



THREE ESSAYS ON DIGITAL AND NON-DIGITAL TRANSFORMATIONS IN BUSINESS-TO-BUSINESS MARKETS

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Summary

Fundamental changes in business-to-business (B2B) buying behavior confront B2B supplier firms with unprecedented challenges. On the one hand, a rising share of industrial buyers demands digitalized offerings and processes from suppliers. Consequently, suppliers are urged to implement digital transformations by expanding the range of both digital offerings and processes. On the other hand, B2B buyers increasingly expect suppliers to provide individually tailored solutions to their idiosyncratic needs. Hence, suppliers are also required to implement non-digital transformations by providing offerings and processes that are customized to each customers' specific requirements.

The rise of these digital and non-digital transformations calls established knowledge into question. Thus, B2B marketing research and practice are urged to create a comprehensive understanding of digital and non-digital transformations by means of novel and empirically grounded insights and derive actionable response strategies. In respond, my dissertation addresses the overall research question of how B2B supplier firms can successfully implement both digital and non-digital transformations in three individual essays.

In Essay 1, I offer a broader perspective on both digital and non-digital transformations by investigating digital service customization (i.e., the tailoring of digital B2B services to customers' individual needs). Through a systematic literature review and bibliometric analysis, I outline a comprehensive set of factors that favor the application of distinct digital service customization strategies. Essay 2 represents a deep dive into digital transformations of sales processes. By making use of two rich sets of qualitative interview material from supplier and buyer firms, I identify the challenges resulting for B2B salespeople from the introduction of digital sales channels into personal selling. Moreover, I uncover facilitating mechanisms that sales managers can employ to support salespeople in coping with digital sales channels. Finally, Essay 3 constitutes a deep dive into non-digital transformations.

Based on qualitative interview material and survey data from matched sales manager–salesperson dyads, the essay explores how configurations of individual salespeople’s personal and procedural competencies facilitate success at selling customer solutions (i.e., highly customized, performance-oriented offerings comprising products and/or services). The essay shows that successfully selling customized offerings like solutions hinges on salespeople’s unique configurations of present and absent competencies.

In a nutshell, these essays provide three major insights on how B2B suppliers can successfully implement digital and non-digital transformations. First, they underscore that a comprehensive understanding of the origins and spillover effects of transformations is a key prerequisite to successfully implementing them. Second, they unveil that digital and non-digital transformations impact on multiple organizational levels. Third, they point out important resources and capabilities that help suppliers to successfully implement transformations, be they digital or non-digital.

With this dissertation, I make substantial contributions to the broader literature on digital and non-digital transformations in B2B contexts. At the same time, my dissertation provides hands-on implications for managers in B2B supplier firms that are facing fundamental transformations in the marketplace—both digital and non-digital in nature.

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List of Abbreviations

AI	Artificial Intelligence
AJG	Academic Journal Guide
B2B	Business-to-Business
B2C	Business-to-Consumer
DSC	Digital service customization
EDI	Electronic data interchange
ESA	Enhanced Standard Analysis
fsQCA	Fuzzy-set Qualitative Comparative Analysis
IMM	Industrial Marketing Management
INFO MAN	Information management
INNOV	Innovation
ISBM	Institute for the Study of Business Markets
MKT	Marketing
OCI	Open catalog interface
OPS&TECH	Operations and technology management
OR&MANSCI	Operations research and management science
PeC	Personal competency configurations
PrC	Procedural competency configurations
PRI	Proportional reduction in inconsistency
VHB	Verband der Hochschullehrer für Betriebswirtschaft e.V.

1 Introduction

1.1 Digitalization and Customization: Transformations for Business-to-Business Supplier Firms

Prospering business-to-business (B2B) markets are key for a country's economy: for instance, B2B sales mounted up to \$9 trillion in the U.S. in 2018 (Demery, 2018). The degree to which a B2B supplier firm can succeed in this vast market depends to a large extent on how quickly and how well the supplier firm reacts to changing customer needs and demands. This is due to the fact that in B2B markets, as opposed to the business-to-consumer domain, very few to only a handful of B2B customers oftentimes account for a major share of a suppliers' revenues (Lilien, 2016).

At present, we are testifying a period of rapidly evolving buying behavior (Grewal et al., 2015; ISBM, 2020). The changes in buying behavior stem, for instance, from customers reacting to pressures from novel legal regulations (Wiersema, 2013) or increasing globalization (Grewal et al., 2015; Kryz & Fuest, 2017) in their own marketplaces. To cope with these pressures and assert their own competitive position, B2B customers adapt their own offerings, processes, and, in consequence, their buying behaviors.

The resulting changes in B2B buying behavior confront B2B supplier firms with unprecedented challenges. On the one hand, customers increasingly confront suppliers with elevated demands for digitalization in terms of both offerings and processes. Digitalization refers to "the *application* of digital technologies that brings about changes in business-to-business firms and business markets caused by digitization [emphasis added]" (Ritter & Pedersen, 2020, p. 182); herein, suppliers' adoption of IT-based, mainly internet-connected technologies and applications (Pagani & Pardo, 2017) for the transformation of offerings and processes. On the other hand, customers voice growing demand for customization. Customization refers to an offering (i.e., product, service, and integrated solution offering containing

both components) or process being tailored to a specific customer's requirements (Coelho & Henseler, 2012), thus satisfying customers' idiosyncratic, heterogeneous requirements.

Being able to adequately respond to changes in buying behavior by successfully implementing both digital and non-digital transformations enables suppliers to safeguard or extend their own competitive position in the marketplace. In fact, many suppliers are simultaneously addressing both transformations by offering customized, digital services (D'Emidio et al., 2015; Mehta & Hamke, 2019). For instance, a survey of 1,350 executives showed that the surveyed firms' investments in digital innovations between 2016 and 2018 exceeded \$100 billion (Abood et al., 2019). This trend, also known as digital servitization (Paschou et al., 2020; Sklyar et al., 2019), can be observed in both product- and service-oriented firms across numerous industries. Manufacturers such as Caterpillar and RollsRoyce increasingly offer digital services like predictive maintenance or condition monitoring (Caterpillar, 2020; Rolls-Royce, 2020b). Such services determine maintenance intervals based on the uptime of each individual customer's machinery. But professional service providers such as McKinsey, for example, have also begun to provide digital services: the McKinsey solutions are digital self-services, which give customers access to customized consulting services whenever they want to (McKinsey&Company, 2019).

When offering such tailored digital services, marketers often experience difficulties in selecting the most suitable digital service customization (DSC) strategy amongst the continuum from relatively standardized to full customization (Gilmore & Pine II, 1997; Ostrom et al., 2010). Yet to avoid costly over- or under-customization, they need to understand the factors that facilitate the adoption of both DSC in general as well as specific DSC strategies.

However, the literature on DSC remains fragmented: existing work either addressed DSC only at the general level or focused only on one specific strategy.

Moreover, existing work remains largely siloed within disciplines. This substantial degree of fragmentation not only inhibits interdisciplinary cross-fertilization and knowledge transfer, but also obstructs practitioners from rapidly determining DSC strategies that are suitable for their firms' customers, resources, and contexts. Thus, there is a strong need from both a theoretical and managerial perspective to develop a comprehensive, domain-spanning understanding of the factors that favor DSC (both in general and in relation to specific DSC strategies).

Furthermore, when inspecting digital transformations, the substantial impact of digitalization on B2B suppliers' business processes merits special attention. With respect to sales processes, for instance, digitalizing distribution means adding digital sales channels (e.g., proprietary online shops or third-party operated electronic marketplaces) to a distribution system that previously consisted of non-digital sales channels (e.g., inside and outside salesforce), thus creating hybrid channel structures (Thaichon et al., 2018).

Digital sales channels are transactional e-commerce applications that build on digital technologies and facilitate the entire procurement process (i.e., selecting, contracting, ordering, expediting and evaluation, and follow-up; van Weele, 2018), mainly for non-complex, off-the-shelf offerings and/or well-defined buyer needs (Hoar, 2015). This definition understands sales channels as channels that allow for transactions and exclude information-only channels (Käuferle & Reinartz, 2015). In 2019, the gross merchandise volume that B2B companies traded through e-commerce worldwide mounted 12.2\$ trillion (Clement, 2020). By 2021, B2B e-commerce in the U.S. alone is expected to reach \$1.2 trillion and thus account for 13% of all U.S. B2B sales (eMarketer, 2019).

For B2B salespeople, the introduction of digital sales channels marks a fundamental change in their roles and activities (Singh et al., 2019): rapid technological advancements such as the rise of artificial intelligence or machine learning have significantly extended contemporary digital sales applications'

functional scope. Thus, recent applications are become more and more capable of increasing a buyer firm representative's independence from a salesperson's assistance along the purchasing process.

To date, practitioners dissent as to what the introduction of digital sales channels means for the salesforce: whilst some summoned the imminent death of the B2B salesperson (Hoar, 2015), a recent Accenture study pointed out that 76% of purchasers still seek to consult a salespeople when researching new offerings (Angevine et al., 2017). Existing academic research has identified substantial benefits for salespeople associated with the introduction of digital sales channels: for instance, digital sales channels alleviate salespeople's resource constraints and complement non-digital, personal channels by unlocking salespeople's resources (Singh et al., 2019; Ingram et al., 2002; Marcos Cuevas, 2018; Syam & Sharma, 2018). They also facilitate insights into buyer preferences (Lawrence et al., 2019; Thaichon et al., 2018), allow for mapping out entire buyer journeys (Steward et al. 2019) and support lead generation (Singh et al., 2019; Anderson, 1996), to name just a few.

However, the prevailing understanding of the challenges that the introduction of digital sales channels confronts salespeople with, remains vague. In addition, little is known about how sales managers can exert their leadership function and support the salesforce in coping with the introduction of digital sales channels into previously non-digital sales channel systems. Hence, in-depth investigations are warranted that clarify the challenges and facilitating mechanisms associated with the introduction of contemporary digital sales applications.

In addition, attention must also be paid to the non-digital transformations that B2B suppliers are increasingly facing. When inspecting customization as non-digital transformation, it strikes that today's B2B markets are becoming more and more demand-driven. In contrast, in the supply-driven B2B markets of the past, providers mainly relied on the superiority of their offerings to differentiate themselves from

competitors (Lilien, 2016). Today, however, suppliers find themselves exposed to customers' demand for offerings that satisfy individual, idiosyncratic needs (Tuli et al., 2007; Ulaga & Reinartz, 2011).

Next to satisfying this demand with customized digital services, many B2B suppliers seek to address the rising demand for customization by offering solutions. Solutions are a specific type of offering that consist of tailored product and/or service components and satisfies a customers' individual performance requirements (Macdonald et al., 2016; Nordin & Kowalkowski, 2010). An archetypical example is Rolls-Royce's offering TotalCare®, which allows customers to purchase flight hours instead on an engine and thus "removes the burden of engine maintenance from the customers and transfers the management of associated risks to Rolls-Royce" (Rolls-Royce, 2020a).

Yet selling highly customized offerings like solutions is challenging and many solution providers struggle to generate profits from their solutions business (Benedettini et al., 2015). Hence, solution salespeople who succeed at selling solutions represent an important strategic asset (Ulaga & Reinartz, 2011). Solution salespeople's sales success is a complex phenomenon that largely depends on salespeople's competencies (i.e., individual clusters of knowledge, skills, attitudes, and traits; Lacoste, 2018).

Although the extant solutions research has increasingly adopted configurational approaches to adequately mirror the complexity inherent to solutions (Böhm et al., 2017; Salonen et al., 2020), most studies explore the effect of firm-level conditions for a successful solution business and neglect individual-level investigation. Related to this, extant research has not yet explored the joint effects of distinct, simultaneously occurring personal (i.e., salespeople's personality-related abilities) and procedural competencies (i.e., salespeople's enactment of the four relational processes of solution selling) on salespeople's sales success.

Taken together, the accelerating changes in buyer behavior are challenging B2B suppliers' established knowledge and managerial strategies. Thus, B2B markets are in a state of flux (Wiersema, 2013). Although extant research in the realms of digital services, e-commerce, and solutions has provided important insights on both digital and non-digital transformations, white spots remain that warrant attention. Hence, new research is required that investigates how B2B suppliers can successfully respond to the evolution of buying behavior (Grewal et al., 2015; ISBM, 2020). Against this background, the three essays of this dissertation aim to answer the following overarching research question:

How can B2B suppliers successfully implement both digital and non-digital transformations?

1.2 Research Scope

I address this overarching research question in three independent essays. In Essay 1, I take a broader perspective and address both transformations by focusing on DSC. Through a systematic literature review and bibliometric analysis across research from six disciplines, I derive a comprehensive set of factors fostering DSC in general as well as four distinct DSC strategies. Essay 2 constitutes a deep dive into digital transformations and makes use of extensive qualitative interview material to identify the challenges resulting for B2B salespeople from the introduction of contemporary digital sales channels into personal selling. At the same time, it investigates facilitating mechanisms that sales managers can use to help the salesforce cope with the introduction of digital sales channels. Eventually, Essay 3 represents a deep dive into non-digital transformations. Based on qualitative interviews and dyadic survey data, this essay explores the configurations of personal and procedural competencies that facilitate salespeople's success at selling highly customized offerings, namely integrated B2B customer solutions.

1.2.1 Essay 1: Digital Service Customization: A Systematic Literature Review and Bibliometric Analysis across Six Research Disciplines

Essay 1 of this dissertation focuses on DSC and thus addresses both the digital and non-digital transformations B2B suppliers are facing. To reap the variety of benefits that offering digital services can yield for suppliers, i.e., service providers (Kowalkowski et al., 2013; Rymaszewska et al., 2017), it is paramount for providers to customize digital service offerings to B2B customers' heterogeneous needs (D'Emidio et al., 2015). Yet providers of digital services in B2B markets often struggle to identify the DSC strategies amongst the continuum from relatively standardized to full customization (Gilmore & Pine II, 1997) that suit the specific context most; for instance, regarding the targeted customer segments of resource density (Ostrom et al., 2010).

So far, extant research on DSC has remained largely siloed both across DSC strategies and disciplines. Thus, a holistic understanding of the factors that favor DSC (in general and in relation to specific DSC strategies) is still lacking. To fill this void and support managers seeking to successfully pursue one or several DSC strategies, Essay 1 provides a systematic literature review and bibliometric analysis of 68 research papers on DSC across six research disciplines (i.e., marketing, information management, innovation, operations and technology management, as well as operations research and management science). Thus, with Essay 1, I answer the following three research questions:

(1) How do different disciplines contribute to the current body of knowledge on DSC?

(2) Which factors favor DSC at (a) general and (b) strategy-levels?

(3) Which directions for future DSC research emerge?

1.2.2 Essay 2: How the Introduction of Digital Sales Channels Affects Salespeople in Business-to-Business Contexts: A Qualitative Inquiry

Essay 2 represents a deep dive into digital transformations. Specifically, it investigates the digitalization of B2B sales processes through the introduction of digital sales channels into previously non-digital sales channel systems. Although building interorganizational relationships through personal interactions between salespeople and purchasers has represented a fundamental principle in B2B markets for decades (Crosby et al., 1990), B2B suppliers nowadays increasingly digitalize sales processes by introducing e-commerce, i.e., transactional digital sales channels that enable the entire procurement process (van Weele, 2018), mainly for non-complex, off-the-shelf offerings and/or well-defined buyer needs (Hoar, 2015).

While existing research has begun to explore the benefits that such digital sales channels bring for the salesforce, the introduction of digital sales channels also confronts salespeople with challenges. However, the prevailing understanding of these challenges remains vague and fragmentary. Strikingly, with one exception (Marcos Cuevas, 2018), no empirical study has been published within the last decade that explores the challenges resulting for salespeople from suppliers' introduction of digital sales channels. Moreover, while research has repeatedly emphasized the crucial role of sales managers in facilitating the salesforce's adaption to changing working environments, no existing article offers current and empirically validated insights on facilitating mechanisms that sales managers can use to help salespeople cope with the introduction of digital sales channels.

Hence, new research is needed that explores the challenges and mitigating mechanisms that apply for today's working environment. Due to rapid technological developments, the capabilities of digital sales applications have significantly improved during the last ten years alone (Mehta & Hamke, 2019). Thus, buyer firm representatives become increasingly independent from a salesperson's assistance in each step of the purchasing process. As contemporary digital sales channels'

significantly improved capabilities have potentially remained unaddressed by literature published in the 2000s (e.g., Lichtenthal & Eliaz, 2003),

Making use of an extensive set of qualitative interview material from 21 informants in supplier firms and 18 informants in buyer firms, Essay 2 therefore explores the following two the research questions:

(1) What challenges arise for salespeople from the introduction of digital sales channels?

(2) Which facilitating mechanisms can sales managers adopt to help salespeople cope with the introduction of digital sales channels?

1.2.3 Essay 3: Different Roads Lead to Rome – A Configurational Perspective on Solution Salespeople’s Sales Success in Business-to-Business Markets

Customers in B2B markets increasingly demand end-results and performance instead of mere standalone products and services (Macdonald et al., 2016; Tuli et al., 2007). To address this demand, a rising number of sellers offers integrated, individually tailored customer solutions, i.e., sets of “customer-supplier relational processes comprising (1) customer requirements definition, (2) customization and integration of goods and/or services and (3) their deployment, and (4) postdeployment customer support, all of which are aimed at meeting customers’ business needs” (Tuli et al., 2007, p. 5).

Yet, due to the complexity of solutions, solution selling is challenging, and many solution providers experience substantial difficulties in generating profits from solution sales (Benedettini et al., 2015). An essential strategic asset that can be leveraged to prevent such perils is successful solution salespeople (Ulaga & Reinartz, 2011). With respect to facilitating solution salespeople’s sales success (i.e., whether they achieve superior levels of sales performance), salespeople’s individual competencies play an essential role (Böhm et al., 2020; Lacoste, 2018; Ulaga & Kohli, 2018; Ulaga & Loveland, 2014).

Although existing solutions literature is making increasing use of configurational research approaches that reflect the complexity of solutions, two research gaps remain. First, individual-level investigations have been largely neglected by the extant literature, as prior studies have mainly addressed firm-level conditions that facilitate a successful solution business (Böhm et al., 2017). Second, the joint effects of simultaneously occurring competencies with respect to sales success have remained under-researched, because most academic work investigated the net effects of selected competencies on sales success in isolation or within two-way interactions (Böhm et al., 2020; Plouffe et al., 2017).

Yet, to adequately reflect reality and advance the solutions literature, a configurational investigation of individual salespeople's personal and procedural competencies and their joint effects on sales success is warranted. Hence, by drawing on a qualitative pre-study comprising 22 in-depth interviews with solution sales managers and two fuzzy-set qualitative comparative analyses (fsQCAs) of survey data from 63 sales manager–salesperson dyads, Essay 3 aims to explore the following main research question:

Which roles play distinct (a) configurations of personal competencies and (b) configurations of procedural competencies in facilitating individual solution salespeople's sales success?

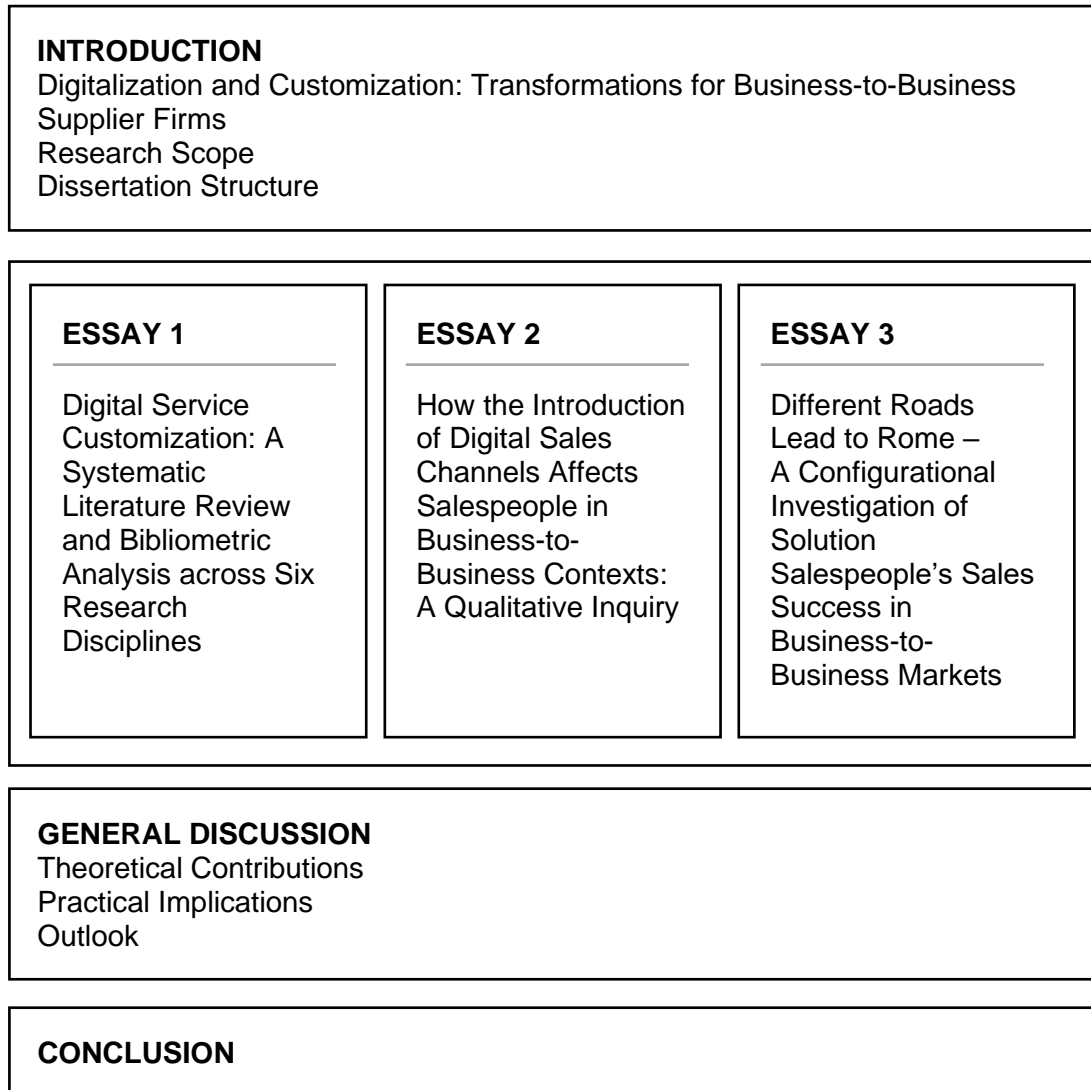
1.3 Dissertation Structure

The remainder of the dissertation is structured as follows: in section 2, I present Essay 1, which features a systematic literature review of research on DSC across six disciplines and a subsequent bibliometric analysis of the identified literature. Section 3 comprises Essay 2, which investigates how contemporary digital sales channels affect B2B salespeople. Section 4 presents Essay 3, which provides a configurational investigation of solution salespeople's sales success. Section 5 discusses the results of the three essays and offers theoretical and practical implications. The section further comprises an outlook on digital and non-digital

transformations in B2B markets. Eventually, section 6 provides a brief conclusion.

The overall structure of my dissertation is displayed by Figure 1.1.

Figure 1.1. Dissertation Structure.



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2 Essay 1: Digital Service Customization: A Systematic Literature Review and Bibliometric Analysis across Six Research Disciplines

Franziska M. Bongers

Revising for Second Review at *Industrial Marketing Management* (AJG: 3, VHB: B)

Offering digital services to customers can yield manifold financial and non-financial benefits for business-to-business firms. One imperative for reaping these benefits is to tailor digital services to customers' individual needs (i.e., digital service customization) [DSC]. However, marketers often struggle to identify the most suitable DSC strategy, from among the broad range of DCS strategies, for their firms' customers, resources, and contexts. Hitherto, research on DSC has remained largely fragmented and scattered across research disciplines. To enable researchers and practitioners to exploit existing research findings, this research conducted a systematic literature review and a bibliometric analysis of 68 papers from six research disciplines. This work identified a comprehensive set of technology-, offering-, provider-, and customer-related factors that facilitate DSC in general, digital self-customization, collaborative, modularity-based, and full DSC. The study further revealed four disciplines that have particularly shaped extant DSC knowledge, in very distinct ways. To stimulate future research and enhance the current understanding of DSC, a fine-grained research agenda is proposed.

Keywords: service customization, digital services, business-to-business, systematic literature review, bibliometric analysis

2.1 Introduction

With the advent of new digital technology, business-to-business (B2B) firms increasingly seek to offer digital services, either enabled or fully provided through the encoding of analog into digital information (Raddats et al., 2019; Yoo et al., 2010). A recent survey of 1,350 executives showed that the surveyed industrial firms invested more than \$100 billion in digital innovations between 2016 and 2018 (Abood et al., 2019). Offering digital services can yield manifold advantages for service providers: for example, the opportunity to exploit new business opportunities (Baines & Lightfoot, 2014), strengthen their competitive position (Kowalkowski et al., 2013), and generate substantial economic value (Belvedere et al., 2013; Nordin & Kowalkowski, 2010; Rymaszewska et al., 2017).

One imperative for reaping these benefits and mastering digital service innovation is to tailor digital services to customers' individual needs (D'Emidio et al., 2015; Mehta & Hamke, 2019). Effective digital service customization (DSC) hinges on comprehensive insights into customers' individual needs as generated by digital technology (Rust & Huang, 2014). Satisfying unique customer needs, in turn, justifies price premiums (Bitner et al., 2000) and deepens customer relationships (Rust & Huang, 2014) but implementing DSC is challenging. Of a broad range of customization strategies, from relatively standardized customization to full customization, managers must determine the best strategy to pursue (Gilmore & Pine II, 1997); however, marketers often struggle to identify the most suitable DSC strategy according to the targeted customer segment or available resources, for instance (Ostrom et al., 2010).

Substantial academic interest has focused on DSC, both in general and with regard to specific DSC strategies. DSC research can be found in literature streams relating to digital service innovation (Huang & Rust, 2017; Leminen et al., 2020; Rust & Huang, 2014) and digital servitization and solutions (Moghaddam & Nof, 2018; Paschou et al., 2020; Suppatvech et al., 2019). DSC is also present in studies

concerning digital business models and platforms (Leminen et al., 2020; Löfberg & Åkesson, 2018) and IT architecture (Yoo et al., 2010), for instance. Notably, knowledge extends to disciplines beyond marketing, such as operations and technology management or information management, for example.

The multitude of previous studies have led scholars to conduct several reviews of the literature. For example, reviews on digital servitization and solutions looked at the development of customized digital service offerings by product-oriented firms (Grubic, 2014; Nordin & Kowalkowski, 2010; Paschou et al., 2020; Raddats et al., 2019; Song, 2017) or considered DSC through modularity (Bask et al., 2010; Liu & Wang, 2008; Pekkarinen & Ulkuniemi, 2008; Peters et al., 2018).

These reviews, however, have had three major shortcomings: First, all existing reviews either addressed DSC at a general level or focused on one specific DSC strategy; an exhaustive overview of DSC research that integrates both general and strategy-levels is still lacking. Second, with the exception of Paschou et al. (2020), existing reviews largely focused on analyzing research within one main discipline, thereby impeding fruitful knowledge transition and cross-fertilization between disciplines (Lindgreen & Di Benedetto, 2017). Third, by limiting their focus to certain DSC strategies and single research disciplines, existing reviews have failed to provide a holistic understanding of the common factors that favor (i.e., facilitate, enable, and support) both DSC in general and in relation to specific DSC strategies.

The fragmentation of DSC research results in key insights into the topic remaining undiscovered and hinders scholars who are interested in DSC from quickly familiarizing themselves with the topic and detecting avenues of enquiry worth pursuing. Similarly, practitioners lacking time to work through the literature themselves are obstructed from rapidly determining DSC strategies that are suitable for their firms' customers, resources, and contexts. To address these research gaps, this study aimed to answer the following research questions:

(1) How do different disciplines contribute to the current body of knowledge on DSC?

(2) Which factors favor DSC at (a) general and (b) strategy-levels?

(3) Which directions for future DSC research emerge?

This study adopted a twofold approach to answering these questions, using a systematic literature review and a bibliometric analysis of 68 articles from six research disciplines. By descriptively and thematically analyzing current DSC knowledge, it makes three main theoretical contributions to DSC research: First, it provides a precise, interdisciplinary profile of the structure and evolution of current DSC knowledge, determining four disciplines as main contributors, while buttressing the importance of interdisciplinary approaches for exhaustive reviews. Second, it is the first study to identify a comprehensive set of technology-, offering-, provider-, and customer-related factors that facilitate both DSC in general as well as digital self-customization, collaborative, modularity-based, and full DSC, thus permitting cross-strategy comparisons. Third, this research makes its insights exploitable for other researchers through its proposal of an extensive research agenda warranting further inquiry. The article thus answers recent calls for “cross-disciplinary ..., high impact reviews of key business-to-business topics” (p.3), such as new technology and B2B marketing (Lindgreen & Di Benedetto, 2018); summarizes and critically evaluates what is known about DSC; and constitutes a substantiated starting point for future research (Di Benedetto & Lindgreen, 2018; Lindgreen & Di Benedetto, 2017; Palmatier et al., 2018).

In addition to its theoretical contributions, the article also provides practical implications for provider firms aiming to adopt or switch between DSC strategies. Specifically, it offers a toolbox outlining factors that facilitate DSC at general and strategy-levels. This toolbox is “designed to have meaning and importance to the practitioner community” (Lindgreen & Di Benedetto, 2018, p. 2), as well as to provide practitioners with ideas and recommendations (Denyer & Tranfield, 2009, p.

678), serving as a prompt for managers to enhance their skills and professional decision-making (Lindgreen & Di Benedetto, 2017).

The remainder of this article is structured as follows: Section 2 describes the method used to identify relevant literature. Section 3 illustrates the descriptive and bibliometric analyses, while Section 4 outlines the thematic analysis and Section 5 discusses the results, contributions, and limitations.

2.2 Method

This study employed systematic cross-disciplinary approach to identify relevant DSC literature. Topics as DSC that are characterized by sufficient, but unstructured and potentially contradictory, findings across disciplines particularly merit systematic literature reviews (Palmatier et al., 2018). Systematic literature reviews significantly advance research by evaluating accumulated knowledge (Williams & Plouffe, 2007) and providing “a state-of-the-art understanding of the research topic” (Palmatier et al., 2018, p. 1). To ensure depth, rigor, replicability, and usability (Palmatier et al., 2018), this research adopted the systematic review procedure outlined by Denyer and Tranfield (2009). The procedure consists of five steps: (1) question formulation, (2) locating studies, (3) study selection and evaluation, (4) analysis and synthesis, and (5) reporting and using the results (Denyer & Tranfield, 2009).

2.2.1 Question formulation

Specifying clear and answerable research questions is vital for guiding the entire review; therefore, a review panel of two academics familiar with DSC research developed the research questions. Panel discussions and a first screening of the literature also identified six disciplines for investigation.

2.2.2 Locating studies

Following Raddats et al. (2019), the study conducted a keyword search, which was subsequently augmented by backward and forward snowballing

searches. The keyword search was applied to the EBSCO Business Source Premier database. Based on extensive brainstorming, keyword search strings were created (Appendix 2.A). The search was limited to high-quality academic literature based on manual selection of journals with 3 to 4* rankings from the 2018 Academic Journal Guide 2018¹ (AJG). Although previous literature reviews advocated lower thresholds (Raddats et al., 2019), or different types of information (e.g., books, practitioner materials; Denyer & Tranfield, 2009), this study made concessions to maintain manageability, which unquestionably implied limitations.

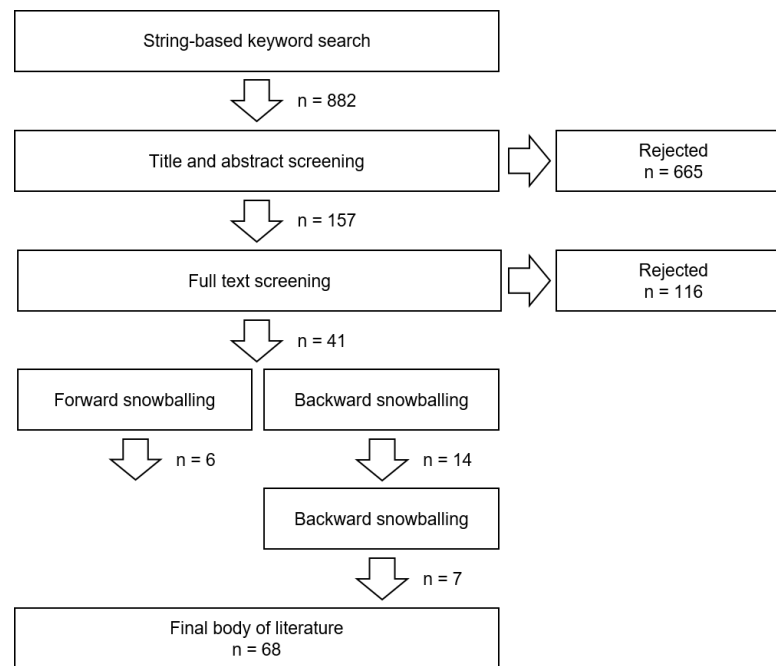
The review covered journals from six disciplines: marketing (MKT), information management (INFO MAN), innovation (INNOV), operations and technology management (OPS&TECH), and operations research and management science (OR&MANSCI). The *Journal of Service Research* (SECTOR) was also included due to its service-specific focus. The research excluded journals focusing on business-to-consumer and business-to-government research, advertising, mathematics, or niche topics (e.g., Naval Research Logistics). The review set no specific start date and considered research published until March 2020 (inclusive).

2.2.3 Study selection and evaluation

Figure 2.1 displays the stepwise selection process. The string-based keyword search yielded 822 results across disciplines, later reduced to 157 papers following a review of papers' titles, abstracts, and keywords. The review of the remaining papers' full texts led to a reduction to 41 papers. Both refinements rested on carefully determined exclusion criteria (Appendix 2.B); for instance, excluding papers addressing "modulation", "system modules" or "service levels".

¹ Chartered Association of Business Schools (2018).

Figure 2.1. Stepwise selection process.



Forward snowballing using Google Scholar, and backward snowballing, yielded another 6 and 14 articles, respectively. The 14 backwardly searched articles provided another seven papers to be included. In total, this systematic approach resulted in 68 papers from six disciplines (Appendix 2.C).

2.2.4 Analysis and synthesis

Sections 3 and 4 outline the descriptive, bibliometric, and thematic analyses of the 68 papers. The descriptive analysis illustrates papers' distributions across years of publication, methods, disciplines, and journals. An additional bibliometric analysis of direct citations between journals identifies each discipline's unique contributions. The thematic analysis provides an in-depth content-related examination of the identified literature.

2.2.5 Reporting and using the results

This paper both reports and disseminates the results. In Section 5, the results provide input for the development of a research agenda to stimulate future research.

2.3 Descriptive Analysis

The descriptive analysis first characterizes the identified literature by years of publication and methods. Thereafter, it assesses the contributions of disciplines (as represented by the journals) in more detail.

Figure 2.2. Distribution of publications over time.

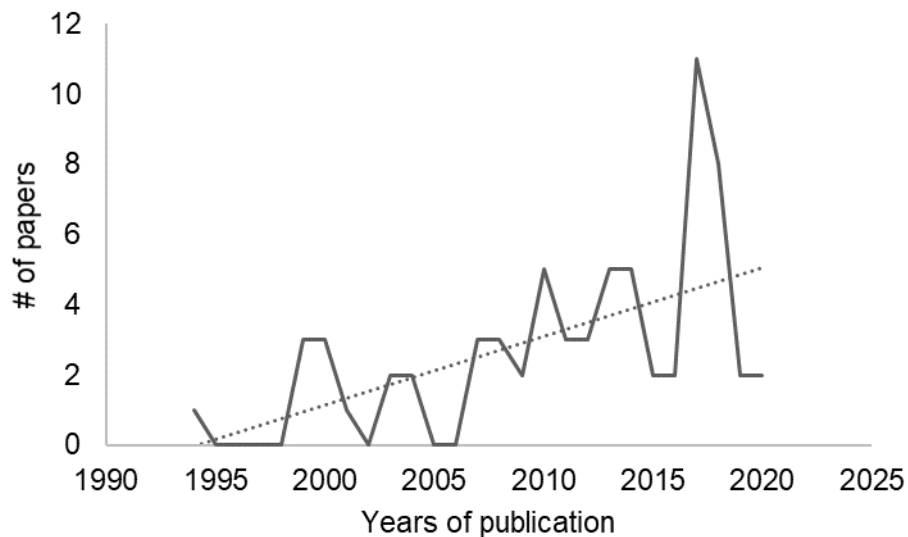


Figure 2.2 illustrates that academic interest in DSC began to increase in 1994 and has risen steadily ever since. No articles were published from 1995 to 1998, or in 2002, 2005, and 2006; five papers were published in 2010 and 2013; and 2017 and 2018 marked a sharp increase in scholarly attention to DSC. Eleven papers were published in 2017 alone, followed by eight papers in 2018. However, in 2019, the publication rate dropped sharply to only two articles. In 2020, two articles have been published by March.

In terms of approaches (Table 2.1), the analysis finds that 17 of the 68 papers (25.0%) adopted a conceptual approach, whereas a majority of 51 (75.0%) adopted an empirical approach. Further distinguishing between the empirical papers reveals that 6 articles (11.8%) used mixed methods, 17 used quantitative methods (33.3%), and 28 used qualitative methods (54.9%).

Table 2.1. Distribution of papers by approach and method.

