians go out in the field, they need to record data properly. ... The processes are in an extremely important role because without them you don't get the data quality and amount of data you need to be able to deliver a great customer experience. – case #13

Decentralized decision-making and collaboration. Seven interviewed cases spoke in favor of a certain level of decentralized decision-making in the organization when it comes to customer insight generation and leverage for service development. The cases spoke about “empowering people”, “empowering teams”, and “empowering subject matter experts” in decision-making. All in all, the cases motivated decentralized decision-making by e.g., quicker decision-making processes and the deep customer or business understanding of the teams. These findings align with the arguments by Neu and Brown (2005) and Urbinati et al. (2019), as according to them, lower-level managers and people in direct customer contact likely have the best understanding of customers and hence, decision-making authority regarding service development should be allocated to them.

It is important to bring the decision power closer to the subject matter expertise and trust these decision-makers. This way decisions can be made more quicker, and we can act before it's too late. ... This is very much a structural thing. – case #15

At the same time, some interviewees offered supplementary perspectives on decision-making. Namely, as case #9 put it, there is naturally some bureaucracy and certain decisions need to be discussed in bigger forums or higher in the organization, as the decision might require wider market or business intelligence. Case #1 elaborated that team-driven decision-making works best when it is steered by a clear service

development or service business strategy and resource allocation, as teams would then have clear targets and knowledge of how their success will be measured.

Neu and Brown (2005) argued that, in addition to decentralized decision-making, an appropriate organizational structure has integrated business unit responsibilities and internal and external collaboration. Business unit responsibilities were touched upon in some of the answers when discussing the needed expertise for data utilization in service development, e.g., the role of IT, operational excellence teams, or data architects. In turn, almost all the cases referred to the importance of internal, cross-organizational collaboration as well as external collaboration with customers and partners, throughout the interviews.

4.7 Customer Insight Generation as a Dynamic Capability

Regarding capabilities, I aimed also to find out in my empirical study whether the interviewed cases would describe customer insight generation and leverage to be a dynamic capability and whether they would see data and analytics to improve the ability to adapt to the changes in the environment.

Firstly, the ever-changing service business environment came into discussion very organically in the interviews. Three cases highlighted the challenge of constantly evolving customer perceived value and needs, both over time as well as during the customer or product life cycle. Case #12 explained:

Service business is a growth market, which means that there are a lot of opportunities out there. It's important to discover the value of those services, but the value is not a static thing. The value evolves with the changing customer needs, which can be triggered by changes in the customers' business, or it can be triggered by timely topics, like energy efficiency. So the value actually changes very fast. ... Which very fast actually gives new opportunities for us to show the value or bring new offerings. – case #12

Overall, all the cases expressed the monitoring of the environment and customers' needs to be central for the service business. As discussed, staying on top of customer understanding is very determinant for the success of any service business (see Bharadwaj et al., 2012; Hartline et al., 2000; Said et al., 2015). The cases told to use differing methods for customer insight generation, but common to all customer understanding generation was to utilize that knowledge in business development to better perform in the evolving market, where there are also competitors making their moves. Case #12 continued:

Of course, customer expectations keep changing. ... So in this context, of course, we are looking for how to differentiate from the competitors and provide value for the customer. And the customers' customers. – case #12

Hence, it can be concluded that the case interviews indicated customer insight generation and leveraging in service development to be indeed a dynamic capability. Also, the reality of evolving customer expectations and needs calls for regular customer insight generation, as previously generated insights may, after some time, be no longer valid in the changing environment. Consequently, drawing from the benefits of data-driven insight generation for service development expressed by the interviewed cases (e.g., continuous insight generation and more comprehensive customer understanding), the use of data and analytics in customer understanding seem to improve customer insight work as a dynamic capability.

5 Discussion & Conclusion

In this chapter, I discuss the empirical findings of my study in relation to the theoretical framework and past literature. After that, I will present both managerial implications and ideas for future research. Finally, in the last section of this chapter, I conclude the study with some final thoughts.

The main research question of the study was:

RQ: How can technology B2B businesses generate and leverage data-driven customer insight for service development?

And the research sub-questions were:

RQ1: How can service development benefit from data-driven insights directly and indirectly?

RQ2: How can businesses manage customer-related data collection and insight generation?

