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Capability configurations for successful advanced servitization

Abstract

Purpose – Advanced servitization is the process that involves the combination of different services that facilitate both the use of a product and customer operations. Although servitization has emerged as a frequent strategy for manufacturers to differentiate themselves from the competition, its implementation can pose major challenges and may not always result in superior firm performance. Consequently, successful advanced servitization may require specific organizational capabilities to unleash performance-enhancing effects. To date, little is known about how to effectively configure advanced servitization to achieve such performance gains.

Design/methodology/approach – Adopting a fit theory perspective and using a configurational approach, we examine the interplay between servitization, organizational capabilities, contextual factors, and financial performance. Specifically, we focus on advanced servitization and assess its necessity and sufficiency for achieving high financial performance. In addition, we study how the alignment of servitization approaches with organizational capabilities and contextual factors affects financial performance. We analyze data from 151 manufacturers in an emerging economy using fuzzy-set Qualitative Comparative Analysis (fsQCA).

Findings – Our findings indicate that advanced servitization is sufficient, but not necessary for high financial performance. In addition, the findings indicate that the alignment of servitization approaches with specific service-related capabilities unfolds complementarity effects that contribute to achieving high financial performance for manufacturers with different firm size and competitive intensity. The findings indicate three configurations that may serve as templates for managers to orchestrate resource allocation and successfully deploy advanced servitization.

Originality – Our study advances the servitization literature by further illuminating advanced servitization as a more complex servitization process. We show how high-performing manufacturers align servitization and organizational capabilities across different contexts, and thus provide design choices for managers in configuring servitization.

Keywords *Servitization, fsQCA, service innovation capability, customization capability, digitalization capability*

Capability configurations for successful advanced servitization

1. Introduction

Servitization has become an important element of manufacturers' innovation strategy to escape product commoditization traps and (re-)establish a competitive edge (Enke *et al.*, 2022; Struyf *et al.*, 2021; Wang *et al.*, 2018). It represents a transformation process in which manufacturing firms shift their business model from a purely product-centric to a more service-centric one (Baines *et al.*, 2020; Kowalkowski *et al.*, 2017). Despite the growing prevalence of servitization in manufacturing industries, firms may not always accomplish their performance targets by increasing their service ratio (Benedettini *et al.*, 2015; Wang *et al.*, 2018). Servitization often challenges manufacturing firms' operations management (Smith *et al.*, 2014) and requires considerable investments in business model transformation as well as the development of new capabilities (Chen *et al.*, 2022; Momeni *et al.*, 2023; Ramirez Hernandez and Kreye, 2022), which together represent efforts that may degrade, or even wipe out, the expected financial returns (Patel *et al.*, 2019).

Prior research has shown that different servitization approaches exist that can produce different financial outcomes (Eggert *et al.*, 2014; Wang *et al.*, 2018) and that draw on different organizational capabilities (Baines *et al.*, 2017; Ulaga and Reinartz, 2011). Servitization approaches can be classified based on the characteristics of the service components offered together with the core product, their integration with the core product, and the differentiated value they offer to customers (Cusumano *et al.*, 2015). Manufacturers commonly provide services that support the use of the product (SSPs, e.g., installation or maintenance) or services that support customer operations (SSCs, e.g., customized process optimization or asset optimization-in-use) (Coreynen *et al.*, 2017; Mathieu, 2001). Furthermore, the 'stepping-stone' argument of servitization suggests that manufacturers tend to initially offer service components on top of products (i.e., SSPs) to strengthen their service

orientation, before ‘graduating’ to also offering services that support customers (i.e., SSCs) (Eggert *et al.*, 2014; Wang *et al.*, 2014).

Today, manufacturers in many industries commonly provide complex offerings that combine both SSPs and SSCs along with the core product. For example, John Deere, a leading agricultural and forestry machinery manufacturer, provides not only services that facilitate the enhanced use of their products (e.g., maintenance, installation, and training), but also services that directly support and optimize customers’ operations (e.g., smart services based on digital twins enabling optimization of fertilizer usage, weeding performance, or harvesting intensity) (John Deere, 2022). Such *advanced servitization* can be defined as a process in which manufacturers have a strong focus on both SSPs and SSCs along with the core product. It comprises the joint provision of a product plus service offerings (i.e., SSPs and SSCs) that differ in terms of their foci and qualities.

Depending on the chosen servitization approach, distinct service-related capabilities beyond existing product-related capabilities become relevant to fully capitalize on servitization and accomplish performance goals (e.g., Ambroise *et al.*, 2018; Raja *et al.*, 2018; Story *et al.*, 2017). Advanced servitization builds upon a unique set of specific service-related capabilities, which requires manufacturers to create the capacity to successfully deploy different kinds of servitized offerings simultaneously. The development and interplay of these service-related capabilities are expected to affect servitization success (Sjödin *et al.*, 2016) and service innovation in manufacturing firms (Chen *et al.*, 2022; Kroh *et al.*, 2018; Marcon *et al.*, 2022). In addition, their alignment with other organizational elements can increase firm performance (Marcon *et al.*, 2022; Venkatraman and Prescott, 1990), business model success (Sjödin *et al.*, 2020), and product/service innovation performance (Sousa and da Silveira, 2019). Yet, developing new service-related organizational capabilities may require resource re-allocation and must fit with the requirements of the chosen servitization

approach (Ambroise *et al.*, 2018). To date, limited knowledge exists about what capabilities manufacturers should build and strengthen to deploy and orchestrate advanced servitization successfully. Taking these considerations as our point of departure, we aim to answer two specific research questions (RQs):

RQ1. Does advanced servitization lead to high financial performance?

RQ2. How do firms align (advanced) servitization with organizational factors in different contexts to achieve high financial performance?

To answer these questions, we focus specifically on the capability requirements for successful servitization, while also considering important contextual factors. Drawing upon the premise of strategic fit, in that organizational capabilities need to be aligned with the implementation of a chosen strategy in a given context to enhance performance (Zajac *et al.*, 2000), we theorize that specific service-related capabilities further enhance the successful realization of servitization. Adopting configuration theory to conceptualize the issue of strategic fit (Fiss, 2011; Ketchen *et al.*, 1997; Meyer *et al.*, 1993) and using a configurational research method, we assess the necessity and sufficiency of servitization in conjunction with further conditions for achieving high financial performance. Utilizing fuzzy-set Qualitative Comparative Analysis (fsQCA) based on data from a survey with 151 manufacturers in an emerging economy, we zoom in on the interplay between servitization approaches, service-related organizational capabilities, and contextual factors in achieving firm performance.