Approach	# Total (n = 68)	Percentage of Total
Conceptual	17	25.0%
Empirical	51	75.0%
• Both	• 6	• 11.8%
• Quantitative	• 17	• 33.3%
• Qualitative	• 28	• 54.9%

An analysis by discipline (Table 2.2) identifies OPS&TECH as a major contributor to the literature, with 26 papers (38.2%), followed by MKT with 16 papers (23.5%) and INFO MAN with 11 papers (16.2%). At the journal level, *Industrial Marketing Management* (IMM; MKT; 8.8%) and *IEEE Transactions on Systems, Man, and Cybernetics* (IEEE; OR&MANSCI; 7.4%) emerge as the most frequently represented outlets. These are followed by the *International Journal of Operations and Production Management* (IJOPM; OPS&TECH), *International Journal of Production Research* (IJPR; OPS&TECH), *Information Systems Research* (ISR; INFO MAN), *Journal of Business and Industrial Marketing* (JBIM; MKT), and *Journal of Service Research* (JSR; SECTOR) follow with a share of 5.9% each.

Table 2.2. Distribution of papers by discipline.

Disciplines and Journals	# Total (n = 68)	Percentage of Total
OPS&TECH	26	38.2%
International Journal of Operations & Production Management	4	5.9%
International Journal of Production Research	4	5.9%
Computers in Industry	3	4.4%
Journal of Operations Management	3	4.4%
International Journal of Production Economics	2	2.9%
Journal of Manufacturing Technology Management	2	2.9%
Business Process Management Journal	1	1.5%
International Journal of Logistics Management	1	1.5%
International Journal of Technology Management	1	1.5%
Journal of Intelligent Manufacturing	1	1.5%
Managing Service Quality	1	1.5%
Production and Operations Management	1	1.5%
Production Planning and Control	1	1.5%
Service Science	1	1.5%

Table 2.2. Continued.

Disciplines and Journals	# Total (n = 68)	Percentage of Total
MKT	16	23.5%
Industrial Marketing Management	6	8.8%
Journal of Business and Industrial Marketing	4	5.9%
Journal of the Academy of Marketing Science	2	2.9%
European Journal of Marketing	1	1.5%
Journal of International Marketing	1	1.5%
Journal of Marketing Research	1	1.5%
Marketing Science	1	1.5%
INFO MAN	11	16.2%
Information Systems Research	4	5.9%
Journal of Management Information Systems	3	4.4%
International Journal of Electronic Commerce	1	1.5%
Journal of the American Society for Information Science and Technology	1	1.5%
Journal of Information Technology	1	1.5%
International Journal of Information Management	1	1.5%
OR&MANSCI	8	11.8%
IEEE Transactions on Systems, Man, and Cybernetics	5	7.4%
Decision Sciences	2	2.9%
Journal of the Operational Research Society	1	1.5%
SECTOR	6	8.8%
Journal of Service Research	4	5.9%
Journal of Service Management	1	1.5%
Journal of Cleaner Production	1	1.5%
INNOV	1	1.5%
International Journal of Innovation Management	1	1.5%

Notes. OPS&TECH = operations and technology management, MKT = Marketing, INFO MAN = information management, OR&MANSCI = operations research and management science, SECTOR = sector-specific, INNOV = innovation.

2.3.1 Additional bibliometric analysis

These insights indicate that some disciplines influence current knowledge on DSC more than others do. To provide supporting evidence, the research conducted a bibliometric analysis of direct citations from journals across all six disciplines. The open-access software tool VOSviewer (version 1.6.14) was chosen for the bibliometric analysis due to its usability and widespread use in previous studies (Kouropalatis et al., 2019; Kumar et al., 2019; Zhang & Banerji, 2017).

Bibliometric analyses illustrate both the structure and evolution of a thematic field through bibliometric networks, which consist of network items and links (Kumar et al., 2019; Merigó et al., 2015). In this work's direct citation analysis, journals

represent bibliometric network items (i.e., nodes). A network link from one journal to another illustrates that papers published in the first journal directly cite papers published in the second journal, or vice versa (van Eck & Waltman, 2014, 2020).

The bibliometric network portrays a particular journal's influence in two ways: First, by the size of the respective network item. The network displays items (i.e., journals) as circles, with bigger circles representing important, highly influential journals. In this article, circle size represents a *journal's overall level of normalized citations*. Since normalization mitigates the effect of newer publications having had less time to be cited, normalized citations serve as an appropriate importance measure (Lindgreen & Di Benedetto, 2018); therefore, large circles represent journals with high levels of normalized citations. Second, the bibliometric network illustrates a journal's influence in terms of network links (Backhaus et al., 2011; Culnan, 1987). In this case, links depict *direct citations between journals*: the more direct citations exist between two journals, the more closely related they are and the thicker their links become (van Eck & Waltman, 2017). Different colors indicate sets of closely related items, called clusters (van Eck & Waltman, 2014). VOSviewer's clustering technique assigns each item precisely to one cluster (van Eck & Waltman, 2017; Waltman et al., 2010); hence, clusters show how closely related journals are in terms of direct citations.

Bibliometric analysis of direct citations (also known as cross-citation) has two advantages, in contrast to other bibliometric approaches such as co-citation, bibliographic coupling, and word analysis: First, direct citation analyses do not suffer from misspellings or differences in word meanings (a flaw that word analyses are often subject to; van Eck & Waltman, 2017). Second, direct citation analyses provide stronger indications of relatedness (Kouropalatis et al., 2019; van Eck & Waltman, 2014, 2017) than co-citation analysis and bibliographic coupling, which deliver less precise information by representing indirect relations.

The minimum number of papers per journal was set to one to include all the journals in the direct citation analysis. After inspecting several clustering solutions, as recommended by van Eck and Waltman (2017) (Appendix 2.D), a solution yielding five clusters of three to six journals was chosen (Table 2.3): alternative solutions yielding 1 cluster with 20 journals, or 18 clusters with 1 to 2 journals each, for example, failed to adequately portray each journal's influence.

Table 2.3. Network clusters.

Cluster	Color	# Items	Represented Journals	Discipline
1	Red	6	Industrial Marketing Management Information Systems Research International Journal of Electronic Commerce International Journal of Production Economics Managing Service Quality Service Science	MKT INFO MAN INFO MAN OPS&TECH OPS&TECH OPS&TECH
2	Green	4	Business Process Management Journal Decision Sciences Journal of Information Technology International Journal of Logistics Management	OPS&TECH OR&MANSCI INFO MAN OPS&TECH
3	Blue	4	International Journal of Information Management International Journal of Production Research Journal of Business and Industrial Marketing Journal of Manufacturing Technology Management	OPS&TECH OPS&TECH MKT OPS&TECH
4	Yellow	3	International Journal of Operations & Production Management International Journal of Technology Management Journal of Service Management	OPS&TECH OPS&TECH SECTOR
5	Purple	3	Computers in Industry Journal of Cleaner Production Journal of Intelligent Manufacturing	OPS&TECH SECTOR OPS&TECH

Notes. MKT = Marketing, INFO MAN = information management, OPS&TECH = operations and technology management, OR&MANSCI = operations research and management science, SECTOR = sector-specific.

Of the total 34 journals, 20 form part of one of the clusters. Of the remaining 14 journals unrelated to others in terms of direct citations (Appendix 2.E), MKT is represented by five journals (35.7%), OPS&TECH by three (21.4%), INFO MAN and

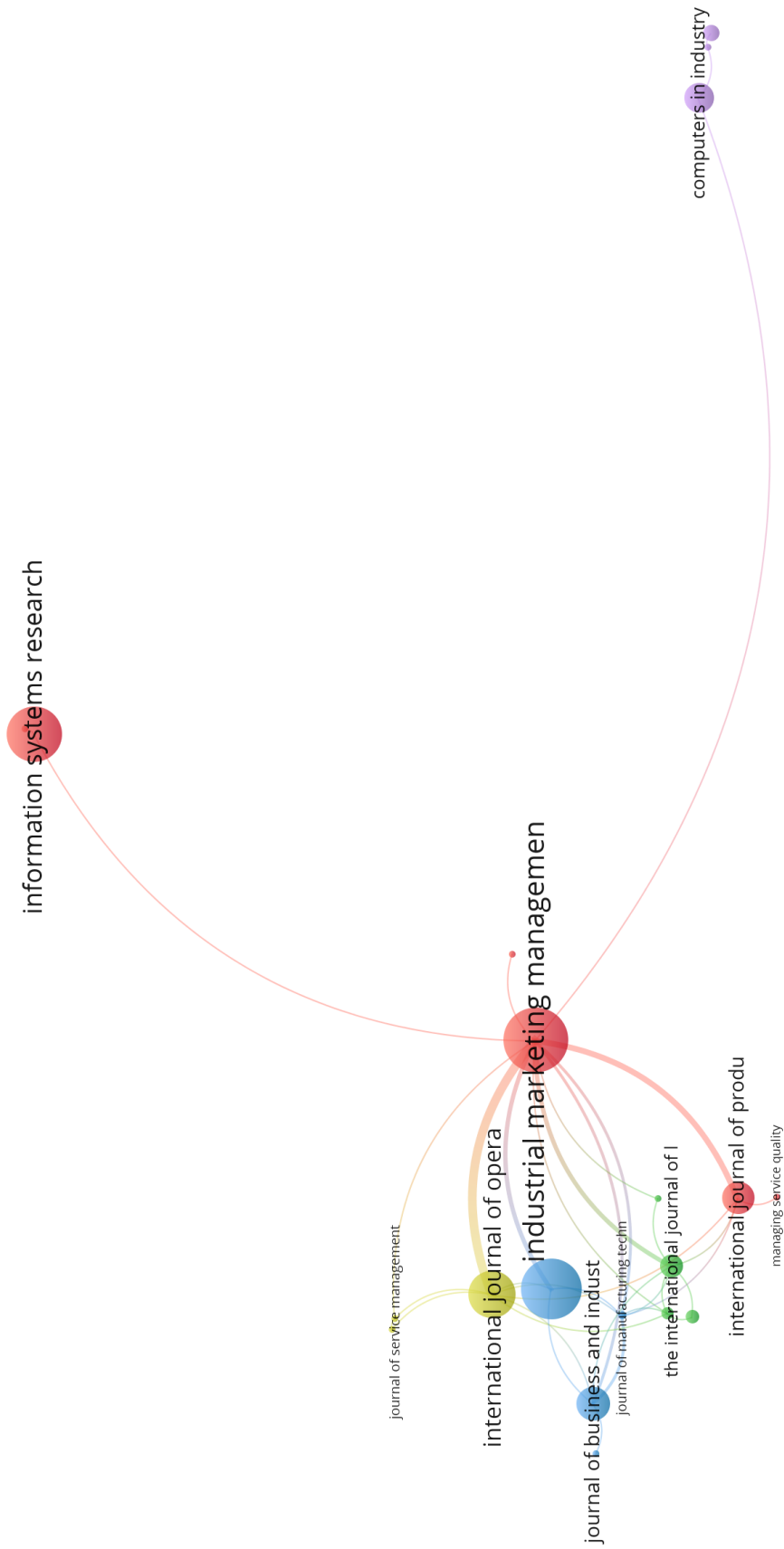
OR&MANSCI by two each (14.3%) and, finally, both SECTOR and INNOV by one each (7.1%). Of the 20 related journals, 12 relate to OPS&TECH (60.0%), three to INFO MAN (15.0%), 2 each to MKT and SECTOR (10%), and 1 to OR&MANSCI (5.0%). Figure 2.3 displays the 5 clusters formed by the 20 journals.

The circle sizes indicate that IMM, IJPR², and ISR have the largest number of normalized citations. The positions and structures of Clusters 2 (green), 3 (blue), and 4 (yellow) indicate high levels of direct citations, both between the journals in each cluster and between the clusters. All three clusters consist of OPS&TECH journals in conjunction with OR&MANSCI and INFO MAN (Cluster 2), MKT (Cluster 3), and SECTOR (Cluster 4) journals. Cluster 5 (purple) contains OPS&TECH and SECTOR journals, but is decoupled from the field, suggesting that direct citations between Cluster 5 journals and others are almost non-existent. Cluster 1 (red) includes MKT, INFO MAN, and OPS&TECH journals and is notably characterized by significant dispersion, indicating lower levels of direct citations. Importantly, IMM in the center of Cluster 1 emerges as the only journal with direct citations to all clusters and as the only one linking distant Cluster 5 (purple) with the rest of the field.

The overlay visualization (Figure 2.4) shows the chronological evolution of DSC research across clusters. Depending on the average publication year of the papers published in one journal, circles are colored darker (older publications, on average) or lighter (newer publications, on average). INFO MAN & OR&MANSCI journals in Cluster 2 emerge as journals with the oldest publications, on average; IMM publications, by contrast, were on average published relatively recently.

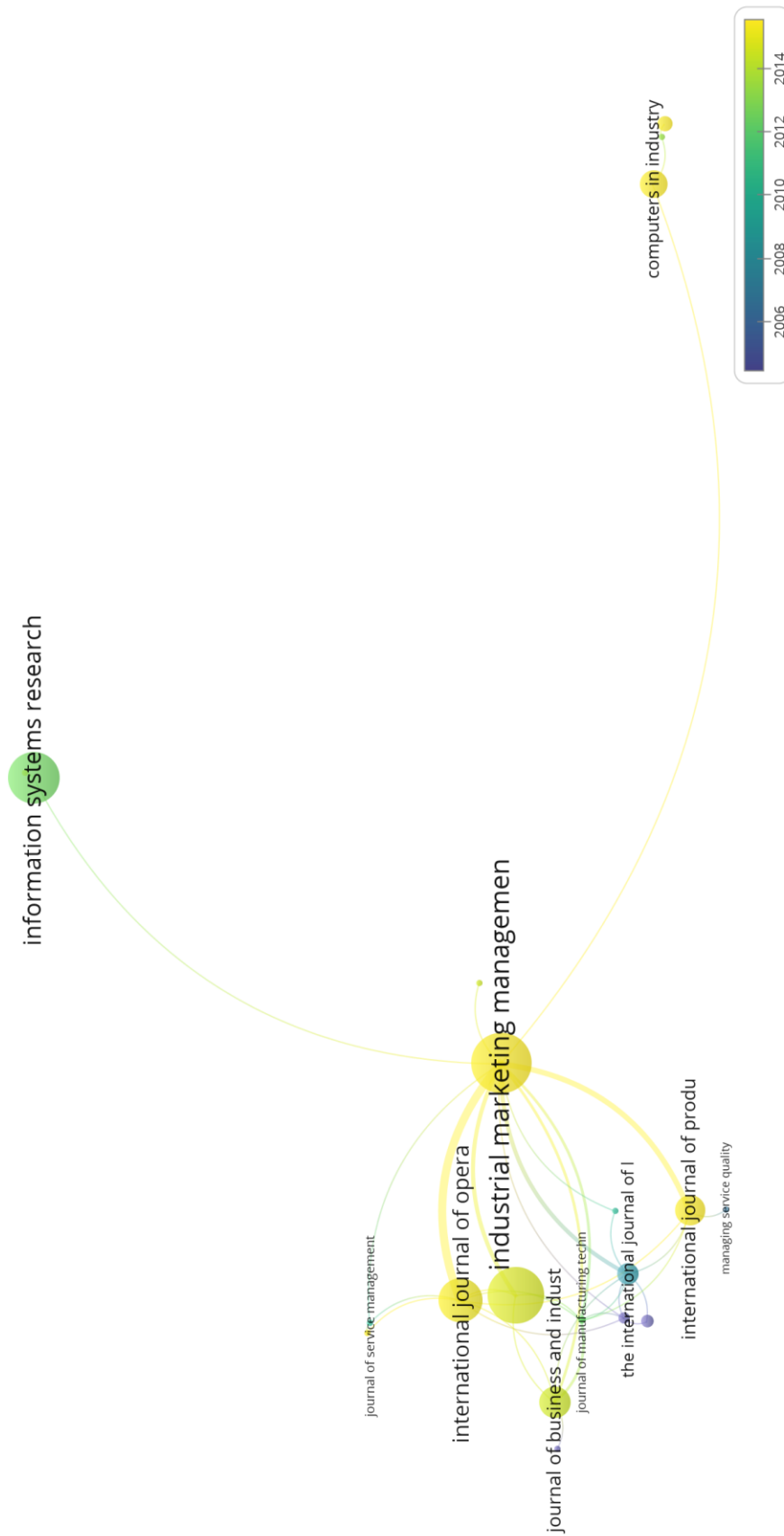
² The biggest blue circle; item label not displayed by VOSViewer for visibility reasons.

Figure 2.3. Structure of DSC research (Original in color).



Notes. Item size = weight in terms of normalized citations, item-to-item distance and link thickness = relationship strength, colors indicate clusters.

Figure 2.4. Evolution of DSC research (Original in color).



Notes. Item size = weight in terms of normalized citations, item-to-item distance and link thickness = relationship strength, colors indicate average year of publication of papers in journal.

2.3.2 Subdiscussion of descriptive and bibliometric analyses

Descriptive and bibliometric analyses of the identified 68 papers provide a precise profile of the extant DSC literature, identifying 5 distinct clusters of journals that confirm the different contributions of the 6 disciplines to the extant knowledge: specifically, OPS&TECH, OR&MANSCI, INFO MAN, and MKT merit further elucidation. OPS&TECH emerges as an important contributor in terms of volume. Furthermore, it is included in each cluster, indicating that OPS&TECH journals share many direct citations with journals across all disciplines. OR&MANSCI and INFO MAN journals provide the oldest publications, on average, highlighting the disciplines' roles in opening up the topic. Notably, MKT's influence is particularly attributable to IMM. The journal emerges, not only as the largest single contributor in terms of publications and normalized citations, but also as a gateway linking dispersed clusters, showing direct citations across all clusters, including the most distant Cluster 5. Moreover, IMM's gateway role is underlined by its relatively new publications: the recency of its publications with many direct citation links to other disciplines illustrate the Journal's role in bridging disciplines. In summary, the analyses lead to the premise that OPS&TECH, OR&MANSCI, INFO MAN, and MKT have all significantly shaped the extant DSC knowledge, but in very distinct ways.

Notably, both the descriptive and bibliometric analyses point to the substantial fragmentation of DSC research: Whereas the clusters might have been expected to correspond to established discipline boundaries, the disciplines are widespread across clusters. The close-knit network of direct citations across discipline boundaries underpins the necessity of an in-depth, interdisciplinary review of DSC to prevent the omission of other disciplines' findings.

2.4 Thematic Analysis

Specifically, this research analyzed the 68 papers thematically to identify the factors that facilitate DSC at general and strategy-levels. Unsurprisingly, the thematic analysis yielded a plethora of factors, some of which apply not only to DSC, but also to non-digital SC. For instance, properly defining customer requirements unquestionably favors DSC, but is also necessary for the delivery of non-digital, customized services and solutions (e.g., Tuli et al., 2007). Appendix 2.F summarizes all the factors favoring both digital and non-digital SC, whereas the following section focuses on novel, DSC-specific insights only.

Based on a thematic approach (Braun & Clarke, 2006), papers were carefully read and categorized along two dimensions: First, articles were theoretically (i.e., based on previous theoretical knowledge and according to analytical interest) categorized, depending on whether they addressed DSC in general or a specific DSC strategy. The DSC strategies that emerged were digital self-customization, collaborative, modularity-based, and full DSC (Table 2.4).

Table 2.4. Definitions of DSC at general and strategy-levels.

DSC	Characteristics	Examples	Represented In
DSC in general	<ul style="list-style-type: none"> No precise specification of "customization" in the respective studies 		<p>Belvedere et al. (2013); Brandon-Jones et al. (2016); de Jong et al. (2003); Coreynen et al. (2017); Gozman et al. (2018); Grubic (2014); Higgins et al. (2011); Huang & Rust (2017); Kindström & Kowalkowski (2014); Liu & Wang (2008); Paschou et al. (2020); Penttinen et al. (2018); Rust & Huang (2014); Schaarschmidt et al. (2018); Song (2017); Raja & Frandsen (2017); Rymaszewska et al. (2017); Xue et al. (2013); Zhu et al. (2012)</p>
Digital self-customization	<ul style="list-style-type: none"> also known as: <i>Adaptive Customization</i> Customization by the user in the individual usage context to fit individual needs Minor adaptations of a relatively standardized prototype (Gilmore & Pine II, 1997; Ma & Seidmann, 2015; MacCarthy et al., 2003) 	<ul style="list-style-type: none"> Cisco WebEx online conference applications for businesses Financial Services Information Sharing and Analysis Center's cyber and physical threat analysis CAT@ daily service delivering machine-specific daily statistics 	<p>Agrifoglio et al. (2017); Bianconi et al. (2012); Bitner et al. (2000); Chiu et al. (2003); Ma & Seidmann (2015); Marinova et al. (2017); Oliveira & Roth (2012); Zhang et al. (2004)</p>
Collaborative DSC	<ul style="list-style-type: none"> Customization through service employee for customers Customization by adaption of a service offering and/or its delivery At the (non-) digitized point-of-delivery (Gilmore & Pine II, 1997; Gwinner et al., 2005) 	<ul style="list-style-type: none"> HARVARD Kennedy School Online Executive Education Programs Epson MOVERIO smart glasses used by technician or field service agent 	<p>Bitner et al. (2000); Marinova et al. (2017); Paluch & Blut (2013)</p>

Table 2.4. Continued.

DSC	Characteristics	Examples	Represented In
Modularity-Based DSC	<ul style="list-style-type: none"> also known as: <i>Partial Customization, Customized Standardization</i> Customization through a customer-specific combination of standardized service and/or product modules Modules are connected through unified interfaces (Baldwin & Clark, 1997; Böttcher & Klingner, 2011; Lampel & Mintzberg, 1996; Pekkarinen & Ulkuniemi, 2008; Squire et al., 2006) 	<ul style="list-style-type: none"> Aurora Telecom configurators for internet and communications contracts BOSCH Nexeed Portfolio of connected manufacturing and industry services 	<p>Apte et al. (1999); Ardolino et al. (2018); Bask, Lipponen, et al. (2010); Bask et al. (2014); Bask et al. (2010); Berthon et al. (1999); Böttcher & Klingner (2011); Cenamor et al. (2017); Eloranta & Turunen (2016); Hoerber & Schaarschmidt (2017); Hoogeweegen et al. (1999); Jarvenpaa & Ives (1994); Kuo (2013); Leminen et al. (2020); Löfberg & Åkesson (2018); Liechty et al. (2001); Meyer et al. (2007); Mithas & Whitaker (2007); Moghaddam & Nof (2018); Moore et al. (2008); Nordin & Kowalkowski (2010); Pekkarinen & Ulkuniemi (2008); Peters & Saidin (2000); Rajala et al. (2019); Rodrigues et al. (2018); Salonen et al. (2018); Snowdon et al. (2000); Song & Sakao (2017); Sun et al. (2017); Susarla et al. (2010); Unver (2011); van Liere et al. (2004); Wei et al. (2019); Yoo et al. (2010); Zhao et al. (2009)</p>
Full DSC	<ul style="list-style-type: none"> also known as: <i>Pure Customization</i> Highest possible customer involvement in design process from the beginning onwards All stages of service development and delivery are customized Tailoring for each specific customer order, resulting in specific, non-reusable offerings (Lampel & Mintzberg, 1996; Squire et al., 2006) 	<ul style="list-style-type: none"> McKinsey solutions (digitally supported professional consulting) KONE's smart people flow systems for buildings (elevators augmented with smart services) 	<p>Ardolino et al. (2018); Baines & Lightfoot (2014); Brax & Jonsson (2009); Klein (2007); Kowalkowski et al. (2013); Nordin & Kowalkowski (2010); Schaarschmidt et al. (2015)</p>

Second, articles were inductively (i.e., in a bottom up way) categorized according to factors favoring DSC. Therefrom, technology-, offering-, providers-, and customer-related factors emerged (Table 2.5). Whenever the procedure elicited new strategies and factors, the categorization was adapted accordingly. Articles addressing more than one DSC strategy or factor were assigned to multiple categories, but not all factors emerged for every strategy.

Table 2.5. Definitions of categories of factors

Factor	Definition
Technology-Related	Aspects related to the specifics of the technology enabling customization.
Offering-Related	Aspects related to the digital service offering itself.
Provider-Related	Aspects related to provider firms' structures, characteristics, activities, and abilities.
Customer-Related	Aspects related to customer firms' structures, characteristics, customer-directed activities, and customers' abilities.

To provide an effective, understandable structure (Hulland & Houston, 2020) and “to capture the complexity of the underlying phenomenon” (Palmatier et al., 2018, p. 4), the following section is organized according to the two dimensions: (1) type of DSC (DSC in general, digital self-customization, collaborative DSC, modularity-based DSC, and full DSC) and (2) favoring factors (technology-, offering-, provider-, or customer-related).

2.4.1 DSC in general

Table 2.6 presents all the factors favoring DSC at a general level.

Table 2.6. Factors favoring DSC in general.

Category	Factor	References
Technology-related	IT resources	(Belvedere et al., 2013; Coreynen et al., 2017; Gozman et al., 2018; Grubic, 2014; Huang & Rust, 2017; Liu & Wang, 2008; Paschou et al., 2020; Raja & Frandsen, 2017; Rust & Huang, 2014; Rymaszewska et al., 2017; Xue et al., 2013; Zhu et al., 2012)
	IT compatibility	(Grubic, 2014; Higgins et al., 2011)
	Real time and past data	(Coreynen et al., 2017; Grubic, 2014; Kindström & Kowalkowski, 2014; Rymaszewska et al., 2017)
Provider-related	Small firm size	(Brandon-Jones et al., 2016)
	High seniority of service employees	(Brandon-Jones et al., 2016)
	Generalist business strategy	(Brandon-Jones et al., 2016)
	Ability to make sense of data	(Coreynen et al., 2017; Paschou et al., 2020; Zhu et al., 2012)
	Ability to mitigate conflict and risk	(Coreynen et al., 2017; Kindström & Kowalkowski, 2014; Schaarschmidt et al., 2018; Song, 2017; Zhu et al., 2012)
	Ability to create innovative service offerings based on existing assets	(Coreynen et al., 2017; Kindström & Kowalkowski, 2014; Paschou et al., 2020)
	Ability to balance customization and delivery capacities	(Coreynen et al., 2017; Kindström & Kowalkowski, 2014; Raja & Frandsen, 2017; Zhu et al., 2012)
Value-selling ability	(Coreynen et al., 2017; Grubic, 2014; Kindström & Kowalkowski, 2014; Paschou et al., 2020)	
Customer-related	Active supply chain management ability	(Kindström & Kowalkowski, 2014; Rymaszewska et al., 2017)
	Small firm size	(Penttinen et al., 2018)
	Self-managed work organization	(de Jong et al., 2003)
	Inter-team work organization	(de Jong et al., 2003)
	Low technology skepticism	(de Jong et al., 2003; Grubic, 2014)
	High perceived technology usefulness	(de Jong et al., 2003)
	Digital customer requirement processing	(Coreynen et al., 2017; Song, 2017)

2.4.1.1 Technology-related factors

Several studies outline that adequate *IT resources* favor DSC in general (Belvedere et al., 2013; Coreynen et al., 2017; Gozman et al., 2018; Huang & Rust, 2017; Liu & Wang, 2008; Paschou et al., 2020; Raja & Frandsen, 2017; Rust &

Huang, 2014; Xue et al., 2013; Zhu et al., 2012). A wide range of technologies enables the tailoring of digital services to customers' individual needs (Grubic, 2014; Paschou et al., 2020; Rust & Huang, 2014; Rymaszewska et al., 2017; Xue et al., 2013); for example, ample server capacity for storing extensive data on operating hours facilitates the tailoring of predictive maintenance services.

Grubic (2014) and Higgins et al. (2011) also highlighted that *IT compatibility*, through standardization, favors DSC; for example, incompatible provider and customer systems could inhibit or even prevent the interpretation of the transmitted sensor data necessary for individualized services.

Additionally, *real time and past data*, as provided by sensors installed on assets in the field, for instance (Coreynen et al., 2017; Kindström & Kowalkowski, 2014), supports DSC. Both providers and customers can be data owners (Rymaszewska et al., 2017), but providers must ensure data security and avoid customers feeling surveilled (Grubic, 2014).

2.4.1.2 Provider-related factors

Studies also identify factors relating to provider firms' structures and abilities. Brandon-Jones et al. (2016) find that *small firm size* providers more likely customize digital service offerings than their larger peers do. Although larger firms generally customize less often, larger firms' *service employees with high seniority* (as measured by salaries exceeding \$150,000) customize more often than their younger coworkers do. Furthermore, providers pursuing a *generalist business strategy*, with a broad range of skills and markets served, customize more (Brandon-Jones et al., 2016).

Moreover, research identifies providers' *ability to make sense of data*, by processing, analyzing, and interpreting it, as a factor favoring DSC: By obtaining deeper insights into available data, providers can create customer profiles and customize service provision (Coreynen et al., 2017; Paschou et al., 2020; Zhu et al., 2012). In addition, providers benefit from the *ability to mitigate conflict and risk*

(Kindström & Kowalkowski, 2014). Ruling out chances that enhancing some aspects of the offering may negatively affect others is essential (Schaarschmidt et al., 2018; Song, 2017), since digital services such as predictive maintenance often consist of numerous digital and non-digital services, as well as one or more product(s). Since providers often deliver customized digital services according to performance guarantees and outcome-based contracting (Coreynen et al., 2017), they should carefully assess potential design constraints (Zhu et al., 2012) and correctly determine potential risks in the design phase already. DSC also benefits from providers' *ability to create innovative service offerings based on existing assets* (Coreynen et al., 2017; Kindström & Kowalkowski, 2014; Paschou et al., 2020). Although heavy machinery often remains in the field for 30 years or more, it can nevertheless represent a point of departure for innovative machine-specific digital services, such as condition monitoring through retrofits with intelligent sensors. Another factor favoring DSC is providers' *ability to balance customization and delivery capacities* (Coreynen et al., 2017; Kindström & Kowalkowski, 2014; Raja & Frandsen, 2017), which is also known as hybrid-offering-deployment capability (Coreynen et al., 2017) or flow knowledge (Zhu et al., 2012) and streamlines the internal processing of customer requirements collected through a front-end interface. Furthermore, providers' *value-selling ability* (Coreynen et al., 2017) favors DSC. A digital offering's intangibility likely makes it harder for customers to understand its value proposition; thus, co-creation (Paschou et al., 2020) and comprehensible value visualization throughout the entire sales process (Grubic, 2014; Kindström & Kowalkowski, 2014) are crucial. Finally, providers' *active supply chain management ability* supports DSC (Kindström & Kowalkowski, 2014). Many providers integrate external partners, such as cloud or software providers, into the development and delivery of digital services to complement their own skills and capacities. Although all the case firms use closed systems, Rymaszewska et al. (2017) point out that external partners' contributions through open systems boost

application and innovation of digital services; thus, they recommend a balance between in-house development and outsourcing.

2.4.1.3 Customer-related factors

Research has also explored the customer structures and abilities that favor DSC. Penttinen et al. (2018) stress that, for *small firm size* customers, a connectivity platform's customization is more important than for larger ones, because of smaller firms' resource constraints and limited trading interactions. Moreover, customer firms characterized by *self-managed* and *inter-team work organization* more likely adopt customized IT services, because these structures allow users to experiment and become acquainted with the services (de Jong et al., 2003). Customers characterized by *low technology skepticism* qualify particularly for DSC; for instance, risk-averse user groups less likely adopt customized IT (de Jong et al., 2003) although, at the individual level, this effect vanishes. In the same vein, technology skepticism represents severe challenge for customized digital service offerings (Grubic, 2014). In turn, *high perceived technology usefulness* increases the adoption rates of customized IT services (de Jong et al., 2003). Studies also outline the relevance of *digital customer requirement processing*; for example, web applications support users in specifying and transmitting requirements (Coreynen et al., 2017). Processing these requirements can occur, for instance, through artificial neural networks (Song, 2017), enabling insights regarding customer needs to be directly embedded into the development and delivery of customized digital services.

2.4.2 Digital self-customization

Table 2.7 summarizes all the factors that favor self-customization of digital services.

Table 2.7. Factors favoring digital self-customization

Category	Factor	References
Technology-related	IT resources	(Bianconi et al., 2012; Bitner et al., 2000; Chiu et al., 2003; Marinova et al., 2017)
	Modifiability by customers	(Agrifoglio et al., 2017; Ma & Seidmann, 2015)
	IT compatibility	(Agrifoglio et al., 2017)
	Real time and past data	(Agrifoglio et al., 2017)
Offering-related	Fixed price strategy	(Ma & Seidmann, 2015)
Provider-related	High overall service orientation	(Oliveira & Roth, 2012)
Customer-related	High order volumes	(Ma & Seidmann, 2015)
	Low demand fluctuations	(Ma & Seidmann, 2015)
	Low technology skepticism	(Oliveira & Roth, 2012)
	Ability to learn	(Marinova et al., 2017)
	Digital customer requirement processing	(Agrifoglio et al., 2017; Chiu et al., 2003; Zhang et al., 2004)

2.4.2.1 Technology-related factors

Again, *IT resources* emerge as a factor favoring DSC (Bitner et al., 2000; Chiu et al., 2003); for instance, IT should be able to identify recurring patterns and trends (Marinova et al., 2017), which can serve self-customization through a library of past customization processes or suggestions. If providers wish to decrease maintenance costs, open source technology represents an appropriate option (Bianconi et al., 2012). Self-customization technology should further be characterized by *modifiability by customers*. Agrifoglio et al. (2017) suggest applications that “can be developed by ... the regular Google Play service or developed by anyone” (p. 1302). Ma and Seidmann (2015) describe modifiability through alterations of a service’s core architecture to enable customers to adapt source code themselves. Agrifoglio et al. (2017) further highlight *IT compatibility* through open technology; for instance, to install additional service features when

desired by customers. Moreover, they emphasize the importance of *real time and past data* for the continuous customization of digital services.

2.4.2.2 Offering-related factors

For self-customizable digital services, Ma and Seidmann (2015) recommend a *fixed price strategy*, but suggested subscription and pay-per-use pricing for relatively standardized software-as-a-service offerings. Although the authors generally advocate premium prices for self-customizable digital services, they propose offerings with different or reduced features at reduced prices for smaller customers with limited purchasing power (Ma & Seidmann, 2015).

2.4.2.3 Provider-related factors

Oliveira and Roth (2012) find that DSC represents one dimension of overall e-service capability which, in turn, is increased by providers' *high overall service orientation*, consisting of service climate, market focus, process management, HR policies, and metrics and standards (Oliveira & Roth, 2012).

2.4.2.4 Customer-related factors

Self-customization is suitable for customers with *high order volumes* and relatively *low demand fluctuations* (Ma & Seidmann, 2015). For such customers, volumes justify the aforementioned premium prices, whereas stable demand keeps customers' ongoing customization efforts manageable.

Moreover, *low technology skepticism* favors the self-customization of digital services. Oliveira and Roth (2012) find that customers' technology receptivity influences providers' e-service capability positively and, thus, the level of DSC they can provide. Moreover, customers' *ability to learn* facilitates self-customization. Customers' learning (i.e., interpreting specific experiences and generating generalizable knowledge; Marinova et al., 2017) improves customers' preference insights and, thus, digital self-customization processes. In addition, *digital customer requirement processing* favors self-customization. Agrifoglio et al. (2017) and Chiu et al. (2003), for instance, highlight user interfaces, while Zhang et al. (2004)

suggest a portal environment (i.e., a function- and content-driven, structured frame supporting users in executing digital self-customization).

2.4.3 Collaborative DSC

Table 2.8 depicts all the factors favoring collaborative DSC.

Table 2.8. Factors favoring collaborative DSC

Category	Factor	References
Technology-related	IT resources	(Bitner et al., 2000; Marinova et al., 2017)
Offering-related	Customer contact (high)	(Paluch & Blut, 2013)
Provider-related	Ability to learn	(Marinova et al., 2017)

2.4.3.1 *Technology-related factors*

Adequate *IT resources* also favor collaborative customization. Studies suggest that provider service employees can increase their learning (Marinova et al., 2017), and an encounter's effectiveness and efficiency (Bitner et al., 2000), by using digital technology; for instance, sales force automation supports service employees in easily tracing customer relationships and eventually using that information to customize service offerings in collaboration with customers.

2.4.3.2 *Offering-related factors*

Furthermore, collaborative customization is appropriate when offerings involve *high customer contact* (Paluch & Blut, 2013). When customers are present during service delivery (i.e., not physically separated) or, at least, receive information during service delivery (i.e., they are not mentally separated), they perceive service offerings as better customized; however, if customers themselves advocate a (physical or mental) separation from service delivery, they perceive those separated digital services as more effectively customized (Paluch & Blut, 2013).

2.4.3.3 Provider-related factors

Marinova et al. (2017) theorize that digital technologies fuel provider service employees' *ability to learn* and, thus, improve collaborative customization; for example, advanced customer relationship management applications generate customer-specific information, which supports tailoring digital services to individual requirements. Learning is particularly important for digital services, because development cycles are much shorter for digital than for non-digital ones, due to rapid technological changes.

2.4.4 Modularity-based DSC

Table 2.9 lists all the factors favoring modularity-based DSC.

Table 2.9. Factors favoring modularity-based DSC

Category	Factor	References
Technology-related	IT resources	(Apte et al. 1999; Ardolino et al., 2018; Bask et al., 2014; Berthon et al., 1999; Moore et al., 2008; Nordin & Kowalkowski, 2010; Peters & Saidin, 2000; Yoo et al., 2010)
	IT compatibility	(Bask, Lipponen, et al., 2010; Berthon et al., 1999; Böttcher & Klingner, 2011; Cenamor et al., 2017; Meyer et al., 2007; Pekkarinen & Ulkuniemi, 2008; Rajala et al., 2019; Salonen et al., 2018; Snowdon et al., 2000; Susarla et al., 2010; Unver, 2011; van Liere et al., 2004; Yoo et al., 2010)
	Real time and past data	(Moore et al., 2008; Song & Sakao, 2017)
Offering-related	Adequate number and diversity of modules	(Böttcher & Klingner, 2011; Cenamor et al., 2017; Moghaddam & Nof, 2018; Peters & Saidin, 2000; Rajala et al., 2019; Rodrigues et al., 2018)
	High information intensity	(Apte et al., 1999; Mithas & Whitaker, 2007)
	Low skill levels of service employees	(Mithas & Whitaker, 2007)
	Customer contact (low) Fixed price strategy	(Mithas & Whitaker, 2007) (Susarla et al., 2010)

Table 2.9. Continued.