RQ3: Which organizational capabilities are related to data-driven insight generation and leveraging for B2B service development?

I use the theoretical framework to discuss my findings, but I also modify the initial framework based on the empirical findings. As a result of the discussion, I answer first the research sub-questions and eventually the main research question. The modified theoretical framework is presented in *Figure 4*.

Analyzing the case interviews, I identified that B2B service businesses have a variety of data coming from the same sources as those named in the theoretical framework of this study (see *Figure 4*). Customer survey data (e.g., NPS, general customer satisfaction, customer effort, and transactional satisfaction) was the only form of customer-related data currently widely used for customer understanding in B2B service development. However, the possibilities of other customer-related data were recognized by practitioners as well, and there was distinctive interest among cases to start leveraging

data in customer understanding. At the same time though, my study confirmed that data and analytics have a different role in B2B than in B2C because of different customer bases and the role of customer relationships, as discussed by Alam and Perry (2002) and Neu and Brown (2005).

My study also confirmed the theoretical reasoning that a lot of qualitative customer understanding is stored within individual employees in the customer frontline (see da Mota Pedrosa, 2012). Very interestingly, a couple of cases described the practice of documenting or quantifying qualitative customer understanding within the organization. The described practices included regular meetings with customer frontline managers, collecting feedback and ideas via a network structure, and surveying the customer frontline ad hoc. So, as exemplified in the theoretical framework (see *Figure 4*), internal knowledge can be turned into customer-related data, which can then be used in service development ideation or validation, or the data may be integrated with other data for data analysis.

RQ1: How can service development benefit from data-driven insights directly and indirectly?

The case interviews brought forward many of the same direct benefits of data and analytics for service development as identified in the literature and the theoretical framework (see Jin et al., 2016; Lim et al., 2019; Urbinati et al., 2019). At the same time, the interviews supplemented the understanding of the direct benefits and diminished the significance of some of them. The identified direct benefits were 1) continuous insight generation on the current service offering, 2) a more comprehensive understanding of the variety of customers in the market as well as potential customers, 3) more efficient concept ideation and validation, 4) behavioral customer segmentation and comparisons, and 5) data-based decision-making.

Differing from the previous literature, and especially from the paper by Urbinati et al. (2019), the interviewed cases saw customer-related data offer limited direct benefit for new service development, as the data the businesses have is related to their current service offering. Instead, the cases saw data to provide ideas on how to improve the current services and offerings. On the other hand, a direct benefit that stemmed from the interviews, but was not covered in the past literature, was data-driven understanding