Our research responds to the call for better causal explanations in servitization research (Salonen *et al.*, 2021) and makes important contributions to current debates on servitization in manufacturing firms (e.g., Anderson and Bering, 2023; Chen *et al.*, 2022). Existing research has commonly looked at specific servitization approaches to differentiate manufacturers' product offerings and create differential value (e.g., Antioco *et al.*, 2018; Eggert *et al.*, 2014). Our study adds to this literature and illuminates and empirically

examines advanced servitization. By demonstrating the sufficiency of advanced servitization for achieving high financial performance, we further underline its relevance as a value-enhancing approach for manufacturing firms. Furthermore, the findings of our study also show how manufacturers configure service-related capabilities and servitization in different contexts to achieve high financial performance. Although prior work has looked at the influence of organizational capabilities (Davies *et al.*, 2023; Lenka *et al.*, 2017; Marcon *et al.*, 2022), the level of available resources (Böhm *et al.*, 2017; Patel *et al.*, 2019), and environmental factors (Cusumano *et al.*, 2015; Visnjic *et al.*, 2019) on servitization, little is known about the interconnected structures between these elements, in particular servitization approaches, organizational capabilities, and contextual factors, in driving performance. By demonstrating that advanced servitization, combined with particular organizational capabilities and contextual factors, form sufficient pathways to achieve high financial performance, we provide novel insights into complementarity effects and the patterning of factors for success. These insights extend prior configuration analyses on the topic (e.g., Forkmann *et al.*, 2017; Lexutt, 2020; Sjödin *et al.*, 2016). Finally, our data stems from an emerging economy, and as such extends the current research emphasis on servitization, which focuses mainly on firms in mature industrial settings (Rabetino *et al.*, 2018).

In summary, our study unpacks equifinal performance-enhancing constellations of organizational and environmental conditions when manufacturers pursue advanced servitization. Our findings guide managers in orchestrating servitization strategies, in particular advanced servitization, and related resource allocation processes. The identified configurations may serve as templates for organizational design or re-design processes in manufacturing firms that aim at pursuing advanced servitization.

2. Conceptual background

2.1. Perspectives on servitization

Servitization refers to a manufacturer's transition from a goods-dominant business model to offerings based on integrated bundles of products and services, often with services in the lead role (Ambroise *et al.*, 2018; Kowalkowski *et al.*, 2017). Manufacturers can use services to support and enrich their product-based offerings, which provide points of differentiation in the marketplace (Ulaga and Reinartz, 2011). Various conceptualizations and classifications have been suggested to describe servitization (for an overview see Faramarzi *et al.*, 2023; Lightfoot *et al.*, 2013; Rabetino *et al.*, 2018, 2021; Raddats *et al.*, 2019; Wang *et al.*, 2018). One frequently used classification is introduced by Mathieu (2001), who suggests that value emerges from service that is either directed toward the supplier's goods or the customer's actions (e.g., Antioco *et al.*, 2018; Eggert *et al.*, 2014; Forkmann *et al.*, 2017). Services supporting the products (SSPs) facilitate the installation and use of products and ensure they are properly functioning (e.g., installation, product inspections, equipment repair, maintenance). Services supporting the customer (SSCs) enhance the customer's actions in relation to the products and thus support customer operations (e.g., process optimization-in-use, research and development, and business process consultancy).

Prior work shows that SSPs are conceivable as a basic element in manufacturers' service business models. Over time manufacturers may substitute SSPs with SSCs, or combine both, which leads to an expansion of the service portfolio and a higher service ratio (Coreynen *et al.*, 2017; Eggert *et al.*, 2014; Forkmann *et al.*, 2017). This study focuses on advanced servitization, which involves a process in which manufacturers combine SSPs and SSCs with the product offering, to differentiate offerings in competitive markets and increase customer switching costs.

Advanced servitization differs from the seemingly related concept of *advanced services* in the servitization literature. Based on the value proposition that manufacturers offer to their customers, Baines and Lightfoot (2014) distinguish between base, intermediate, and advanced services, with the latter being defined as "a capability delivered through product performance and often featuring; relationship over extended life-cycle, extended responsibilities and regular revenue payments" (p. 22). Advanced services focus on outcome assurance (Baines *et al.*, 2013) and they support core business processes and activities of client firms (Baines and Lightfoot, 2014). As such, they reflect a type of service that is closely associated with SSCs and that typically provides a high level of customer value (Story *et al.*, 2017). Our conceptualization of advanced servitization is different in that it reflects a process, in which manufacturers have a strong focus on both SSPs and SSCs along with the product.

Based on the distinction between SSPs and SSCs, manufacturers may theoretically pursue four different approaches (see Figure 1): *No/basic servitization* involves a situation in which manufacturers have no or a weak focus on SSPs and SSCs. This quadrant represents the traditional offering strategy of product-centric manufacturers, for which servitization represents a negligible aspect of their offering strategy. Many manufacturers have now moved away from this approach as it does not offer a distinctive point of differentiation against competition (Gebauer *et al.*, 2010). *SSP-focused servitization* involves a situation in which manufacturers have a strong focus on SSPs, but no or a weak focus on SSCs. According to the stepping-stone argument, manufacturers in early servitization phases fall into this quadrant (Eggert *et al.*, 2014; Wang *et al.*, 2014). *SSC-focused servitization* reflects a challenging situation in practical terms. A strong focus on SSCs with no or low engagement in SSPs represents a possible but arguably hard-to-implement offering strategy. SSCs, such as asset optimization-in-use services, depend not only on SSC-related input factors (e.g., real-

time optimization consulting via over-the-air algorithm updates) but may also require (at least some) SSP-related components (e.g., spare parts and maintenance). Hence, only a limited number of manufacturers may pursue this approach. Finally, *advanced servitization* as the focus of our study involves a situation in which manufacturers have a strong focus on both SSPs and SSCs as part of their offering strategy and provide both types of services together with the product. Typically, manufacturers in more mature servitization phases fall into this quadrant.

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2.2. Organizational capabilities and contextual factors for advanced servitization

Servitization represents a transformation process for manufacturing firms in that it provides a way of competing in the marketplace that goes beyond using product offerings (Baines *et al.*, 2020; Forkmann *et al.*, 2017; Kastalli *et al.*, 2013; Pailoa and Gebauer, 2020). As such, it cannot be considered in isolation but must be embedded in other aspects of a business model. To understand the multi-faceted aspects relating to servitization as well as their interplay, this study is grounded in strategic fit considerations, specifically strategy-conduct-environment alignment, based on general strategy literature (Venkatraman and Prescott, 1990; Zott and Amit, 2008). This alignment (or 'fit') theory posits that business models are based on not only a specific strategy (e.g., moving from a product-centric to a service-centric offering strategy) but also on its synergistic orchestration with conduct aspects (e.g., organizational capabilities) and contextual aspects (e.g., general firm and industry characteristics). In addition, this view suggests that more than one but less than many constellations of strategic, organizational, and contextual factors for achieving superior performance can co-exist (i.e., there is a limited number of equifinal 'recipes' for success; Doty *et al.*, 1993). The better the alignment of the different aspects with each other, the more likely superior performance will be achieved, as higher synergy results from complementarity effects (Venkatraman and

Camillus, 1984; Fiss, 2011). Complementarity means that the effectiveness of one aspect regarding an outcome of interest is affected by other aspects, such that reinforcing effects occur when they occur together (Jackson and Ni, 2013).