Category	Factor	References
Provider-related	Structured knowledge storing	(Jarvenpaa & Ives, 1994; Song & Sakao, 2017)
	Modular firm structures	(Pekkarinen & Ulkuniemi, 2008)
	Process accountability of service employees	(Peters & Saidin, 2000)
	Active supply chain management ability	(Bask, Lipponen, et al., 2010; Bask et al., 2014; Bask, Tinnilä, et al., 2010; Eloranta & Turunen, 2016; Hoogeweegen et al., 1999; Leminen et al., 2020; Moghaddam & Nof, 2018; Pekkarinen & Ulkuniemi, 2008; Rajala et al., 2019; Salonen et al., 2018; Susarla et al., 2010; van Liere et al., 2004; Wei et al., 2019; Zhao et al., 2009)
	Ability to balance customization and delivery capacities	(Cenamor et al., 2017; Hoogeweegen et al., 1999; Pekkarinen & Ulkuniemi, 2008)
	Value-selling ability	(Liechty et al., 2001; Rajala et al., 2019; Sun et al., 2017)
Customer-related	Ability to learn	(Hoeber & Schaarschmidt, 2017; Rajala et al., 2019)
	Ability to make sense of data	(Löfberg & Åkesson, 2018; Peters & Saidin, 2000)
	Integrated cross-organizational processes	(Wei et al., 2019)
	Digital customer requirement processing	(Kuo, 2013; Moore et al., 2008; Pekkarinen & Ulkuniemi, 2008)

2.4.4.1 Technology-related factors

As for the preceding strategies, adequate *IT resources* favor modularity-based DSC (Apte et al., 1999; Berthon et al., 1999; Nordin & Kowalkowski, 2010; Peters & Saidin, 2000). Specifically, IT should enable the acquisition, pre-processing, and management of data (Moore et al., 2008), for example, by identifying both users and assets (Ardolino et al., 2018). Furthermore, IT should be flexible and fully integrated (Bask et al., 2014). Research also highlights the layered modular architecture of IT, which can turn products into digital service platforms (Yoo et al., 2010).

Modularity-based DSC is also facilitated by *IT compatibility* in terms of modules being standardized, compatible, and substitutable through uniform interfaces (Bask, Lipponen, et al., 2010; Pekkarinen & Ulkuniemi, 2008; Yoo et al., 2010), which is particularly important for future alterations or updates (Böttcher &

Klingner, 2011; Rajala et al., 2019). The principle underlying modularity is “quantization” (p. 100): a breaking down of monolithic services into the smallest possible elements (Berthon et al., 1999), each of which forms part of a superordinate service process (Snowdon et al., 2000). Interfaces are clearly defined ties enabling the encapsulation and decoupling of modules and smooth information exchange between them (Meyer et al., 2007; Susarla et al., 2010; van Liere et al., 2004). For interfaces to work, clear module boundaries are essential (Pekkarinen & Ulkuniemi, 2008). Interfaces connecting digital service and physical product modules are particularly challenging to design (Unver, 2011), since open standards are almost nonexistent in manufacturing industries (Salonen et al., 2018). External partners frequently provide modules that require cross-firm unified interfaces and standards (Cenamor et al., 2017; Rajala et al., 2019; Salonen et al., 2018; van Liere et al., 2004; Yoo et al., 2010). To this end, platforms (i.e., “technological infrastructures that allow firms to develop, configure, and deliver advanced services”; Cenamor et al., 2017, p. 55), represent a fruitful approach, since they combine core (i.e., existing or own) and peripheral (i.e., new or external) modules (Salonen et al., 2018; Yoo et al., 2010).

Furthermore, modularity-based DSC is facilitated by *real time and past data* (Moore et al., 2008), which serves as valuable input for reconfigurations of existing offerings and new sales (Song & Sakao, 2017); for instance, customers’ past usage volumes might serve as input for the selection of suitable modules of data and telephone capacity from professional internet and communications providers.

2.4.4.2 Offering-related factors

Regarding service offerings, an *adequate number and diversity of modules* favors modularity-based DSC. For most customers, a limited number of modules and configurations offers sufficient variety (Cenamor et al., 2017; Rajala et al., 2019; Rodrigues et al., 2018). Accordingly, the structured configuration process proposed by Böttcher and Klingner (2011) rests on the free composition of modules, but within

a pre-defined scope. However, the range of selectable modules needs to be wide enough not to impair the “likelihood of finding the best match for each individual” module (Moghaddam & Nof, 2018, p. 686). Peters and Saidin (2000) therefore recommend, especially for smaller provider firms, focusing on economies of scope by offering a sufficiently broad range of choices.

High information intensity also facilitates modularity-based DSC services. In contrast to physical actions, services in which the ratio of time spent on information is high are particularly prone to being modularized, codified, and standardized through IT (Mithas & Whitaker, 2007). For highly information-intensive services, modularity enables the adoption of the so-called “case manager approach” (i.e., one employee responsible for all service modules, thus representing “one face” to the customer; Apte et al., 1999). Services suitable for modularity-based DSC require *low skill levels of employees* and *low customer contact* (i.e., ratios of time spent on physical presence; Mithas & Whitaker, 2007). Finally, Susarla et al. (2010) claim that a *fixed price strategy* is eight times more likely to be adopted for modularity-based customization of digital services, because modularity loosens interdependencies and fosters task separation between suppliers and customers.

2.4.4.3 Provider-related factors

To adopt modularity-based DSC, providers should implement *structured knowledge storing*. To exploit existing knowledge about customers or previously provided modules, knowledge should be structured and electronically stored in “replicable units”, accessible irrespective of time and/or place (Jarvenpaa & Ives, 1994, p. 36). For this purpose, Song and Sakao (2017) propose libraries from which knowledge units can be retrieved for customization purposes.

Furthermore, *modular firm structures* (Pekkarinen & Ulkuniemi, 2008) support modularity-based DSC. Specifically, internal (e.g., a provider’s digital business development unit) and external (e.g., consultancy) modules should be organized in a standardized way for the development and delivery of a modular

digital service offering. Peters and Saidin (2000) stress the *process accountability of service employees*. Being accountable empowers service employees to take appropriate action in “unpredictable and ad hoc situations” (Peters & Saidin, 2000, p. 107), such as might occur, for example, when predictive maintenance services issue alert machine failure.

Moreover, modularity-based DSC benefits from a provider’s *active supply chain management ability*, since modules (e.g., for payment) are often provided by external partners (Bask, Lipponen, et al., 2010; Bask et al., 2014; Bask, Tinnilä, et al., 2010; Eloranta & Turunen, 2016; Wei et al., 2019). Accordingly, Moghaddam and Nof’s (2018) calculation of module integration rests on the collaboration of all module-providing partners. Partner networks in which some partners are unwilling to cooperate are potentially conflict-laden and unstable (Moghaddam & Nof, 2018). Hoogeweegen et al. (1999) suggest that, through the so-called “virtual organization”, collaboration between provider firms can arise and dissolve quickly. Integrating external modules is crucial especially for small, volatile markets (Pekkarinen & Ulkuniemi, 2008). Module integration generally necessitates unified, standardized, and collaborative business processes (van Liere et al., 2004; Zhao, Liu, Yang, & Sadiq, 2009) and the integration of external modules into existing structures (Salonen et al., 2018), which can occur through different mechanisms (Eloranta & Turunen, 2016). Involving external partners allows providers to focus on core modules (Rajala et al., 2019; Susarla et al., 2010) and strongly influences a provider’s overall business model (Leminen et al., 2020). Moreover, providers’ *ability to balance customization and delivery capacities* supports modularity-based DSC. Hoogeweegen et al. (1999) and Pekkarinen and Ulkuniemi (2008) emphasize the particular role of modular internal processes in matching module requirements and available capacities; for instance, separating platform front-end and back-end processes prevents responsibility overlaps for solution building and platform orchestration (Cenamor et al., 2017). Furthermore, research stresses providers’

value-selling ability; for example, a digital service offering's intangibility necessitates increased efforts to make a particular module's value more tangible through a "clarification of the offering concept" (Rajala et al., 2019, p. 646). Moreover, providers need to determine customers' willingness to pay for separate modules exactly (Liechty et al., 2001; Sun et al., 2017). Due to intangibility, determining prices for digital modules is likely to be much more challenging than for non-digital ones. Additionally, providers' *ability to learn* to as a means to build knowledge about how to combine service and product modules fosters modularity-based DSC (Hoeber & Schaarschmidt, 2017). Such learning can be both exploitative (i.e., based on existing knowledge) and explorative (i.e., based on new experiences; Rajala et al., 2019). Moreover, modularity-based DSC benefits from provider service employees' *ability to make sense of data* (Löfberg & Åkesson, 2018). In spite of promising innovations such as artificial intelligence, many firms have human service employees analyze, or at least double-check, most of the data transmitted from machine sensors. By having the required skills (Peters & Saidin, 2000), service employees thus turn mere data into value (Löfberg & Åkesson, 2018).

2.4.4.4 Customer-related factors

Furthermore, modularity-based DSC benefits from *integrated cross-organizational processes* between customers and providers, which depend on a digital offering's openness (Wei et al., 2019); for instance, some digitized service modules require frequent information exchange between customers and provider firms or run only when connected to master data hosted by the provider firm.

Adequate tools for *digital customer requirement processing* also favor modularity-based DSC (Kuo, 2013): for instance, Pekkarinen and Ulkuniemi (2008) emphasize the importance of a digital service platform having a modular customer interface (i.e., process or organizational modules that capture customer requirements). Moore et al. (2008) recommend a user interface for modularity-based

customization: a so-called “scenario manager” enables users to digitally select and combine service modules, which then triggers service production and delivery.

2.4.5 Full DSC

Table 2.10 shows all the factors favoring full DSC.

Table 2.10. Factors favoring full DSC

Category	Factor	References
Technology-related	IT resources	(Ardolino et al., 2018; Baines & Lightfoot, 2014; Brax & Jonsson, 2009; Nordin & Kowalkowski, 2010)
	Real time and past data	(Kowalkowski et al., 2013)
Offering-related	Integrated offerings	(Brax & Jonsson, 2009; Kowalkowski et al., 2013)
Provider-related	Flexibility	(Schaarschmidt et al. 2015)
	Ability to balance customization and delivery capacities	(Baines & Lightfoot, 2014)
	Value-selling ability	(Ardolino et al., 2018; Baines & Lightfoot, 2014)
Customer-related	Integrated cross-organizational processes	(Baines & Lightfoot, 2014; Brax & Jonsson, 2009)
	Information sharing	(Klein, 2007)

2.4.5.1 Technology-related factors

Like aforementioned strategies, full DSC benefits from adequate *IT resources*. Nordin and Kowalkowski (2010) identify technological developments as important external antecedents for solutions. Since IT enables remote access and autonomous, real-time optimization analyses (Ardolino et al., 2018; Baines & Lightfoot, 2014; Brax & Jonsson, 2009), providers gain insights into customers' behavior, which supports the effective customization of digital offerings. Additionally, *real time and past data* (Kowalkowski et al., 2013) favors full DSC for the previously outlined reasons.

2.4.5.2 Offering-related factors

According to Brax and Jonsson (2009), fully customized digital services should be delivered as *integrated offerings*. Specifically, the authors emphasize a so-called “basic-level integration” between the parts of a solution offering, referring

to the coordination and smooth “co-functioning” (p. 551) of product and service parts. Due to the offering’s uniqueness, such co-functioning is critical, because readjustments can easily become very expensive. Kowalkowski et al. (2013) extend this notion by positing the bundling of customized digital services, together with existing offerings, but also in a standalone manner. Especially for the rental models or outcome-based contracting often employed in digitized environments, this is of note.

2.4.5.3 Provider-related factors

To fully customize digital services, Schaarschmidt et al. (2015) recommend provider *flexibility*, referring to providers accepting low control over the design parameters, especially when customers face high environmental turbulence and need the digital service offering to adapt repeatedly (Schaarschmidt et al., 2015). For digital services, flexibility might enable, for instance, an offering’s adjustment through only a few mouse clicks. In addition, providers’ *ability to balance customization and delivery* fosters full customization by maintaining a balance between front-end service employees mainly executing customization tasks (Baines & Lightfoot, 2014) and back-end service employees coordinating resource composition. Research also highlights providers’ *value-selling ability*: especially for digital and, therefore, intangible services, providers must ensure that they measure (Ardolino et al., 2018) and demonstrate value for customers (Baines & Lightfoot, 2014).

2.4.5.4 Customer-related factors

Integrated cross-organizational processes facilitate full DSC between customers and providers (Baines & Lightfoot, 2014; Brax & Jonsson, 2009). For digital services, integrated processes are essential, since some processes might run at customers’ sites only when connected to master data hosted by the provider firm. Brax and Jonsson (2009) referred to this as “higher-level integration between systems” (p. 551).

Klein, (2007) stress the importance of *information sharing* between customers and providers. Although information sharing might also be important for non-digital full customization, the information required for full DSC is likely to be “fuzzier” and more complex: for instance, customers might be unaware of customization potential, which is why increased frequency and depth of information sharing are vital.

2.4.6 Subdiscussion of the thematic analysis

The thematic analysis unveils technology-, offering-, provider-, and customer-related factors favoring DSC in general as well as digital self-customization, collaborative, modularity-based, and full DSC (for a holistic overview, please see Appendix 2.F). Closer inspection reveals the distinct nature of the four categories: whereas technology-related factors are few, but studied extensively, a contrary picture emerges for the remaining categories. With the exception of providers' *active supply chain management ability*, the broad variety of offering-, provider-, and customer-related factors are rarely investigated. The scarcity of profound insights on providers and customers is particularly surprising, given their importance for successful customization across strategies. In terms of DSC strategies, the thematic analysis indicates a strong bias toward modularity-based DSC. Whereas the multitude of insights generates a rich, nuanced understanding of modularity-based DSC, especially digital self-customization and collaborative DSC remain poorly understood. The thematic analysis also yields a substantial number of insights into DSC in general, which are not attributable to a specific DSC strategy. The fact that some of these insights replicate at the strategy level partly mitigate this shortfall; for instance, providers' *ability to make sense of data* emerged for DSC in general, but also for modularity-based DSC. For the remaining factors, their transferability to certain strategies remains unverified.

2.5 General Discussion

The purpose of this article was threefold: First, it sought to identify different disciplines' contributions to current DSC knowledge. Based on an in-depth descriptive and bibliometric analysis of 68 research papers, this work identifies the unique ways in which four major contributors (OPS&TECH, OR&MANSCI, INFO MAN, and MKT) have shaped the extant DSC research. While OPS&TECH's contribution rely on volume, OR&MANSCI and INFO MAN were "door openers" for DSC research. Notably, IMM, as the single largest contributor and cross-disciplinary gateway, primarily drives MKT's contribution. Second, this work aimed to identify the factors favoring DSC at the general and strategy-levels. An in-depth thematic analysis yields a comprehensive set of technology-, offering-, provider-, and customer-related factors that favor DSC in general and support digital self-customization, collaborative, modularity-based, and full DSC. The analysis reveals that a thorough understanding of modularity-based DSC and technology-related factors exists, but other strategies and factors remain hitherto under-researched. To facilitate future research on DSC and address the paper's third goal, the following section of this article proposes a fine-grained research agenda.

2.5.1 Research agenda

The following section outlines key lacunas in the literature as revealed by the descriptive, bibliometric, and thematic analyses. To fill these gaps, it proposes a series of research questions (Table 2.11).

Table 2.11. Research agenda

Research Gap	Exemplary Research Questions
Transferability of insights	<ul style="list-style-type: none"> • Which general-level factors replicate on strategy-level? • Which do not and why? • To what extent do factors differ for standalone and product-based services? • Are some DSC strategies better suited for standalone (versus product-based) services than others are?
Relative importance and interrelationships of factors	<ul style="list-style-type: none"> • To what extent does the importance of factor vary within and across strategies (e.g., baseline and higher-order factors)? • To what extent do factors influence each other? • Which configurations of abilities cause the best financial and/or behavioral outcomes (see below)?
Trajectories towards DSC	<ul style="list-style-type: none"> • How do firms move along the DSC strategy continuum? • What is the transition trajectory from non-digital SC to DSC? • Which hurdles do providers encounter on their trajectory and how can they overcome them?
Outcomes of DSC	<ul style="list-style-type: none"> • Which financial and behavioral outcomes do different DSC strategies achieve (e.g., WTP, repurchase rates, loyalty)? • To what extent do strategies differ in their outcomes? • How do customized digital service offerings change over time for different DSC strategies?

2.5.1.1 *Transferability of insights*

The thematic analysis yields multiple insights into DSC in general, which are not attributable to a specific DSC strategy; for instance, the role that providers' *ability to mitigate conflict and risk* plays for particular DSC strategies remains unclear. Studies could therefore investigate which of the factors identified for DSC at a general level are also relevant for specific DSC strategies, thus extending both theoretical and managerial understandings of these strategies. Moreover, while this study did not differentiate between standalone (e.g., digital information services) and product-based services (e.g., predictive maintenance), future research could investigate whether factors differed for different service types, in order to help resolve contradictions in the literature regarding customized digital product-based services. Whereas some studies define product-based services as relatively standardized (Kowalkowski et al., 2013), others advocate customized product-oriented services (Leminen et al., 2020).

2.5.1.2 *Relative importance and interrelationships of factors*

Whilst the purpose of this study was to identify the factors that favored DSC, the relative importance of factors within and across strategies remains unclear; for example, future research endeavors could attempt to differentiate baseline factors (e.g., IT resources) from higher-order factors (e.g., data interpretation skills), both within and across strategies. To identify optimal configurations of factors, advanced methods, such as fuzzy set qualitative comparative analyses, seem appropriate. In addition, research could consider potential interrelationships and examine whether some factors must exist for others to occur. Such work would substantially enrich the present study's insights and help managers to identify starting points for adopting or switching to a specific DSC strategy.

2.5.1.3 *Trajectories towards DSC*

Another avenue worth scholarly attention is whether firms follow certain DSC trajectories. While there is evidence for trajectories from less to more customized service offerings and vice versa in solutions and servitization research (e.g., Kowalkowski et al., 2015), no such insights exist specifically for DSC; therefore, this research proposes that future studies map out potential trajectories from one DSC strategy to another, and from non-digital SC to DSC. Moreover, insights into how to mitigate potential hurdles on these transition trajectories would extend DSC research and prove useful for marketers' strategic decision-making.

2.5.1.4 *Outcomes of DSC*

Finally, while this research provides a synthesized and comprehensive overview of the factors that favor DSC, insights regarding outcomes at the general and strategy-levels remain scattered across articles and research disciplines; thus, this paper calls for studies that summarize, for example, the financial and behavioral outcomes of DSC at both the general and strategy-levels. Additionally, research could extend the understanding of the outcomes of DSC by longitudinally mapping out changes in customized digital service offerings for different strategies.

2.5.2 Theoretical contributions

Through its unique approach, this article provides three main theoretical contributions to DSC research: First, it extends extant reviews related to DSC (e.g., Grubic, 2014; Raddats et al., 2019) by delivering a precise profile of six research disciplines' distinct contributions to the current body of DSC knowledge. Whereas OPS&TECH contribute the majority of studies, OR&MANSCI and INFO MAN publications first opened up the research field. Notably, MKT fulfills an important gateway role, mainly through IMM. These findings provide evidence that single-discipline reviews cannot deliver such comprehensive insights on a topic as multi-discipline reviews can. Although Paschou et al.'s (2020) review included several disciplines, it did not provide such granular insights into the topic's structure and evolution as the present work does.

Second, this work stands out from existing ones through its comprehensiveness: in contrast to reviews focusing only on modularity (Bask, Lipponen, et al., 2010; Liu & Wang, 2008; Pekkarinen & Ulkuniemi, 2008; Peters et al., 2018), this review identifies and comprehensively synthesizes technology-, offering-, provider-, and customer-related factors that favor DSC at general and strategy-levels. Based on an in-depth thematic analysis, this research is therefore the first to facilitate cross-strategy comparisons. The study provides proof that modularity-based DSC and technology-related factors are thoroughly studied, whereas especially digital self-customization and collaborative DSC, as well as provider- and customer-related factors, remain strikingly under-researched.

Third, to formalize these insights and facilitate their exploitation by peer scholars, this work provides a research agenda with detailed research questions. The agenda identifies "pressing under-researched areas, and prioritize[s] research topics" (Lindgreen & Di Benedetto, 2018, p. 3), to guide interested scholars' attempts to explore DSC further; for instance, it proposes more research on trajectories from one DSC strategy to another, and from non-digital SC to DSC.

2.5.3 Managerial implications

DSC is imperative for successfully mastering digital service innovation but, to reap the benefits of DSC, marketers must understand which DSC strategies are suitable for the digital service offerings, resources, and contexts of their firms. This paper's particular goal was therefore to provide useful, viable implications for managers, especially those struggling to identify the most suitable strategy along a continuum from relatively standardized to full customization (Ostrom et al., 2010). This work proposes a comprehensive, easy-to-handle toolbox of factors that merit managerial attention when adopting or switching to a certain DSC strategy (Appendix 2.F), thus enabling managers to quickly "track down all the available literature themselves" (Paschou et al., 2020) and identify the most suitable strategies for their specific environments.

The insights lead to the premise that investments in adequate, compatible IT facilities is key; therefore, digital service providers might consider cloud computing as an option for remote service delivery and data storage. Regarding the offerings themselves, this paper provides recommendations primarily in terms of modularity-based DSC; for example, this strategy is particularly suitable when a significant proportion of a service offering consists of information. Professional information providers, such as the Financial Services Information Sharing and Analysis Center, could thus consider adopting a modularity-based strategy for the customization of digital cyber threat analyses. Moreover, provider abilities represent interesting factors meriting closer inspection: in the short-term, providers might consider investing in employee training on value selling or data analysis. In the long-term, providers should aim to create internal structures enabling streamlined interaction between front- and back-end employees (e.g., agile teams) and foster innovative thinking within the firm (e.g., through design thinking). Finally, the identification of suitable customer segments through customer surveys merits managerial attention

and providers could adopt measures to assess customers' levels of technology skepticism, thus identifying customers open to DSC.

2.5.4 Limitations

Although this research was executed with due diligence and best efforts to ensure the highest possible rigor, some limitations must still be noted: First, this article followed previous work (Paschou et al., 2020; Raddats et al., 2019) in excluding all publication types except peer-reviewed journals (e.g., books, unranked journals). Despite the exclusion unquestionably limiting the insights, it should be acknowledged that no "review paper can be truly comprehensive" (Hulland & Houston, 2020, p. 353).

Second, citations made for questionable reasons (Backhaus et al., 2011) could have influenced the bibliometric analysis of direct citations. However, since this potential bias would have affected any citation-based bibliometric analysis (e.g., co-citation analysis), the decision was taken to maximize displayable relatedness through direct citation analysis (van Eck & Waltman, 2017).

Third, personal experiences or educational background might have influenced the paper selection and research agenda. Indubitably, decisions about whether to include or exclude a certain paper or potential research question were relatively subjective but, by following rigorous procedures (Braun & Clarke, 2006; Denyer & Tranfield, 2009), personal biases were reduced to a minimum.

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2.7 Appendices

Appendix 2.A. Search strings.

(IS³ (...)) AND (AB (service AND (personali* OR customi* OR tailor* OR individual* OR modul*) AND (digi* OR technolog* OR remote OR smart OR online OR web OR data OR artificial OR augmented OR agent OR bot OR cloud OR internet))) OR (IS (...)) AND (TI (service AND (personali* OR customi* OR tailor* OR individual* OR modul*) AND (digi* OR technolog* OR remote OR smart OR online OR web OR data OR artificial OR augmented OR agent OR bot OR cloud OR internet))) OR (IS (...)) AND (KW (service AND (personali* OR customi* OR tailor* OR individual* OR modul*) AND (digi* OR technolog* OR remote OR smart OR online OR web OR data OR artificial OR augmented OR agent OR bot OR cloud OR internet)))

³ ISSN numbers of the selected journals of each discipline.

Appendix 2.B. Exclusion criteria.

Category	Exclusion criteria
Format	<ul style="list-style-type: none">• Editorials• Books and book reviews• Conference papers
Focus	<ul style="list-style-type: none">• Consumer research• (Services for) Product customization• Customization or personalization of communication, websites, e-commerce environments• Service customization in the healthcare context directed at patients not professionals
Content Misspecifications	<ul style="list-style-type: none">• Individuals as persons• Individual levels of investigation• Personality• Modulation• System modules (e.g., for manufacturing systems)• Service level (e.g., in terms of production time)

Appendix 2.C. Final body of literature.

#	Author(s) (Year)	Publication Title	Discipline	Journal
1	Berthon, Pitt, Katsikeas, & Berthon (1999)	Executive insights: Virtual services go international: International services in the marketspace	MKT	JIM
2	Bitner, Brown, & Meuter (2000)	Technology Infusion in Service Encounters	MKT	JAMS
3	Böttcher & Klingner (2011)	Providing a method for composing modular B2B services	MKT	JBIM
4	Coreynen, Matthyssens, & Van Bockhaven (2017)	Boosting servitization through digitization: Pathways and dynamic resource configurations for manufacturers	MKT	IMM
5	Eloranta & Turunen (2016)	Platforms in service-driven manufacturing: Leveraging complexity by connecting, sharing, and integrating	MKT	IMM
6	Huang & Rust (2017)	Technology-driven service strategy	MKT	JAMS
7	Kindström & Kowalkowski (2014)	Service innovation in product-centric firms: A multidimensional business model perspective	MKT	JBIM
8	Kowalkowski, Kindström, & Gebauer (2013)	ICT as a catalyst for service business orientation	MKT	JBIM
9	Leminen, Rajahonka, Wendelin, & Westerlund (2020)	Industrial internet of things business models in the machine-to-machine context	MKT	IMM
10	Liechty, Ramaswamy, & Cohen (2001)	Choice menus for mass customization: An experimental approach for analyzing customer demand with an application to a web-based information service	MKT	JMR
11	Liu & Wang (2008)	Forecast competitor service strategy with service taxonomy and CI data	MKT	EJM
12	Löfberg & Akesson (2018)	Creating a service platform – how to co-create value in a remote service context	MKT	JBIM
13	Paschou, Rapaccini, Adrodegari, & Saccani (2020)	Digital servitization in manufacturing: A systematic literature review and research agenda	MKT	IMM
14	Rust & Huang (2014)	The service revolution and the transformation of marketing science	MKT	MS
15	Salonen, Rajala, & Virtanen (2018)	Leveraging the benefits of modularity in the provision of integrated solutions: A strategic learning perspective	MKT	IMM
16	Wei, Geiger, & Vize (2019)	A platform approach in solution business: How platform openness can be used to control solution networks	MKT	IMM

Appendix 2.C. Continued.

#	Author(s) (Year)	Publication Title	Discipline	Journal
17	Gozman, Liebenau & Mangan (2018)	The Innovation Mechanisms of Fintech Start-Ups: Insights from SWIFT's Innotribe Competition	INFO MAN	JMIS
18	Jarvenpaa & Ives (1994)	The global network organization of the future: Information management opportunities and challenges	INFO MAN	JMIS
19	Ma & Seidmann (2015)	Analyzing software as a service with per-transaction charges	INFO MAN	ISR
20	Mithas & Whitaker (2007)	Is the world flat or spiky? Information intensity, skills, and global service disaggregation	INFO MAN	ISR
21	Penttinen, Halme, Lyytinen, & Myllynen (2018)	What Influences Choice of Business-to-Business Connectivity Platforms?	INFO MAN	IJEC
22	Peters & Saidin (2000)	IT and the mass customization of services: the challenge of implementation	INFO MAN	IntJIM
23	Sun, Zhao, & Sarkar (2017)	How high should we go? Determining reservation values to negotiate successfully for composite software services	INFO MAN	ISR
24	Susarla, Barua, & Whinston (2010)	Multitask agency, modular architecture, and task disaggregation in SaaS	INFO MAN	JMIS
25	van Liere, Hagdorn, Hoogeweegen, & Vervest (2004)	Embedded coordination in a business network	INFO MAN	JIT
26	Yoo, Henfridsson, & Lyytinen (2010)	The new organizing logic of digital innovation: An agenda for information systems research	INFO MAN	ISR
27	Zhang, Zambrowicz, Zhou, & Roderer (2004)	User information seeking behavior in a medical Web portal environment: A preliminary study	INFO MAN	JASIST
28	Schaarschmidt, Walsh, Bertram, & von Kortzfleisch (2015)	Customer-induced interactions and innovation in professional services: The case of software customisation	INNOV	IJInnM
29	Agrifoglio, Cannavale, Laurenza, & Metallo (2017)	How emerging digital technologies affect operations management through co-creation. Empirical evidence from the maritime industry	OPS&TECH	PPC
30	Ardolino, Rapaccini, Saccani, Gaiardelli, Crespi, & Ruggeri (2018)	The role of digital technologies for the service transformation of industrial companies	OPS&TECH	IJPR

Appendix 2.C. Continued.

#	Author(s) (Year)	Publication Title	Discipline	Journal
31	Baines & Lightfoot (2014)	Servitization of the manufacturing firm: Exploring the operations practices and technologies that deliver advanced services	OPS&TECH	IJOPM
32	Bask, Lipponen, Rajahonka, & Tinnilä (2010)	The concept of modularity: Diffusion from manufacturing to service production	OPS&TECH	JMTM
33	Bask, Merisalo-Rantanen, & Tuunanen (2014)	Developing a Modular Service Architecture for E-store Supply Chains: The Small- and Medium-Sized Enterprise Perspective	OPS&TECH	SSCI
34	Bask, Tinnilä, & Rajahonka (2010)	Matching service strategies, business models and modular business processes	OPS&TECH	BPMJ
35	Belvedere, Grando, & Bielli (2013)	A quantitative investigation of the role of Information and Communication Technologies in the implementation of a product-service system	OPS&TECH	IJPR
36	Brandon-Jones, Lewis, Verma, & Walsman (2016)	Examining the characteristics and managerial challenges of professional services: An empirical study of management consultancy in the travel, tourism, and hospitality sector	OPS&TECH	JOM
37	Brax & Jonsson (2009)	Developing integrated solution offerings for remote diagnostics: A comparative case study of two manufacturers	OPS&TECH	IJOPM
38	Cenamor, Rönnerberg Sjödin, & Parida (2017)	Adopting a platform approach in servitization: Leveraging the value of digitalization	OPS&TECH	IJPE
39	Grubic (2014)	Servitization and remote monitoring technology: A literature review and research agenda	OPS&TECH	JMTM
40	Hoeber & Schaarschmidt (2017)	Transforming from service providers to solution providers: Implications for provider-customer relationships and customer-induced solution innovation	OPS&TECH	IJTM
41	Klein (2007)	Customization and real time information access in integrated eBusiness supply chain relationships	OPS&TECH	JOM
42	Kuo (2013)	Mass customization and personalization software development: A case study eco-design product service system	OPS&TECH	JIntM
43	Meyer, Jekowsky, & Crane (2007)	Applying platform design to improve the integration of patient services across the continuum of care	OPS&TECH	MSQ
44	Moghaddam, & Nof (2018)	Collaborative service-component integration in cloud manufacturing	OPS&TECH	IJPR

Appendix 2.C. Continued.

#	Author(s) (Year)	Publication Title	Discipline	Journal
45	Moore, Ng, Yeo, Sundberg, Wong, & De Vin (2008)	Advanced machine service support using Internet-enabled three-dimensional-based virtual engineering	OPS&TECH	IJPR
46	Oliveira & Roth (2012)	The influence of service orientation on B2B e-service capabilities: An empirical investigation	OPS&TECH	POM
47	Pekkarinen & Ulkuniemi (2008)	Modularity in developing business services by platform approach	OPS&TECH	IJLM
48	Raja & Frandsen (2017)	Exploring servitization in China: Challenges of aligning motivation, opportunity and ability in coordinating an external service partner network	OPS&TECH	IJOPM
49	Rajala, Brax, Virtanen, & Salonen (2019)	The next phase in servitization: transforming integrated solutions into modular solutions	OPS&TECH	IJOPM
50	Rodrigues, Oliveira, & Leitão (2018)	Decentralized and on-the-fly agent-based service reconfiguration in manufacturing systems	OPS&TECH	CI
51	Rymaszewska, Helo, & Gunasekaran (2017)	IoT powered servitization of manufacturing – an exploratory case study	OPS&TECH	IJPE
52	Song (2017)	Requirement management for product-service systems: Status review and future trends	OPS&TECH	CI
53	Xue, Ray, & Sambamurthy (2013)	The impact of supply-side electronic integration on customer service performance	OPS&TECH	JOM
54	Zhu, Gao, Li, & Tang (2012)	A Web-based product service system for aerospace maintenance, repair and overhaul services	OPS&TECH	CI
55	Apte, Beath, & Goh (1999)	An Analysis of the Production Line versus the Case Manager Approach to Information Intensive Services	OR&MANSCI	DS
56	Bianconi, Brunori, Valigi, La Rosa, & Stracci (2012)	Information technology as tools for cancer registry and regional cancer network integration	OR&MANSCI	IEEE
57	Chiu, Cheung, Kafeza, & Leung (2003)	A Three-Tier View-Based Methodology for M-Services Adaptation	OR&MANSCI	IEEE
58	Higgins, Vyatkin, Nair, & Schwarz (2011)	Distributed Power System Automation With IEC 61850, IEC 61499, and Intelligent Control	OR&MANSCI	IEEE
59	Hoogeweegen, Teunissen, Vervest, & Wagenaar (1999)	Modular Network Design: Using Information and Communication Technology to Allocate Production Tasks in a Virtual Organization	OR&MANSCI	DS

Appendix 2.C. Continued.

#	Author(s) (Year)	Publication Title	Discipline	Journal
60	Snowdon, MacNair, Montevecchi, Callery, El-Taji, & Miller (2000)	IBM journey management library: An arena system for airport simulations	OR&MANSCI	JORS
61	Unver (2011)	System architectures enabling reconfigurable laboratory-automation systems	OR&MANSCI	IEEE
62	Zhao, Liu, Yang, & Sadiq (2009)	Aligning collaborative business processes - An organization-oriented perspective	OR&MANSCI	IEEE
63	de Jong, de Ruyter, & Lemmink (2003)	The Adoption of Information Technology by Self-Managing Service Teams	SECTOR	JSR
64	Marinova, de Ruyter, Huang, Meuter, & Challagalla (2017)	Getting Smart: Learning From Technology-Empowered Frontline Interactions	SECTOR	JSR
65	Nordin & Kowalkowski (2010)	Solutions offerings: A critical review and reconceptualisation	SECTOR	JOSM
66	Paluch & Blut (2013)	Service Separation and Customer Satisfaction: Assessing the Service Separation/Customer Integration Paradox	SECTOR	JSR
67	Schaarschmidt, Walsh, Evanschitzky (2018)	Customer Interaction and Innovation in Hybrid Offerings: Investigating Moderation and Mediation Effects for Goods and Services Innovation	SECTOR	JSR
68	Song & Sakao (2017)	A customization-oriented framework for design of sustainable product/service system	SECTOR	JCP

Notes. JIM = Journal of International Marketing, JAMS = Journal of the Academy of Marketing Science, JBIM = Journal of Business and Industrial Marketing, IMM = Industrial Marketing Management, JMR = Journal of Marketing Research, EJM = European Journal of Marketing, MS = Marketing Science, JMIS = Journal of Management Information Systems, ISR = Information Systems Research, IJEC = International Journal of Electronic Commerce, IntJIM = International Journal of Information Management, JIT = Journal of Information Technology, JASIST = Journal of the American Society for Information Science and Technology, IJInnM = International Journal of Innovation Management, PPC = Production Planning and Control, IJPR = International Journal of Production Research, IJOPM = International Journal of Operations and Production Management, JMTM = Journal of Manufacturing Technology Management, SSCI = Service Science, BPMJ = Business Process Management Journal, JOM = Journal of Operations Management, IJPE = International Journal of Production Economics, IJTM = International Journal of Technology Management, JIntM = Journal of Intelligent Manufacturing, MSQ = Managing Service Quality, POM = Production and Operations Management, IJLM = International Journal of Logistics Management, CI = Computers in Industry, DS = Decision Sciences, IEEE = IEEE Transactions on Systems, Man and Cybernetics, JORS = Journal of the Operational Research Society, JSR = Journal of Service Research, JOSM = Journal of Service Management, JCP = Journal of Cleaner Production.

Appendix 2.D. Clustering solutions.

Run	Resolution	Min. Cluster Size	No. of Clusters	Average no. of Items per Cluster	No. of Items in Smallest Cluster	No. of Items in Largest Cluster
1	2	5	1	20.0	20.0	20.0
2	5	3	5	4.0	3.0	6.0
3	10	2	9	2.2	2.0	3.0
4	20	1	18	1.1	1.0	2.0

Notes. Min. = minimum, no. = number; bold letters indicate the chosen clustering solution.

Appendix 2.E. Unrelated journals.

Discipline	# Total (n = 14)	Percentage of Total	Unrelated journals
MKT	5	35.7%	<ul style="list-style-type: none"> • Journal of the Academy of Marketing Science • European Journal of Marketing • Journal of International Marketing • Journal of Marketing Research • Marketing Science
OPS&TECH	3	21.4%	<ul style="list-style-type: none"> • Journal of Operations Management • Production and Operations Management • Production Planning and Control
OR&MANSCI	2	14.3%	<ul style="list-style-type: none"> • IEEE Transactions on Systems, Man and Cybernetics • Journal of the Operational Research Society
INFO MAN	2	14.3%	<ul style="list-style-type: none"> • Journal of Management Information Systems • Journal of the American Society for Information Science and Technology
INNOV	1	7.1%	<ul style="list-style-type: none"> • International Journal of Innovation Management
SECTOR	1	7.1%	<ul style="list-style-type: none"> • Journal of Service Research

Appendix 2.F. Continued.