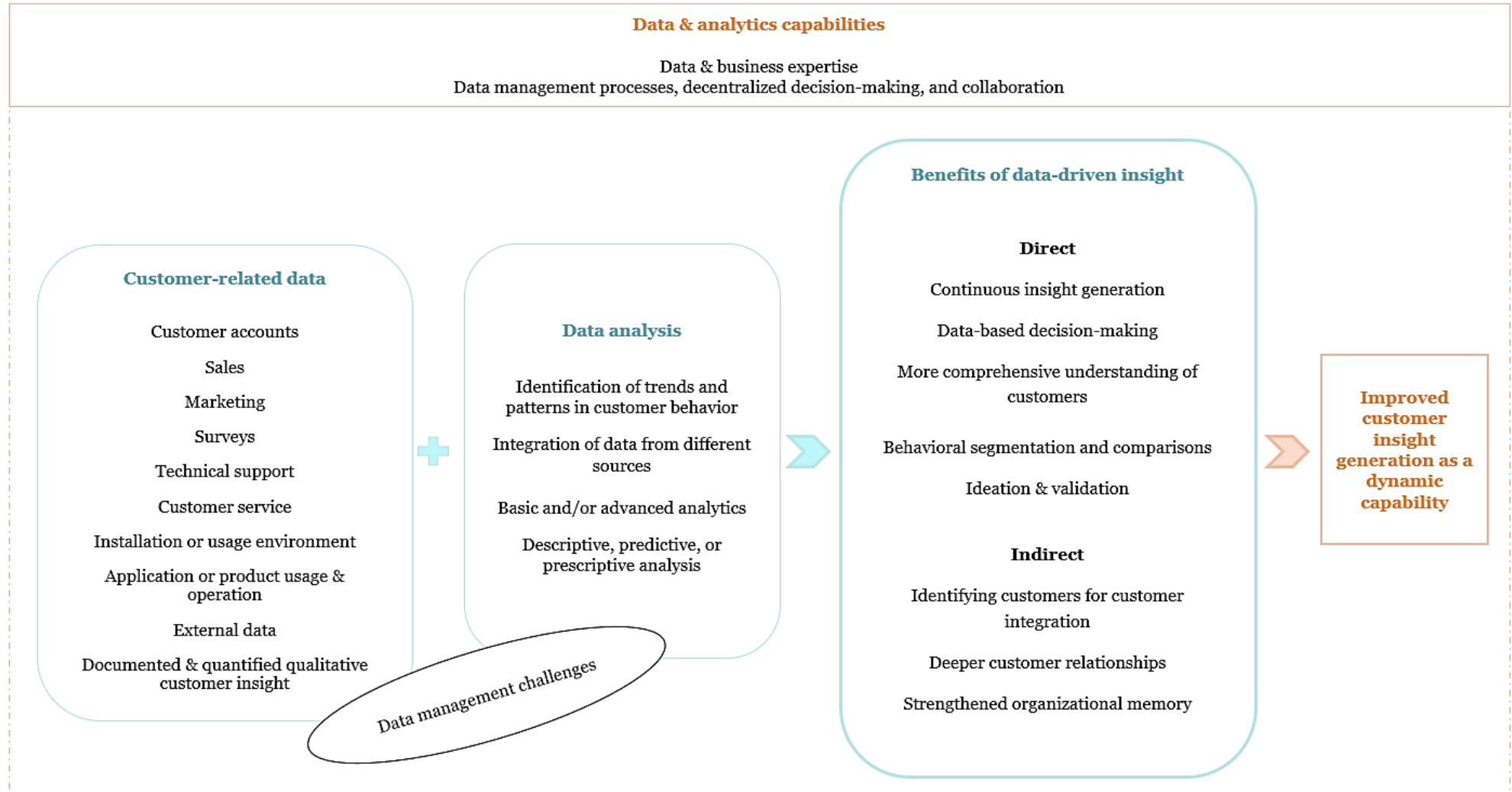


Figure 4. The modified theoretical framework, additions based on the empirical findings are marked in red. Own illustration.

the potential customers: data on potential customers can be used to develop the service offering as well. I have added both findings to the modified theoretical framework (see *Figure 4*).

As for the indirect benefits of data-driven customer insight in B2B services, the interviews demonstrated that customer-related data could be used to identify lead users for customer integration, deepen customer relationships, and strengthen organizational memory via information documentation, like hypothesized in the theoretical framework and literature review (see Ostrom et al., 2015; Urbinati et al., 2019). Additionally, the analysis of the interviews brought forward another indirect benefit of data-driven customer insight, namely using data as a tool for ideation, validation, and facilitation in customer integration projects (see *Figure 4*). Also, compared to the literature review, the interviews elaborated on, for example, how service personalization through data is one mechanism to deepen customer relationships, and how the documentation of qualitative customer information fosters organizational memory also over teams.

RQ2: How can businesses manage customer-related data collection and insight generation?

The case interviews confirmed the existence of the six common challenges of big data management in service business, proposed by Lim et al. (2018). The challenges are: 1) collecting the relevant data for service development, 2) facilitating easy and spontaneous data collection from customers, 3) managing the quality of data for service development, 4) planning data analytics for service development, 5) integrating different data from various sources for analysis, and 6) following data usage regulations and protecting customer privacy. Even though the cases had not used much customer-related data to advance service development, they had utilized data to advance many other business initiatives and were hence knowledgeable of data management.

The analysis of interviews regarding big data management offered implications, especially for practice. However, the analysis also provides some new theoretical implications: The interviews exemplified how the business model of the company affects the methods and possibilities of data-driven customer insight generation. Namely, some forms of B2B sales channels, like B2B2B, may restrict the service provider's access to end customer-related data. Additionally, the case interviews demonstrated that there are

similarities between businesses in their methods to automate data structuring and clustering (e.g., sentiment analysis and NLP). Because of varying service business targets, however, the techniques to analyze data to understand and predict customer behavior are more versatile among businesses. Lastly, to add to the literature by Park and Lee (2011) and Hartmann et al. (2016), it seems that, in practice, to understand customer behavior as deeply as possible, businesses need to integrate customer-related data both from different data sources as well as from various instances during the customer life cycle. I added this consideration to the modified theoretical framework, under “data analysis” (see *Figure 4*).