This study focuses on three sets of elements as well as their interplay to explain financial performance as the outcome of interest: SSPs and SSCs as part of manufacturers' offering strategies, different service-related capabilities as organizational factors that underpin servitization (i.e., service innovation capability, customization capability, and digitalization capability), and firm- and industry-related contextual factors (i.e., firm size, and competitive intensity). The next sections will discuss each set of elements in more detail.

2.2.1. Organizational capabilities relating to servitization

Servitization requires the development of new capabilities that equip manufacturers to fulfill their changed strategic goals (Teece, 2018). In this context, it is noteworthy that SSPs and SSCs draw on very different service-related capabilities (Ulaga and Reinartz, 2011). Manufacturers can develop and deliver SSPs based on standalone products or as part of a standardized offering bundle, often without developing many new service-related capabilities (Ulaga and Reinartz, 2011). Manufacturers that focus on SSCs, on the other hand, move from a mainly product-centric business model to offering tailored and integrated solutions to customers (Raja *et al.*, 2018), which usually requires an intensified development of service-related capabilities (Ambroise *et al.*, 2018; Ulaga and Reinartz, 2011). However, the service-related capabilities needed for advanced servitization are less well understood.

In addition, prior work points to different paradoxes in servitization – that is, competing demands that manufacturers may experience when servitizing (e.g., Dmitrijeva *et al.*, 2022; Kohtamäki *et al.*, 2020a; Tóth *et al.*, 2022). In a recent study of digital servitization, Tóth *et al.* (2022) show that the servitization-related tensions for manufacturers are manifold and can include learning, belonging, organizing, and performing tensions. Furthermore, a multi-case

study by Dmitrijeva *et al.* (2022) reveals that these tensions differ across servitization stages. In the early stages of servitization a particular challenge for manufacturers is whether to focus on leveraging existing (product-related) capabilities or developing new (service-related) capabilities. In more mature stages of servitization, the challenge is which service-related capabilities should be strengthened and whether these capabilities should be established in-house or acquired from external partners.

In our study, we focus on three important service-related capabilities: service innovation, customization, and digitalization capabilities. The selection of these capabilities is based on prior servitization research, which suggests that these capabilities play an essential role in enabling or reinforcing servitization to unleash performance-enhancing effects (Kroh *et al.*, 2018; Lenka *et al.*, 2017; Matthyssens and Vandenbempt, 2010; Ramirez Hernandez and Kreye, 2022; Story *et al.*, 2017; Ulaga and Reinartz, 2011). *Service innovation capability* is the ability to develop new service offerings (by improving existing or introducing new lines of services) that create value for customers (Marcon *et al.*, 2022; Sjödin *et al.*, 2016). Thus, service innovation capability entails processes to design, deploy, and launch new services (Menor and Roth, 2007). *Customization capability* represents the ability to efficiently adapt the design and delivery of services and products to fit the needs of customers without substantial trade-offs in cost, delivery, and quality (Matthyssens and Vandenbempt, 2010; Wang *et al.*, 2014). Prior work indicates that the customization of solutions to address the specific needs of customers (akin to SSCs) is frequently practiced by manufacturers providing servitized offerings (Kohtamäki *et al.*, 2020a). Finally, *digitalization capability* refers to the ability to build data and information systems around organizational processes to advance the efficacy of the development and delivery of product-service offerings (Kroh *et al.*, 2018; Lenka *et al.*, 2017). Digitalization capability helps manufacturers access and interpret information (e.g., technical knowledge and customer

intelligence) to coordinate service processes seamlessly and effectively (Kohtamäki *et al.*, 2020b).

An example of the importance of such capabilities is Siemens employing MindSphere, a cloud-based (IoT) operating system with data analytics and connectivity capabilities, for advanced monitoring and optimization of its products (i.e., it enables a digital twin capability for installed base asset-monitoring/optimization-in-use applications as part of advanced servitization), connected to rapid service development, testing and deployment processes, and routines that are specific to customers' production systems. The resulting optimization services enable Siemens to tailor solutions virtually in real time to changing customer-specific needs (Siemens, 2019). In this example, all three capabilities exist for utilizing MindSphere. These capabilities together may enable and facilitate servitization and produce synergies that unleash performance-enhancing effects (Kohtamäki *et al.*, 2019; 2020b; Ramirez Hernandez and Kreye, 2022; Sjödin *et al.*, 2016).

Despite growing attention to issues around strategic fit in servitization research (Benedettini *et al.*, 2015; Forkmann *et al.*, 2017; Kohtamäki *et al.*, 2019; Sjödin *et al.*, 2016), understanding the alignment of service-related capabilities and servitization remains largely unexplored, especially from a configurational perspective (see Table 1). We adopt the premise that servitization is a resource-intensive endeavor for manufacturers (Ambroise *et al.*, 2018). Service innovation, customization, and digitalization capabilities should all contribute to facilitating the creation of differential value for customers but may be of differential importance depending on the characteristics of the servitized offering. Leveraging service-related capabilities for advanced servitization ensures that services may not only be an add-on but function as effective solutions integrated with core products without unnecessary and thus ineffective resource investments (Sjödin *et al.*, 2016). Notably, manufacturers may face resource constraints when they seek to build and leverage service-

related capabilities and offer SSPs and SSCs simultaneously (e.g., Patel *et al.*, 2019). Furthermore, pressures arising from manufacturers' external business environment may create additional challenges that interfere with the effective use of service-related capabilities and/or delivery of servitized offerings. Hence, manufacturers may leverage different sets of capabilities to support advanced servitization contingent upon internal or external demands. Therefore, the alignment of the servitization approach with service-related organizational capabilities (Forkmann *et al.*, 2017) should unleash complementarity effects that support the successful deployment of advanced servitization.

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2.2.2. Contextual factors relating to servitization

Besides service-related capabilities, we focus on contextual factors in our study. Specifically, we consider firm size as a firm-specific and competitive intensity as an environmental contextual factor. Both firm size and economic circumstances such as competition have been shown to influence the servitization of manufacturers (Böhm *et al.*, 2017; Cusumano *et al.*, 2015). Firm size serves as an indicator of available resources (Audia and Greve, 2006). Such available resources that larger firms can use in a discretionary manner enable managers to invest in new projects, including transforming an existing business model and developing new capabilities, without necessarily removing resources from other uses. The extant studies show that firm size can have important resource availability implications for strategic change toward services (Kowalkowski *et al.*, 2013). In addition, larger firms are in a better position to mitigate temporal revenue losses due to business model transformation such as servitization (Böhm *et al.*, 2017; Patel *et al.*, 2019). Therefore, we argue that larger firms should have more resources to pursue high levels of both SSPs and SSCs simultaneously.