Category	Type of DSC							
	Favoring Factors	DSC and non-digital SC	DSC in general	Digital self-customization	Collaborative DSC	Modularity-based DSC	Full DSC	
Provider-related	DSC							
		Workforce resources	x (5)					
		Knowledge resources	x (3)					
		Adaptive selling-ability				x (1)		
		Ability to sense new business Sales experience Untapped growth potentials and capabilities					x (1) x (2) x (1)	
Customer-related	Small firm size		x (1)					
	Self-managed work organization		x (1)					
	Inter-team work organization		x (1)					
	Low technology skepticism		x (2)	x (1)				
	High perceived technology usefulness		x (1)					
	Digital customer requirement processing		x (2)	x (3)			x (3)	
	High order volumes			x (1)				
	Low demand fluctuations			x (1)				
	Ability to learn			x (1)				
		Customer demand for customization		x (1)		x (1)		x (1)
		High potential customer lifetime value		x (1)				x (1)
		Insight into customer needs		x (4)				x (1)
	Customer involvement		x (1)				x (1)	
	Close customer relationships		x (1)				x (3)	
	Complex needs						x (1)	

Notes. Numbers in parentheses indicate the number of publications mentioning the respective factor.

3 Essay 2: How the Introduction of Digital Sales Channels Affects Salespeople in Business-to-Business Contexts: A Qualitative Inquiry

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Supplier firms in business-to-business (B2B) contexts increasingly introduce digital sales channels. This marks a fundamental change for salespeople, in particular, given the extended capabilities of contemporary digital sales applications. While prior research has begun to explore the benefits of introducing digital sales channels for salespeople, insights into the challenges remain vague and fragmented. In addition, prior work has not yet identified facilitating mechanisms that sales managers can use to support salespeople in coping with the introduction of digital sales channels. Drawing on in-depth interviews with key decision-makers from supplier firms (21 interviews) and buyer firms (18 interviews), this article advances current theoretical knowledge by identifying three main challenges for salespeople, namely (1) the amplification of professional purchasing's strategic reorientation, (2) the threat of purchasers' playing off personal against digital sales channels, and (3) tightrope acts in buyer education. Furthermore, this research offers insights into mechanisms that sales managers can adopt to support salespeople in coping with the introduction of digital sales channels, which are (1) thoughtful internal communication and (2) sales trainings. These findings extend personal selling, multichannel, and sales management research and offer actionable practical implications.

Keywords: personal selling, digitalization, digital sales channels, e-commerce, business-to-business marketing, salespeople

3.1 Introduction

For decades, building interorganizational relationships through personal interactions between salespeople and purchasers has been a fundamental principle of business-to-business (B2B) contexts (e.g., Crosby et al., 1990). Yet B2B suppliers¹ increasingly digitalize sales processes by introducing e-commerce (e.g., digital sales applications such as online shops): in the U.S., for instance, B2B e-commerce gross merchandise volumes increased from \$5,826 billion in 2013 to \$12,216 billion in 2019 (Mehta & Hamke, 2019). Furthermore, 17% of all U.S. B2B sales are predicted to be generated digitally by 2023 (Clement, 2020). In this research, e-commerce refers to transactional digital sales channels that enable the entire procurement process (van Weele, 2018), mainly for non-complex, off-the-shelf offerings and/or well-defined buyer needs (Hoar, 2015).

The introduction of such digital sales channels is associated with substantial benefits for the salesforce: for example, by unlocking salespeople's resources for more strategic and complex activities, digital sales channels alleviate salespeople's resource constraints and complement non-digital, personal channels (Ingram et al., 2002; Marcos Cuevas, 2018; Singh et al., 2019; Syam & Sharma, 2018). Furthermore, digital channels facilitate insights into buyer preferences (Lawrence et al., 2019; Thaichon et al., 2018), allow for mapping out entire buyer journeys (Steward et al., 2019), give support to lead generation (Anderson, 1996; Singh et al., 2019) and customer segmentation (Syam & Sharma, 2018), improve information flows and interaction (Koponen & Rytsy, 2020; Leek et al., 2003; Long et al., 2007), and support the formation of new types of business relationships (Arli et al., 2018; Pagni & Pardo, 2017; Thaichon et al., 2018).

Despite these and many more benefits for the salesforce, the introduction of digital sales channels also confronts salespeople with challenges. Yet the prevailing

¹ Please note that we use the terms *supplier (firm)* and *buyer (firm)* to refer to firms; when referring to individual representatives, we use the terms *salesperson* and *purchaser*.

understanding of the challenges remains vague and fragmentary: although manifold challenges have been mentioned by prior work, few studies have offered empirically grounded, in-depth investigations of the challenges the salesforce experiences due to the introduction of digital sales channels (e.g., Sharma & Gassenheimer, 2009; Sharma et al., 2010). Strikingly, except for work by Marcos Cuevas (2018), no empirical study has been published within the last decade that explores the challenges resulting for salespeople from the introduction of digital sales channels.

However, the capabilities of digital sales applications have significantly improved during the last ten years alone (Mehta & Hamke, 2019). Due to rapid technological developments, contemporary digital sales channels are fundamentally different from preceding ones. Specifically, contemporary applications' extended functional scope increasingly enhances a buyer firm representatives' independence from a salesperson's assistance in each single step of the purchasing process: for instance, salespeople traditionally used to serve as purchasers' main information sources (Marcos Cuevas, 2018). Yet today, many suppliers have artificial intelligence (AI)-based chatbots provide first-level support for non-complex issues in online shops. Furthermore, contemporary applications can predict upcoming buyer needs based on user profiles (Syam & Sharma, 2018) and determine buyer-specific prices (Dodt, 2020).

In result, a buyer firm does no longer depend on product recommendations or price negotiations to be executed by a salesperson. As the challenges resulting from contemporary applications' significantly improved capabilities have potentially remained unaddressed by literature published in the 2000s (e.g., Lichtenthal & Eliaz, 2003), new research is needed that accounts for domain experts' real-time experiences with challenges that salespeople face due to the introduction of contemporary digital sales channels.

In addition to understanding the challenges that result for salespeople from digital sales channels, it is also important to examine facilitating mechanisms that

sales managers can adopt to help the salesforce cope with the introduction of digital sales channels. Repeatedly, scholars have emphasized the crucial role of sales managers in facilitating the salesforce's adaption to changing working environments: for example, extant work mentioned facilitating mechanisms such as adequate leader behaviors (Ingram et al., 2002) and payment schemes (Arli et al., 2018; Thaichon et al., 2018;), trustful sales manager-salesperson relationships (Ingram et al., 2002; Sharma et al., 2010), coaching and motivating salespeople (Anderson, 1996; Honeycutt, 2002; Long et al., 2007), and providing sales trainings (Anderson, 1996; Johnson & Bharadwaj, 2005; Long et al., 2007; Sarin et al., 2010; Thaichon et al., 2018).

Yet again, although prior research has pointed out many potential facilitating mechanisms, no existing article offers insights that are both empirical and contemporary in nature. Thus, novel and empirically validated insights on mechanisms that apply for today's working environment remain scarce. Consequently, research is warranted that builds on practitioners' first-hand experiences to identify facilitating mechanisms that sales managers can adopt to help salespeople cope with the challenges resulting from the introduction of digital sales channels.

Reducing these voids in the literature is important as the prevailing lack of understanding hinders salespeople from successfully adapting to the changing environment and obstructs sales managers from supporting salespeople in their individual adaption processes. Thus, the present study empirically investigates both the (1) challenges arising for salespeople from the introduction of digital sales channels and (2) facilitating mechanisms that sales managers can adopt to help salespeople cope with the introduction of digital sales channels.

We explore this emerging phenomenon using a qualitative research approach (Gioia et al., 2013). To generate comprehensive insights and do justice to the multifaceted nature of the phenomenon, we conducted in-depth interviews with

both key decision-makers from supplier firms (Part A, 21 interviews) and buyer firms (Part B, 18 interviews) in selected industries (e.g., chemicals, automotive, and mechanical engineering). From our two-part study, we find three major challenges for salespeople, i.e., the amplification of professional purchasing's strategic reorientation, the threat of purchasers playing off personal against digital sales channels, and tightrope acts in buyer education. Moreover, we identify two facilitating mechanisms, namely thoughtful internal communication and sales training.

With these findings, our study makes three main contributions to the literature. First, it advances the stream within personal selling literature that focuses on the changing role of the salesperson due to technological developments such as digitalization (e.g., Marcos Cuevas, 2018; Sharma et al., 2010; Singh et al., 2019) by answering recent calls for research on the changes resulting for personal selling in light of e-commerce (Alavi & Habel, 2020). Our findings show that the introduction of digital sales channels exposes salespeople to decreasing effectiveness as well as substantial ambidexterity in managing buyer relationships. Second, we contribute to multichannel research (e.g., Lawrence et al., 2019; Sharma & Mehrotra, 2007; Wilson & Daniel, 2007) by revealing that salespeople require vigilance and resilience in sales interactions to prevent purchasers from playing off personal against digital sales channels. Third, our study extends literature centering on sales management for digital and non-digital channels (e.g., Syam & Sharma, 2018; Thaichon et al., 2018) by revealing thoughtful internal communication and sales training as facilitating mechanisms that sales managers can use to help the salesforce to cope with the introduction of digital sales channels.

The remainder of this paper proceeds as follows: In Section 2, we present the theoretical background of our work by providing important conceptualizations and an exemplary overview of the extant research on the introduction of digital sales channels into personal selling. Section 3 presents our research methodology and in

Section 4, we outline our findings. Finally, Section 5 presents the theoretical and practical implications of our work, its limitations, and suggestions for further research.

3.2 Theoretical Background

3.2.1 Conceptualizing digital sales channels in B2B contexts

Commonly, B2B supplier firms serve different buyer segments with different types of sales channels. In this research, we refer to sales channels as to channels that allow for transactions and exclude information-only channels (Käuferle & Reinartz, 2015). Buyers with complex needs (e.g., highly customized, individually tailored cable routing for special vehicles), on the one hand, require consultative selling through cost-intensive, personal sales channels. For buyers with transactional needs (e.g., standard cable routings), digital sales channels represent a more efficient way to serve them. By digital sales channels, we understand transactional applications (e.g., online shops) that build on digital technologies and facilitate the entire procurement process (i.e., selecting, contracting, ordering, expediting and evaluation, and follow-up; van Weele, 2018).

For each buyer segment, suppliers thus create an effective, but also cost-minimizing mix of personal channels and digital sales channels (Ingram et al., 2002). Sometimes, of course, a single buyer firm's divergent needs might require it to use both transactional digital and consultative personal channels at the same time (Lichtenthal & Eliaz, 2003). In this sense, transactional digital channels complement inside and outside salesforces (Long et al., 2007), thus forming hybrid sales structures (Thaichon et al., 2018) that enable both simple, transactional selling and complex, consultative selling (Marcos Cuevas, 2018).

The technologies that enable digital sales channels range from basic technologies such as the internet to advanced technologies such as AI or cognitive computing (Srai & Lorentz, 2019). Our study's scope includes technologies that

directly enable sourcing and supply management (e.g., the internet as means for online shops) and technologies that support others therein (e.g., AI-based chatbots in online shops).² This definition rests on our understanding of digitalization as “the application [italics added] of digital technologies that brings about changes in business-to-business firms and business markets caused by digitization” (Ritter & Pedersen, 2020, p. 182).

Unquestionably, the extended functional scope of contemporary applications in comparison to early e-commerce affects salespeople in both B2B and business-to-consumer (B2C) contexts (Singh et al., 2019; Thaichon et al., 2018). However, B2B buying differs fundamentally from B2C buying (Grewal et al., 2015) and, thus, the tensions that arise for B2B salespeople from the introduction of digital sales channels are idiosyncratic and differ from those a retail salesperson faces. To facilitate the high volume transactions that characterize B2B markets (Lilien, 2016), salespeople traditionally assisted members of the buying center (Webster & Wind, 1972) in all steps of the sales or purchase process, respectively (Dubinsky, 1981; van Weele, 2018).

However, recent digital technologies are significantly extending a digital sales channel’s functional scope such that buyer firm representatives become less dependent on a salesperson’s assistance along the purchase process: for example, the selection stage is supported by sophisticated product search or AI-based recommendations for suitable complementing products based on the user’s browsing behaviors and past purchase preferences. Beyond that, contemporary digital sales applications can even predict upcoming needs based on similar user profiles (Syam & Sharma, 2018). PIAB AB, a supplier of vacuum pumps and accessories, also provides an online shop in which users can conduct product configuration online, without a salesperson’s being required for requirements

² Unquestionably, further technologies (e.g., social media or the blockchain) can also support selling and purchasing; due to their information-only nature, however, they are beyond the scope of this study.

definition (PIAB AB, 2020). Contracting and ordering are facilitated by mobile and voice commerce allowing to order conveniently from the site. In addition, dynamic, AI-enabled algorithms can nowadays determine buyer-specific prices (Dodt, 2020), which renders negotiations between salespeople and purchasers obsolete. For further examples of digital sales channels and their functions, please refer to Appendix 3.A. In stark contrast, early applications' value proposition unfolded mainly for technically very savvy users (Moen et al., 2003).

3.2.2 Previous research on challenges and facilitating mechanisms regarding the introduction of digital sales channels

Since the introduction of these early applications, scholars have investigated the effects on personal selling from different lenses and by means of different methodological approaches. Table 3.1 displays a brief illustrative overview of the literature.

Table 3.1. Illustrative research on challenges and facilitating mechanisms regarding the introduction of digital sales channels (in chronological order).

Author(s) Year	Seller View	Buyer View	Approach and Method	Key Insights	Challenges for salespeople	Facilitating mechanisms
Anderson (1996)	x		Conceptual	<ul style="list-style-type: none"> - Amongst the two other forces, technological developments are a major driver of personal selling's transformation. - The article finds that technology can never truly replace salespeople but requires them to take new roles and responsibilities. 	<ul style="list-style-type: none"> - Evolution into new roles (e.g., channel managers) - Learning more about buyers and take over responsibility for buyer profitability - Internal coordination - Technical skills required - Development of long-term, mutually beneficial partnerships in new environment 	<ul style="list-style-type: none"> - Coaching and partnering with salespeople - Learning environment - Motivating - Training - Serving as role models - Learning more about buyers - Keeping up to technological developments - Internal coordination
Kennedy and Deeter- Schmelz (2001)		x	Mixed methods (5 interviews with purchasers from various industries + survey with 232 purchasers from various industries)	<ul style="list-style-type: none"> - Perceived innovativeness, internet convenience, cost pressure, influence by peers, and support by suppliers increase buyers' intentions to use the internet for purchasing. - The ability to research and communicate online make buying process more efficient and buyer-seller relationships more effective. 	<ul style="list-style-type: none"> - Delivering training and support for buyer firms regarding online purchasing - Technical skills required 	
Honeycutt (2002)	x		Conceptual	<ul style="list-style-type: none"> - Technological innovations are amongst the major forces affecting selling and sales management. 		<ul style="list-style-type: none"> - Coaching salespeople - Motivating - Keeping up to technological and global developments

Table 3.1. Continued.

Author(s) Year	Seller View	Buyer View	Approach and Method	Key Insights	Challenges for salespeople	Facilitating mechanisms
Ingram et al. (2002)	x		Conceptual	<ul style="list-style-type: none"> - Effective sales strategies, sales force leadership, and productive technology use are most important for a successful future salesforce. - A research agenda outlines 15 pressing areas worth inquiry. 	<ul style="list-style-type: none"> - Determination of optimal channel mix for serving each buyer - Monitoring channel interfaces 	<ul style="list-style-type: none"> - Holistic leadership approach - Trust based relationships with salespeople - Expertise - Coaching salespeople
Jap and Mohr (2002)	x		Conceptual	<ul style="list-style-type: none"> - The Relationship x Technology matrix exemplifies the internet's differential influence on firms' relationship marketing activities. 	<ul style="list-style-type: none"> - Long-term relationships being undermined - Compatibility of e-commerce with types of existing relationships 	
Sharma (2002)	x		Conceptual	<ul style="list-style-type: none"> - Internet presence evolved through five stages: information, knowledge, conversations, relationship, e-commerce. 	<ul style="list-style-type: none"> - Reduction of locational advantages - Declining prices - Rising competitive intensity 	
Leek et al. (2003)	x	x	Quantitative (survey with 107 supplier and buyer firms from various industries)	<ul style="list-style-type: none"> - Instead of the internet, intranets, and extranets, supplier and buyer firm representations mainly make use of mobile telephones and e-mail. - The former are more frequently adopted by suppliers than by buyers. 	<ul style="list-style-type: none"> - Altered nature of communication and its effect on business relationships - Danger of losing trust due to reduced interpersonal interaction - Decreased likelihood of compromise in negotiations - Aggravated crisis management 	

Table 3.1. Continued.

Author(s) Year	Seller View	Buyer View	Approach and Method	Key Insights	Challenges for salespeople	Facilitating mechanisms
Lichtenthal (2003)	x	x	Conceptual	<ul style="list-style-type: none"> - Internet integration affects all six types of purchases from less (i.e., straight rebuy) to most (i.e., strategic new task) complex purchase situations. - The author derives important implications for the salesforce (e.g., in terms of relationship building). 	<ul style="list-style-type: none"> - Integration of information from various buyer touchpoints - Online and offline learning required - Difficulties in creating of online relationships - Maximization of inter-enterprise relationship streams 	<ul style="list-style-type: none"> - Push of business strategy driving change - Integration of sales and service
Lichtenthal and Eliasz (2003)	x	x	Conceptual	<ul style="list-style-type: none"> - The internet impacts market size and structure, business buying and selling behavior, negotiation strategies, pricing, distribution and logistics as well as communication. 	<ul style="list-style-type: none"> - Channel alignment - Trust issues - Difficulties in initiating new business relationships - Buyer-specific pricing - Not all offerings can be sold through e-commerce - Privacy concerns in e-commerce - Integration of all touchpoints 	
Moen et al. (2003)	x		Qualitative (six case studies of software-developing firms)	<ul style="list-style-type: none"> - The internet can be used to make personal selling easier through prior online information provision. - The internet's capability to substitute personal sales in its role for relationship development is questionable as such critical tasks will remain with the salesforce. 	<ul style="list-style-type: none"> - Technical skills required - Not all offerings can be sold through e-commerce - Reliability / credibility of supplier difficult to convey online (selection of presented information) 	

Table 3.1. Continued.

Author(s) Year	Seller View	Buyer View	Approach and Method	Key Insights	Challenges for salespeople	Facilitating mechanisms
Schulze (2003)	x	x	Qualitative (ethnographic study)	- Buyer firms choose their preferred location on a service relationship (i.e., high in personal interaction) and self-service technology continuum depending on environmental dynamism, partner domain expertise, customer domain expertise, buyers' technical expertise, social bonding, and interaction frequency.	- Difficulties in determining an optimal revenue model across channels	
Deeter-Schmelz and Kennedy (2004)		x	Quantitative (survey with 138 purchasers from various industries)	- Purchasers perceive salespeople as a more useful as information source than the internet. - Especially in close buyer-supplier relationships, very little usefulness is attributed to the internet.	- Evolution into new roles - Reduced personal interactions	
Hunter et al. (2004)		x	Conceptual	- Depending on the buying situation's risk importance and risk probability, e-commerce represents a more or less suitable channel for purchasers.	- Declining prices	
Schulze and Orlikowski (2004)	x	x	Qualitative (ethnographic study)	- Internet-based self-service technologies cause four major changes for personal selling.	- No provision with privileged upfront information - Deterioration of relationships	

Table 3.1. Continued.

Author(s) Year	Seller View	Buyer View	Approach and Method	Key Insights	Challenges for salespeople	Facilitating mechanisms
Day and Bens (2005)	x		Quantitative (survey with 165 senior marketing, sales, and MIS managers from various industries)	<ul style="list-style-type: none"> - The internet reduces service costs and tightens business relationships. - Although these opportunities outweigh the potential negative aspects of price wars, channel cannibalization, and disruption by new business models, most firms will not be able to realize the benefits related to the internet. 	<ul style="list-style-type: none"> - Difficulties with new pricing models - Fears of channel conflict - Channel alignment and delivering seamless buyer experience 	
Johnson and Bharadwaj (2005)	x		Quantitative (survey with 168 salespeople from various industries)	<ul style="list-style-type: none"> - The introduction of digital sales channels not only improves salespeople's effectiveness, but also increases job insecurity concerns. - Sales managers can steer these effects by making use of human capital improvements, sales force control systems, and strategic communication. 	<ul style="list-style-type: none"> - Apprehension and resistance of salespeople due to perceived job insecurity - Channel alignment - Technical skills required - Pressure from buyer to become more digital 	<ul style="list-style-type: none"> - Investment in human capital through training - Suitable sales force control systems
Long et al. (2007)	x		Conceptual	<ul style="list-style-type: none"> - The internet affects all steps of the selling process by supporting salespeople. - A comprehensive framework and eleven propositions summarize the suggested effects. 	<ul style="list-style-type: none"> - Channel alignment - Potential data leakage - Apprehension and resistance of salespeople due to perceived job insecurity 	<ul style="list-style-type: none"> - Clear communication of technological tools' value - Training - Coaching - Keeping up to technological and global developments

Table 3.1. Continued.

Author(s) Year	Seller View	Buyer View	Approach and Method	Key Insights	Challenges for salespeople	Facilitating mechanisms
Tanner et al. (2008)	x		Qualitative (interviews with 54 salespeople from various industries)	<ul style="list-style-type: none"> - Personal selling is undergoing fundamental changes in various areas, which all affect salespeople's roles and skills required. 	<ul style="list-style-type: none"> - More advanced skillset required - Multichannel environment is less dependent on salespeople - Information overload - Evolvement into new roles 	
Sharma and Gassenheimer (2009)	x		Quantitative (survey with 511 salespeople from the insurance industry)	<ul style="list-style-type: none"> - The authors develop a scale to measure salespeople's feeling of being cannibalized by the internet. - Perceived cannibalization increases salespeople's alienation from work, especially in munificent contexts. - In a low munificent context, perceived cannibalization also decreases their commitment. 	<ul style="list-style-type: none"> - Lower commissions - Apprehension and resistance of salespeople due to perceived job insecurity - Decreased motivation and alienation of salespeople - Decreased relationship commitment of salespeople 	
Sarin et al. (2010)	x		Mixed methods (37 interviews + survey with 828 salespeople from a Fortune 500 firm)	<ul style="list-style-type: none"> - Timeliness, formal structure, and voluntariness of a training on online sales influence how effective salespeople perceive the training to be, depending on its impact and their age. - Perceived effectiveness influences perceived ability to deal with change, depending on their learning orientation. 	<ul style="list-style-type: none"> - High failure rate of e-commerce introduction - Apprehension and resistance of salespeople due to perceived job insecurity - Lower commissions - Reduced personal interactions 	<ul style="list-style-type: none"> - Training

Table 3.1. Continued.

Author(s) Year	Seller View	Buyer View	Approach and Method	Key Insights	Challenges for salespeople	Facilitating mechanisms
Sharma et al. (2010)	x		Quantitative (survey with 511 salespeople from the insurance industry)	<ul style="list-style-type: none"> - Feeling cannibalized by the internet reduces salespeople's job effort, satisfaction, and performance. - Relational capital attenuates these negative effects. 	<ul style="list-style-type: none"> - Decreased motivation and alienation of salespeople - Apprehension and resistance of salespeople due to perceived job insecurity - Decreased job effort - Decreased satisfaction - Decreased job performance - Channel alignment 	<ul style="list-style-type: none"> - Trust based relationships with salespeople (i.e., relational capital)
Obal and Lancioni (2013)	x	x	Conceptual	<ul style="list-style-type: none"> - The introduction of new technology such as e-commerce fundamentally changes buyer-seller relationships. 	<ul style="list-style-type: none"> - Lacking salesperson readiness for e-commerce - Power shifts 	
Arli et al. (2018)	x		Conceptual	<ul style="list-style-type: none"> - Research has taken different theoretical lenses over time to examine personal selling. - A review of the literature reveals relational selling strategies, mechanisms, and outcomes as well as factors leveraging relational selling effects. 	<ul style="list-style-type: none"> - Trust issues - Role conflict and ambiguity of the salesperson - Careful limitation of technology required (regarding internal and external customers) - Aggravated access to buyer insights due to reduced personal interactions - Relationship building across channels 	<ul style="list-style-type: none"> - Adequate payment scheme (further mechanisms mentioned, but not directly related to technological development)

Table 3.1. Continued.

Author(s) Year	Seller View	Buyer View	Approach and Method	Key Insights	Challenges for salespeople	Facilitating mechanisms
Marcos Cuevas (2018)	x		Qualitative (interviews with 37 senior sales leaders, sales consultants and sales academics)	<ul style="list-style-type: none"> - Personal selling is changing due to three key drivers: new buyer behavior and rising customer requirements, new technology, and globalization, concentration, and competition. - Transformations occur along three dimensions: the composition of the offer, the nature of buyer-supplier relationships, and the configuration of sales organizations and professional selling roles of salespeople. 	<ul style="list-style-type: none"> - Systematization of selling - Higher service quality expectations from buyers - Increased knowledge and sophistication on buyer side - Evolvement into new roles - More advanced skillset required - Identification of new ways of interacting with customers - Need to increase sales productivity - Formalization of relationships - Reduced autonomy and flexibility 	<ul style="list-style-type: none"> - Ability to balance transactional and strategic/consultative sales management approaches
Syam and Sharma (2018)	x		Conceptual	<ul style="list-style-type: none"> - Machine learning and AI affect all steps of the selling process. - Technology supports salespeople by taking over certain tasks, but also by facilitating tasks that still need to be conducted by humans. 	<ul style="list-style-type: none"> - Technical skills required 	

Table 3.1. Continued.

Author(s) Year	Seller View	Buyer View	Approach and Method	Key Insights	Challenges for salespeople	Facilitating mechanisms
Thaichon et al. (2018)	x		Conceptual	<ul style="list-style-type: none"> - Personal selling has evolved from the maximization of face-to-face contact (1970s) to the digitization of selling activities (2000s). - In today's environment, a hybrid sales structure (inside sales - outside sales - online channels) is most beneficial. 	<ul style="list-style-type: none"> - Channel alignment - Higher service quality expectations from buyers - More advanced skillset required - Necessity to learn more about customer - Internal coordination 	<ul style="list-style-type: none"> - Training - Adequate payment scheme - Information sharing - Encouraging group motivation through adequate team structures
Singh et al. (2019)	x		Conceptual	<ul style="list-style-type: none"> - New digital technology fundamentally affects personal selling. - The authors therefore outline research priorities in three areas: the sales profession and value creation, the sales professional and organizational issues, and the sales professional and individual-level issues. 	<ul style="list-style-type: none"> - Increasing plurality of professional roles - Diminishing role of the salesperson, but also more specialized roles in selling - Buyers are more empowered, but also more informed and fulfilling collaborative roles - Management of multiple touchpoints with buyers - Internal coordination - Shift from hard to soft skills - Loss of trust and interpersonal connections - Reduced bargaining power - Reallocation of sales tasks 	

What we can learn from preceding work is that aligning channels is a major transformational force for salespeople in supplier firms that seek to introduce digital sales channels into previously non-digital sales channel systems (e.g., Day & Bens, 2005; Ingram et al., 2002; Jap & Mohr, 2002; Long et al., 2007; Singh et al., 2019; Thaichon et al., 2018). Furthermore, potentially reduced personal interactions (e.g., Arli et al., 2018; Deeter-Schmelz & Kennedy, 2004; Leek et al., 2003; Marcos Cuevas, 2018), perceived insecurity and lacking readiness (e.g., Johnson & Bharadwaj, 2005; Long et al., 2007; Sharma et al., 2010; Sharma & Gassenheimer, 2009), and impediments for relationship building (e.g., Jap & Mohr, 2002; Leek et al., 2003; Lichtenthal, 2003; Lichtenthal & Eliaz, 2003; Moen et al., 2003; Schultze & Orlikowski, 2004) are amongst the most frequently discussed challenges.

With regard to preexisting knowledge of mechanisms that sales managers can adopt to support salespeople in overcoming challenges, several studies pointed to sales trainings (e.g., Anderson, 1996; Long et al., 2007; Johnson & Bharadwaj, 2005; Sarin et al., 2010; Thaichon et al., 2018). In addition, coaching and motivating salespeople (e.g., Anderson, 1996; Honeycutt, 2002; Long et al., 2007) and close, trustful relationships between sales managers and salespeople (e.g., Ingram et al., 2002; Sharma et al., 2010) represent important mechanisms.

Despite the substantial body of knowledge, a major share of existing research dates to the early 2000's, which limits its applicability to contemporary digital sales applications and the challenges they impose on salespeople. At the same time, recent empirically grounded research on these challenges is surprisingly scarce. The same picture emerges regarding facilitating mechanisms that sales managers can use to help salespeople cope with digital sales channels. To account for the fact that contemporary applications can increasingly diminish the traditional role of the salesperson as assistant along the entire purchasing process, it is necessary to clarify the challenges arising for salespeople from the introduction

contemporary digital sales channels and identify facilitating mechanisms that apply for today's working environment.

3.3 Research Methodology

3.3.1 Approach

For our study, we chose a qualitative research approach. Qualitative research is particularly appropriate for in-depth explorations of complex processes, mapping out novel areas of interest, and accounting for contextual realities and perceptions (e.g., Creswell, 2007; Patton, 2015; Rubin & Rubin, 2011). As the exploration of challenges and facilitating mechanisms related to the introduction of contemporary digital sales applications represents a complex, underexplored phenomenon, a qualitative research design is an adequate choice. We chose to follow the systematic inductive approach suggested by Gioia et al. (2013) for collection and analysis of our empirical material as it aligns well with our research goals.

3.3.2 Data collection

To obtain access to the rich, retrospective and real-time experiences and insights of domain experts, we conducted semi-structured interviews. First, we interviewed key decision-makers from supplier firms (Part A of the study). To triangulate the resulting insights and ensure their comprehensiveness (Yin, 1994), we decided to integrate the purchasing perspective by conducting a second wave of interviews with executives from buyer firms (Part B). Integrating a buyer perspective is key to generate a comprehensive understanding and derive effective implications for personal selling (e.g., Kennedy & Deeter-Schmelz, 2001; Paesbrugge et al., 2017). Since we adopted the same approach for both parts of the study, we describe them jointly.

For the selection of interviewees, we followed a theoretical sampling procedure. Within an iterative process, we selected participants, verified their

suitability for our study, conducted interviews, and looked out for new participants with different backgrounds and experience, who could enrich existing insights, increase the diversity of our sample and extend the depth of our insights (e.g., Eisenhardt & Graebner, 2007; Reynolds et al., 2003).

We identified potential interviewees by means of extensive desk research through a professional networking platform. We contacted them with messages conveying the rough purpose of the study, but providing no further details in advance, to limit social desirability bias in participants' responses. Participants' suitability as "knowledgeable agents" (Gioia et al., 2013) was determined on the basis of their sound knowledge and expertise regarding the introduction of digital sales channels from both a supplier firm's (Part A) and a buyer firm's (Part B) perspective.

To assess knowledge and expertise, we used three sources: first, we retrieved the length of a potential interviewee's firm affiliation, years in the present (or a similar) job position, and areas of responsibility from the professional networking platform. For participants who had tenures of less than a year, we made sure they had already worked in the specific field in another firm. In addition, we triangulated this information with information from firm websites and, eventually, participants' answers to the initial interview questions on personal experiences with e-commerce. In result, we had seven of the initial participants excluded from the analysis. Furthermore, we ensured comparability by confirming the firms' prolonged usage of similar applications, in addition to external and/or internal salesforces for selling (Part A) and purchasing (Part B) purposes, respectively.

Specifically, we interviewed informants with strategic insights into both e-commerce and sales (Part A) and purchasing (Part B). In so doing, we considered the notion that, nowadays, a broad set of actors on both the buyers' and suppliers' side (Singh et al., 2019) is involved in sales and purchase processes, respectively. We chose German-speaking countries as our research contexts. These nations

represented suitable contexts as, for example, German B2B markets are characterized by a high degree of digitalization (Riegel & Schick, 2015).

The interview period lasted from November 2017 to October 2018 (Part A) and January 2018 to January 2019 (Part B). The leading author of this paper conducted the interviews and subsequently discussed the insights in regular intervals with the remaining authors. Interviews were conducted by telephone, except one that was conducted in person. During all the interviews, respondents were constantly assured full attention, such as by repeating parts of their statements and integrating these into our questions. Moreover, a friendly, comfortable interview atmosphere was created, and informants were encouraged to talk openly. If necessary, probing and follow-up questions stimulated their flow of speech.

Semi-structured interview guidelines ensured consistent quality and coverage of a uniform range of topics of interest. The guidelines are presented in Appendices 3.B and 3.C. We jointly developed the guidelines and did not provide them to participants prior to the interview. During the interviews, no strict question order was set to allow informants to direct the interview flow (Corbin & Strauss, 2015). Moreover, we captured promising new areas of interest by actively listening and remaining open to occasional flexible adaptations, as required by each interview (Kvale, 1996).

All interviews were audiotaped and transcribed verbatim. Field notes were also taken during the interviews, to enable joint discussions of the insights in regular intervals and support inquirer credibility and validity (Eisenhardt, 1989; Patton, 2015). On average, the interviews lasted 40:01 minutes (Part A) and 42:23 minutes (Part B). In total, the interviews lasted 14:00:21 hours (Part A) and 12:42:51 hours (Part B).

3.3.3 Samples

The number of informants for both studies was not determined in advance, but resulted from the point at which we reached theoretical saturation, such that further interviews would have generated no meaningful new information (Gioia et al., 2013; Glaser & Strauss, 1965;). With 21 interviewees (Part A) and 18 interviewees (Part B), the sizes of our samples correspond to recommended sample sizes (Creswell, 2007). Table 3.2 displays our interview participants.

To limit single-respondent bias, we applied snowballing techniques (Welch 1975) and were thus able to interview multiple informants within four firms (1S and 14S, 6S and 7S; 9S and 11S; 20S and 21S). Our purposeful sampling procedure also affirmed our sense that statements by single key informants were credible (Kumar et al., 1993).

Table 3.2. Sample of the study (Part A and Part B).

#	Industry	Firm Size	Job Function	Gender	Tenure in Function	Interview duration
PART A						
1S	Energy Industry	1-10	Chief Operating Officer	M	2 years 10 months	00:46:11
2S	Consumer Goods and Trade	>10.001	Project Manager E-Commerce	M	2 years 3 months	00:41:53
3S	Metal Industry and Processing	>10.001	Senior Sales Manager	M	3 years 9 months	00:32:35
4S	Metal Industry and Processing	1001-5000	E-Commerce Manager	F	2 years 4 months	00:35:40
5S	Wholesale	201-500	Sales Manager	M	10 years 2 months	01:01:00
6S	Automotive	11-50	Head of E-Commerce	M	2 years 5 months	00:35:22
7S	Automotive	11-50	Head of Marketing	M	2 years 8 months	00:35:00
8S	Consulting	11-50	Online Shop Manager	F	1 year 9 months	00:25:11
9S	Automotive	501-1000	Project Manager Product Information Management	M	1 years 10 months	00:33:06
10S	Metal Industry and Processing	>10.001	Project Manager Online Shop	M	4 years	00:35:09
11S	Automotive	501-1000	Business Development Manager	F	3 years 3 months	00:34:26
12S	Mechanical Engineering	201-500	E-Business Manager	M	4 years 8 months	00:34:57
13S	Consumer Goods and Trade	1001-5000	E-Business Manager	M	8 years 9 months	00:26:11
14S	Energy Industry	1-10	E-Commerce & Marketing Manager	M	2 years 9 months	00:38:20
15S	Metal Industry and Processing	5001-10.000	Senior E-Business Consultant	M	5 months	00:42:29
16S	Electrical Engineering	201-500	Head of E-Commerce	M	7 months	00:44:03
17S	Printing Industry	51-200	Business Development Manager	M	1 year	00:41:27
18S	Mechanical Engineering	1001-5000	E-Shop Support Engineer	F	8 months	00:50:24
19S	Chemical Industry	>10.001	Corporate Program Manager Digital	F	1 year	00:40:33
20S	Wholesale	501-1000	Head of E-Business	M	12 years 10 months	00:57:46
21S	Wholesale	501-1000	Head of Corporate Development	M	3 months	00:48:38

Table 3.2. Continued.

#	Industry	Firm Size	Job Function	Gender	Tenure in Function	Interview duration
PART B						
1B	Facility Management	>10.001	Head of Purchasing	M	1 year 3 months	01:10:00
2B	Automotive	5001-10.000	Commodity Manager	M	1 year 8 months	00:45:00
3B	Electrical Engineering	1001-5000	Project Manager Purchasing	M	4 years 6 months	00:38:22
4B	Mechanical Engineering	5001-10.000	Purchasing Manager	M	2 years 4 months	00:37:55
5B	Railroad Construction	201-500	Project Buyer	M	2 years 3 months	00:28:01
6B	Energy Industry	>10.000	Category Manager Corporate Procurement	M	1 year 11 months	00:31:31
7B	Mechanical Engineering	501-1000	Professional Purchaser	M	1 year 2 months	00:49:36
8B	Mechanical Engineering	1001-5000	Head of Strategic Purchasing	M	1 year 5 months	00:40:56
9B	Marketing and Advertising	501-1000	Purchasing Manager	F	11 months	01:07:43
10B	Wholesale	51-200	Procurement and Sales Manager	M	15 years	00:37:42
11B	Automotive	51-200	Purchasing Manager	M	1 year 1 month	00:47:42
12B	Banking	>10.001	Head of Procurement	M	5 years 4 months	00:38:53
13B	Mechanical Engineering	>10.001	Purchasing Manager	M	5 years 7 months	00:41:16
14B	Mechanical Engineering	51-200	Commercial Director	M	8 years 11 months	00:32:08
15B	Healthcare	>10.001	Head of Purchasing	M	2 years	00:54:30
16B	Publishing Industry	1001-5000	Head of Purchasing	M	5 years 8 months	00:35:23
17B	Dairy Industry	501-1000	Head of Purchasing	M	21 years 2 months	00:37:43
18B	Electrical Engineering	201-500	Strategic Purchaser	F	10 months	00:28:30

Notes. S = supplier firm, B = buyer firm. Firm size is expressed by the number of employees. M = male, F = female. N/A = not available.