RQ3: Which organizational capabilities are related to data-driven insight generation and leveraging for B2B service development?

Thirdly, this study aimed to understand the capabilities related to data-driven customer insight generation for service development. When it comes to data and analytics capabilities and more specifically the required expertise, the interviews offered deeper insight into the topic compared to the literature (see Lim et al., 2018; Mishra et al., 2019). Regarding expertise, three domains emerged clearly from the answers: data analytics skills, service business and business context knowledge, and data architecture expertise (i.e., translator role between the business and data). The last one stemmed purely from the interviews, as multiple cases highlighted the need to have people in a “data architect” role to support the business with data and analytics solutions. Hence, this domain of expertise was added to the modified theoretical model (see *Figure 4*).

Regarding other data and analytics capabilities, the cases highlighted the importance of data collection and quality management processes throughout the interviews. The cases also spoke in favor of some level of decentralized decision-making to empower subject matter experts as well as internal and external collaboration, though some cases brought up limitations to the former. Overall, these findings were in line with the previous literature (Neu & Brown, 2005; Shah et al., 2006; Urbinati et al., 2019).

Lastly, the interviews demonstrated that customer insight generation and leverage in service development is a dynamic capability, as it supports the service business to adapt to the changes in the environment, such as changes in customer needs. The interviews also confirmed the idea that data-driven customer insights improve this dynamic

capability because data, for example, offers a more continuous way and a wider scope to monitor customer behavior and preferences. This finding is also in line with the theoretical framework and past studies (Eisenhardt & Martin, 2000; D. Teece & Pisano, 1994).

RQ: How can technology B2B businesses generate and leverage data-driven customer insight for service development?

To summarize, B2B service businesses may use a variety of customer-related data ranging from sales data to customer surveys and quantified qualitative customer understanding to generate data-driven customer insight. Data should be integrated both from different sources and different points of the customer life cycle to reach the most valuable insights. Businesses may utilize forms of basic and advanced analytics to identify trends and patterns in customer behavior, aiming to generate either descriptive, predictive, or prescriptive customer insight.

During data collection and insight generation for service development, there exist six common challenges of big data management that practitioners need to consider and manage with standardized data management processes. As a result, successful data-driven customer insight generation offers various direct and indirect benefits for service development, including the following: continuous insight generation on the current service offering, a more comprehensive understanding of the variety of customers in the market as well as potential customers, more efficient concept ideation and validation, behavioral customer segmentation and comparisons, data-based decision-making, more efficient customer integration projects, deeper customer relationships, and strengthened organizational memory.

Data-driven customer insight generation and leverage require certain enabling data and analytics capabilities: expertise in data, business, and data architecture, data management processes, decentralized decision-making, and internal and external collaboration. Successful use of data and analytics improve the organization's customer insight generation as a dynamic capability. At the same time, for customer insight generation to bring value to the organization, it needs to be tied to the strategy and targets of the service business.

5.1 Managerial Implications

The results of this study demonstrate that data-driven customer insights offer versatile direct and indirect benefits for B2B service development. At the same time, there are certain data management challenges and capability requirements that need to be considered to successfully leverage data and analytics. This section covers the managerial implications of the study, elaborating on how B2B service businesses could start the generation of data-driven customer insight for service development.

Deriving from the empirical findings and the theoretical framework, any customer insight generation measures should support the strategic targets of the service business and advance value or profit generation. Otherwise, the customer understanding is redundant. So, it should first be considered if there would be clear use cases for customer insight, which would help the business reach its strategic targets.

In case there are clear use cases for customer insight in service development, the business should next consider the common challenges in big data management and investigate their preparedness for those. Regarding data collection, one should know what the relevant data for the needed insight would be, where and how it can be collected if it is not yet actively collected, and whether there are standardized data collection, integration, and quality processes and requirements in the organization to be followed. In case there are not the kinds of processes, requirements, or KPIs, those should be established. As discussed by many cases, certain standards and set practices protect the business from data quality issues and help the organization to recalibrate in the occurrence of new regulations or changes in the business environment. Naturally, practitioners need to familiarize themselves also with data regulations and data privacy laws and plan all the activities and processes to adhere to those.