Competitive intensity refers to the degree of competition in an industry (Auh and Menguc, 2005; Gao *et al.*, 2015). Competitive intensity increases with the number of

competitors in an industry as well as the frequency and ferocity of competitive moves. Highly competitive industries typically show cutthroat price wars and frequent new offering introductions that diminish predictability and certainty (Auh and Menguc, 2005). Increasing competitive intensity motivates manufacturers to seek novel ways to compete and differentiate themselves in the market and explore new sources of revenues outside their core product business (Cusumano *et al.*, 2015; Visnjic *et al.*, 2019). Servitization represents a mechanism that enables manufacturers not only to differentiate their core product offering but also introduce many types of technical consultation, customization, and financial services that could increase the customer's switching cost and loyalty (Visnjic *et al.*, 2019). Hence competitive intensity may create environmental pressures or demands that motivate manufacturers to differentiate their offerings through advanced servitization.

3. Research design

3.1. Data collection and sample

Our empirical research is set in the equipment manufacturing industries in Iran. We selected this research setting based on two considerations. First, Iran is one of the 'Next Eleven' emerging economies, which are fast-growing economies with the potential of becoming a large economy (Barker, 2012). Second, Iran is one of the most industrialized economies in the Middle East, with over 40 major industry sectors, many of them in manufacturing, such as automotive, chemicals, or consumer durables. Therefore, Iran's diverse manufacturing sectors provide a rich context for exploring how manufacturers align their organizational capabilities to pursue servitization. Furthermore, data from an emerging economy could counterbalance the potential bias in studies in the servitization literature that commonly focus on manufacturers in developed and mature economies (see comparable arguments in Subramaniam *et al.*, 2015).

We collected data from equipment manufacturers across diverse sectors, including industrial automation equipment, food processing equipment, electrical equipment, and energy and petrochemical equipment. The sampling frame included a list of 400 equipment manufacturers, excluding micro-sized firms (i.e., less than 25 full-time employees), from a business directory developed by two leading Iranian universities' executive MBA/DBA programs. We developed an online questionnaire and invited senior managers by email to participate in the study as key informants. The email explained the purpose of the study and assured anonymity and confidentiality. We obtained 151 usable responses as cases for further analysis (response rate of 37.7%). Most of the respondents were male (70%), and the respondents' average age was 38 years. Table 2 illustrates the sample composition.

To ensure high data quality, we captured respondents' knowledgeability on aspects of servitization in their firm, using a seven-point Likert scale anchored in 1 = "not knowledgeable at all" to 7 = "extremely knowledgeable". Only respondents with knowledgeability scores of 5 or higher were considered in the analysis. In addition, respondents were required to hold a relevant executive position in either strategy/business development, R&D and manufacturing, or services and key account management departments to be eligible to complete the questionnaire. We used existing scales for most of the constructs, professionally translated from the English language scales into Persian, and back-translated to ensure translation comprehensibility and equivalence (Brislin, 1970). We also pre-tested the questionnaire with eight managers to identify and revise unclear terms and ambiguous questions and simplify sentence structures where needed. In addition, we asked the managers to pay specific attention to the provided descriptions of SSPs and SSCs and identify unclear terms and examples.

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3.2. Measures and measurement model validation

We captured all constructs, except for SSPs and SSCs, using established reflective multi-item scales with slight adaptions to our study's context (see Table 3). We asked respondents to answer questions about antecedent conditions by reflecting on their firm's deployment of servitization, service-related capabilities, and competitive intensity over the last two years (i.e., 24 months). We asked them to answer questions about financial performance by reflecting on how their firm performed overall compared to main competitors over the previous year (i.e., 12 months). This partially time-lagged approach helps to account for the trailing effect of servitization and organizational capabilities on financial performance.

We measured service innovation capability based on four items from Vorhies and Morgan (2005). Customization capability was measured using four items from Wang *et al.* (2014). Digitalization capability was based on five items from Menor and Roth (2007). Competitive intensity was measured using four items from Gao *et al.* (2015). We employed seven-point Likert-type scales anchored in 1 = "completely disagree" and 7 = "completely agree". We measured firm size by the number of full-time employees. We used four items from Zhou *et al.* (2005) to measure firm performance, using a seven-point scale anchored in 1 = "much worse than main competitors" and 7 = "much better than main competitors".

To measure servitization, we developed and pre-tested archetype descriptors for the provision of SSPs and SSCs based on prior work (Antioco *et al.*, 2018; Eggert *et al.*, 2014; Forkmann *et al.*, 2017; Mathieu, 2001) and gave illustrative examples. We pre-tested two paragraphs describing different services that manufacturers could provide in combination with core products, followed by different illustrative examples. This approach has been employed by studies on organizational strategy (Miles *et al.*, 1978) and servitization (Heirati *et al.*, 2023). Respondents were asked to assess each of the servitized offerings regarding

their importance as part of the manufacturer's offering to customers. We employed a seven-point relevance scale, anchored in 1 = "not important at all" and 7 = "extremely important".

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Following established measurement validation procedures (Bagozzi *et al.*, 1991), we assessed the reliability and validity of the latent constructs, using multiple fit indices to evaluate the overall fit of the measurement model. The results of a confirmatory factor analysis show a satisfactory model fit: $\chi^2 = 318.15$, df = 178, $\chi^2/df = 1.78$; comparative fit index (CFI) = 0.93; Tucker–Lewis index (TLI) = 0.92; root mean square error of approximation (RMSEA) = 0.07; standardized root mean square residual (SRMR) = 0.05. Table 3 shows that the composite reliabilities (CR) and average variances extracted (AVE) exceed the standard thresholds of 0.6 and 0.5, respectively (Bagozzi *et al.*, 1991). Analysis of discriminant validity based on Fornell and Larker's (1981) procedure indicates satisfactory discriminant validity, as the square root of the AVE of each construct is higher than the correlation of that construct with all other constructs in the measurement model (see Table 4). In summary, the results suggest a satisfactory measurement model fit. The mean score of each multi-item construct was calculated in preparation for the subsequent analyses.

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We examined non-response bias by comparing early and late respondents (Armstrong and Overton, 1977). The results of a series of t-tests showed no significant differences between the two sub-samples ($p > 0.05$), thus non-response bias was not a concern in this study. In addition, we used procedural and statistical remedies to control for common method variance (MacKenzie and Podsakoff, 2012). Procedural controls included, for example, measures to ensure sufficient levels of respondents' knowledgeability to answer the questions. We reduced the potential impact of social desirability by providing respondents with explicit instructions to reflect the actual situation in their organization when answering

the questions and by promising anonymity. Besides taking procedural controls, we employed the marker variable technique (Lindell and Whitney, 2001), using a two-item variable that measures the perceived organizational support for the respondent's "opinion" and "well-being" from Bell and Menguc (2002). We adjusted the coefficient and significance levels using the lowest positive coefficient value ($r_m = 0.02$). We found that adding the marker variable did not alter the original values of the coefficients and their associated significance levels in the correlation table. These results show that common method bias is not an issue in this study.