3.3.4 Analysis and data structure

To document and organize the multi-stage coding procedure, we used MAXQDA software. Following Gioia et al. (2013), two independent researchers dedicated considerable efforts to extensive, open, and in-vivo coding to generate a comprehensive initial understanding of the material and to do justice to its heterogeneity. Subsequently, we iteratively reviewed and modified all the emerging codes, terms, and categories. Using the initial open coding, we structured and iteratively refined the coding, identifying and categorizing common topics in the material into first-level concepts and second-order themes, looking for similarities and differences in our data and seeking to distill the most novel and interesting insights (Gioia et al., 2013). Aspects mentioned by only one interview participant were re-classified or deleted. Table 3.3 displays the data structure consisting of the final 1st order concepts, 2nd order themes, and aggregate dimensions that emerged from the iterative, multi-step procedure.

Table 3.3. Data structure.

1 st Order Concepts	2 nd Order Themes	Aggregate Dimensions
<ul style="list-style-type: none"> • Creating internal purchasing platforms for non-purchasers (B) • Pre-negotiating purchase conditions for internal platform (B) • Enabling non-purchasers to execute routine purchases in a self-directed manner (B) 	Redirecting released purchasing resources into strategic activities	Amplification of professional purchasing's strategic reorientation
<ul style="list-style-type: none"> • Focusing purchasers' resources on optimization of sourcing (B) • Focusing purchasers' resources on development of key product groups (B) 		
<ul style="list-style-type: none"> • Preference for known suppliers (B) • Avoiding disappointing known suppliers (B) • Lacking knowledge about purchase guidelines and strategy (B) 	Regaining strategic power over purchasing	
<ul style="list-style-type: none"> • Lacking search for potentially better suppliers (B) • Monitoring of employees' purchasing (B) • Preventing maverick buying through e-commerce (B) • Cost savings through reduction of maverick buying (B) 		

Challenges for salespeople

Table 3.3. Continued.

<ul style="list-style-type: none"> No concessions in e-commerce environment (S, B) 	No concessions in e-commerce		
<ul style="list-style-type: none"> Purchasers' deploying their negotiation strengths (B) Decisive nuances indicating potential for concessions (B) Key words indicating potential for concessions (B) Salespeople have room for additional discounts (S, B) Salespeople have room of free add-ons (S, B) Salespeople seek to achieve optimum for buyer firm (S, B) 	Exploiting potential for concessions in personal interactions	Threat of purchasers playing of personal against digital sales channels	
<ul style="list-style-type: none"> Educating buyer firms about benefits of e-commerce (S) Providing setup assistance (S) 	Routing buyer firms towards e-commerce	Tightrope acts in buyer education	
<ul style="list-style-type: none"> Supplier firms' granting free channel choice for buyer firms (S) 	Free channel choice for buyers		
<ul style="list-style-type: none"> Sharing information to mitigate job loss fears (S) Sharing information about goals of e-commerce strategy (S) Sharing information about ongoing developments regarding e-commerce (S) 		Thoughtful internal communication	Facilitating mechanisms
<ul style="list-style-type: none"> Salespeople become consultants (S) Salespeople de-escalate in case of problems (S) 	Increased requirements	Sales training	
<ul style="list-style-type: none"> Providing opportunities to train required skills (S) 	Adequate training		

Notes. (B) = derived from buyer firm representatives' statements, (S) = derived from supplier firm representatives' statements.

Across all stages, we made dedicated efforts to ensure the study's rigor. First, we subjected the material to constant comparisons, both within and across transcripts and with the extant literature, to minimize potential biases (Corbin & Strauss, 2015) and maximize our findings' distinctiveness. Second, we applied various data triangulation procedures to increase the credibility and transferability of our findings (Eisenhardt, 1989; Patton, 2015); for example, collecting material from both supplier and buyer representatives allowed us to triangulate the informants' different perspectives. In addition, we ensured dependability and confirmability by triangulation across analysts, in that two researchers independently executed open coding for about 20% of the material (Patton, 2015). Their proportional agreement (.89) and the Holsti (1969) coefficient (.96) exceeded the threshold (.80)

recommended by Neuendorf (2002). Third, we actively involved participants in the process of insight generation. Specifically, we sent summaries of the full results to the informants and solicited their critical feedback. The informants provided positive feedback and suggestions for minor revisions, which we successively evaluated and agreed to implement.

3.4 Findings

In the following section, we describe our findings and support them with excerpts from the interviews.³ First, we present the challenges resulting for salespeople from the introduction of e-commerce. Second, we feature facilitating mechanisms that sales managers can adopt to help salespeople cope with digital sales channels.

3.4.1 Challenges for salespeople

3.4.1.1 Amplification of professional purchasing's strategic reorientation

A first challenge that we identified is that the introduction of digital sales channels reinforces the strategic reorientation of professional purchasing. In many buyer firms, professional purchasers increasingly focus on strategic activities (e.g., targeted sourcing and supply chain optimization) instead of executing straight, standard rebuys, for instance. Digital channels accelerate this strategic reorientation by unlocking the resources professional purchasers require for strategic activities. Specifically, we find that many contemporary applications allow purchasers to shift less-complex purchases directly to those individuals in the buyer firm that do actually experience the respective demand (e.g., technicians in need of new tools). Notably, these individuals do not form part of the professional purchasing department.

³ Please note that all displayed quotes have been translated from German. Back-translation ensured the translations' accuracy.

These non-purchasers (e.g., technicians or administrative assistants) can directly order (e.g., tools or office materials) through buyer firm-internal purchasing platforms. Compared to early e-commerce applications, these platforms are much easier to use and offer B2C-like shopping experiences. They are set up by the purchasing department and connected to approved suppliers' online shops and catalogs via open catalog interfaces (OCIs), for instance. Professional purchasing pre-negotiates conditions and items to be ordered by non-purchasers but has no further involvement into ordering, as explained by the following two buyer firm representatives:

This means, the person who is standing at the machine on site, or who has a wrench in his hand in the workshop. We can now get them to order their things themselves; for them, it takes the same amount of time, irrespective of whether they fill out a form or go to the computer and order the whole thing themselves. The big saving is in the purchasing department, because we have switched the focus in purchasing from operational to strategic. Now we can handle the product groups effectively. We used to have many product groups that we could not really handle adequately. We have the time to do so now, because people no longer sit here all-day long, handling orders; they have become more strategically active. (...) This takes us much further forward as a firm. [Interview 17B]

A reduction of your internal effort [for purchasing] because these e-commerce solutions are usually made available for exactly those people experiencing the demand. [Interview 5B]

By shifting from standard purchases directly to those experiencing the demand, purchasers gain valuable time for strategic activities; for example, as emphasized by one interviewee, purchasers can dedicate their attention to the development of strategically important product groups and optimize the sourcing for these specific groups. Consequently, strategic activities, such as the development of key suppliers and the scouting for new business opportunities, gain increasing importance, as illustrated by the following informants:

After all, the intention of purchasing is a more strategic-tactical one than an operational one. Of course, I am speaking of

the level where the value creation takes place and where I expect to see the most value-added contributions. If I have an optimized and partially automated order process, then the fields where purchasing can generate its value contribution are at the tactical-operational level—product strategy, product selection, bundling, and the quantity effect. They are not focused on order processing. [Interview 12B]

Through automation, they [the purchasers] have a lot of time to take care of the big things that always need a lot of attention. (...) With the same number of employees, purchasing becomes more efficient through systems. Suddenly, they [the purchasers] have more time for in-depth interaction. That means—and that is what they actually need—they deal with increasing value. These are the large-volume procurement cases, where they really do have politics and where a human factor is necessary for internal negotiation, as just described. [Interview 15B]

In result, the interactions between salespeople and purchasers increasingly turn towards strategic topics (e.g., business development).

In addition, our interviews also reveal that digital sales channels fuel purchasing's strategic reorientation by forestalling unauthorized transactions (i.e., maverick buying). Notably, unapproved maverick buying oftentimes occurs by means of personal interactions between individuals in supplier and buyer firms: individuals in the buyer firm with a demand (e.g., a technician or administrative assistant) engage in maverick buying because they wish to continue using suppliers they have known for a long time and have close personal relationships (or even friendships) with.

Personal interaction with salespeople is the easiest way for individuals to accidentally or intentionally circumvent the respective buyer firm's streamlining strategies: for instance, administrative assistants could easily order office materials by phone from any supplier whom they deemed suitable and later hand in the bill for payment. In addition to accidentally circumventing approved purchasing processes as for a lack of knowledge, such incidents often arise from close personal bonds: as a result of these bonds, people try to not disappoint their preferred supplier or simply do not look out for alternative suppliers. For instance, one interviewee emphasized:

Departments generally defend existing suppliers (...)
Sometimes, it can be a bit of a hindrance if you like one supplier more than another one. (...) If salespeople create a particularly strong personal bond with users, that employee naturally seeks to not disappoint that salesperson to not to get the deal. [Interview 15B]

However, maverick buying is a severe problem in that it undermines buyer firms' internal purchasing strategies: maverick buying not only significantly increases process costs (e.g., because of inadequate price negotiations or documentation), but also exposes buyer firms to inestimable risks (e.g., suppliers becoming insolvent).

Thus, professional purchasing seeks to suppress maverick buying by means of digital sales channels. Through digital applications, it is less easy for individuals to circumvent buyer firms' strategies as e-commerce applications accept no orders without previous registration (as do online shops and electronic marketplaces) or even technical integration processes (as do OCIs and EDI), with both has to be authorized by purchasing (e.g., by establishing OCI or EDI interfaces only with contractual partners and according to mutually acceptable terms). Hence, professional purchasing becomes able to regain power of procurement, as emphasize by the following interviewees:

If you see this in the decoupling of the departments from the supplier (i.e., that the supplier no longer goes to the department without being asked) that is quite positive, because then the purchasing department has much more negotiating power in the company. [Interview 5B]

Sometimes, we have no overview, and some processes are not under our control at all. Some things get lost because of the lack of transparency and consistent documentation. [Interview 9B]

In result, buyer firms terminate relationships between salespeople and individuals without authorization for a specific purchase. Such relationship terminations give salespeople little scope of action as they are not able to do anything about it.

3.4.1.2 *Threat of purchasers playing off personal against digital sales channels*

Furthermore, interviews reveal the opportunity for professional purchasers to play off digital and personal channels against each other, at the cost of salespeople. Specifically, some purchasers seek to use personal interactions to circumvent the highly buyer-specific conditions the parties have agreed on and that are openly displayed in the digital channel context. This threat for salespeople stems from potential channel misalignments: whereas digital applications rest on pre-negotiated, thereafter fixed conditions (e.g., regarding prices or delivery), personal interactions favor concessions.

The increased likelihood of salespeople making concessions is attributable to purchasers' ability to recognize the potential for concessions that salespeople may be willing to make. Recognizing such potential means interpreting the subtle nuances of information transmitted through personal interaction (i.e., information that cannot be transmitted through digital sales channels); for instance, interviewees from buyer firms referred to the opportunity to read between the lines, or even to "tease out" additional information from salespeople:

It is not only what is written in black and white in the contract that counts, but also the many shades of gray in between. You cannot get these shades through a rigid online or web application. [Interview 5B]

Targeted questions, targeted questioning techniques, different types of questions that enable you to lead the conversation or glean information from your counterpart; information that you would not have gotten in the impersonal way. [Interview 7B]

In terms of concessions, we find that salespeople have more room to maneuver for discounts and grant extras than digital applications: for instance, salespeople often have approval to circumvent pre-negotiated conditions and grant extra discounts, free services, more time to make payments, or faster delivery. Our insights reveal that salespeople are indeed willing to make these extra concessions.

In result of granting concessions, however, salespeople's contribution margins are frequently lower than the contribution margins that suppliers achieve in the digital environment. For example, two supplier firm representatives emphasized:

Of course, the sales representative can give certain discounts and ensure that the order is entered in the optimal way for the buyer firm. [Interview 2S]

Sure, we have higher profit margins through the online shop than through telephone sales, because there, as I said, you can talk to someone. [Interview 12S]

Salespeople's granting of extras is further reinforced by the negotiation pressure that purchasers exercise in personal interactions: purchasers apply their professionally trained negotiating skills to "tease out" extra benefits from salespeople (e.g., faster delivery or price reductions), as expressed by the following interviewees:

Let me tell you the most important advantage: you can make things possible through personal contact. If you know somebody in a firm, you can make things possible that a platform could never make possible for you. [Interview 3B]

Faster delivery times, sometimes a special bonus, et cetera. You will not get that on paper. [Interview 5B]

It is possible to work out one or another point through individual negotiation: something that cannot not be achieved electronically. [Interview 7B]

3.4.1.3 *Tightrope acts in buyer education*

Finally, our interview data indicates that salespeople must perform substantial tightrope acts in terms of routing buyers towards digital sales channels. Specifically, our informants indicate that supplier firms refrain from having buyers pushed into e-commerce, although they seek to automate as much business as possible by shifting it to digital applications. Instead, suppliers grant free choice to buyers. Thus, buyer firms can select whichever channel they deem most suitable for their purposes, even if the channel costs for the supplier firm exceed the revenues and profits generated by the respective buyer. Notably, an overwhelming majority of

informants from supplier firms agreed on not forcing buyer firms into digital channels, as emphasized by two interviewees:

And I think it is also important for a company to give the buyer firm the choice of which path he wants to take for the consultation or the order. I think we would annoy or even lose many buyers if we were to disconnect the phones. I can also confirm this from my own painful experience. [Interview 7S]

Especially purchasers from buyer firms who appreciate the personal interaction or the personal consultation and want to place their orders accordingly; I cannot imagine that they would like themselves to be prescribed by us, how they have to place their orders with us. Accordingly, I do not consider this a good thing. [Interview 10S]

Consequently, buyer firm representatives commonly get served through their preferred channel. This means that occasions occur in which purchasers get served through personal interactions, even if value or volume of an order do not justify the expensive, personal sales channel.

A major reason for why suppliers strictly adhere to having buyer firms deliberately choose their preferred channel from the range of digital and personal channels is the high reputation that personal interactions still enjoy in the industries that we investigated for this study. This reputation hinders suppliers from forcing buyers into digital channels, as illustrated by the following quote:

The [supplier firm's] industry, especially this industry, is like a village. Everybody knows everyone and, as I said, in this industry, much value is still placed on personal interactions. [Interview 3S]

At the same time, however, the reputation of personal interactions restricts initiatives to push digital sales channels to educational strategies, which are commonly enacted by salespeople. Herein, the roles of both inside and outside salespeople comprises informing and educating buyer firms about how to use introduced digital applications and outlining the benefits of doing so. For example, the following interview partner explained:

For many years we have been trying to reroute buyers. Our diverse consulting and information approaches represent our strategy. (...) On the one hand, there is our outside salesforce, which is naturally at the front line with our buyers locally. On the other hand, there is the inside salesforce that speaks with the buyer firm representative. [Interview 21S]

Oftentimes, buyer education initiatives also become more technical in nature. In these cases, salespeople (especially those working in the outside salesforce) are required to instruct buyer firm representatives about technical prerequisites and setup necessary for using a novel e-commerce application. Specifically, we find that salespeople oftentimes teach buyer firms with outdated or no applications in place about the possibilities related to digital sales channels. This particularly applies for small, family-owned businesses where owners execute purchasing in addition to other responsibilities and neither had interest nor time to deal with novel applications. As expressed by the following interviewee, educating such buyers about digital channels is of utmost importance in routing these buyers in the right direction:

With these buyer firms, one [the salesperson] needs to start at the very beginning and, first, explain the sense of updating the computer system or using a modern browser. [Interview 6S]

In summary, many salespeople are urged to take over the job of routing buyer firms towards digital applications, although officially, buyer firms are free to choose their preferred channel, which implies substantial ambidexterity for them to deal with.

3.4.2 Facilitating mechanisms to support salespeople in coping with the challenges

Moving beyond the challenges for salespeople, our interviews also offered meaningful insights into facilitating mechanisms. These mechanisms are meant to serve as a directive for sales managers' efforts in helping the sales force to cope with the introduction of digital sales channels. Why it is important to have a

salesforce that embraces digital channels was illustrated by one informant as follows:

E-commerce as such only works if salespeople are convinced of it. [Interview 4S]

3.4.2.1 Thoughtful internal communication

A first mechanism that we found in our interview data is targeted, thoughtful internal communication regarding the introduction digital sales channels. By internal communication, we understand the communication directed within a supplier firm's sales organization from higher management to the salesforce.

A well thought-through, considerate communication strategy is necessary, on the one hand, to attenuate salespeople's job loss fears. Unsurprisingly, the drastic changes that salespeople associate with the introduction of digital sales channels results in fears of being cannibalized, becoming superfluous, and, eventually, losing their jobs. Yet these fears are unjustified, as illustrated by the following interviewee, for example:

Of course, the goal is to automate as much as possible; yet, not to reduce the number of people, but to scale up. We say that we can do much more with the same number of people in the future. There is no contradiction. Ideally, we do as much as possible online and double sales volumes. Ideally, we have the same team in service and sales, which can then concentrate on special requests. [Interview 11S]

Instead of downscaling salesforces, supplier firms seek to retain or even expand existing sales teams. However, this information needs to be clearly communicated and made visible to salespeople. Thus, ensuring salespeople in a continuous and repetitive manner that their jobs are not endangered due to digital channels is key for convincing salespeople of digital sales channels. For example, an informant explained:

Launching an e-commerce or a store in the B2B domain, if you have a classic sales department from the history, is always something that has to be communicated extremely well, because

there are always people who are afraid for their jobs. [Interview 18S]

So very much internally, we had to do a lot of internal marketing for the online shop. [Interview 3S]

In addition to mitigating salespeople's job loss fears, regular internal communication initiatives are also crucial to keep salespeople in the loop about ongoing strategic developments and management decisions on e-commerce. Repeated and open internal communication about the strategic goals a supplier firm pursues with e-commerce is an important tool: not only do they help to ensure the salesforce of their continued role as an important sales channel, but they can also emphasize the complementary, rather than substituting, role of digital sales channels. For example, one interview participant highlighted:

An open communication policy: What are the goals of our online store? And where do we want to go with it? It is quite simple, information for the employees. In fact, since the introduction of the online store almost 12 years ago, our team has not been reduced in terms of personnel. [Interview 10S]

3.4.2.2 Sales training

A second, related facilitating mechanism is sales training. Training enables salespeople to develop an advanced set of skills to meet the new requirements that result from the previously outlined challenges. Specifically, advanced skills are required from salespeople to defend themselves against purchasers seeking to squeeze out extra concessions, but also to fulfill the roles of knowledge brokers and consultants (e.g., for the joint development of future business opportunities and the generation of follow-up business). For example, two supplier firm informants explained:

We see that the number of salespeople is not necessarily decreasing; that is, of course, a wrong assumption. You do not digitalize and, consequently, need only half the people. Instead, you need somehow different skills. [Interview 11S]

The inside salesforce has become a consultant of the buyer. (...) If the buyer firm representatives know what they are

looking for, they can order online, but it goes beyond standard business, a special solution, we definitely need the inside salesperson. [Interview 12S]

To act as knowledge brokers, consultants, and business developers for buyer firms, salespeople need to develop in-depth knowledge of the offerings of the supplier firm, their respective functional scopes and potential integration into the respective buyer firm's usage context, as illustrated by the following interview partners:

If someone [i.e., a buyer firm] has ordered the wrong part and is not sure which one is needed. For these special cases, a lot of explanation is necessary and our [i.e., the salesforce's] know-how is required. [Interview 6S]

When the buyer has a wide, wide range of requirements are very, very broad and, oftentimes, the representative does not have in-depth knowledge in that product group. Therefore, we [i.e., the salesforce] must support very strongly in intensive discussions. [Interview 16S]

Furthermore, securing the continued business relationship between supplier and buyer firm oftentimes requires salespeople to apply soft-skills as they must more and more engage in deescalating interventions. For example, interview participants stated:

... if problems occur with the payment process or follow-up product questions arise. Questions that require product consulting, so to speak. [Interview 8S]

... for complaints. If it is a very difficult case, it is an advantage to have the buyer firm representative on the phone to de-escalate the situation. That is why our strategy is not to turn it [i.e., the possibility to contact an inside salesperson] off completely for B2B buyers. Because sometimes, personal contact is a must-have, especially in case of problems, don't you agree? [Interview 6S]

Consequently, sales management is urged to create opportunities for salespeople to develop skills in terms of negotiation, business development, and problem-solving by means of continuous sales trainings. At the same time, such

sales trainings also offer opportunities for internal communication; for instance, one interviewee emphasized:

Well, we just take everyone with us on the trip, so we train them regularly, we are constantly in dialogue. This has also been my job for the last six years. They had already thought about it, according to: Don't worry, your job is not at risk. [Interview 12S]

3.5 Discussion

Building interorganizational relationships through personal interactions between salespeople and purchasers has been a fundamental principle in B2B contexts for decades. Yet suppliers increasingly introduce digital sales channels to complement existing systems of non-digital, personal sales channels. Given that the introduction of digital sales channels marks a fundamental change in how salespeople operate and succeed, it is important to clarify the challenges arising for salespeople from the introduction of digital sales channels and identify facilitating mechanisms for sales managers to help the salesforce cope with it.

Based on in-depth interviews with key decision-makers from supplier firms (Part A, 21 interviews) and buyer firms (Part B, 18 interviews) in different industries, this research identified three main challenges for salespeople and two facilitating mechanisms related to the introduction of digital sales channels. Our findings offer several theoretical and practical implications as well as avenues for further research, which we outline in the following.

3.5.1 Theoretical contributions

Salespeople must cope with decreasing effectiveness and substantial ambidexterity in managing buyer relationships. First, this study advances the stream within personal selling literature that focuses on the changing role of the salesperson due to technological developments such as digitalization (e.g., Marcos Cuevas, 2018; Sharma et al., 2010; Singh et al., 2019) by answering recent calls for research on the changes resulting for personal selling in light of e-commerce (Alavi & Habel, 2020).

To date, this research stream has remained vague on the strategic shifts that e-commerce triggers in buyer firms and the challenges resulting from such shifts for the salesforce. Due to the strong influence of purchasing on selling (Kennedy & Deeter-Schmelz, 2001; Paesbrugge et al., 2017, 2018), it is essential to understand buyer-sided strategic shifts and the effects of these shift on personal selling prior to deriving implications for suppliers (Grewal et al., 2015). This study sharpens existing knowledge (Marcos Cuevas, 2018; Paesbrugge et al., 2017) by showing that the introduction of digital sales channels by supplier firms is highly interrelated with the strategic reorientation of the purchasing function in buyer firms and discussing the resulting effects on sales. Specifically, our research reveals that e-commerce fuels professional purchasing's strategic reorientation in two ways. First, digital sales applications unlock purchasers' resources for strategic topics by having simple purchasing shifted to non-purchasers. Second, they strengthen purchasing's strategic power by forestalling unauthorized transactions.

For salespeople, these findings indicate that interactions with purchasers increasingly turn to strategic topics. At the same time, buyer firms terminate personal relationships between salespeople and individuals lacking authorization to make a specific purchase, without the salesperson being able to do anything about it. This finding is remarkable as it illustrates that digital sales channels diminish the effectiveness of established personal relationships by amplifying purchasing's strategic reorientation. Notably, supplier firm representatives seem to be unaware of the strategic upheavals that introducing digital channels provokes in buyer firms, as exemplified by the lack of statements relating to it in Part A of the study. Suppliers' lacking awareness is surprising but reinforces the adequacy of our research approach.

Furthermore, our results extend earlier research, which pointed out that salespeople "who understand and are prepared to help train and support their customers in their online purchasing efforts will be better positioned to gain the

loyalty of these buyers” (Kennedy & Deeter-Schmelz, 2001, p. 287). While buyers might acknowledge education towards e-commerce with increased loyalty, our results indicate that buyer education in a multichannel environment also implies an idiosyncratic conflict for salespeople: on the one hand, industry traditions and supplier firms have buyers not “limit themselves to a single channel; [but instead] pick the one that is most convenient or effective for the situation” (Day & Bens, 2005, p. 166). On the other hand, salespeople are requested to route buyer firms towards digital sales channels.

These conflicting strategic goals expose salespeople to ambidexterity in that they need to pursue two incompatible strategies at the same time (Agnihotri et al., 2017). Especially when buyers are unwilling to be rerouted to digital applications, salespeople are required salespeople to cope with the arising ambidexterity by finding subtle, but sustainable ways to redirect buyer firms to digital channels, without openly counteracting prevailing though patterns and practices.

Salespeople require vigilance and resilience in sales interactions.

Second, we contribute to multichannel research (e.g., Käuferle & Reinartz, 2015; Lawrence et al., 2019; Sharma & Mehrotra, 2007; Wilson & Daniel, 2007) by identifying the threat of purchasers playing off personal against digital channels. Previous multichannel literature has yielded contradictory insights with regard to channel conflicts: whereas one stream of research repeatedly emphasized the threats resulting from conflicts between multiple sales channels (e.g., Frazier, 1999; Wilson & Daniel, 2007), recent studies suggested positive cross-fertilization effects between digital and non-digital sales channels. Specifically, Lawrence et al. (2019) found that salespeople can make use of the information on buyer firms’ behaviors in digital channels to improve targeted discounting in personal interactions, thus improving sales and profits.

Our study extends these insights and suggest that discounting can also get out of hand easily when purchasers circumvent digital channels by “teasing out”

extra concessions—a challenge which, surprisingly, supplier firms are aware of. This indicates that targeted discounting by salespeople represents a very thin line. On the one hand, some salespeople seem to be able to optimize discounting and increase sales and profits. Others, on the other hand, seem to be prone to giving away financial value voluntarily, thus endangering the achievement of their own and the supplier firm's financial performance. Thus, profitably servicing the same buyers in the long-run through digital and personal sales channels requires salespeople, who can recognize purchasers' circumvention strategies, resist to these strategies without counteracting the supplier firm's multichannel go-to-market, and effectively cope with the threat of purchasers pitting one channel against the other. To prevent them from making themselves vulnerable to purchasers seeking to "tease out" extra concessions, salespeople must be vigilant and pay close attention to what and how they communicate in sales meetings.

Two mechanisms facilitate embracing the challenges resulting from e-commerce. Third, our study extends literature centering on sales management for digital and non-digital channels (e.g., Syam & Sharma, 2018; Thaichon et al., 2018) by revealing two mechanisms (i.e., thoughtful internal communication and sales training) that sales managers can adopt to support salespeople in successfully embracing the challenges resulting from the introduction of digital sales channels. Specifically, our research is first to empirically demonstrate the crucial role of transparent and ongoing communication in preparing a salesforce prior to and during the introduction of digital sales channels, which has not yet received academic attention. This indicates that transparent communication is warranted to maintain a trustful, supportive environment and attenuate salespeople's job loss fears.

At the same time, by offering additional insights into the skills that should be acquired within sales training on how to cope with digital sales channels, our research addresses recent calls for insights into sales skills that salespeople require

after the deployment of digital technologies (Singh et al., 2019) and reinforces former studies on sales training (e.g., Johnson & Bharadwaj, 2005 Sarin et al., 2010). Specifically, we find that, next to product expertise and negotiation skills, salespeople require also soft skills and emotional intelligence to deescalate in case of problems (Singh et al., 2019).

3.5.2 Practical implications

In addition to its theoretical implications, this research has several practical implications for both B2B salespeople and sales managers, which we outline in the following. A first recommendation we derive from this study is that sales managers must create awareness within the salesforce about the challenges resulting from digital sales channels. Our results revealed a significant lack of supplier-sided awareness regarding some of the challenges for salespeople. Therefore, it is essential to counteract this knowledge gap and bring the topic to the attention of the salesforce, for instance, by means of regular internal communication initiatives.

Related to this, we recommend that sales managers learn about change management practices as to hit the right tone in their internal communication of the digitalization strategy to salespeople. Being open and meeting the salesforce at eye-level is crucial in successfully communication major organizational transformations such as the introduction and continued implementation of digital sales channels. On the one hand, communication must be both warm and understanding in nature as to mitigate fears and stimulate an open, supportive climate. Yet at the same time, it must also be determined and convincing as to not raise doubts or concerns and, eventually, resistance within the salesforce. Unquestionably, balancing these two interests is difficult and whether to lean to one side or the other likely depends on the respective sales team.

It is not unlikely that salespeople will be difficult to convince and skeptical about digital channels; thus, it is important for managers to stimulate regular discussions with the salesforce about their experiences in the multichannel context.

Such discussions enable them to review the team climate and verify whether additional communication initiatives or (slight) adaptations of the own communication style might be required. Staying in touch and close contact also enables sales managers to sense whether potential misunderstandings or ambiguities have arisen. If that is the case, quick counteractions are of utmost importance and the most effective tool to prevent rumors from spreading within the salesforce. Repairing damages in terms of suspicion and fears afterwards is far more time- and resource-consuming.

Furthermore, we recommend that sales managers provide salespeople with training opportunities to improve their negotiation skills, but also to accelerate their transformation into buyer consultants, knowledge brokers, and business developers as well as communicators and problem-solvers. This requires that salespeople get the chance to immerse themselves deeply into both their own firm's portfolio of offerings, but also into buyer firms' internal processes and requirements. On the one hand, extensive technical and non-technical product knowledge, which is a prerequisite for jointly moving into a new field of business or developing potentially more suitable products, can be fostered by having salespeople shadow field technicians. This means, that salespeople spend one or several days together with a technician on and watch the implementation of an offering on the buyer's site.

On the other hand, generating deeper insights about buyer firms helps salespeople to create awareness of purchasers' playing off personal against digital channels. For instance, we recommend triangulating internally available information on a respective buyer firm's purchasing history (e.g., by checking past orders that a purchaser has placed online) to prevent circumvention attempts. Developing awareness enables salespeople to detect situations in which purchasers are trying to circumvent pre-negotiated conditions. In-depth knowledge of the buyer firm also helps salespeople to identify a specific buyer's business strategy and figure out promising strategies to reroute this buyer towards e-commerce.

3.5.3 Limitations and avenues for future research

Although this study provides novel insights that extend prior research, it has some limitations. Despite its value for under-researched complex topics such as the present one, qualitative research remains subjective in nature, as it depends on researchers' personal opinions, experiences, and interpretation skills (Corbin & Strauss, 2015; Patton, 2015). To minimize potential researcher bias, we made considerable efforts to fulfill the quality criteria outlined by Patton (2015). Yet we cannot rule out the possibility of some self-selection bias; being generally interested in the topic, our informants could have been more likely to see things in a positive light. To counteract this limitation, we asked questions on both the benefits and challenges of personal and digital channels. To address the questionable generalizability of qualitative research (Patton, 2015), we also obtained a cross-industry sample, consisting of both suppliers and buyers. Considering these efforts, we are confident that our findings are credible.

Future research studies might build on our qualitative insights and quantitatively investigate the extent to which challenges and facilitating mechanisms relate to each other. Presumably, sales trainings on negotiation skills could enable salespeople to hamstring the circumvention of digital sales channels. Furthermore, studies could examine the following questions: To what extent does the degree to which a salesperson can overcome a specific challenge depend on personal characteristics or education? Which personal characteristics make salespeople more prone to giving away financial value? Are empathic salespeople more successful in routing buyers to digital channels?

In addition, further research could address the effects of the introduction of digital sales channels on personal interactions at different stages of a specific buyer–supplier relationship (Dwyer et al., 1987). Anecdotal evidence drawn from our interview material suggests that personal interactions might be more important in early stages, but less important in later stages. Qualitative studies could map

changes over the course of a business development. Further research questions might be: Are there signals indicating the decreasing importance of personal interactions? How do purchasers and salespeople interact when interactions occur only infrequently?

Moreover, we suggest that future research investigates the effects of digital technologies that were beyond the scope of this research (e.g., social media). As information-only technologies can nevertheless fulfill important functions regarding pre-purchase activities (e.g., collecting information about a potential new supplier), we recommend that scholars connect to the nascent stream of research on social media usage in B2B (e.g., Agnihotri, 2020) and investigate these technologies' impact on purchasing: Do interactions with a supplier firm through social media fuel purchases? To what extent is social media usage in B2B limited to small and medium-sized buyer firms? If so, what are the intentions of larger supplier firms to engage in social media?

Finally, further studies could address the relative importance of personal interaction and e-commerce along the relationship. Our study suggests that suppliers simultaneously provide personal interaction digital channels for buyers, but not always to their own benefit. Determining the optimal ratio of the two types of interaction, to generate appropriate benefits for both suppliers and buyers, would be of interest for both academia and managerial practice.

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3.7 Appendices

Appendix 3.A. Illustrative examples of how B2B suppliers deploy new digital technology in e-commerce.

Industry	Firm	E-commerce application	New digital technology	Functionality provided by the technology	Source(s)
Packaging	Broekhof	Online shop	<ul style="list-style-type: none"> Artificial intelligence Machine learning 	<ul style="list-style-type: none"> Chatbot to answer questions Product recommendations 	(Sposob 2019)
Food distribution	JJ Food Service	Online shop	<ul style="list-style-type: none"> Machine learning 	<ul style="list-style-type: none"> Product recommendations 	(Olavsrud 2015)
Automotive	Daimler Truck AG	Online shop	<ul style="list-style-type: none"> Augmented reality 	<ul style="list-style-type: none"> Product configuration 	(Daimler Truck AG 2020)
Industrial automation	PIAB AB	Online shop	<ul style="list-style-type: none"> Augmented reality 	<ul style="list-style-type: none"> Product configuration 	(PIAB AB 2020)
Logistics	Capital Logistics	EDI	<ul style="list-style-type: none"> Cloud computing 	<ul style="list-style-type: none"> Real-time shipment visibility and tracking for suppliers and buyers Automated communication 	(The Descartes Systems Group Inc. 2020)
	Amazon business	Electronic marketplace	<ul style="list-style-type: none"> Artificial intelligence Machine learning Augmented reality 	<ul style="list-style-type: none"> Product identification Product recommendations Dynamic pricing 	(Dodt 2020; Savin 2019)
Wholesale	Alibaba	Electronic marketplace	<ul style="list-style-type: none"> Artificial intelligence Machine learning Cognitive computing Natural language processing Virtual reality 	<ul style="list-style-type: none"> Product identification Dynamic pricing Chatbot to answer questions Automated content generation 	(Marr 2019)

Appendix 3.B. Interview guideline for Part A of the study.

<p>Introduction</p>	<ul style="list-style-type: none"> • Welcome to the interview, and thank you very much for your participation. • The interview will take around 30–40 minutes, according to your schedule, of course. I have prepared some questions, but I highly encourage you to comment freely on your personal experiences, perceptions, and opinions. There are no right or wrong answers. • To return to the results later, I would like to record the interview. Do you agree with that? Of course, we will anonymize all material and treat it as strictly confidential. The material will neither be stored nor passed to third parties. Is that okay with you? [If yes: start recording]. • So far, are there any questions from your side? [If yes, answer questions; if not, proceed to interview]. • Okay, so let us start the interview. Today, I would like to talk with you about e-commerce in the business-to-business context.
<p>Topic</p>	<p style="text-align: center;">Main questions (Suppliers)</p> <ul style="list-style-type: none"> Common understanding of e-commerce <ul style="list-style-type: none"> • For you, what is B2B e-commerce? E-commerce and personal selling in the firm <ul style="list-style-type: none"> • To what extent is your firm engaged in e-commerce? • When did your firm start engaging in e-commerce? • To what extent does your firm offer personal sales channels (e.g., inside and outside salesforces)? Advantages and challenges of e-commerce versus personal selling <ul style="list-style-type: none"> • What benefits/challenges of e-commerce/personal selling do you see for buyers/your firm?* • In which situations (e.g., products, purchasing phases ...) do buyers predominantly use e-commerce/personal selling, in your opinion?* • Which buyers predominantly use e-commerce/personal selling?* Supplier motives <ul style="list-style-type: none"> • To what extent does your firm incentivize buyers to use e-commerce? • What were the motives for implementing e-commerce? Personal interaction <ul style="list-style-type: none"> • What benefits/challenges of personal interaction do you see for buyers/your firm?* • How has personal interaction between salespeople and purchasers changed due to e-commerce? • To what extent do you see these changes as positive/negative?* • To what extent do e-commerce channels and the need for personal interaction represent a contradiction? • To what extent have relationships with buyers changed due to e-commerce?

Appendix 3.B. Continued.

Topic	Main questions (Suppliers)
Future of e-commerce in firm	<ul style="list-style-type: none"> • In the future, what does your firm plan in terms of e-commerce?
End	<ul style="list-style-type: none"> • From my side, there are no more questions. • Do you have any further comments or questions? Do you think we have missed anything important? • Then let me thank you for taking part in the interview. Your input has been extremely helpful for us. If you wish to add something later, please do not hesitate to contact me by phone or e-mail. • Is there anybody else, such as a colleague or a buyer firm representative, to whom I could also talk? • I wish you a pleasant day. Goodbye!

*Successfully asked questions

Examples of probes and follow-up questions used throughout the interview:

- How do you mean...?
- Can you elaborate on this?
- Why is that?
- Could you provide an example?

Appendix 3.C. Interview guideline for Part B of the study.