Regarding the analytics side of insight generation, the needed analytics need to be defined based on the type of customer-related data and the goals of the analysis (descriptive, predictive, or prescriptive). Based on the case interviews, a recommended way to start data utilization is from basic analytics instead of advanced analytics, and from descriptive analysis proceeding later to prediction and prescription.

Lastly, the empirical findings demonstrate that customer understanding is a multidisciplinary mission, requiring data, business, and data architecture expertise. I would suggest businesses include people from different roles in discussions when

considering setting up customer-related data collection and analysis practices. Indeed, versatile expertise, such as service development, service design, customer support, sales, marketing, and analytics, would likely offer different, complementary ideas for customer understanding. Additionally, empowering subject matter experts in data-driven customer insight generation might speed up the development work and lead to sharper insight.

5.2 Future Research

My study builds on the interdisciplinary fields of service research, marketing, and management. The research contributes to studies on data utilization and customer understanding in service development. I aimed to understand how data-driven customer insight could be generated and leveraged for B2B service development.

According to Lim et al. (2018), empirical studies on data utilization for service advancement are scarce, and such research would be essential to build on theories and methodologies for practical implications. Therefore, I encourage future researchers to continue and further examine the topic.

Reflecting on the core limitations of my research, my suggestion for future studies is to narrow the scope and have more specific research questions. My research was very explorative and extensive, leading to many interesting research sub-topics which I could not analyze as deeply as I would have wanted. For example, the required capabilities for data collection and leveraging in service development could have been a singular topic of its own. That is, I believe studies specializing in certain aspects of data utilization, e.g., data management, integrations, or capabilities, could offer a deeper understanding of the phenomenon. Next, it would be relevant to specify what customer-related data offers the presented benefits of data-driven insight.

This kind of empirical research could be conducted in different industries, and the recruitment of cases should consider companies and interviewees of versatile backgrounds. Future studies could verify whether the identified data benefits, challenges, and capabilities apply to different settings. Without the kind of accessibility constraints that I faced in my data collection, I would encourage researchers to examine especially the practices of businesses that are pioneers in data-driven insight leverage.

That way, the number of study cases could also be smaller than in my study, enabling deeper understanding and descriptions of individual cases.

I also encourage future research to use a variety of data collection methods to study data-driven customer insight generation for service development, as it would build on the confirmability of this line of research (see Eriksson & Kovalainen, 2011). Other possible methods to collect research data among cases could be, e.g., group interviews, surveys, and observations in service development projects.

5.3 Conclusion

The purpose of this study was to examine the possibilities of data-driven customer insight generation and leverage in B2B service development. I was motivated to research the topic because it had not been studied much before (Lim et al., 2018), and I had recognized that the benefits of data and analytics were of interest to practitioners as well.

The literature review of the study was built on service design, new service development, and service innovation research (i.e., service development research). Moreover, my theoretical framework included research on data management, data and analytics capabilities as well as dynamic capabilities, to better understand the challenges and requirements related to data-driven customer insight generation and leverage.

To gain an extensive, yet inductive, understanding of the phenomenon, I followed a qualitative, multiple-case research design. The research data was collected via case interviews in January 2023, and I interviewed 17 experts working in eight different organizations. The data analysis was based on case and thematic analysis (see Eisenhardt, 1989; Miles & Huberman, 1994).

The findings of my study show that data-driven customer insight has versatile direct and indirect benefits for B2B service development, including the following: continuous insight generation, more comprehensive customer understanding, ideation and validation, behavioral customer segmentation and comparisons, data-based decision-making, more efficient customer integration projects, deeper customer relationships, and strengthened organizational memory. However, practitioners need to both have certain data and analytics capabilities as well as manage challenges of data management,

to succeed in insight generation and leveraging. Moreover, data and analytics seem to improve the organization's customer insight generation as a dynamic capability. At the same time, for customer insight generation to bring value to the organization, it needs to be tied to the strategy and targets of the service business.

The strengths of my research are novelty and empirical validity, as the study is intimately linked to empirical evidence. Careful documentation of the research process also allows for the testability of the findings. My study contributes to building academic literature on customer-related data utilization for B2B service development and offers especially empirical implications to the topic. Additionally, the study offers managerial implications for data-driven customer insights generation and leverage.

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