4. Data analysis and results

4.1. Analytic approach overview

We employed fsQCA, using the fs/QCA software program (Ragin and Davey, 2014), to analyze the data and answer the two research questions. In a preliminary step, we transformed raw construct measures into fuzzy-set membership scores through calibration. Next, to answer RQ1, we examined if the servitization approaches (i.e., provision of SSCs, SSPs, as well as advanced servitization representing their combination) are sufficient for achieving high financial performance. After that, for RQ2, we conducted another analysis of sufficiency including the two servitization approaches (i.e., provision of SSPs and SSCs) plus the three service-related capabilities and two contextual factors. Technically, the last analytical step resembles a process-tracing analysis (Kasper-Brauer and Leischnig, 2016; Schneider and Rohlfing, 2013; Woodside, 2014).

4.2. Calibration

We used the direct method of calibration to obtain the fuzzy-set scores (Ragin, 2008). For SSPs, SSCs, service innovation capability, customization capability, digitalization capability, competitive intensity, and financial performance, we set the threshold for full membership in a fuzzy set at value 7, the threshold for full non-membership in a fuzzy set at value 1, and the

crossover point at value 4 on a seven-point scale. These calibration rules link membership in a fuzzy set to scale descriptors and respondents' levels of agreement with, or assessment of, construct measures. As calibration can produce fuzzy-set membership scores of 0.5 that exactly meet the crossover point and cause problems when determining a case's set membership (i.e., whether a case is more in or more out of a fuzzy set), a constant of 0.001 was added to all fuzzy-set membership scores below 1 (Fiss, 2011). We captured firm size by measuring the number of full-time employees across three categories: 1 = less than 50 employees (but more than 25), 2 = between 51 and 200 employees, and 3 = more than 200 employees. Classifications of firm sizes by the number of employees have different definitions across economic regions (e.g., European Union vs Middle East). We adopted the classification employed by several OECD countries in Asia and the Middle East (Berisha and Pula, 2015). Therefore, we set the threshold for full membership in the fuzzy set of large firms at value 3, full non-membership in this set at value 1 (i.e., small firms), and the crossover point at value 2 (i.e., medium-sized firms). For advanced servitization, we created a macro-condition using the 'logical *and*' operator. This condition represents cases having membership (i.e., fuzzy-set scores higher than 0.5) in both SSP and SSC fuzzy sets (i.e., their intersection).

4.3. Analysis 1: Sufficiency analysis for specific and advanced servitization, with financial performance as the outcome

In our first analysis, we examined if servitization approaches are sufficient for high financial performance. Advanced servitization and its sub-components (i.e., SSPs and SSCs) as well as their negations were entered as antecedent conditions, and financial performance was entered as the outcome condition in the analysis. Table 5 summarizes the results of this analysis and shows that the presence of advanced servitization is a sufficient condition as the consistency score of 0.82 exceeds the sufficiency consistency threshold of 0.8 (Fiss, 2011; Ragin, 2008).

Inspection of the coverage score for this consistently sufficient condition (value 0.86) further shows that it is an empirically relevant condition. In other words, there is considerable overlap between the outcome set and the antecedent set.

Although these results are promising, the sufficiency consistency score of 0.82 shows that some inconsistency (0.18) still exists, which can be attributed to contrarian cases that run counter to the assumption of advanced servitization explaining financial performance. Figure 2 illustrates the results of the sufficiency analysis in a XY-plot. Especially cases in quadrant IV of Figure 2 are of interest. These contrarian cases score high in the antecedent condition (i.e., they have fuzzy-set membership scores higher than 0.5) but low in the outcome condition (i.e., they have fuzzy-set membership scores smaller than 0.5) (Kasper-Brauer and Leischnig, 2016; Schneider and Rohlfing, 2013; Woodside, 2014). 22 of the cases under analysis are contrarian cases, that is, they reflect firms with advanced servitization but low financial performance.

--- INSERT TABLE 5 HERE ---

4.4. Analysis 2: Sufficiency analysis for servitization approaches, organizational capabilities, and contextual factors, with financial performance as the outcome

Next, we examined the interplay between servitization approaches, organizational capabilities, and contextual factors to explain financial performance. Besides the two servitization approaches, we entered the three service-related capabilities and the two contextual conditions into an analysis of sufficiency. A truth table covering all logical combinations of the seven antecedent conditions leading to the outcome was created. Following standard procedures, we then refined this truth table based on frequency scores to ensure a minimum level of empirical representation. We set the frequency cut-off at 2, which means that only those configurations of conditions with at least two cases were considered in the analysis, and the remaining rows of the truth table were treated as logical remainders in

the analysis (Fiss, 2011; Ragin, 2008). To specify consistent configurations for achieving the outcome, we examined the (descending) ordered consistency scores and set the sufficiency consistency threshold at a value of 0.96 (after observing a dip at this value) and the proportional reduction in inconsistency (PRI) cut-off at value 0.80 (Greckhamer *et al.*, 2018; Schneider and Wagemann, 2012). We then conducted the analysis using the Quine-McCluskey algorithm to obtain the minimally sufficient solution (Ragin, 2008).

Table 6 shows the results of the logical minimization process and is based on the parsimonious and intermediate solutions produced by the analysis. Inspection of these two solutions helps distinguish core and peripheral conditions as part of a configuration (Fiss, 2011). Core conditions are causally more essential for an outcome than peripheral conditions (Fiss, 2011). The results reveal three enriched configurations of conditions that reflect consistently sufficient pathways for achieving high financial performance. The overall solution consistency score is 0.96, and the overall solution coverage score is 0.62. All configurations include the provision of SSPs and SSCs, that is, represent advanced servitization.

--- INSERT TABLE 6 HERE ---

Configuration 1 denotes cases that are large manufacturing firms operating in a highly competitive environment. These firms leverage customization capabilities when they offer SSPs and SSCs simultaneously. Configuration 2 reflects large manufacturing firms operating in a highly competitive environment. Here, firms rely on service innovation capabilities but not digitalization capabilities when offering SSPs and SSCs. Configuration 3 involves manufacturers operating in a competitive environment. Firm size has a subordinate role in this configuration. These firms leverage all three service-related capabilities when they provide both SSPs and SSCs.

As shown in Table 6, the consistency scores of the enriched configurations range from 0.97 to 0.99. They exceed the sufficiency consistency score for advanced servitization that was obtained in Analysis 1 (value 0.82 in Table 5). The addition of service-related capabilities and contextual conditions has thus increased the consistency in explaining financial performance. Figure 3 shows the XY-plots to illustrate how the cases are distributed for each of the three configurations identified by the sufficiency analysis. Comparison of the XY-plots for the baseline model (Analysis 1) and each of the XY-plots of the enriched models (Analysis 2) reveals an increase in consistency and a much lower number of contrarian cases.