Introduction	<ul style="list-style-type: none"> • Welcome to the interview, and thank you very much for your participation. • The interview will take around 30–40 minutes, according to your schedule, of course. I have prepared some questions, but I highly encourage you to comment freely on your personal experiences, perceptions, and opinions. There are no right or wrong answers. • To return to the results later, I would like to record the interview. Do you agree with that? Of course, we will anonymize all material and treat it as strictly confidential. The material will neither be stored nor passed to third parties. Is that okay with you? [If yes: start recording]. • So far, are there any questions from your side? [If yes, answer questions; if not, proceed to interview]. • Okay, so let us start the interview. Today, I would like to talk with you about e-commerce in the business-to-business context.
Topic	Main questions (Buyers)
Common understanding of e-commerce	<ul style="list-style-type: none"> • For you, what is B2B e-commerce?
E-commerce and personal selling in the firm	<ul style="list-style-type: none"> • To what extent is purchasing conducted via e-commerce in your firm? • When did your firm start purchasing via e-commerce? • To what extent does your firm make use of personal sales channels (e.g., inside and outside salesforces) for purchasing?
Advantages and challenges of e-commerce versus personal selling	<ul style="list-style-type: none"> • What benefits/challenges of e-commerce/personal selling do you see?* • In which situations (e.g., products, purchasing phases ...) is e-commerce/personal selling particularly suitable, in your opinion?* • To what extent to you see differences between buyer firms?
Supplier motives	<ul style="list-style-type: none"> • What advantages/challenges of e-commerce do you see for suppliers?* • To what extent to you perceive incentives from suppliers to make use of e-commerce?
Personal interaction	<ul style="list-style-type: none"> • What advantages/disadvantages of personal interaction do you see for your firm?* • How has personal interaction between purchasers and salespeople changed due to e-commerce? • To what extent do you see these changes as positive/negative?* • To what extent do e-commerce channels and the need for personal interaction represent a contradiction? • To what extent have relationships with suppliers changed due to e-commerce?

Appendix 3.C. Continued.

Topic	Main questions (Suppliers)
Future of e-commerce in firm	<ul style="list-style-type: none"> • In the future, what does your firm plan in terms of e-commerce?
End	<ul style="list-style-type: none"> • From my side, there are no more questions. • Do you have any further comments or questions? Do you think we have missed anything important? • Then let me thank you for taking part in the interview. Your input has been extremely helpful for us. If you wish to add something later, please do not hesitate to contact me by phone or e-mail. • Is there anybody else, such as a colleague or a buyer firm representative, to whom I could also talk? • I wish you a pleasant day. Goodbye!

*Successively asked questions

Examples of probes and follow-up questions used throughout the interview:

- How do you mean...?
- Can you elaborate on this?
- Why is that?
- Could you provide an example?

4 Essay 3: Different Roads Lead to Rome – A Configurational Investigation of Solution Salespeople’s Sales Success in Business-to-Business Markets

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Successful solution salespeople represent an essential strategic asset in solution selling. Yet, how solution salespeople achieve sales success through their personal and procedural competencies remains poorly understood. Drawing on the job demands-resources model and configuration theory, this article explores how configurations of personal competencies and configurations of procedural competencies impact solution salespeople’s sales success. Findings from a pre-study of in-depth interviews with 22 solution sales managers and two fuzzy-set qualitative comparative analyses of cross-sectional survey data from 63 matched sales manager–salesperson dyads revealed that multiple equally effective configurations of both personal and procedural competencies facilitate sales success. The findings propose that sales success is facilitated by unique strength profiles such that successful solution salespeople are not required to possess the full range of personal competencies nor to excel along the entire solution selling process. The results offer important implications for the solution selling literature and managerial practice.

Keywords: customer solutions, business-to-business, salespeople, fuzzy-set qualitative comparative analysis, job demands-resources model, configuration theory

4.1 Introduction

Business-to-business (B2B) customers are increasingly demanding end results and performance instead of standalone products and services (Macdonald et al., 2016; Ulaga & Kohli, 2018). In this respect, more and more sellers offer integrated, individually tailored customer solutions, i.e., sets of “customer-supplier relational processes comprising (1) *customer requirements definition*, (2) *customization and integration of goods and/or services* and (3) their *deployment*, and (4) *postdeployment customer support* [emphasis added], all of which are aimed at meeting customers’ business needs” (Tuli et al., 2007, p. 5). Due to the complexity inherent to solutions, solution selling is challenging, and many solution sellers struggle to generate profits from their solutions business (Benedettini et al., 2015; Neely, 2008).

An essential strategic asset that solution sellers can leverage to prevent such perils is successful solution salespeople (Ulaga & Reinartz, 2011). Solution salespeople’s sales success (i.e., superior levels of sales performance) represents a complex, multifaceted phenomenon that substantially depends on salespeople’s competencies (i.e., clusters of knowledge, skills, attitudes, and traits; Lacoste, 2018). In this research, competencies encompass both personal competencies (i.e., personality-related abilities; e.g., Böhm et al., 2020; Ulaga & Kohli, 2018; Ulaga & Loveland, 2014) and procedural competencies (i.e., how salespeople enact each of the four relational processes of solution selling; e.g., Panagopoulos et al., 2017).

To adequately reflect the complex nature of solutions, the extant research has increasingly adopted configurational research approaches (Böhm et al., 2017; Salonen et al., 2020). These approaches acknowledge that oftentimes multiple, equally effective paths can have the same outcome (Fiss, 2011). Against this backdrop, we identify two main research gaps. First, knowledge about the role of configurations on the level of the individual salesperson remains scant. Extant research has mainly focused on configurational investigations of firm-level

conditions that facilitate a successful solution business (e.g., Ambroise et al., 2018; Böhm et al., 2017; Forkmann et al., 2017; Lexutt, 2020) but has largely neglected individual-level investigations. Second, prior research has not yet investigated the joint effects of multiple, simultaneously occurring competencies on individual solution salespeople's success in solution selling. Instead, studies have investigated selected competencies' linear effects on sales success either in isolation or within two-way interactions (e.g., Böhm et al., 2020; Panagopoulos et al., 2017; Plouffe et al., 2017). Yet, to accurately reflect reality, a configurational investigation is required that mirrors the complexity of solution selling and offers a more nuanced perspective on the interplays of successful salespeople's personal and procedural competencies. From a practical viewpoint, a more nuanced understanding provides guidance to sales managers who seek to improve both the structure of solution sales organizations and the daily management of solution salesforces beyond a one-size-fits-all approach.

Thus, our research goal is to explore the roles of distinct configurations of personal competencies and configurations of procedural competencies in facilitating individual solution salespeople's sales success. To achieve this research goal, we rely on an exploratory research approach. Based on a qualitative pre-study comprising 22 in-depth interviews with solution sales managers, we first integrate the broad range of personal competencies identified in prior research into five key personal competencies that are critical to achieving sales success in solution selling: the *anticipation* of customer needs, *communication* of the solution offering, *value selling*, *external networking*, and *internal networking*. Furthermore, the interviews corroborate that there is no single best way to achieve sales success in solution selling; instead, sales success is associated with distinct combinations in terms of both personal and procedural competencies.

In a second step, we conduct two fuzzy-set qualitative comparative analyses (fsQCA) of survey data from 63 matched sales manager–salesperson dyads from

selected industries. The fsQCA studies reveal five distinct personal competency configurations associated with success in solution selling. Moreover, our research suggests that successful salespeople display four distinct procedural competency configurations, which means they do not act uniformly along the four relational processes of solution selling.

With these findings, this article makes two main contributions to the solutions literature. First, we extend prior research on the competencies required from solution salespeople (e.g., Blocker et al., 2012; De Jong et al., 2014; Evans et al., 2012; Koponen et al., 2019; Plouffe et al., 2017; Ulaga, 2018) by showing that multiple equally effective configurations of present and absent competencies facilitate solution salespeople's success. Whereas extant studies have mainly explored selected competencies' linear effects on sales success (e.g., Böhm et al., 2020; Panagopoulos et al., 2017; Plouffe et al., 2017), our research advances the literature by investigating competencies' joint effects. Our results showcase that successful solution salespeople do not have to possess the full range of known competencies. Instead, our insights suggest that salespeople's individual strength profiles facilitate success, as a lack of certain competencies can be balanced out by overcompensation and complementarity effects across competencies.

Second, this article contributes to research that explores the process of solution selling (e.g., Macdonald et al., 2016; Storbacka, 2011; Tuli et al., 2007) by outlining that successful salespeople do not act uniformly along the four relational processes. To date, the prevailing assumption in solutions literature is that all four relational processes are equally important for success in solution selling such that salespeople would be required to deliver exceptional performance in each of the four relational processes to be successful (Panagopoulos et al., 2017; Tuli et al., 2007). Our research extends the existing knowledge by revealing major variations in how successful salespeople execute the overall solution selling process.

Our work also bears managerial implications for solution sales executives. While it is key to recruit salespeople equipped with the competencies needed for the solutions business (e.g., Dunn et al., 1991; Levihn & Levihn, 2016), our results suggest that specific configurations of both personal and procedural competencies facilitate sales success. Hence, sales managers should focus on identifying configurations that work particularly well for their specific context instead of attempting to find a jack of all trades.

The remainder of this article is structured as follows. We first provide the theoretical underpinnings of our work. Subsequently, we present our two explorative empirical research studies, commencing with the qualitative pre-study. After that, we outline our dyadic survey study and fsQCAs. To conclude, we present the theoretical and managerial implications offered by our research and suggest avenues for future research.

4.2 Theoretical Background

In the following section, we provide the theoretical background of our work. First, we explain the role of salespeople in solution selling. Then, we establish a link between solution salespeople's competencies and sales success by drawing on the job demands-resources model. Finally, we employ configurational theory to provide reasoning for the joint effects of solution salespeople's personal and procedural competencies on sales success.

4.2.1 The role of salespeople in solution selling

Solutions are hybrid offerings that support customers' processes and create value in use for customers by resolving idiosyncratic problems (Macdonald et al., 2016; Ulaga & Reinartz, 2011). When deploying solution offerings, solution salespeople are of utmost importance (Böhm et al., 2020; Koponen et al., 2019; Panagopoulos et al., 2017). For instance, solution salespeople execute cost and profitability management and are responsible for generating follow-up solution

business (Blocker et al., 2012). Furthermore, they engage in (technical) consultancy and finance (Virtanen et al., 2015), coordinate internal and external teams (Galbraith, 2002), interact with customers (Kaski et al., 2018; La Rocca et al., 2016), and deliver services (deLeon & Chatterjee, 2017). Therefore, salespeople represent a key strategic asset (Ulaga & Reinartz, 2011) and governance mechanism of solution providers (Colm et al., 2020).

Although the sales function in a solutions context is oftentimes relatively fluid and not strictly limited to the salesforce (for instance, it can be extended to project or key account managers), we refer to salespeople as the individuals performing the broad range of activities that arise along the solution selling process (La Rocca et al., 2016; Panagopoulos et al., 2017). Notwithstanding the importance of teams in complex sales (Bachrach et al., 2017; Schmitz, 2013; Schmitz & Ganesan, 2014), salespeople represent “focal boundary spanner[s]” (Ulaga & Kohli, 2018, p. 167) and a “key employee group” (Panagopoulos et al., 2017, p. 161) in solution selling. Thus, this study’s unit of analysis is the individual salesperson.

The solution selling process consists of four relational processes: *customer requirements definition*, *customization and integration*, *deployment*, and *postdeployment support*, all of which solution salespeople are involved in during a solution project (Tuli et al., 2007; Ulaga & Kohli, 2018). These four relational processes evolve dynamically and do not necessarily move directly from one process to the next (Ulaga & Kohli, 2018).

Each relational process of solution selling involves a broad range of distinct activities enacted by solution salespeople: *customer requirements definition* requires salespeople to develop an in-depth understanding of a customer’s context (e.g., in terms of the customer’s resources, competitive situation, and internal processes) to detect unrecognized needs. *Customization and integration* require salespeople’s active involvement in the selection, design, and adaption of an offering that suits each individual customer’s needs. To this end, solution salespeople must ensure

that all goods and/or service components work smoothly together. During *deployment*, the solution is installed at the customer's site, which salespeople monitor and take care of. Furthermore, they carefully introduce and adequately train the customer's employees in terms of using the solution. Finally, *postdeployment support* comprises jointly engaging in new business developments and relationship maintenance, which necessitates salespeople to remain available and monitor the extent to which the customer's needs have been fulfilled by the solution (Panagopoulos et al., 2017; Tuli et al., 2007; Ulaga & Kohli, 2018).

Due to its inherent complexity and risk, selling solutions differs considerably from product sales (Grewal et al., 2015; Ulaga & Loveland, 2014) and has been shown to be highly demanding on solution salespeople (Böhm et al., 2020; Evans et al., 2012; Ulaga & Kohli, 2018). For instance, traditional product selling often starts with finding suitable customers for the firm's product. In contrast, solution selling commences with the identification of each customer's idiosyncratic problems, which is then followed by the development of tailored solutions to resolve these problems (Levihn & Levihn, 2016; Ulaga & Loveland, 2014). Hence, to master solution sales, salespeople require special competencies that mirror entrepreneurship (Bonney & Williams, 2009) and go beyond what is usually needed for success with other selling strategies (Friend & Malshe, 2016; Storbacka, 2011; Storbacka et al., 2011).

4.2.2 Conceptual foundation: The job demands-resources model

We draw on the job demands-resources model to link solution salespeople's competencies and sales success (i.e., superior levels of sales performance). Extant research suggests that the role of individual-level variables increases with the growing complexity of the sales process (Plouffe et al., 2017). Thus, due to the complexity of solution selling, it is important to investigate the competencies at the individual salesperson level that foster success in solution selling. To this end, we rely on the job demands-resources model, which acknowledges that job demands and resources vary according to the tasks salespeople must perform (Bakker &

Demerouti, 2007). Job demands are physical, social, or organizational aspects requiring physical and/or psychological effort and that have physiological and/or psychological costs (Bakker et al., 2010; Xanthopoulou et al., 2007).

To meet these demands, solution salespeople must fall back on their individual resources that allow them to achieve work goals and reduce job demands and their associated costs (Bakker et al., 2010; Xanthopoulou et al., 2007). In line with Xanthopoulou et al. (2007), this research conceptualizes solution salespeople's personal and procedural competencies as resources, which enable salespeople to fulfill the different demands that arise within each relational process of solution selling, thus facilitating sales success.

Against this backdrop, a careful review of the solutions literature yielded a multitude of critical competencies at the individual solution salesperson level, which we present in Table 4.1. Table 4.1 features the relevant studies along with the investigated personal and procedural competencies and methods adopted by each study.

Table 4.1 reveals that personal competencies have been studied intensively using a variety of methodological approaches. In contrast, procedural competencies remain sparsely researched. Furthermore, our review of the literature shows that extant research on solution salespeople's competencies mainly centered on identifying important competencies for solution salespeople (e.g., Friend & Malshe, 2016; Koponen et al., 2019; Ulaga & Loveland, 2014) or on measuring selected competencies' linear effects on salespeople's sales success (e.g., Böhm et al., 2020; Panagopoulos et al., 2017; Plouffe et al., 2017). Yet, research that accounts for the interplay between competencies and their joint effects on sales success is still scarce.

Table 4.1. Extant research on solution salespeople's competencies.

Key studies	Competency types	Competencies	Methods and data	Interplay of personal competencies	Interplay of procedural competencies	Effects on sales success
Plouffe and Barclay (2007)	Personal	<ul style="list-style-type: none"> Salesperson navigation 	<ul style="list-style-type: none"> Conceptual 	x	x	x
Bonney and Williams (2009)	Personal	<ul style="list-style-type: none"> Salesperson opportunity recognition 	<ul style="list-style-type: none"> Conceptual 	x	x	x
Blocker et al. (2012)	Personal	<ul style="list-style-type: none"> Value (co-) creation Value appropriation 	<ul style="list-style-type: none"> Conceptual 	x	x	x
Terho et al. (2012)	Personal	<ul style="list-style-type: none"> Value-based selling 	<ul style="list-style-type: none"> Cross-industry interview study of 11 senior executives 	x	x	x
Ulaga and Loveland (2014)	Personal	<ul style="list-style-type: none"> Ability to gain deep understanding of customer's business model Ability to manage customer expectations Ability to develop strong networking skills in customer and seller organizations Ability to make tangible the intangible and to practice value selling 	<ul style="list-style-type: none"> Cross-industry focus group of 16 senior sales managers Cross-industry interview study of 20 executives 	x	x	x

Table 4.1. Continued.

Key studies	Competency types	Competencies	Methods and data	Interplay of personal competencies	Interplay of procedural competencies	Effects on sales success
Kindström et al. (2015)	Personal	<ul style="list-style-type: none"> Understanding business logic and value of customers Visualizing value Transferring Coordinating (spanning supplier and customer firm) Team leading Coordinating (internally in supplier firm) 	<ul style="list-style-type: none"> Cross-industry case studies of three solution provider firms 	x	x	x
Friend and Maishe (2016)	Personal	<ul style="list-style-type: none"> Diversity sensitivity Multipoint probing Orchestration Stability preservation 	<ul style="list-style-type: none"> Cross-industry interview study of 117 informants within 59 key account customers 	x	x	x
deLeon and Chatterjee (2017)	Personal	<ul style="list-style-type: none"> Ability to implement instrumental service Ability to implement interpersonal service Value mindset 	<ul style="list-style-type: none"> Cross-industry interview study (no more details) SEM (PLS) of single-industry (i.e., software), single-level survey data from 157 senior executives 	x	x	x
Kaski et al. (2018)	Personal	<ul style="list-style-type: none"> Rapport building 	<ul style="list-style-type: none"> Cross-industry interview study of 14 salespeople Conversation analysis of 7 video-recorded sales interactions Follow-up interview study of customers (no more details) 	x	x	x

Table 4.1. Continued.

Key studies	Competency types	Competencies	Methods and data	Interplay of personal competencies	Interplay of procedural competencies	Effects on sales success
Ulaga and Kohli (2018)	Personal	<ul style="list-style-type: none"> Flexibility Ability to solve problems Ability to reduce uncertainties by providing pertinent information to key stakeholders and encouraging adaptive behaviors of parties involved 	<ul style="list-style-type: none"> Conceptual 	x	x	x
Koponen et al. (2019)	Personal	<ul style="list-style-type: none"> Sales communication competence 	<ul style="list-style-type: none"> Cross-industry interview study of 29 CEOs, salespeople, or sales managers Interview study of 10 sales communication educators 	x	x	x
Plouffe et al. (2017)	Personal	<ul style="list-style-type: none"> Predecision outcome elaboration 	<ul style="list-style-type: none"> SEM of survey data from two firms and 109 / 192 executives 	x	x	✓
Böhm et al. (2020)	Personal	<ul style="list-style-type: none"> Value opportunity recognition 	<ul style="list-style-type: none"> Multilevel modeling of cross-industry, multi-level survey data from 799 salespeople and respective sales managers from 29 business units 	x	x	✓
Salonen et al. (2020)	Personal	<ul style="list-style-type: none"> Value-based selling Risk perceptions Solution experience 	<ul style="list-style-type: none"> fsQCA of single-industry (i.e., building), multi-level survey data from 184 salespeople 23 solution champions, and 26 sales managers 	✓	x	x

Table 4.1. Continued.

Key studies	Competency types	Competencies	Methods and data	Interplay of personal competencies	Interplay of procedural competencies	Effects on sales success
Panagopoulos et al. (2017)	Procedural	<ul style="list-style-type: none"> Salesperson solution involvement (i.e., enactment of the overall solution selling process) 	<ul style="list-style-type: none"> Two scale development studies (i.e., interview study of 27 senior executives, single firm survey of 104 customers) Two single firm surveys of 120 salespeople and 38 managers / 185 customers One multi firm survey for 247 salespeople and 58 managers 	x	x	✓
This study	Personal	<ul style="list-style-type: none"> Anticipation Communication Value selling Internal networking External networking 	<ul style="list-style-type: none"> Cross-industry interview study with 22 sales managers Two fsQCA of cross-industry, multi-level survey data from 63 salespeople and 39 respective sales managers 	✓	✓	✓
	Procedural	<ul style="list-style-type: none"> Customer requirements definition Customization and integration Deployment Postdeployment support 				

Notes: x = no part of study, ✓ = part of study. SEM = Structural Equation Modeling, PLS = Partial Least Squares, fsQCA = Fuzzy-set Qualitative Comparative Analysis.

4.2.3 Understanding the joint effects of solution salespeople's competencies

We rely on configuration theory (e.g., Fiss, 2007; Meyer et al., 1993; Vorhies & Morgan, 2003) to investigate the complex interplay of salespeople's competencies and their joint effects on salespeople's success. According to configuration theory, a configuration refers to a "multidimensional constellation of conceptually distinct characteristics [which we refer to as conditions in the following] that commonly occur together" (Meyer et al., 1993, p. 1175).

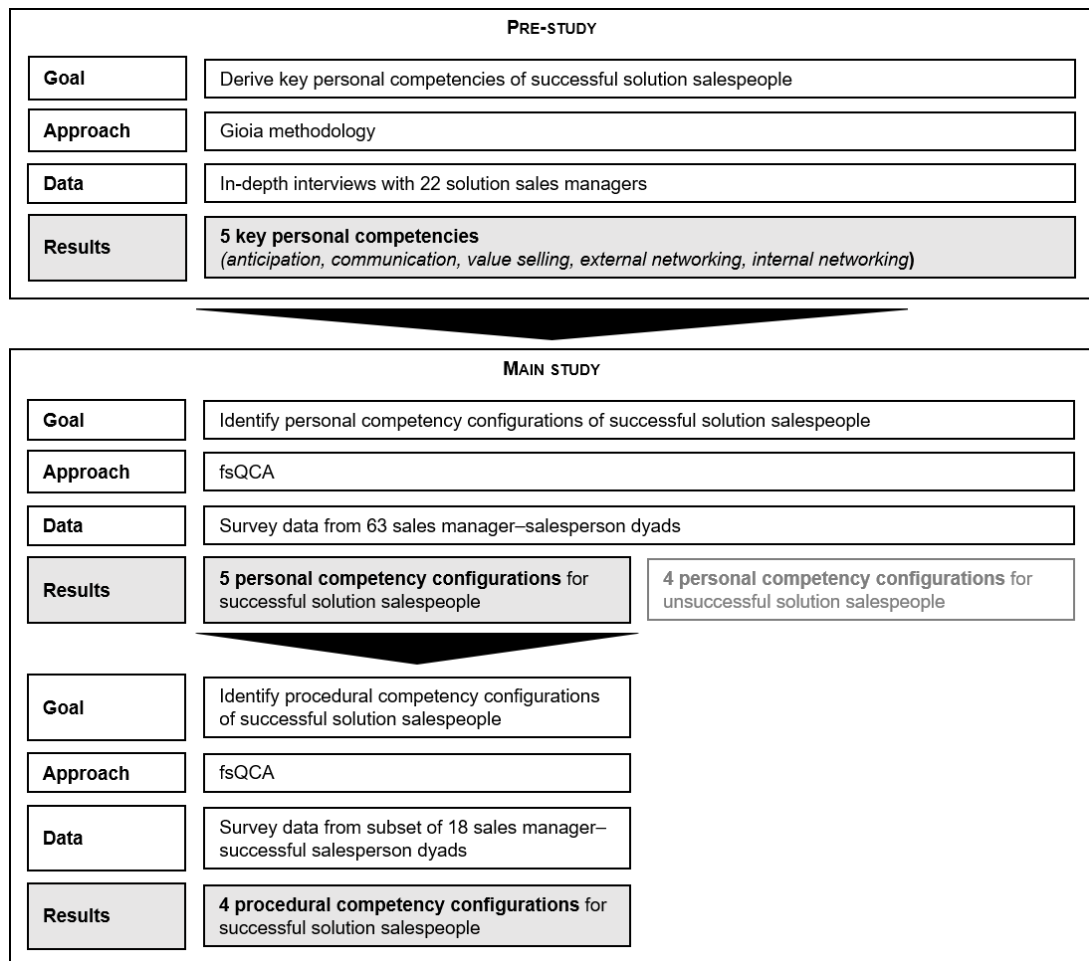
Configuration theory seeks to understand the joint effects of these coherent conditions and argues that they cannot be studied in isolation when seeking to provide a holistic understanding of a specific phenomenon. Furthermore, configuration theory acknowledges equifinality, complex causality, and non-linear relationships (Fiss, 2007; Meyer et al., 1993) such that various equifinal paths can have the same outcome. Additionally, the same conditions can be found to cause the outcome in one configuration but have no effect in another. Further, those configurations associated with the presence of the specific outcome do not necessarily have to be the exact inverse to those associated with the absence of said outcome. Finally, conditions can vary in their causal essentiality for the outcome: core conditions indicate stronger causal relations, whereas peripheral conditions indicate weaker relations (Fiss, 2011).

By adopting this theoretical lens, a configurational study of salespeople's competencies should provide a deeper understanding of the interplay between competencies and its effect on salespeople's success in solution selling (i.e., superior sales performance levels). Hence, adopting a configurational perspective enables us to make meaningful contributions to the extant literature by exploring the roles of distinct personal and procedural competency configurations with respect to individual solution salespeople's sales success.

4.3 Methodology

To study these questions, we adopted a two-staged mixed methods research design, which is displayed in Figure 4.1. Both of our studies were explorative in nature.

Figure 4.1. General research approach.



4.3.1 Pre-study

4.3.1.1 Research design, data collection, and sample

The literature review revealed that a broad set of personal competencies has been discussed in the extant literature. For our study, we thus sought to derive a consolidated set of solution salespeople’s most relevant key personal competencies in Step 1. To this end, we conducted in-depth interviews with 22 solution sales managers to explore their meaningful insights and contextual experiences (Creswell, 2007; Patton, 2015). On average, each interview lasted about 35 minutes.

Appendices 4.A and 4.B describe our interview guideline and sample characteristics in greater detail.

All interviews were recorded, transcribed verbatim, and analyzed through the systematic Gioia methodology (Gioia et al., 2013). First, two of the authors subjected the extensive body of interview material to careful open and in-vivo coding procedures. Next, we jointly discussed and modified the codes and integrated them into superordinate themes and dimensions. Through an iterative process, we identified similarities and differences in the data, from which we distilled the key personal competencies that interviewees perceived as most relevant with respect to solution salespeople's sales success. Disagreements were resolved through joint discussions.

4.3.1.2 Results and interpretation

From the meaningful insights provided by sales managers, we derived five key personal competencies that were perceived to be the most relevant for solution salespeople's sales success. These personal competencies are the *anticipation* of customer needs; *communication* competencies to manage customer expectations and facilitate customers' understanding of the offering; and *value selling* competencies, namely salespeople's ability to center on, picture, and visualize the solutions' idiosyncratic value propositions from customers' perspectives. Furthermore, we identified *external networking* and *internal networking* competencies as essential for sales success. Exemplary quotes about the key personal competencies, along with definitions and references to related constructs in the literature, are summarized in Table 4.2.

Table 4.2. Interview findings on key personal competencies.

Dimension and definition	Themes	Exemplary quotes	Related constructs in the solutions literature
Anticipation (i.e., competency to sense and understand customers' needs as stemming from their idiosyncratic business)	<ul style="list-style-type: none"> Identify needs that customers do not voice Think like customers Read between the lines Be empathic 	<p> Oftentimes, customers do not know. They know what they want, but they do not know the way to go and what pitfalls exist. Therefore, it is important to have this foresight from our side. [Interview 3]</p> <p> He or she must anticipate to a high degree how the customer's business works and how the customer thinks. [Interview 5]</p> <p> As a salesperson, it is the most important thing to find out where the customer has troubles. [Interview 9]</p>	<ul style="list-style-type: none"> Ability to gain deep understanding of customer's business model (Ulaga & Loveland, 2014) Understanding business logic and value of customers (Kindström et al., 2015)
Communication (i.e., competency to explain the capabilities and boundary conditions of the solution and thus facilitate customers' under-standing of the solution offering)	<ul style="list-style-type: none"> Deliver explanations that facilitate customers' understanding Specify clearly what can be delivered Find the right words Make customers listen Storytelling 	<p> For me it is more important that someone is extremely good at communicating to customers. [Interview 5]</p> <p> He or she [i.e., the salesperson] understands the customer's worries and needs, always has an open ear, and is very good in listening, asks the right questions, does not tell so much on his own, but listens more and talks about his understanding. Then he can offer the right solution. [Interview 14]</p> <p> Let me put it this way: they [i.e., salespeople] can explain with their hands and feet. [Interview 22]</p>	<ul style="list-style-type: none"> Ability to make tangible the intangible, manage customer expectations, and foster customers' understanding of the offering (Ulaga & Loveland, 2014) Sales communication competence (Koponen et al., 2019) Rapport building (Kaski et al., 2018)
Value selling (i.e., competency to center on and stress value generation for customers)	<ul style="list-style-type: none"> Understand customers' businesses and processes Understand customers' contexts Derive value propositions for each customer Know how to place solutions at each customer 	<p> A sales talk should always reveal where the customer's shoe really pinches (...) not only consist of a frontal presentation of our products. [Interview 8]</p> <p> It is outlined that (...) it [i.e., the solution] can be used in the future. Although it is now used with these requirements, one could improve them in the future. [This perspective] is also sold [to the customer]. [Interview 14]</p> <p> [The given information] is not necessarily just product-related, but the solution also includes the idea of customer service, i.e., using the example [about the requirement of getting from A to B, the customer] wants to do this as conveniently as possible and at a certain time. [Interview 9]</p>	<ul style="list-style-type: none"> Visualizing value (Kindström et al., 2015) Value opportunity recognition (Böhm et al., 2020) Value mindset (deLeon & Chatterjee, 2017) Ability to practice value selling (Salonen et al., 2020; Terho et al., 2012; Ulaga & Loveland, 2014)

Table 4.2. Continued.

Dimension and definition	Themes	Exemplary quotes	Related constructs in the solutions literature
External networking (i.e., competency to generate and nurture strong relationships with individuals in customer firms)	<ul style="list-style-type: none"> Build strong personal relationships with key decision makers in customer firms Invest in nurturing existing relationships Build trust 	<p>He or she knows the Buying Center and can place the solution in a holistic view quite high in the respective firm. [Interview 14]</p> <p>If we build a long-term relationship with the decision makers, (...) they will contact us for help on their own. [Interview 20]</p> <p>He or she has an extremely good network (...), so he or she knows different points of contact [of the customer organization]. [Interview 1]</p>	<ul style="list-style-type: none"> Transferring, coordinating (spanning supplier and customer firm; Kindström et al., 2015) Orchestration (Friend & Malshe, 2016) Ability to develop strong networking skills in customer organizations (Ulaga & Loveland, 2014)
Internal networking (i.e., competency to generate and nurture strong relationships from colleagues from the own and other departments within the own firm)	<ul style="list-style-type: none"> Coordinate internal stakeholder Communicate constantly with internal stakeholders Build influential position Create internal support for solutions projects Identify best contact person Maintain overview over solutions projects 	<p>One must be able to trigger the topics in the own firm (...) to get an appropriate priority on this new product development. [Interview 15]</p> <p>He or she must be able to bring other colleagues on board if required by the situation. [Interview 5]</p> <p>Like a puppeteer, who always has the different departments somewhere on the screen to get the relevant information and to give them the relevant information. [Interview 13]</p>	<ul style="list-style-type: none"> Team leading, coordinating (internally in supplier firm; Kindström et al., 2015) Ability to develop strong networking skills in vendor organizations (Ulaga & Loveland, 2014)

Table 4.2 shows that the key personal competencies we derived integrate many of the personal competencies outlined by the extant literature (e.g., Böhm et al., 2020; Kaski et al., 2018; Terho et al., 2012; Ulaga & Kohli, 2018; Ulaga & Loveland, 2014). Thus, we are confident that exploring these personal competencies with respect to their joint effects on individual solution salespeople's sales success will generate meaningful and practically relevant results.

Beyond that, our informants also helped us to gain a better understanding of the complex interplay of competencies and corroborated the competencies' joint effects on salespeople's sales success. For instance, the interviewees referred to unique strength profiles with respect to salespeople's competencies:

How competencies are distributed varies across people, and everybody has his or her own style. [Interview 18]

Some interviewees also described different types of solution salespeople working within their sales organization and even provided labels for these different types:

These people listen, they are eloquent, and eventually they say 'Yes, we can!' (...) So, when I come to the counter pole (...) they are very reliable. (...) And then there are the networkers, who are known everywhere. [Interview 17]

In addition, our interview partners pointed to the existence of different styles in solution selling:

With respect to deployment, I believe that if I do this properly, make sure that the thing [i.e., the solution] works and that the customer feels in good hands, then I can put less emphasis on aftersales, because the customer already feels in good hands and has picked up a lot during the implementation. (...) I do not want to only have uniform salespeople, who all have the same weaknesses or strengths. [Interview 9]

These anecdotal insights underscore that adopting a configurational approach to explore competencies' joint effects on individual salespeople's sales success represents an adequate choice that reflects the complexity of solution selling.

4.3.2 Research design of the main study

In Step 2, our main study, we sought to examine the joint effects of personal competencies and procedural competencies with respect to individual salespeople's sales success (i.e., superior sales performance levels). To this end, we employed fsQCA, a set-theoretic, case-based method that is gaining popularity amongst marketing scholars (Habib et al., 2020; Lexutt, 2020; Rubera & Kirca, 2017). It identifies single conditions (i.e., a single "independent" variable) or configurations of several conditions (i.e., conjunctions of various "independent" variables) that are necessary or sufficient for an outcome (i.e., the "dependent" variable) to be present or absent across all investigated cases (Ragin, 2008; Schneider & Wagemann, 2012).

In comparison to conventional, correlation-based approaches, QCA has several advantages (see Frösén et al., 2016; Salonen et al., 2020). First, it allows researchers to capture causal complexity (i.e., the relative importance of several variables of interest in explaining the outcome; Fiss, 2007, 2011). Second, it accounts for equifinality (i.e., the possibility that distinct paths can lead to one and the same outcome). Third, QCA assumes causal asymmetry such that different conditions and configurations can be responsible for the occurrence of the outcome and for its absence. Fourth, it enables a fine-grained differentiation between necessity and sufficiency (Fiss, 2011).

QCA relies on cases' memberships in sets. Compared with crisp-set QCA, fsQCA allows researchers to differentiate not only between full membership (membership score of 1) and no membership (membership score of 0), it also accounts for partial membership (membership scores of < 1 and > 0). For instance, a case's (i.e., individual salesperson's) membership in the set of salespeople with superior sales performance indicates whether this case is more in the set (as indicated by fuzzy scores > 0.50) or more out of the set (as indicated by fuzzy scores < 0.50). Due to this fine-grained assessment, fsQCA yields higher

consistency standards, is more encompassing, and does not exacerbate limited diversity (i.e., the fact that not all possible configurations can commonly be observed in a given dataset; Ragin, 2009). Hence, fsQCA is well-suited for exploring complex, multifaceted phenomena, in which varying levels of distinct conditions simultaneously affect the presence or absence of the outcome, as is the case in the present investigation.

4.3.3 Data collection and sample

We conducted a two-staged, self-administered online survey from February 2020 to July 2020. To rule out concerns about common method variance, we used different data sources for the dependent and independent variables (in our case, outcome and conditions, respectively), as recommended by prior research (Homburg et al., 2012; Lindell & Whitney, 2001; Worm et al., 2017). Specifically, in Stage 1, we sent out questionnaires to solution sales managers regarding their industry and firm characteristics, the solutions offered by their firm, and their own demographics. More importantly, each sales manager selected up to three associated salespeople of managers' choice and distinct performance levels. For these salespeople, we received assessments of their sales performance levels from sales managers.

Upon completion of their own questionnaire, sales managers forwarded the questionnaires to the selected salespeople (Stage 2). In this stage, salespeople assessed the remaining variables of interest and indicated their respective demographics. Neither group knew the answers of the other group. The matching procedure also guaranteed all participants' anonymity as we used automatically generated, relatable survey links.

We undertook dedicated efforts to ensure our dataset's quality. First, we engaged in extensive desk research to identify solution providers in German-speaking B2B markets. In joint discussions, we agreed on the following criteria. First, firms had to offer "customized and integrated product-service combinations"

(Böhm et al. 2020, p. 7), in other words, complex technical solutions designed around a core product component. Second, firms had to belong to selected industries (see Appendix 4.C). Following Worm et al. (2017), two of the authors cross-validated that the identified firms offered solutions according to our criteria using secondary material from the firms' websites, industry publications, and professional networking platforms. Firms for which agreement could not be achieved were dropped from the list. This procedure yielded a set of 269 B2B firms.

Senior sales managers (e.g., heads of sales and sales directors) were identified through professional networking platforms and firm websites and were contacted by e-mail. To raise interest, we enclosed a personalized cover letter explaining our research purpose and included a report of the pre-study's interview results. We personally conducted follow-up calls to maximize response rates and received completed questionnaires from 48 sales managers. The 48 sales managers provided sales performance assessments for 106 solution salespeople in Stage 1.

Based on the information provided by sales managers on industry and firm characteristics, as well as the respective solution offerings, we ensured that our study consistently focused on complex technical solutions designed around a core product component (e.g., solutions comprising highly customized heavy machinery or electronics in conjunction with tailored long-term service level agreements). For instance, sales managers described their respective solutions as highly tailored offerings containing product components like "chain-based control, oil pump, and mass balancing gears for combustion engines" or "specialized packaging machines for valve bagging and liquids," in line with installation and after-sales service level agreements to ensure the solution's performance. We chose this context to account for the significant variance in both competencies and even the solution selling process depending on the complexity of the solution, as indicated by our interview partners from the pre-study. Our aim was to establish a certain level of homogeneity

among the solution offerings studied, while at the same time ensuring some level of variance across them.

We sent two rounds of reminders to participating sales managers and asked them to kindly remind the selected salespeople to complete the forwarded questionnaires. We received 73 completed questionnaires from salespeople in Stage 2. Comparisons of responding and non-responding firms' number of employees ($t = 1.0956$, $p = 0.2744$) confirmed the absence of non-response bias. We verified salespeople's involvement in each relational process of solution selling and discarded seven responses due to the respondent lacking responsibility for one or more relational processes. In addition, we discarded one response due to click-through behavior. Due to incomplete sales manager questionnaires, two salesperson questionnaires were not attributable; therefore, the final sample consisted of 63 sales manager–salesperson dyads (39 sales managers). For our explorative purposes and number of conditions, this sample size is perfectly suited (Greckhamer et al., 2013; Thomann, 2019). Appendix 4.C provides the characteristics of our final sample.