--- INSERT FIGURES 2 and 3 HERE ---

5. Discussions

5.1. Theoretical contributions

Although a rich body of work on the role of servitization for manufacturers exists, prior studies have commonly looked at specific types of services or servitization approaches in isolation, thus neglecting more complex arrangements as frequently used in business practice. Our research focuses on advanced servitization as a more complex form of service provision, in which manufacturers offer SSPs and SSCs simultaneously. It examines how manufacturers leverage service-related capabilities in combination with advanced servitization to achieve financial performance under certain organizational and environmental circumstances. In extension to most extant research on servitization, we use an emerging economy context for our empirical analyses. The findings of our research have three important theoretical implications.

First, we introduce advanced servitization as a novel, yet in business practice frequently used, servitization approach and demonstrate its sufficiency for achieving high financial performance. We extend an existing typology of services and conceptualize advanced

servitization as a process in which manufacturers have a strong focus on both SSPs and SSCs along with the core product. We assert that manufacturers in competitive markets are likely to offer both SSPs and SSCs as part of the overall servitized offering to enhance their competitive edge. While advanced servitization itself is shown to be sufficient to achieve high financial performance, contrarian cases exist that contradict this finding. Thus, some manufacturers pursuing advanced servitization underperform competitively and fail to achieve high financial performance. We, therefore, conducted further analyses to better understand the extent to which service-related capabilities and contextual factors can help explain these inconsistencies and reduce them.

Second, our study reveals the interconnected structures between advanced servitization and service-related organizational capabilities that drive financial performance. The findings unpack three equifinal performance-enhancing configurations that help to reduce the number and extent of contrarian cases, which contradict the assumption of advanced servitization contributing to high financial performance. The results indicate that the enriched configurations consisting of SSPs, SSCs, specific capabilities, and contextual factors have higher consistency scores, which supports the underlying notion of synergistic complementarity effects. These insights add to prior configuration analyses on the topic (e.g., Forkmann *et al.*, 2017; Lexutt, 2020; Sjödin *et al.*, 2016) and further underline the importance of the concepts of strategic fit and organizational alignment (Venkatraman and Prescott, 1990; Zajac *et al.*, 2000) for servitization research (Kohtamäki *et al.*, 2019; Sousa and da Silveira, 2019). We show that 'more is not always better' when it comes to investing in capabilities for servitization endeavors, further substantiating suggestions made by Forkmann *et al.* (2017). While the three performance-enhancing configurations show the importance of service innovation, customization, and digitalization capabilities for effectively capitalizing on advanced servitization, they also underline that possessing higher levels of

specific capabilities is not always beneficial. This implies trade-offs between the costs and benefits of capability development, consequently impacting the financial performance of a manufacturer.

Third, our study contributes to prior work by explaining how firm size and competitive intensity as contextual factors affect manufacturers' decisions to deploy specific service-related capabilities in pursuing advanced servitization. Large firms are often better equipped to cope with the (investment) challenges associated with the transition from a product-centric to a service-centric business model (Böhm *et al.*, 2017; Patel *et al.*, 2019). In addition, competitive intensity motivates manufacturers to pursue servitization, differentiate themselves in the market, and identify new revenue streams (Cusumano *et al.*, 2015; Visnjic *et al.*, 2019). Our findings provide novel insights into how the alignment of servitization, organizational capabilities, and contextual factors helps achieve high financial performance. For example, the results show that large manufacturers operating in highly competitive markets provide SSPs and SSCs to achieve high financial performance by leveraging their customization capability (Configuration 1). We further found that firm size has a subordinate role in explaining financial performance in the case of manufacturers offering SSPs and SSCs by leveraging all three service-oriented capabilities (Configuration 3). This finding suggests that firm size may become irrelevant when well-established organizational capabilities are synergized with servitization to achieve high financial performance. Our empirical findings thus add to prior studies by highlighting the complementary nature of different service-related capabilities, such as service innovation, customization, and digitalization capabilities, servitization, and contextual factors (e.g., Coreynen *et al.*, 2017; Gebauer *et al.*, 2020; Raddats *et al.*, 2022).

5.2. Managerial implications

Servitization is a transformation process involving many challenges, including investments in developing new capabilities while facing resource constraints. Manufacturers operating in highly competitive industries, characterized by fierce price competition, exhibit lower returns and decreased profit margins. In such situations, manufacturers shift away from a product-centric approach and turn to servitization for the purpose of differentiation. However, they must carefully consider what and how to differentiate their offering and invest in specific capabilities to pursue the intended servitization approach. Our study provides guidance on whether and when investing in and leveraging specific service-related capabilities is beneficial to successfully offer both SSPs and SSCs simultaneously.

The findings of our study suggest that investments in advanced servitization can pay off. Yet, offering basic installation and warranty services requires different sets of capabilities compared to offering predictive maintenance services supported by connected machines (e.g., IoT) and complex analytical applications (e.g., big data analytics). Therefore, managers need to understand the nature and characteristics of specific servitization approaches (i.e., SSPs and SSCs) as well as the additional requirements that arise from their combined provision and cannot just assume that an advanced approach is best based on a combination of capabilities needed for the more specific servitization approaches.

Second, our study reveals three performance-enhancing configurations as templates to successfully leverage specific service-related capabilities when pursuing advanced servitization. Managers should analyze customer needs and market trends before adding new services to their offering portfolio. For example, many manufacturers can differentiate their positioning in the market by developing and delivering customized service offerings rather than innovating novel services. Manufacturers should invest in consultation services as well

as technologies and means that enable them to provide customized offerings that integrate products and services to their customers.

Third, our study underlines the dual role of digitalization capability as a complementary capability besides service innovation and customization capabilities when pursuing both SSPs and SSCs. Servitization increasingly requires the use of digital technologies, such as the Internet of Things (IoT), cloud computing, and predictive analytics. Many manufacturers, such as GE Power, Siemens, and Otis, use sensors and IoT technologies to collect and analyze real-time performance data to provide services such as predictive maintenance and product optimization. Thus, digitalization and innovation capabilities may go hand in hand. Through predictive maintenance, the manufacturer benefits from having a greater understanding of its supply chain requirements and, indeed, may benefit from improved product design through better assessing product failures. Digitalization capability in the form of leveraging information technologies helps to identify and analyze customer needs and facilitate the flow of information to people participating in a service development project. The advanced understanding of customer needs and a more effective flow of information enable manufacturers to speed up service innovation activities and tailor newly developed services according to customer needs. However, digitalization capability is shown to be irrelevant (Configuration 1) or not required (Configuration 2), particularly in the case of larger firms. Further, costly investment in technologies and equipment to boost digitalization capability may counterbalance the financial return resulting from advanced servitization.

5.3. Avenues for future research

Although our paper makes important contributions, it has certain limitations that open possibilities for future research. Future studies could investigate different sets of capabilities and their interplay with advanced servitization (e.g., market sensing capabilities, solution selling capabilities, etc.), thus adding to the findings of our study. In addition, future studies

could focus on other types of servitized offering categorizations when examining the necessity and sufficiency for performance as well as their interplay with other organizational capabilities and contextual factors that influence financial performance.

We adopted the classification of servitized offerings by Mathieu (2001) and Antioco *et al.* (2008). Based on different typologies of service (e.g., smoothing, adapting, and substituting in Cusumano *et al.*, 2015), future research could investigate the interplay between service-related capabilities and other servitization approaches. Also, scholars could narrow their focus to different types of digitalized servitization, where digitalization can be a requisite condition to pursue servitization (Eloranta *et al.*, 2021; Kohtamäki *et al.*, 2022; Struyf *et al.*, 2021). Further, future studies can extend our research through a longitudinal study to investigate path dependencies in the development of capability configurations, explaining trajectories of organizational change when pursuing advanced servitization. Finally, we suggest scholars expand our research by examining and comparing the antecedents of advanced servitization across developed and emerging economies.

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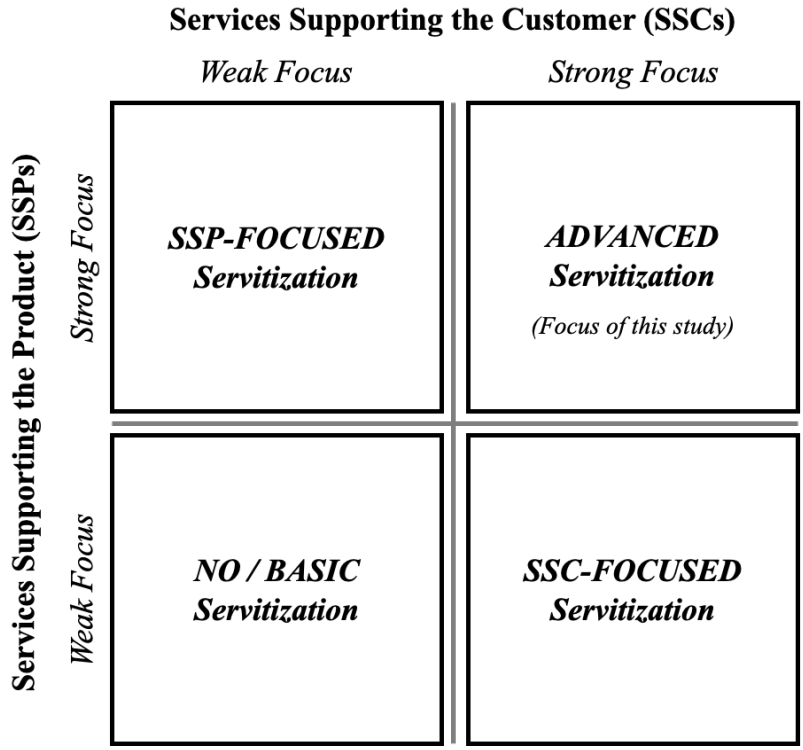
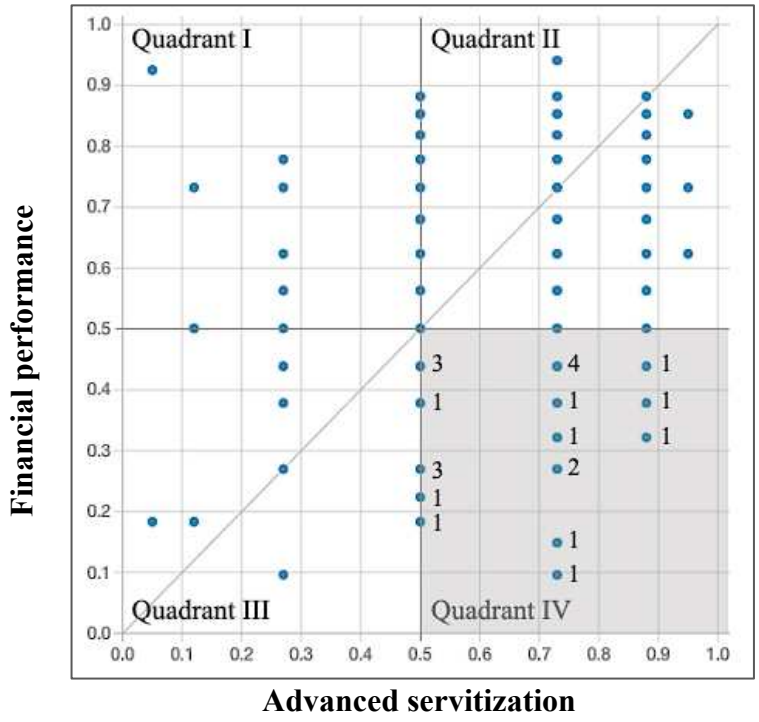
Figure 1. Servitization approaches



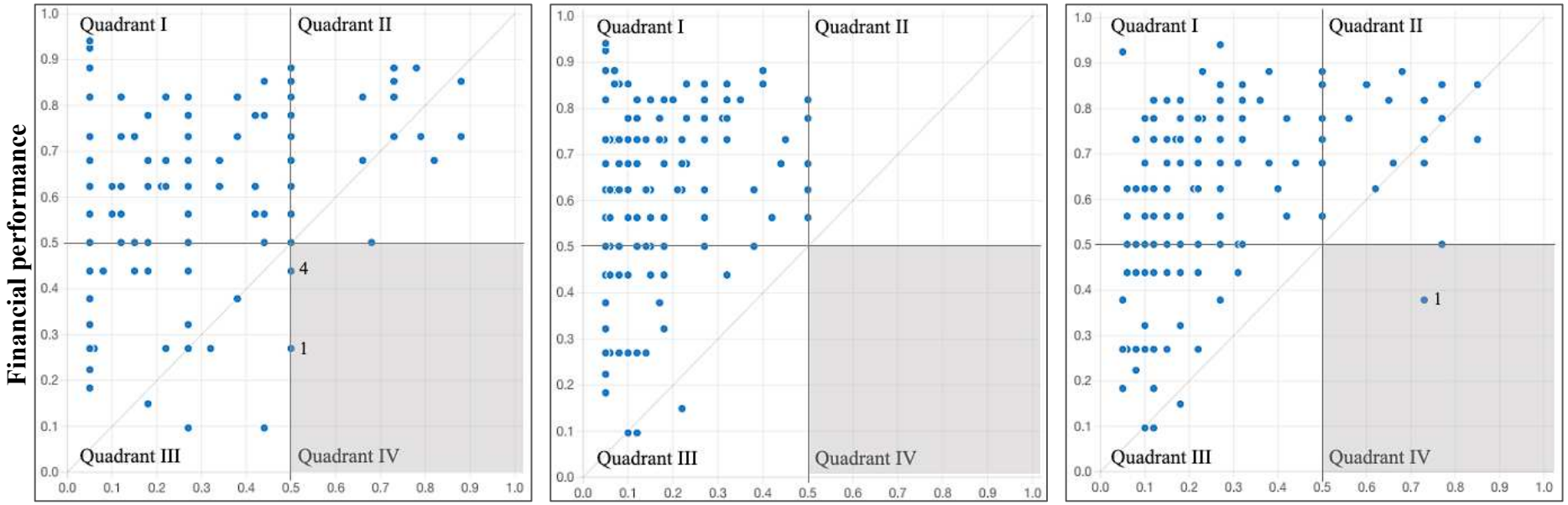
Source: Authors own creation.