4.3.4 Measures

We designed both questionnaires based on a thorough review of prior literature and used established scales for all constructs. We pre-tested the online survey instruments with practitioners and marketing academics to ensure comprehensibility, consistency, and face validity. Based on pre-test participants' feedback, we added additional screen-out questions and slightly reworded some of our items. All scale sources, items, and descriptive statistics are summarized in Appendix 4.D.

All measures passed our tests for reliability and convergent and discriminant validity. Without exception, Cronbach's alpha and composite reliability values surpassed 0.70 (Bagozzi & Yi, 2012). Average variances extracted were above or approximately 0.50 (Fornell & Larcker, 1981). For all constructs, we compared the

square roots of the average variances extracted with the inter-construct correlations and found no indications of discriminant validity issues (Fornell & Larcker, 1981). In addition, we performed correlation analyses for all variables of interest (Appendix 4.E), which confirmed the non-linearity of the respective relationships and, thus, the relevance of our configurational investigation.

4.3.5 Calibration

We performed fsQCAs in three subsequent steps: calibration, analysis of necessity, and analysis of sufficiency (Schneider & Wagemann, 2012). First, we calibrated our data to transform the original values into fuzzy scores ranging from 0 to 1. As required, our calibration was guided by profound theoretical expertise concerning the constructs of interest and in-depth case knowledge (Ragin, 2008). Furthermore, we sought to avoid skewed fuzzy data as these could substantially affect the results (Wagemann & Siewert, 2018). For all variables, we executed the recommended tests for skewness (Thomann & Maggetti, 2017; Wagemann & Siewert, 2018) and found no indications for skewed fuzzy data. Details on the calibration procedures are displayed in Table 4.3.

Table 4.3. Calibration procedures.

Variable	Original scale	Approach	Full non-member (0.00)	Cross-over (0.50)	Full member (1.00)	Transformation Mechanism	Reasoning
Sales performance	1 = considerably worse; 4 = equal; 7 = considerably better	Direct	1.00	4.40	7.00	Logistic function (Ragin 2008)	- Maintain the qualitative information of the scale (Lexutt, 2020) - Indications of slightly positive distortion from prior literature (Panagopoulos et al., 2017; Yeboah Banin et al., 2016)
Anticipation	1 = totally disagree; 7 = totally agree	Totally fuzzy and relative		n/a			
Communication	1 = totally disagree; 7 = totally agree	Totally fuzzy and relative		n/a			
Value selling	1 = totally disagree; 7 = totally agree	Totally fuzzy and relative		n/a			
External networking	1 = totally disagree; 7 = totally agree	Totally fuzzy and relative		n/a		Normalized cumulative distribution function (Cheli & Lemmi, 1995)	- Original scale information does not yet indicate set memberships (Duşa, 2018) - Guaranteed usable fuzzy scores scales of this type (Duşa, 2018; Habib et al., 2020)
Internal networking	1 = totally disagree; 7 = totally agree	Totally fuzzy and relative		n/a			

Table 4.3. Continued.

Variable	Original scale	Approach	Full non-member (0.00)	Cross-over (0.50)	Full member (1.00)	Transformation Mechanism	Reasoning
Customer requirements definition	1 = considerably worse; 4 = equal; 7 = considerably better	Direct	1.00	4.90	7.00		
Customization and integration	1 = considerably worse; 4 = equal; 7 = considerably better	Direct	1.00	4.90	7.00	Logistic function (Ragin, 2008)	- Maintain the qualitative information of the scale (Lexutt, 2020) - Indications of moderately positive distortion from prior literature (Panagopoulos et al., 2017)
Deployment	1 = considerably worse; 4 = equal; 7 = considerably better	Direct	1.00	4.90	7.00		
Postdeployment support	1 = considerably worse; 4 = equal; 7 = considerably better	Direct	1.00	4.90	7.00		

Notes. Full non-member = full exclusion from the set, crossover = neither in nor out the set, full member = full inclusion in the set.

4.3.6 Analyses of set relationships

QCA differentiates between necessity and sufficiency analyses. If a condition or configuration¹ is necessary for the outcome, the outcome cannot occur without the condition being present. However, the *condition can be present without the outcome*. Thus, the condition represents a superset of the outcome. In contrast, if a condition is sufficient for the outcome, the outcome can occur without the condition being present. However, the *condition cannot be present without the outcome*. Thus, the condition represents a subset of the outcome (Ragin, 2008; Schneider & Wagemann, 2012).

We executed all analyses in R 4.0.2 (R Foundation, 2020), making use of packages QCA 3.9 (Duşa et al., 2020) and SetMethods 2.6 (Oana et al., 2020). As recommended, we performed separate analyses for necessity and sufficiency, which we present in the results section. For the sufficiency analysis, we adopted the procedures of the enhanced standard analysis (ESA; Schneider, 2018; Schneider & Wagemann, 2013). First, we constructed truth tables (Appendices 4.F and 4.G), which contain all 2^k (where k is the number of conditions) possible configurations of conditions. Each case was assigned to one configuration depending on the case's degree of membership in an n -dimensional vector space of configurations. Truth table minimization was executed by means of Boolean algebra and the Quine–McCluskey algorithm. As for the limited diversity of the real world, not all possible configurations are usually observed. Of these logical remainders (i.e., truth table rows with no or too few observed cases), ESA includes only those that do not contradict necessary conditions/configurations, are not simultaneous subsets of both the absence and presence of the outcome, and are not logically implausible.

¹ The remainder of the paragraph refers to both conditions and configurations of conditions.

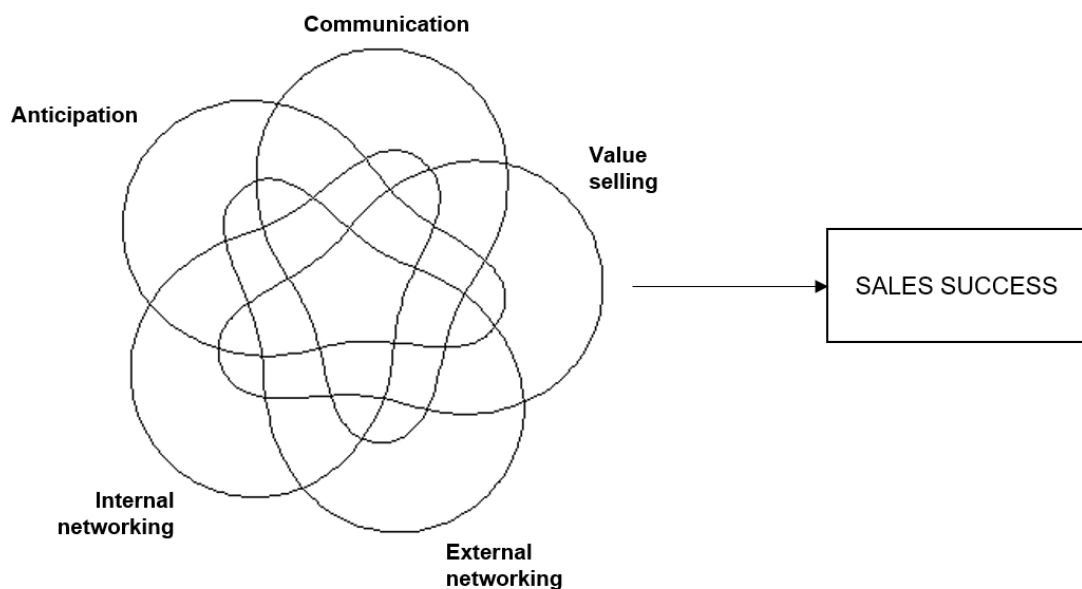
4.4 Results

4.4.1 Personal competency configurations' effects on sales success

4.4.1.1 Analysis of necessity

First, we investigated the joint effects of configurations of the personal competencies that we identified in our pre-study (i.e., *anticipation*, *communication*, *value selling*, *external networking*, and *internal networking* competencies) on sales success. Figure 2 displays the conceptual framework underlying the analysis.

Figure 4.2. Conceptual framework for the study of personal competency configurations.



Notes. The Venn diagram indicates the configurations of conditions (i.e., personal competencies) that exert a joint effect on the outcome (i.e., sales success).

As recommended for necessity analyses, we used a consistency cutoff of 0.90 such that a condition or configuration is almost always necessary for the outcome to occur (Ragin, 2006, 2008; Schneider & Wagemann, 2012). To identify all potential necessary conditions and configurations, we ran a super subset analysis (Schneider, 2018; Thiem, 2017). However, especially configurations easily become so large that they almost always represent a superset of the outcome (Duşa, 2018; Wagemann & Siewert, 2018). Thus, inspecting the necessary

configurations with caution and refraining from automatically accepting them as necessary is warranted (Schneider, 2018).

In addition, we adopted a relevance of necessity (RoN) cutoff of 0.70. The RoN indicates the relevance of a condition or configuration for the outcome. For instance, if the fuzzy scores for a specific condition or configuration are high among all cases, the condition or configuration is omnipresent and, thus, not relevant for the outcome to occur (Duşa, 2018). In our data, we did not find any necessary conditions or configurations for the presence or absence of the outcome. Accordingly, there is no competency or competency configuration without which sales success (or its absence) cannot occur.

4.4.1.2 Analysis of sufficiency

For the analysis of sufficiency, we constructed truth tables for both the presence and absence of the outcome (Appendix 4.F). Based on an observed gap in the distribution of truth table rows' consistency scores (Crilly et al., 2012; Ragin, 2008), we specified an inclusion consistency cutoff of 0.95, which well exceeds the recommended 0.75 (Schneider & Wagemann, 2012). Given our sample size, we chose a frequency cutoff of $n = 1$.

For both truth tables and each individual row, we inspected the proportional reduction in inconsistency (PRI) scores. Following ESA (Schneider & Wagemann, 2013), we used the PRI scores to decide whether to consider a configuration sufficient for the presence or absence of the outcome and assigned the rows accordingly to avoid simultaneous subset relations. Next, we executed truth table minimization and generated conservative, parsimonious, and (where possible) intermediate solutions.²

Conservative (also called complex) solutions rest on observed truth rows, whereas for parsimonious and intermediate solutions, remainders (i.e., unobserved

² We apologize for the twofold adoption of the term "solution". In terms of the methodology, the solution refers to the result of the truth table minimization.

truth table rows) are included. Remainders occur as usually not every truth table row is observed due to limited diversity. ESA differentiates between easy and difficult remainders (Schneider & Wagemann, 2013). Difficult remainders are those that contradict previously specified necessary conditions or indicate simultaneous subset relations. For the present study, no necessary conditions were identified, so none had to be excluded. Based on the inspection of the truth tables, we excluded truth table rows 19, 28, and 29 from the analysis of the presence of the outcome and the remaining rows from the analysis of its absence. We also specified directional expectations about the expected effect of the investigated conditions; based on our insights from the pre-study and the prior literature, we expected all competencies to facilitate sales success.

4.4.1.3 Solution for presence of outcome

Table 4.4 presents the five personal competency configurations that are part of the intermediate solution and consistently associated with sales success (for the radar chart representation of the results, please refer to Appendix 4.H). It also displays the consistency, coverage, unique coverage, and PRI scores for the individual configurations and the overall solution. The high scores for solution consistency (0.926), coverage (0.695), and PRI (0.754) indicate that the solution configurations were almost always sufficient and highly relevant for the outcome (Schneider & Wagemann, 2012).

Table 4.4. Personal competency configurations of successful solution salespeople.

Personal competencies	Personal competency configurations (PeC)				
	1PeC	2PeC	3PeC	4PeC	5PeC
Anticipation			○	●	●
Communication	○	●		○	●
Value selling	○	○	●	●	
External networking		○	●	○	●
Internal networking	●		●		○
Consistency	0.943	0.944	0.959	0.957	0.953
Raw coverage	0.386	0.373	0.365	0.326	0.326
Unique coverage	0.048	0.055	0.082	0.040	0.022
PRI	0.743	0.640	0.820	0.739	0.615
Solution consistency			0.926		
Solution coverage			0.695		
PRI			0.754		

Notes. Black circles indicate the presence, white circles indicate the absence of a condition. Blank spaces represent “don’t care” (i.e., the presence or absence of the condition is causally unrelated to the outcome such that the respective condition can be either present or absent). Large circles indicate core conditions, small circles indicate peripheral conditions.

The results demonstrate that solution salespeople can be successful with different personal competency configurations. Configuration 1PeC of successful salespeople combines low *communication* and *value selling* competencies with a high *internal networking* competency. Configuration 2PeC combines high *communication* with low *value selling* and *external networking* competencies. In Configuration 3PeC, a low *anticipation* competency is complemented by high *value selling* and *external networking* competencies as core conditions, and the *internal networking* competency appears as a peripheral condition. Configuration 4PeC

combines high *anticipation* and value selling with low *communication* and *external networking* competencies. Finally, Configuration 5PeC consists of high *anticipation*, *communication*, and *external networking* competencies combined with a low *internal networking* competency.

4.4.1.4 Robustness checks

Following up on the sufficiency analyses, we executed a series of robustness checks. For both analyses, we inspected the solutions resulting from variations in the crossover point for the calibration of the outcome (i.e., sales performance). Specifically, we ran four additional analyses at crossover points 4.3 and 4.8 (two each for the analysis of presence and absence of the outcome). Furthermore, we also executed 14 post-hoc cluster analyses across seven cluster variables (salespeople's age, gender, economic education, and technical education; firm size in employees; firm size in revenues; and industry) to verify that the solution formula holds across sub-groups in our data (Oana et al., 2020; Oana & Schneider, 2018). The robustness checks indicated slight deviations in consistency, coverage, and/or PRI scores but showed no significant deviations in the configurations and solutions.

In addition, we executed a sufficiency analysis for the absence of sales success (i.e., average and below-average sales performance levels). Although we found four competency configurations associated with the absence of the outcome, the resulting solution's PRI score of 0.413 fell below the required PRI threshold of 0.750 (Misangyi & Acharya, 2014). As for these results' lack of meaningfulness, we refrain from further elaborating on them. Further details on the results of all robustness checks are available upon request from the authors.

4.4.1.5 Interpretation of the competency configurations

For the chosen context, we identify five distinct configurations of *anticipation* (i.e., competency to sense and understand customers' needs as stemming from their idiosyncratic business), *communication* (i.e., competency to explain the capabilities and boundary conditions of the solution and thus facilitate customers'

understanding of the solution offering), *value selling* (i.e., competency to center on and stress value generation for customers), *external networking* (i.e., competency to generate and nurture strong relationships with individuals in customer firms), and *internal networking* (i.e., competency to generate and nurture strong relationships with colleagues from their own and other departments within the firm) that are consistently associated with success in solution selling.

Specifically, our findings show that high *internal networking* (Configuration 1PeC) and *communication* (Configuration 2PeC) competencies work on their own, which means that salespeople in these configurations do not have to possess further personal competencies to achieve success. Beyond that, *internal networking* and *communication* competencies can overcompensate for other missing competencies: for instance, neither 1PeC nor 2PeC salespeople are the best at convincing customers of solutions through *value selling* competencies. Presumably 1PeC salespeople can overcompensate for their weaknesses in customer-directed personal competencies such as *communication* and *value selling* by means of close relationships with colleagues from their own firm (as resulting from their *internal networking* competency). Thanks to these relationships, acquainted and befriended co-workers likely support 1PeC salespeople with knowledge, insights, and tricks that help them in solution selling. In addition, close internal relationships likely enable 1PeC salespeople to delight customers by having potential requests addressed in a short time frame in an informal, non-bureaucratic way based on their internal relationships. Interestingly, anecdotal evidence from our interviews backs these propositions: specifically, informants indicated that an *internal networking* competency enables salespeople to motivate experts from specialist departments to help push things forward.

Interview evidence also helps to explain Configuration 2PeC: salespeople who possess an exceptional *communication* competency can persuade customers by ensuring that they perfectly understand the benefits and boundary conditions of

the solution offering. Thus, these solution salespeople are experts at making the intangible tangible (Ulaga & Loveland, 2014). At the same time, their *communication* competency overcompensates for being non-superior regarding *value selling* and *external networking*. Presumably, customers who work with 2PeC salespeople make a purchase decision not because these salespeople excel at visualizing value or as a result of close relationships. Instead 2PeC salespeople help customers to recognize the value inherent to a solution offering themselves, which fosters present and future purchases. Therefore, *communication* and *value selling* substitute rather than complement each other; in other words, possessing one of the two is enough with respect to sales success.

Configuration 3PeC suggests that building strong relationships (through superior *external networking* and *value selling* competencies) can overcompensate for lacking the personal competency to *anticipate* customer needs. Presumably, 3PeC salespeople generate sales by convincingly conveying a solution's value to customers. At the same time, customers are stimulated to openly communicate their needs within the boundaries of close relationships. As a result, the *anticipation* competency is not required from salespeople to fulfill the exact requirements of a customer and, thus, achieve superior performance levels. The peripheral role of *internal networking* implies a weaker causal relationship with the outcome. Consequently, some salespeople in this configuration might excel in *value selling* and *external networking* but possess only average or below-average *internal networking* competencies. Thus, a combination of *value selling* and *external networking* is more predictive of superior sales performance.

Finally, our results suggest that a high *anticipation* competency requires complementary competencies. Specifically, this means that deep insights into customer needs (as resulting from *anticipation*) can only boost sales performance when salespeople convey them to customers through superior competencies in either *value selling* (Configuration 4PeC) or *communication* and *external networking*

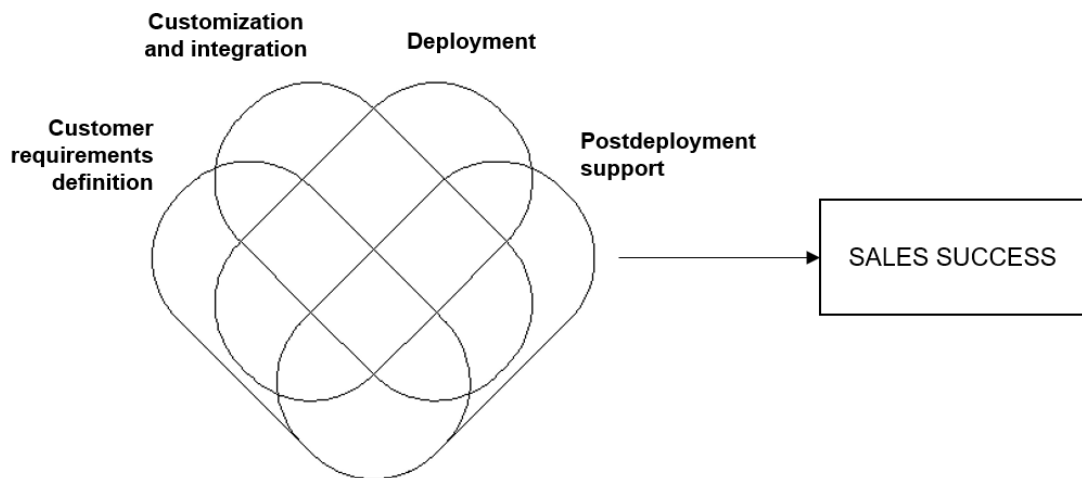
(Configuration 5PeC). 4PeC salespeople seem to be more reticent (as indicated by low *communication* and *external networking* competencies) but this is overcompensated by their excellent ability to understand and demonstrate what customers really need. Salespeople in Configuration 5PeC overcompensate for their lack of *internal networking* competency by being deeply rooted in customer firms through their customer-directed competencies. Hence, 4PeC and 5PeC salespeople do not need to fall back on delighting customers through non-bureaucratic, fast service delivery. Instead, they achieve performance by either convincingly conveying a solution's business value for present and potential future needs (Configuration 4PeC) or generating a deep understanding and close relationship with a customer (Configuration 5PeC).

4.4.2 Successful solution salespeople's procedural competency configurations

Next, we focus on elucidating how successful salespeople act along the four relational processes and thus concentrate our subsequent analysis on procedural competency configurations. For the successful salespeople, we seek to explore whether successfully selling solutions requires salespeople to excel at each relational process or whether the successful ones instead emphasize some certain relational processes of the solution selling process over others.

We thus created a sub-dataset including only those cases who had been identified as successful in the previous analysis. We adopted the same analytic approach with one exception: now, we investigated salespeople's procedural competencies (i.e., how they enact the relational processes of *customer requirements definition, customization and integration, deployment, and postdeployment support*) as conditions. As before, sales performance served as the outcome variable, indicating individual salespeople's sales success. The conceptual framework underlying this part of our study is displayed in Figure 3.

Figure 4.3. Conceptual framework for the study of procedural competency configurations.



Notes. The Venn diagram indicates the configurations of conditions (i.e., procedural competencies) that exert a joint effect on the outcome (i.e., sales success).

4.4.2.1 Analysis of necessity

Adopting the same approach and thresholds, we detected three configurations that exceeded the consistency and RoN thresholds. We cautiously inspected these configurations and decided to exclude them from further analyses as they were of no informative value for the present study and only barely passed the consistency threshold of 0.90 (with scores of 0.904, 0.908, and 0.906).

4.4.2.2 Analysis of sufficiency

We constructed a truth table for the presence of the outcome (Appendix 4.G) and determined a frequency cutoff of $n = 1$. As all cases had previously been identified as successful, no additional analysis of the absence of the outcome was executed. We used the recommended consistency cutoff of 0.75 (Schneider & Wagemann, 2012) as we sought to include all cases. Accordingly, no remainders were included in the analysis so that we could subsequently discuss the conservative solution, which relies on observed cases only.

4.4.2.3 Solution for presence of outcome

Table 4.5 presents the four procedural competency configurations that form part of the conservative solution and are thus consistently associated with sales

success (radar chart available in Appendix 4.I). The high scores for consistency (0.932), PRI (0.862), and coverage (0.844) indicate that the configurations are almost always sufficient and highly relevant for the outcome to occur (Schneider & Wagemann, 2012).

Table 4.5. Procedural competency configurations of successful solution salespeople.

Procedural competencies	Procedural competency configurations (PrC)			
	1PrC	2PrC	3PrC	4PrC
Customer requirements definition	●			○
Customization and integration	●	○		
Deployment		○	○	●
Postdeployment support			●	○
Consistency	0.921	0.996	0.993	1.000
Raw coverage	0.639	0.640	0.576	0.486
Unique coverage	0.087	0.109	0.011	0.010
PRI	0.778	0.991	0.976	1.000
Solution consistency			0.932	
Solution coverage			0.844	
PRI			0.862	

Notes. Black circles indicate the presence, white circles indicate the absence of a condition. Blank spaces represent “don’t care” (i.e., the presence or absence of the condition is causally unrelated to the outcome such that the respective condition can be either present or absent).

The results demonstrate that successful salespeople put different emphasis on the four relational processes. Configuration 1PrC combines high *customer requirements definition* and *customization and integration* competencies. Configuration 2PrC combines low *customization and integration* and *deployment* competencies. Configuration 3PrC comprises low *deployment* and high

postdeployment support competencies. Finally, Configuration 4PrC consists of low *customer requirements definition* and *postdeployment support* competencies but a high *deployment* competency.

4.4.2.4 Robustness checks

Two additional analyses employing variations in the crossover points (4.3 and 4.8) as well as seven post-hoc cluster analyses across the same cluster variables as before yielded no deviations in the solutions, although we observed minor changes in consistency, PRI, and coverage scores. Further details on all robustness checks' results are available from the authors upon request.

4.4.2.5 Interpretation of the procedural competency configurations

For the chosen context, we identified four distinct procedural competency configurations of *customer requirements definition*, *customization and integration*, *deployment*, and *postdeployment support*, which are consistently associated with sales success. Specifically, salespeople in Configuration 1PrC excel at the first two relational processes, namely *customer requirements definition* and *customization and integration*. These salespeople excel at the exact definition of their customers' needs and the design of perfectly fitting solutions. As 1PrC salespeople presumably consider specifications regarding the solution's implementation and aftersales support already in early relational processes, competencies in the subsequent processes less relevant in terms of achieving success. Thus, salespeople's competencies in these relational processes do not impact whether they will achieve overall sales success.

Surprisingly, Configuration 2PrC consists of two absent conditions. This indicates that salespeople with low *customization and integration* as well as *deployment* competencies nevertheless can achieve sales success. Although unexpected, this finding illustrates that salespeople's competencies in enacting the four relational processes are not the only factors that matter when it comes to overall sales success in solution selling. A potential explanation is offered by both

anecdotal interview evidence as well as the solutions and team selling literature (Bachrach et al., 2017; Salonen et al., 2020; Sleep et al., 2015; Steward et al., 2010). Both suggest that selling complex offerings like solutions requires not just an engaged salesforce but also further auxiliary resources from a solution provider (e.g., support from other departments, like engineering). Our insights propose that for the investigated context, these auxiliary resources are of particular importance for 2PrC salespeople.

Moreover, our results indicate that being highly competent in only one relational process may allow salespeople to overcompensate for being less competent with respect to others. Specifically, we find that lacking the *deployment* competency can be overcompensated for by excelling at *postdeployment support* (Configuration 3PrC) and vice versa (Configuration 4PrC). On the one hand, 3PrC salespeople are superior when it comes to after-sales support, adaptations of the offering, and the generation of follow-up business. They generate continued revenue and always have customers' future needs in mind to offset weaknesses in solution deployment. On the other hand, 4PrC salespeople likely rely on improvisation and quick reactions in deployment to satisfy customers. Presumably, they quickly realize ad-hoc adaptations (e.g., by customizing trainings at the customer's site for solution users) within the course of solution implementation to achieve success. Doing so allows them to overcompensate for poorly defined customer needs and weaknesses in generating after sales business.

4.5 General Discussion

Whether individual solution salespeople are successful at solution selling is a highly complex, multifaceted phenomenon that substantially depends on their personal competencies and their procedural competencies in the four relational processes of solution selling. Despite the important contributions of the extant literature to the knowledge about salespeople's competencies, the literature does not provide an adequate understanding of the roles of distinct personal competency

configurations and procedural competency configurations in facilitating individual solution salespeople's sales success

Thus, we sought to extend the extant research by examining the interplay of both personal competencies and procedural competencies with respect to solution salespeople's sales success. To this end, we collected and analyzed qualitative data based on interviews with 22 solution sales managers and survey data from 63 matched sales manager–salesperson dyads. Our findings suggest that salespeople's success in solution selling is associated with unique configurations in terms of both personal and procedural competencies. With this finding, our study makes two main contributions to the solution selling literature. We outline our theoretical contributions along with actionable implications for sales managers as well as limitations and suggestions for future research in the following sections.

4.5.1 Theoretical contributions

First, our study extends prior research on the competencies of solution salespeople (e.g., Blocker et al., 2012; De Jong et al., 2014; Evans et al., 2012; Koponen et al., 2019; Plouffe et al., 2017; Ulaga, 2018) by showing that multiple equally effective configurations of present and absent competencies facilitate solution salespeople's sales success. Prior work on solution salespeople's competencies mainly centered on identifying important competencies for solution salespeople (Friend & Malshe, 2016; Koponen et al., 2019; Ulaga & Loveland, 2014) or focused on measuring selected competencies' net effects on salespeople's sales success (Böhm et al., 2020; Panagopoulos et al., 2017; Plouffe et al., 2017). With very few exceptions, prior studies have predominately explored competencies' influence on salespeople's success in solution selling as linear effects. The implication of such approaches would be that ideal salespeople should possess all the competencies that have been identified as drivers of sales success. However, as indicated by prior configurational studies in the solutions domain (Böhm et al., 2017; Salonen et al., 2020), adequately reflecting the complex nature of solutions requires

approaches that account for the existence of multiple equally effective ways of achieving the same outcome.

By exploring the joint effects of personal competencies (namely, *anticipation*, *communication*, *value selling*, *external networking*, and *internal networking*) and procedural competencies (namely, *customer requirements definition*, *customization and integration*, *deployment*, and *postdeployment support*) on sales success, this research identifies distinct configurations of present and absent competencies that are consistently associated with sales success (i.e., superior sales performance levels). Hence, our findings suggest that a lack of certain competencies can be balanced out by overcompensation and complementarity effects across competencies.

From our study, we find that salespeople who excel at all personal and procedural competencies, respectively, are not the ones achieving superior sales performance levels. Instead, our research illustrates that successful solution salespeople are not uniform in their competencies; rather, they achieve sales success through unique strength profiles. Accordingly, our research proposes that achieving sales success does not require salespeople to possess the full range of known competencies but rather the appropriate combination of competencies. For example, we find that the *anticipation* competency requires complementary competencies to facilitate sales success. Moreover, our results propose that certain weaknesses in customer-directed competencies (e.g., *communication* or *value selling*) can be overcompensated for through support from colleagues, which results from *internal networking*.

Second, our study contributes to research exploring the process of solution selling (e.g., Macdonald et al., 2016; Storbacka, 2011; Tuli et al., 2007) by documenting major variations in how successful solution salespeople enact the four relational processes of solution selling. According to the prevailing assumption in this literature, salespeople's performance in all four relational processes is equally

important for their success in solution selling (Panagopoulos et al., 2017; Tuli et al., 2007).

Following up on prior knowledge that salespeople tend to emphasize some selling activities over others (DeCarlo & Lam, 2016), our research suggests that achieving sales success does not necessarily require solution salespeople to excel in each of the four relational processes, as assumed by the extant literature (Panagopoulos et al., 2017). Instead, our results reveal that certain salespeople emphasize relational processes early in the overall selling process, whereas others emphasize later stages. Thus, this research shows that unique strategies along the solution selling process facilitate sales success due to overcompensation effects between distinct relational processes.

Furthermore, our findings propose that there is no single relational process in which salespeople must necessarily excel to achieve superior overall sales success. On the contrary, we even find evidence that salespeople scoring average and below-average performance levels in *customization and integration* as well as *deployment* can nevertheless achieve superior overall sales success within the investigated context. These findings suggest that sales success does not solely depend on salespeople's performance within the four relational processes of solution selling, which alludes to the importance of auxiliary resources from a solution provider firm and reinforces the growing role of teams in complex sales (Schmitz & Ganesan, 2014).

Taken together, our research findings suggest that successful salespeople are all unique in terms of both their personal and procedural competencies. Our results demonstrate that there is no single best way to sales success. These insights underscore that successfully selling solutions is a complex, multifaceted phenomenon, which requires solution sales managers to rely on more than a one-size-fits-all approach to managing a successful solution salesforce.

4.5.2 Managerial implications

Our findings offer important insights for solution sales executives. First, sales managers are well advised to adopt a configurational mindset for managing the solution salesforce. Our results show that salespeople achieve success in solution selling by means of distinct configurations of personal and procedural competencies, thus underscoring the important role of individual-level competencies with respect to sales success. We find that successful solution salespeople are not uniform but display unique strength profiles. Hence, effective sales management in a solutions context necessitates more than generalist, one-size-fits-all approaches. Based on our insights, we propose that sales managers acknowledge that no single best way to sales success exists. Consequently, we recommend that sales managers learn from the unique differences between solution salespeople and their distinct ways of reaching sales success.

Second, our results suggest that certain configurations can determine whether solution salespeople achieve superior levels of sales performance. This means that the interplay between present and absent competencies is decisive in terms of sales success. For instance, our results suggest that deep insights into customer needs generated by the *anticipation* competency can only boost sales success being conveyed to customers through complementary competencies. We propose that sales managers build on the insights generated by our study and identify best practice configurations that work particularly well for their respective context. Specifically, managers should first focus on those solution salespeople who deliver superior sales performance levels and then proceed by accurately describing these high performers.

To derive best practice configurations, we recommend that sales managers translate their observations into set-like assessments. For example, managers could assign scores indicating whether salespeople possess more or less of a specific personal competency or whether people are better or worse at enacting a specific

relational process. By comparing scores of successful solution salespeople against one another, sales managers could then identify the best practice configurations displayed by successful solution salespeople. In addition, sales managers could even match these best practice configurations against the individual contextual background of the solution provider firm (e.g., industry; competitive position; and auxiliary resources that salespeople make use of, such as technical support from engineers).

Third, building on the identification of best practice configurations, this research offers further managerial guidance for hiring new solution salespeople. Our study findings suggest that successful salespeople can possess unique strength profiles in terms of both their personal and procedural competencies. Thus, we recommend that when hiring, sales managers do not strive to find a jack of all trades amongst potential candidates. For example, our findings suggest that high *internal networking* and *communication* competencies can work on their own such that no further personal competencies are required to achieve sales success. Therefore, instead of striving to find candidates who are good at everything, we suggest that managers determine the firm-specific best practice configurations prior to assessing a potential candidate's aptitude for the job in order to know what configurations to look out for. These insights highlight the complexity of solution selling and call into question some of the traditional tools used for the assessment and classification of salespeople, such as the Myers–Briggs test.

Fourth, we also provide recommendations for how sales managers can make use of our results to manage an existing solution salesforce. For instance, we find that some salespeople achieve superior sales performance levels without necessarily being particularly good at any relational processes. Thus, our research underlines the importance of auxiliary resources from a solution provider firm, which corresponds to the growing role of increasingly complex sales teams in solution selling. For example, auxiliary resources can potentially comprise support from other

departments (e.g., engineering), which support salespeople in enacting the solution selling process. As such resources can be considered essential for the success of a solution project, sales managers are well advised to consider auxiliary resources that successful solution salespeople make use of within their assessment of best practice configurations. The importance of further resources again underscores the complex and multifaceted nature of solution selling and emphasizes the specific requirements it imposes on both salespeople and sales managers.

4.5.3 Limitations and future research

In conclusion, we discuss the avenues for future research arising from the limitations of our work. First, our results apply to the type of solution we chose for our study, namely, particularly complex technical solutions designed around a core product component. To account for evidence from our interviews indicating that some industries (e.g., information technology) differ from others regarding the execution of the four relational processes, we chose industries for which the sales managers shared a common understanding of how the four relational processes were normally executed. However, the competency configurations identified in our context may be considerably different from other contexts. For example, selling less complex, modular solutions (Salonen et al., 2018) might require a different combination of personal competencies and/or different emphasis along the solution selling process. Therefore, future research could investigate different types of solutions and different industries to yield valuable new insights.

Second, our analyses focused on competencies that we assumed would generally facilitate sales success. Nevertheless, we found configurations in which certain competencies were absent. Against this backdrop, future studies might complement our approach by investigating other, potentially more controversial competencies. For instance, Decormier and Jobber (1993) discussed salesperson dominance, which could serve as a potential starting point. Furthermore, whereas our research centered on individual-level competencies, we nevertheless

acknowledge that other factors could undoubtedly affect solution salespeople's sales success. For instance, research has pointed to several interesting firm-level and industry-level conditions (e.g., Böhm et al., 2017; Lexutt, 2020; Salonen et al., 2020). Thus, we highly encourage researchers to include multi-level data in future configurational analyses.

Third, while our study represents—to the best of our knowledge—a first effort to demonstrate that successful solution salespeople display unique configurations of procedural competencies, we cannot deliver an exhaustive explanation for why 2PrC salespeople, who are characterized by a lack of both customization and integration as well as deployment competencies, nevertheless achieve overall sales success. Future research may adopt a team selling perspective and explore the extent to which other departments (e.g., engineering) have a stronger influence on some relational processes than the sales department, which could overcompensate for salespeople lacking performance. If this were found to be the case, it might even be better to redirect these salespeople elsewhere to ensure solution sales success and optimize overall resource allocations.

Fourth, future research could proceed by explicitly exploring potential relationships between personal and procedural competency configurations. Our intermediate case number, which served the purpose of the present research well, prevented us from providing proof of such relationships. However, an indicative comparison of the frequency distributions of personal and procedural competency configurations suggested that salespeople displaying certain personal competency configurations also consistently displayed certain procedural competency configurations. We propose that future research investigate this meaningful connection to advance research on the role of individual salespeople in solution selling.

Finally, future studies could build on and extend our results by adopting a longitudinal perspective on how solution salespeople's personal and procedural

competency configurations evolve over time. This might add interesting and truly novel insights into this promising and growing body of literature on the competencies of individual salespeople in solution selling.

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4.9 Appendices

Appendix 4.A. Interview guideline.

Introduction

- Welcome to the interview and thank you very much for your participation.
 - The interview will take around 30–40 minutes. I have prepared some questions, but I highly encourage you to comment freely on your personal experiences, perceptions, and opinions. There are no right or wrong answers.
 - To return to the results later, I would like to record the interview. Do you agree with that? Of course, we will anonymize all material and treat it as strictly confidential. The material will neither be stored nor passed to third parties. Is that okay with you? [If yes: start recording].
 - So far, are there any questions from your side? [If yes, answer questions; if not, proceed to interview].
 - Okay, so let us start the interview. As already mentioned, this study centers on solutions in a business-to-business context.
-

Main questions

Probes and follow-up questions

- | | |
|--|--|
| <ul style="list-style-type: none"> • What do you understand by the term “solutions” in your context? • Can you please describe the process of how you sell solutions in your firm? • Now please think about a salesperson in your firm that is very successful in terms of sales performance. • Which competencies make this salesperson so successful? • To which competencies can the success of this salesperson be attributed? • To what extent do solution salespeople vary in their performance along the selling process? | <ul style="list-style-type: none"> • How do you mean...? • Can you elaborate on this? • Why is that? • Could you provide an example? |
|--|--|
-

End

- From my side, there are no more questions.
 - Do you have any further comments or questions? Do you think we have missed anything important?
 - Then let me thank you for taking part in the interview. Your input has been extremely helpful for us. If you wish to add something later, please do not hesitate to contact me by phone or e-mail.
 - I wish you a pleasant day. Goodbye!
-

Appendix 4.B. Sample characteristics of the interview study.

No.	Industry	Gender	Job Position	Experience
1	Mechanical engineering	m	Head of International Units and Sales Support	2 years and 2 months
2	Energy industry	m	Head of Sales for Business Customers	1 year and 8 months
3	Consulting	f	Team Director Sales and Marketing	3 years
4	Energy industry	m	Product Manager	8 years and 2 months
5	Measurement and control technology	m	Sales Area Manager	2 years and 4 months
6	Mechanical engineering	m	Area Sales Manager	2 years and 1 month
7	Electronics	m	Senior Sales Manager	1 year and 10 months
8	Electronics	m	Area Sales Manager	1 year and 5 months
9	Electronics	m	Head of Sales	8 months
10	Electronics	m	Head of Order Center	7 years and 2 months
11	Electronics	m	Market Segment and Business Development Manager	1 year and 8 months
12	Energy industry	m	Head of Sales	2 years and 6 months
13	Electronics	m	Head of Sales National	6 years and 6 months
14	IT	m	Regional Sales Director	1 year
15	Chemical industry	m	Field Sales Force	8 years and 7 months
16	Marketing and Advertising	m	Sales Director	4 years and 8 months
17	Mechanical engineering	m	Vice President Sales	2 years and 11 months
18	Chemical industry	m	Head of Sales	5 years
19	Mechanical engineering	m	Head of Sales Europe	6 months
20	Chemical industry	m	General Manager	13 years and 11 months
21	Electronics	m	Key Account Manager	3 years and 1 month
22	Medical technology	m	National Project Leader / Division Manager Key Account Management	11 years

Notes: No. = number, m = male, f = female.

Appendix 4.C. Sample characteristics of the survey study.

Firm variables (provided by sales managers)		
Firm size [number of employees]		
< 10	3	7.69%
10 to 49	6	15.38%
50 to 249	17	43.59%
250 to 499	7	17.95%
500 to 999	1	2.56%
1.000 to 4.999	4	10.26%
≥ 5.000	0	0.00%
n/a	1	2.56%
	39	100.00%
Firm size [€ revenues]		
< 1 Mil.	0	0.00%
1 to <10 Mil.	7	17.95%
10 to <50 Mil.	13	33.33%
50 to <400 Mil.	14	35.90%
400 to <1 Bil.	4	10.26%
1 to <10 Bil.	0	0.00%
≥ 10 Bil.	0	0.00%
n/a	1	2.56%
	39	100.00%
Industry		
Chemical industry	3	7.69%
Rubber industry	1	2.56%
Metal industry	3	7.69%
Mechanical engineering	20	51.28%
Electronics	4	10.26%
Other	8	20.51%
	39	100.00%
Sales manager variables		
Experience [years]		
Mean	10.18	---
Area of Responsibility		
Board of directors	0	---
Management board	8	(multiple choices allowed)
Sales	37	
Marketing	9	
Project management for solutions	7	
Other	8	
	39	
Age [years]		
< 25	0	0.00%
25-34	3	7.69%
35-49	12	30.77%
50-65	23	58.97%
> 65	0	0.00%
n/a	1	2.56%
	39	100.00%

Appendix 4.C. Continued.

Sales manager variables		
Gender		
Male	38	97.44%%
Female	1	2.56%
n/a	0	0.00%
	39	100.00%
Salesperson variables		
Experience [years]		
Mean	23.46	---
Economic education		
Limited knowledge	2	3.17%
Basic knowledge	16	25.40%
Good knowledge	29	46.03%
Very good knowledge	14	22.22%
Expert knowledge	2	3.17%
	63	100.00%
Technical education		
Limited knowledge	1	1.59%
Basic knowledge	2	3.17%
Good knowledge	18	28.57%
Very good knowledge	29	46.03%
Expert knowledge	13	20.63%
	63	100.00%
Gender		
Male	59	93.65%
Female	3	4.76%
n/a	1	1.59%
	63	63
Age [years]		
< 25	0	0.00%
25-34	10	15.87%
35-49	28	44.44%
50-65	23	36.51%
> 65	0	0.00%
n/a	2	3.17%
	63	100.00%

Notes. n/a = not applicable, mil. = million, bil. = billion.

Appendix 4.D. Measures.

Variable	Source	M	SD	α	AVE	CR	IR
Sales success <i>Adapted from Panagopoulos et al. (2017) and Sujan et al. (1994)</i> How good is this solution salesperson compared to the other solution salespeople at ... (1 = "considerably worse"; 7 = "considerably better") ... gaining market share through solutions. ... generating high profits through solutions. ... generating high revenues through solutions. ... generating fast turnovers through solutions. ... acquiring key accounts for solutions. ... exceeding sales targets for solutions. ... supporting me to achieve my own solutions sales targets. ... developing the business with our solutions further.	Sales managers	4.56	0.89	0.85	0.45	0.86	0.43 0.69 0.35 0.12 0.56 0.56 0.48 0.54
Customer requirements definition <i>Adapted from Panagopoulos et al. (2017)</i> How good are you at the following activities compared to your sales colleagues? (1 = "considerably worse"; 7 = "considerably better") - Understanding the needs of my customers - Understanding the broader objectives of my customers - Asking the right questions to identify customers' needs - Developing a deep understanding of my clients.	Sales-people	5.20	0.82	0.81	0.52	0.81	0.60 0.46 0.47 0.56
Customization and Integration <i>Adapted from Panagopoulos et al. (2017)</i> How good are you at the following activities compared to your sales colleagues? (1 = "considerably worse"; 7 = "considerably better") - Selecting suitable product and service components for good solutions. - Adjusting offers from products and services to create good solutions. - Combining products and services to good solutions in the respective offers.	Sales-people	4.99	0.91	0.90	0.75	0.90	0.72 0.82 0.72

Appendix 4.D. Continued.

Variable	Source	M	SD	α	AVE	CR	IR
Deployment <i>Adapted from Panagopoulos et al. (2017)</i> How good are you at the following activities compared to your sales colleagues? (1 = "considerably worse"; 7 = "considerably better") <ul style="list-style-type: none"> - Making sure that the solutions are delivered quickly. - Supervising the installation of the solutions at the customer's site. - Giving the users of the solutions the necessary skills. - Providing customers with the information they need to use the solutions. 	Sales-people	4.65	0.85	0.83	0.57	0.84	0.41 0.65 0.44 0.79
Postdeployment support <i>Adapted from Panagopoulos et al. (2017)</i> How good are you at the following activities compared to your sales colleagues? (1 = "considerably worse"; 7 = "considerably better") <ul style="list-style-type: none"> - Checking whether the respective customer requirements have been met. - Remaining responsive to my customers. - Staying in touch with my customers. - Keeping customers informed of new developments. - Creating additional quotes to meet new customer needs. - Building long-term relationships with my customers. 	Sales-people	4.94	0.90	0.89	0.58	0.89	0.33 0.74 0.89 0.40 0.33 0.97
Anticipation <i>Adapted from Wilder et al. (2014)</i> Please indicate to what extent you agree with the following statements. (1 = "totally disagree"; 7 = "totally agree") <ul style="list-style-type: none"> - I can anticipate the needs of my customers. - I discover the needs of my clients before they are aware of them themselves. - I recognize the needs of my customers before they tell me about them. - It is easy for me to perceive the needs of my customers before they tell me about them. - I can predict the needs of my customers. 	Sales-people	4.73	0.93	0.85	0.55	0.86	0.50 0.41 0.79 0.44 0.60

Appendix 4.D. Continued.

Variable	Source	M	SD	α	AVE	CR	IR
External networking							
<i>Adapted from Terho et al. (2017)</i>							
Please indicate to what extent you agree with the following statements. (1 = "totally disagree"; 7 = "totally agree")							
- I always try to identify all groups of people affected by our solutions at my customers.	Sales-people	5.60	0.93	0.85	0.55	0.86	0.16
- I deal with the important decision makers for our solutions at my customers.							0.36
- Through my many contacts in customer companies I work very effectively with them.							0.69
- I know different employees in each customer firm.							0.47
Internal networking							
<i>Adapted from Terho et al. (2017)</i>							
Please indicate to what extent you agree with the following statements. (1 = "totally disagree"; 7 = "totally agree")							
- I deal with the relevant decision-makers in my firm.	Sales-people	5.90	0.87	0.85	0.55	0.88	0.49
- Due to my various contacts in my firm, I work very effectively.							0.62
- I know different employees in my firm.							0.57
- I build strong working relationships with other employees in my firm.							0.62
- I work very closely with employees of other departments in my firm.							0.72
- I discuss sales strategies with employees from different departments.							0.25
<p>Notes. M = mean, SD = standard deviation, α = Cronbach's alpha, AVE = average variance extracted, CR = composite reliability, IR = indicator reliability, n/a = not applicable. The original questionnaires were in German such that scale items were translated and back-translated by professionals with expert knowledge of both the German and English language.</p>							

Appendix 4.E. Correlation analyses.

Variable	1	2	3	4	5	6	7	8	9	10
1. Sales Performance	1.00									
2. Anticipation	-0.10	1.00								
3. Communication	0.01	0.12	1.00							
4. Value selling	0.15	0.14	0.33**	1.00						
5. External networking	-0.02	0.03	0.43**	0.28*	1.00					
6. Internal networking	0.12	0.02	0.46**	0.35**	0.47**	1.00				
7. Customer requirements definition	-0.10	0.45**	0.16	0.01	0.11	0.08	1.00			
8. Customization and integration	0.01	0.45**	0.32**	0.14	0.08	0.13	0.65**	1.00		
9. Deployment	0.04	0.48**	0.34**	0.22†	0.19	0.14	0.46**	0.41	1.00	
10. Postdeployment support	-0.12	0.38**	0.31*	0.22†	0.33**	0.21†	0.56**	0.46**	0.63**	1.00

Notes. † $p < 0.1$. * $p < 0.05$. ** $p < 0.01$.

Appendix 4.F. Truth tables for fsQCAs of personal competency configurations.

Truth table for presence of sales success.

Row	ANTI	COMM	VSELL	EXTNW	INTNW	OUT	n	incl	PRI
16	0	1	1	1	1	1	4	0.970	0.864
18	1	0	0	0	1	1	1	0.966	0.691
26	1	1	0	0	1	1	1	0.965	0.549
27	1	1	0	1	0	1	1	0.962	0.556
31	1	1	1	1	0	1	1	0.961	0.654
4	0	0	0	1	1	1	3	0.960	0.720
9	0	1	0	0	0	1	4	0.960	0.682
20	1	0	0	1	1	1	1	0.957	0.612
25	1	1	0	0	0	1	4	0.955	0.614
8	0	0	1	1	1	1	1	0.954	0.643
2	0	0	0	0	1	1	1	0.954	0.670
21	1	0	1	0	0	1	2	0.951	0.668
23	1	0	1	1	0	1	1	0.951	0.613
24	1	0	1	1	1	0	2	0.948	0.464
6	0	0	1	0	1	0	1	0.943	0.566
11	0	1	0	1	0	0	2	0.941	0.598
28	1	1	0	1	1	0	3	0.938	0.474
29	1	1	1	0	0	0	1	0.938	0.477
30	1	1	1	0	1	0	4	0.935	0.579
17	1	0	0	0	0	0	2	0.930	0.576
14	0	1	1	0	1	0	3	0.929	0.490
19	1	0	0	1	0	0	2	0.925	0.381
12	0	1	0	1	1	0	2	0.922	0.480
1	0	0	0	0	0	0	4	0.916	0.661
5	0	0	1	0	0	0	1	0.916	0.514
32	1	1	1	1	1	0	11	0.874	0.497
3	0	0	0	1	0	?	0	---	---
7	0	0	1	1	0	?	0	---	---
10	0	1	0	0	1	?	0	---	---
13	0	1	1	0	0	?	0	---	---
15	0	1	1	1	0	?	0	---	---
22	1	0	1	0	1	?	0	---	---

Notes. ANTI = anticipation, COMM = communication, VSELL = value selling, EXTNW = external networking, INTNW = internal networking. OUT = Outcome, n = frequency, incl = consistency scores, PRI = proportional reduction in inconsistency scores. Non-bold truth table rows were excluded from the analysis of the presence of the outcome (i.e., presence of sales success) due to higher PRI scores for the absence of the outcome (i.e., absence of sales success).

Truth table for absence of sales success.

Row	ANTI	COMM	VSELL	EXTNW	INTNW	OUT	n	incl	PRI
26	1	1	0	0	1	1	1	0.957	0.451
19	1	0	0	1	0	1	2	0.953	0.610
27	1	1	0	1	0	1	1	0.952	0.444
24	1	0	1	1	1	1	2	0.947	0.448
28	1	1	0	1	1	1	3	0.941	0.497
29	1	1	1	0	0	1	1	0.938	0.479
25	1	1	0	0	0	0	4	0.928	0.386
31	1	1	1	1	0	0	1	0.926	0.346
6	0	0	1	0	1	0	1	0.925	0.434
18	1	0	0	0	1	0	1	0.924	0.309
20	1	0	0	1	1	0	1	0.923	0.304
14	0	1	1	0	1	0	3	0.922	0.443
23	1	0	1	1	0	0	1	0.922	0.387
8	0	0	1	1	1	0	1	0.917	0.357
11	0	1	0	1	0	0	2	0.912	0.402
5	0	0	1	0	0	0	1	0.912	0.486
30	1	1	1	0	1	0	4	0.910	0.421
9	0	1	0	0	0	0	4	0.907	0.268
2	0	0	0	0	1	0	1	0.906	0.330
17	1	0	0	0	0	0	2	0.904	0.424
21	1	0	1	0	0	0	2	0.902	0.332
12	0	1	0	1	1	0	2	0.892	0.281
4	0	0	0	1	1	0	3	0.885	0.201
1	0	0	0	0	0	0	4	0.837	0.339
32	1	1	1	1	1	0	11	0.820	0.276
16	0	1	1	1	1	0	4	0.807	0.123
3	0	0	0	1	0	?	0	---	---
7	0	0	1	1	0	?	0	---	---
10	0	1	0	0	1	?	0	---	---
13	0	1	1	0	0	?	0	---	---
15	0	1	1	1	0	?	0	---	---
22	1	0	1	0	1	?	0	---	---

Notes. ANTI = anticipation, COMM = communication, VSELL = value selling, EXTNW = external networking, INTNW = internal networking. OUT = outcome, n = frequency, incl = consistency scores, PRI = proportional reduction in inconsistency scores. Non-bold truth table rows were excluded from the analysis of the absence of the outcome (i.e., absence of sales success) due to higher PRI scores for the presence of the outcome (i.e., presence of sales success).

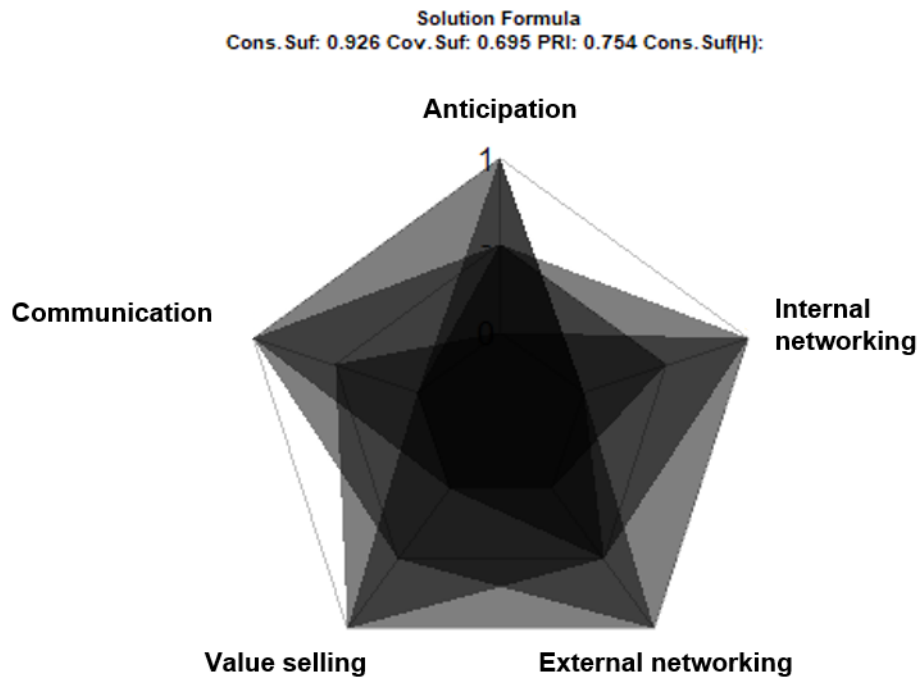
Appendix 4.G. Truth table for fsQCA of procedural competency configurations.

Truth table for presence of sales success.

Row	CRD	CI	D	PDS	OUT	n	incl	PRI
2	0	0	0	1	1	1	1.000	1.000
3	0	0	1	0	1	1	1.000	1.000
7	0	1	1	0	1	1	1.000	1.000
9	1	0	0	0	1	2	1.000	1.000
10	1	0	0	1	1	2	1.000	1.000
13	1	1	0	0	1	3	1.000	1.000
15	1	1	1	0	1	1	1.000	1.000
14	1	1	0	1	1	1	0.999	0.995
1	0	0	0	0	1	4	0.995	0.987
6	0	1	0	1	1	1	0.992	0.964
16	1	1	1	1	1	1	0.966	0.860
4	0	0	1	1	?	0	---	---
5	0	1	0	0	?	0	---	---
8	0	1	1	1	?	0	---	---
11	1	0	1	0	?	0	---	---
12	1	0	1	1	?	0	---	---

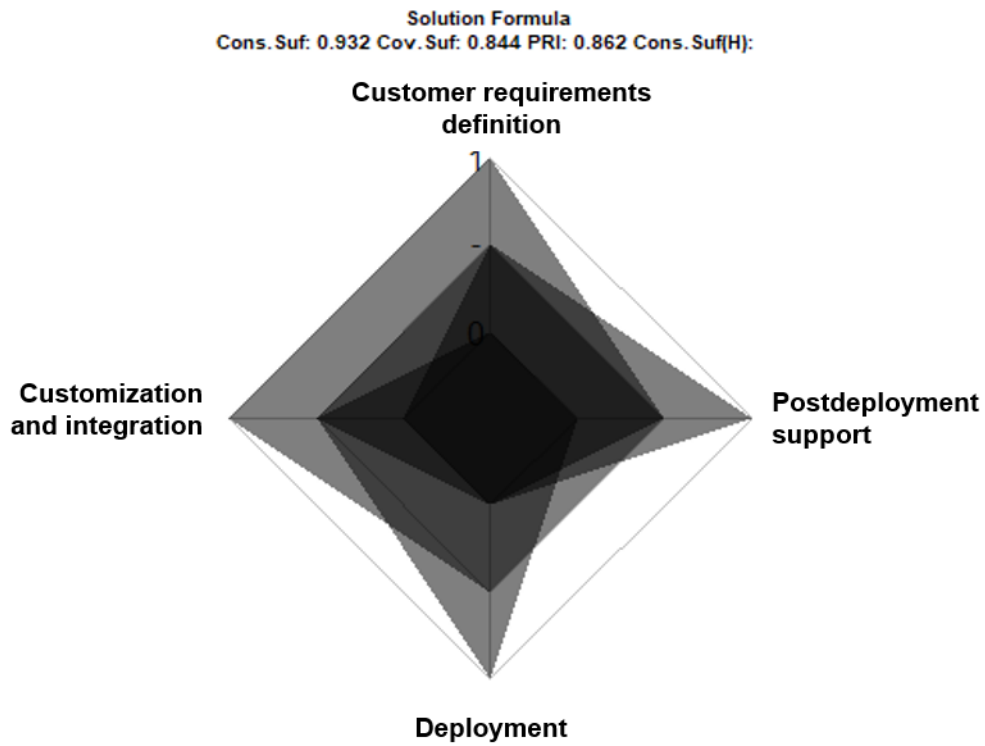
Notes. CRD = customer requirements definition, CI = customization and integration, D = deployment, PDS = postdeployment support. OUT = outcome, n = frequency, incl = consistency scores, PRI = proportional reduction in inconsistency scores.

Appendix 4.H. Radar chart of personal competency configurations of successful solution salespeople.



Notes. Solution configurations are displayed as overlapping areas in different shades. Outer border = presence, inner border = absence, middle = don't care.

Appendix 4.I. Radar chart of procedural competency configurations of successful solution salespeople.



Notes. Solution configurations are displayed as overlapping areas in different shades. Outer border = presence, inner border = absence, middle = don't care.

5 General Discussion

With the three essays of this dissertation, I sought to answer my overarching research question on how business-to-business (B2B) suppliers can successfully implement the digital and non-digital transformations that arise from changes in buying behavior. I investigated this question in three independent essays. Essay 1 addresses both digital and non-digital transformations and offers a comprehensive overview of factors favoring the application of digital service customization (DSC) in general as well as four distinct DSC strategies. Essay 2 constitutes a deep dive into digital transformations and provides insights into three main challenges for salespeople and two facilitating mechanisms related to the introduction of digital sales channels into personal selling. Finally, Essay 3 represents a deep dive into customization as non-digital transformation and provides insights into configurations of solution salespeople's personal and procedural competencies that are consistently associated with success in selling complex, customized offerings like solutions. In the remainder, I discuss the findings of my dissertation by outlining theoretical contributions and practical implications that go beyond the individual contributions and implications of each essay. The section concludes with a brief outlook.

5.1 Theoretical Contributions

In the following section, I proceed from the contributions that the essays of this dissertation individually offer to research on digital services, e-commerce, personal selling, and solution selling. This dissertation in its entirety makes several overarching contributions to the literature on transformations in B2B contexts, be they digital or non-digital.

5.1.1 Transformations' origins and spillover effects

First, with my dissertation, I contribute to the literature by advancing the current understanding of how transformations that originate in the customer's sphere

spill over to supplier firms. To fully understand how changes occurring buyer firms translate into altered demands and, ultimately, transformations for supplier firms, it is indispensable to shed light on the outward-looking, buyer-sided view, while simultaneously maintaining the inward-looking supplier perspective (Kennedy & Deeter-Schmelz, 2001; Paesbrugge et al., 2017). Yet, only few prior studies (e.g., Tuli et al., 2007) have managed to integrate both the supplier's and the customer's view to offer comprehensive perspectives. Instead, extant studies have either adopted an inward-looking, supplier-sided view to understand the origins of both digital- and non-digital transformations (Davies et al., 2006; Marcos Cuevas, 2018) or focused exclusively on exploring the buyer-sided perspective, without considering how changes in buying behavior translates into transformations for supplier firms (Brandon-Jones & Carey, 2011; Srari & Lorentz, 2019).

Hence, by illustrating transformations' origins in buyer firms and documenting spillovers from buyer to supplier firms, my dissertation responds to recent calls for research that investigates changes in buying behavior to derive adequate response strategies for suppliers (e.g., Grewal et al., 2015; ISBM, 2020). For instance, Essay 1 underscores the important role that customer-related factors play with respect to the identification of the most suitable DSC strategy. Moreover, Essay 2 reveals that the introduction of digital sales channels fuels the purchasing function's strategic reorientation, which impacts on relationship management strategies and forms of cooperation. Notably, my findings also show that many supplier firm representatives lack awareness of the strategic upheavals that introducing digital channels provokes in buyer firms, which limits supplier firms' ability to develop adequate response strategies. Thus, my dissertation underscores that incorporating all stakeholder's perspectives is essential to deliver comprehensive insights that advance the prevailing understanding of transformations' origins and spillover effects.

5.1.2 Transformations' effects on multiple organizational levels

Second, building on its first contribution, my dissertation advances research on transformations in B2B firms by showing that organizational transformations emanate on multiple organizational levels within a supplier firm. Most existing research understands digital and non-digital transformations as a firm-level phenomenon. Hence, a plethora of studies has explored how supplier firms are generally affected by digitalization (Kowalkowski et al., 2013; Pagani & Pardo, 2017; Ritter & Pedersen, 2020; Rust & Huang, 2014; Singh et al., 2019; Thaichon et al., 2018) and customization (Coreynen et al., 2017; Eggert et al., 2011, 2014; Fang et al., 2008; Rymaszewska et al., 2017; Siahtiri et al., 2020). Essay 1 of this dissertation also adopts this perspective and integrates the extant studies' findings into a comprehensive overview of factors that facilitate certain DSC strategies.

With Essays 2 and 3, however, my dissertation extends the prevailing, firm-level focus to the level of the individual employee in a supplier firm. Both essays illustrate that the individuals in supplier firms are decisive in terms of a supplier firm's implementation of digital and non-digital transformations: for instance, Essay 3 demonstrates that successfully selling customized offerings like solutions requires salespeople, who possess the right combination of present and absent personal and procedural competencies. At the same time, both essays also demonstrate that the individuals working in supplier firms are strongly affected by digital and non-digital transformations. For example, Essay 2 shows that salespeople face three major challenges due to the introduction of digital sales channels, which managers must consider prior to striving for such transformation. Thus, this dissertation offers novel insights by revealing that digital and non-digital transformations impact not only on the firm-, but also on the individual-level within a supplier firm.

5.1.3 Resources and capabilities facilitating successful transformations

Third, I contribute to the research on transformations of B2B firms by offering novel insights into the resources and capabilities that supplier firms require to

successfully implement digital and non-digital transformations. Resources comprise the assets a supplier firm has at hand to successfully implement a transformation, whereas capabilities are a firm's ability to employ resources for this purpose (Barney, 1991; Helfat & Lieberman, 2002; Peteraf, 1993). Both resources and capabilities determine a supplier's strategic scope of action in terms of implementing transformations.

Essay 1 of this dissertation presents a broad set of resources and capabilities that help supplier firms to implement specific DSC strategies. As prior research has mainly focused on selected strategies such as, e.g., modularity (Bask et al., 2010; Liu & Wang, 2008; Pekkarinen & Ulkuniemi, 2008; Peters et al., 2018), a comprehensive overview has not yet been available.

Beyond that, Essays 2 and 3 put special emphasis on the important role of the B2B salesforce as a supplier firm resource. In this respect, my dissertation shows that both digital and non-digital transformations require salespeople with specific competencies, which corroborates the role of people as important strategic assets of supplier firms (Ulaga & Kohli, 2018; Ulaga & Loveland, 2014). For instance, Essay 2 points out that the introduction of digital sales channels requires salespeople, who possess the ability to cope with decreasing effectiveness and substantial ambidexterity in managing buyer relationships. Furthermore, the essay underscores the importance of salespeople being vigilant and resilient. In addition, Essay 3 highlights the importance of salespeople's personal competencies by revealing five distinct configurations of anticipation, communication, value selling, external networking, and internal networking competencies. The essay also introduces configurations of procedural competencies (i.e., salespeople's enactment of each of the four relational processes of solution selling), which previous solutions literature has not yet investigated (Panagopoulos et al., 2017).

Furthermore, the individuals working in supplier firms are also of particular importance regarding the enactment of the firms' capabilities (i.e., the ability to

employ resources for a specific purpose). In this respect, Essay 2 indicates that digital sales channels will succeed only if salespeople are convinced of these channels' value, which is why sales managers should aim to secure salespeople's support for digital sales channels. To this end, Essay 2 introduces two facilitating mechanisms to the literature (e.g., Syam & Sharma, 2018; Thaichon et al., 2018), which that sales managers can use to support salespeople in embracing the introduction of digital sales channels.

5.1.4 Extended disciplinary and methodological scope

Fourth, my dissertation advances the literature on digital and non-digital transformations by answering calls for cross-disciplinary research (Lindgreen & Di Benedetto, 2018) and methodological diversity (Davis et al., 2011). To date, most research on digitalization and customization occurs within the boundaries of marketing research. Yet neglecting the important knowledge generated by associated disciplines such as management or information systems research, fuels disciplines' drifting apart and exacerbates academic silo-thinking. To counteract this development, Essay 1 incorporates research from six distinct disciplines. Drawing on a multidisciplinary body of literature, the essay reveals the existence of interdisciplinary connections and thus reinforces the importance of cross-fertilization across research disciplines as to facilitate more comprehensive knowledge generation.

At the same time, existing research on digital and non-digital transformations oftentimes adopts the same, relatively limited range of methods of inquiry. For instance, a multitude of the studies reviewed for this dissertation predominantly employs conceptual (Anderson, 1996; Bonney & Williams, 2009; Storbacka, 2011) and qualitative research approaches (Baines & Lightfoot, 2014; Pagani & Pardo, 2017; Schultze & Orlikowski, 2004). Without a doubt, conceptual and qualitative research represents a strong and indispensable pillar of knowledge generation due to its ability to shape new research streams and introduce novel fields of interest.

However, making use of multiple methods research has been shown to yield stronger results, due to cross-methodological triangulation, mutual compensation of potential methodological shortcomings, and the generation of a holistic and comprehensive understanding about the phenomenon of interest (Davis et al., 2011).

Thus, I employ a broad variety of methods in my dissertation: in Essay 1, I perform a systematic literature review and bibliometric analysis of 68 research studies from six disciplines. For Essay 2, I analyze in-depth interviews that I conducted with both key decision-makers from supplier firms (21 interviews) and buyer firms (18 interviews) in selected industries. Eventually, Essay 3 draws on a pre-study comprising in-depth interviews with of solution sales managers (22 interviews) from selected industries as well as two fuzzy-set qualitative comparative analyses of cross-sectional survey data from 63 matched sales manager–salesperson dyads. The broad range of methods adopted enables me to investigate my overall research question from multiple angles, such that I am confident the findings generated by this dissertation are both compelling and robust.

5.2 Practical Implications

Next to its theoretical contributions, my dissertation also offers actionable implications for managers in strategy and sales departments in B2B supplier firms that are undergoing digital and/or non-digital transformations.

5.2.1 Understanding the effects of transformations on individual employees

First, my findings underscore that, ultimately, both digital and non-digital transformations for supplier firms are transformations for the individuals working in the respective firms: transformations alter the activities they perform, the competencies they need, or the offerings they deal with. Thus, I seek to draw strategic managers' attention to the far-reaching consequences that digital and non-digital transformations have throughout the entire supplier firm. Strategy

departments must become aware of the intertwined effects resulting from their strategic decisions. Thus, I recommend that strategic managers reckon that decisions taken at strategic levels can cause detrimental and potentially unintended consequences on the operational level: for example, Essay 2 shows that strategy departments in supplier firms oftentimes expose salespeople to conflict and ambidexterity by officially granting free channel choice to buyer firms, but actually urging salespeople to route buyers to digital sales channels.

Thus, managers are well advised to deepen their understanding of the effects that strategic decision-making has for the individual employees on the operational level. To create acceptance and support for strategic decisions, strategists need to think ahead and consider how individual employees will be affected by a specific decision. All my dissertation essays reveal that digital and non-digital transformations require specific sets of competencies from service employees and salespeople. For the existing workforce, this implies a necessity to adapt to these new competency requirements. At the same time, new competency requirements also bear substantial implications in terms of talent management. Both these effects must be considered prior to making far-reaching strategic decisions regarding both digital and non-digital transformations.

5.2.2 Enabling individual employees to cope with transforming environments

Second, the new competency requirements arising from digital and non-digital transformations corroborate the importance of managers' offering opportunities for individual employees' professional development. All three essays of my dissertation underscore that capable service employees and salespeople are essential in successfully implementing transformations. For instance, value selling competencies represent a key personal competency in transforming environments, as suggested by both Essay 1 and Essay 3. Specifically, selling highly customized offerings such as solutions requires employees, who can picture, extrapolate, and

convincingly demonstrate an offerings' business value to customers long before the respective offering will be installed at the customer's site.

As such competencies need to be systematically developed and maintained, I encourage managers to offer employees sufficient opportunities for reflection on their professional development and suitable trainings. As exemplified by Essay 2, for example, sales trainings play an important role in helping salespeople to turn into knowledgeable consultants for buyer firms. By providing people with chances to develop the skills required by both digital and non-digital transformations, managers empower the workforce to cope with transforming environments.

5.2.3 Developing adequate leadership strategies for transforming environments

Third, my dissertation demonstrates that transforming environments necessitate managers to pursue fine-granular strategies in managing salespeople, rather than one-size-fits-all approaches. Instead, transforming environments require managers to develop individual one-to-one management strategies more than ever. For example, Essay 3 highlights that successful salespeople put more emphasis on some of the four relational processes, instead of excelling at all four relational processes of solution selling. This implies that sales managers acknowledge individual differences and grant salespeople sufficient leeway to develop their very individual success recipes.

In addition, adopting fine-granular management approaches implies that sales managers reckon the individual struggles that results for salespeople as of transformation processes. I want to stress the importance of acknowledging the challenges each employee faces due to digital and non-digital transformations. The results of Essay 1 imply that sales managers engage in thoughtful internal communication. This means they reduce resistance and create support for transformation processes by repeatedly emphasizing that no one will be left behind within transformation processes. Instead of addressing all with one and the same

message, I encourage sales managers to create a trustful atmosphere and talk openly, in a one-to-one manner with salespeople to individual fears that arise within the course of digital and non-digital transformations. Doing so is essential for developing adequate response strategies such that each employee feels taken along on a transformation journey.

5.3 Outlook

Taken together, the findings presented in this dissertation make substantial contributions to the literature on transformations in B2B supplier firms. Looking ahead, they also offer several promising avenues for future research.

5.3.1 The role of the customer for successful transformations

First, I recommend that future research explores the role of the customer for a supplier's digital and non-digital transformations. In my dissertation, I mainly adopt a supplier-centric focus to investigate how suppliers can successfully implement digital and non-digital transformations. Yet, especially Essays 1 and 2 suggest that considering the customer's view to derive implications for suppliers is indispensable to generate comprehensive insights. Similarly, for example, recent research proposes that customers' value perceptions and capabilities play a crucial role for a successful solution business (Elgeti et al., 2020; Macdonald et al., 2016).

Thus, I propose that researchers proceed by investigating the role that a supplier's customer base plays for the supplier's digital and non-digital transformation efforts. For instance, customers that pursue passive purchasing practices that focus on prices and service levels (Paesbrughe et al., 2017) might be less likely to exert pressure to transform on suppliers, but also less likely to take an active, cooperating part in suppliers' transformations. Customers adopting supportive purchasing that centers on innovations and solutions or integrative, strategy-centric purchasing practices (Paesbrughe et al., 2017), on the other hand,

might be more prone to call for digitalization and customization, but also more willing to jointly undertake transformation journeys together with supplier firms.

Furthermore, research could investigate the role of the customer with respect to self-customization in B2B markets, which remains a sparsely researched area of interest (e.g., Agrifoglio et al., 2017). Although digitally-enabled self-customization becomes more and more present in the B2B e-commerce environment (e.g., by making product adaptations online), Essay 1 revealed a striking lack of studies on self-customization, which researchers could reduce by exploring whether and how B2B customers make use of self-customization in e-commerce environments. To this end, novel methods such as eye tracking studies with B2B purchasers could yield interesting insights. Taken together, investigating the customer's role in a supplier's transformation would significantly advance the literature on digital and non-digital transformations in B2B contexts.

5.3.2 Impact of the nature of the offering on transformations

A second avenue for future research that I derive from my dissertation is to investigate the nature of a supplier's offering and its impact on the supplier's digital and non-digital transformations. While beyond the scope of my essays, extant research suggests that the nature of the offering might influence a supplier's transformation: for example, studies found substantial differences between modular versus fully integrated solutions (Salonen et al., 2018). Accounting for such differences, I focused on a specific type of solution in Essay 3, namely complex technical solutions with an underlying core product component. In Essays 1 and 2, I adopted a broader view across offerings.

Proceeding from the findings of Essay 3, researchers could analyze in more detail how the transformations of suppliers of different types of solutions (e.g., fully integrated versus modular) differ and investigate the root causes for the potentially arising differences. Presumably, salespeople require different competency configurations for successfully selling fully integrated versus modular solution

offerings. Empirically demonstrating these differences, for example, by means of configurational research multiple contexts, would make important contributions to solution selling research.

Furthermore, I propose that scholars build on the first essay of this dissertation by investigating the extent to which successful transformation paths differ for suppliers for digital product-based versus pure service offerings. For example, the delivery of digital product-based services might be more dependent on a customer's interaction with the product that underlies the service, which relates to the firstly outlined research avenue. Such insights could be tested by means of qualitative research, for instance.

5.3.3 Iterative transformation cycles over time

Finally, I propose that more research explores suppliers digital and non-digital transformations as a continuing phenomenon by means of longitudinal studies. The rich insights offered by my essays originate from a broad range of methods, yet they cannot offer time-spanning insights. However, as transformations are not terminated at some point in time, additional research is warranted that builds on my insights and adds a longitudinal perspective on digital and non-digital transformations.

For instance, research could investigate how transformations continuously evolve along with the progress of technology. As technological advances increasingly allow for big data-based analyses of purchasing behavior, research has indicated that data-based insights into purchase behavior have the potential to boost offline sales (Lawrence et al., 2019). Using data analytics to improve customization efforts over time represents a promising avenue, which future research studies could explore by means of customer journey analyses. In addition, the rapid evolution of digital technology increasingly allows for post-sale modifications of formerly static product offerings (Ng & Wakenshaw, 2017). In a solutions context, this would imply the growing immersion of the postdeployment support process into

the customer requirements definition process. In result, the solution selling process would increasingly evolve into a solution selling cycle. In respond, new research would be warranted that maps out the implications of such cyclic selling processes for both suppliers and customers. Such insights would generate truly novel and valuable knowledge.

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6 Conclusion

At present, we are testifying rapidly evolving changes in business-to-business (B2B) buying behavior, which confront B2B supplier firms with unprecedented challenges. Adequately responding to buyers' increasing demand for digitalized and customized offerings and processes is prerequisite for suppliers to persist in the market. Therefore, my dissertation explores how suppliers can successfully implement digital and non-digital transformations in three independent essays.

Taken together, these essays demonstrate that suppliers must be aware of and understand the origins and spillover effects of transformations to successfully respond to them. Moreover, my findings underscore that transformations emanate not only on the firm-level, but also impact on the level of the individual employee within a supplier firm. Finally, I point out important resources and capabilities that help B2B supplier firms to successfully implement digital and non-digital transformations.

As such, my dissertation makes several substantial contributions to extant research on digital and non-digital transformations in B2B supplier firms. At the same time, it provides actionable implications for sales and strategy managers. Finally, it also offers fruitful avenues regarding both transformational forces that merit continued scholarly attention.