Figure 2. Binned XY-plot for the baseline model (Analysis 1)



Notes: Sufficiency consistency = 0.82; coverage = 0.86; number of contrarian cases in Quadrant IV = 22. The digits next to the dots in Quadrant IV show the number of contrarian cases (expressed by a dot). Source: Authors own creation.

Figure 3. Binned XY-plots for Analysis 2



Configuration 1

Sufficiency consistency = 0.97
Coverage = 0.52
Number of contrarian cases in Quadrant IV = 5

Configuration 2

Sufficiency consistency = 0.99
Coverage = 0.27
Number of contrarian cases in Quadrant IV = 0

Configuration 3

Sufficiency consistency = 0.97
Coverage = 0.42
Number of contrarian cases in Quadrant IV = 1

Notes: The digits next to the dots in Quadrant IV show the number of contrarian cases (expressed by a dot). While the sufficiency analysis of the baseline model was based on all empirical cases, the sufficiency analysis for the enriched model had a frequency threshold of 2. This more restrictive requirement of empirical representation of a configuration can lead to the exclusion of contrarian cases identified by the baseline model analysis. A detailed inspection of the cases entered the enriched model analysis reveals that one contrarian case was treated as a logical remainder due to the increased frequency threshold in the enriched model analysis. Source: Authors own creation.

Table 1. Key empirical research on the interplay between servitization, organizational capabilities, and contextual factors

Article	Investigated core constructs			Conceptual focus on…		
	Organizational capabilities	**Contextual factors**	**Outcome**	**…different types of servitization**	**…interplay of servitization and organizational capabilities**	**…interplay of servitization and contextual factors**
Antioco *et al.* (2008)	– Service training – Customer treatment		– Service-product sales ratio – Service volume	Yes (SSC/SSP in isolation)	Yes (as isolated moderator)	
Fang *et al.* (2008)		– Organizational (Resources) – Environmental (Industry growth, turbulence, and competition)	– Firm value			Yes (as isolated moderator)
Eggert *et al.* (2011)	– Product innovation		– Financial performance	Yes (SSC/SSP in isolation)	Yes (as isolated moderator)	
Josephson *et al.* (2016)	– R&D intensity – Marketing intensity	– Organizational (Resources)	– Firm risk		Yes (as isolated moderator)	Yes (as isolated moderator)
Böhm *et al.* (2017)		– Organizational (knowledge, resources)	– Financial performance			Yes (configuration)
Ambroise *et al.* (2018)		– Organizational (organizational design)	– Financial performance	Yes (three types of servitization)		Yes (configuration)
Ayala *et al.* (2019)		– Organizational (service supplier support)	– SSC benefits – SSP benefits	Yes (SSC/SSP in isolation)		Yes (as moderator)
Kohtamäki *et al.* (2020)	– Digitalization		– Profitability		Yes (as isolated moderator)	
Lexutt (2020)		– Organization (service culture, structure, leadership)	– Financial performance – Non-financial performance	Yes (SSC/SSP in isolation)		Yes (configuration)

Table 1. continued

Yan *et al.* (2021)		– Organizational (service-oriented corporate culture, organizational structure, human resource management)	– Financial performance	Yes (SSC/SSP in isolation)		Yes (as isolated moderator)
Davies *et al.* (2023)	– Digitalization – Service		– Financial performance – Market performance	Yes (SSC/SSP in isolation)	Yes (as isolated moderator)	
Li *et al.* (2023)	– Big data		– Market performance	Yes (Basic and advanced servitization in isolation)	Yes (as isolated moderator)	
Shleha *et al.* (2023)		– Organizational (distribution channel)	– International sales performance			Yes (as isolated moderator)
Wang *et al.* (2023)		– Organizational (resources, service relatedness)	– Trade credit		Yes (as isolated moderator)	
Yang *et al.* (2023)	– Digitalization – Network capability – Risk taking		– Firm performance		Yes (networking capability as isolated moderator)	
This study	– Service innovation – Digitalization – Customization	– Organizational (firm size) – Environmental (competitive intensity)	– Financial performance	Yes (SSC, SSP, and their combination as part of advanced servitization)	Yes (configuration)	Yes (configuration)

Note: This overview excludes prior work focusing on antecedents of servitization (i.e., servitization as the outcome); for an overview of review studies on servitization see, for example, Faramarzi *et al*. (2023).
Source: Authors own creation.

Table 2. Sample composition

Respondent and firm characteristics	**%**
Firm size	
Small (below 50 employees)	17.2
Medium (between 50 and 200 employees)	45.7
Large (over 200 employees)	37.1
Sector	
Industrial automation equipment and mechanical power tools	32.9
Electronic equipment	16.8
Energy and petrochemical equipment	24.8
Food and agricultural equipment	9.3
Sorting and packaging equipment	3.1
Elevating, lifting, and logistic equipment	8.1
Casting equipment	2.5
Medical and lab equipment	2.5
Respondent position	
CEO or managing director	28.6
Business development executives	26.1
Marketing or sales executives	18.0
R&D or manufacturing executives	23.0
Services or account management manager	4.3

Source: Authors own creation.

Table 3. Construct measures

	Loading	AVE	CR
Service innovation capability *(1 = "completely disagree" to 7 = "completely agree")*		0.76	0.93
1 In our firm, we are good at developing new services to exploit R&D investment than our competitors.	0.88		
2 … market testing of new services is routinely done.	0.86		
3 … we are often more successful in launching new services than our competitors.	0.87		
4 … we have a strong emphasis on ensuring that service development efforts are responsive to customer needs.	0.87		
Customization capability *(1 = "completely disagree" to 7 = "completely agree")*		0.73	0.92
1 We can add products/services variety without increasing cost.	0.86		
2 We can set up for a different product/service at low cost.	0.86		
3 We can customize products/services while maintaining a large volume.	0.87		
4 We can add product/service variety without sacrificing product quality.	0.83		
Digitalization capability *(1 = "completely disagree" to 7 = "completely agree")*		0.62	0.89
1 Information technologies are used to speed up the introduction of services/products.	0.69		
2 Information technologies are used to identify and diagnose customer needs.	0.86		
3 Information technologies are used to share information that coordinates service/product development activities.	0.81		
4 Communication flow within the service/product development project groups is facilitated through digital-based channels.	0.80		
5 Our service firm utilizes digital technology to facilitate the flow of information to people participating in the service/product development process.	0.77		
Competitive intensity *(1 = "completely disagree" to 7 = "completely agree")*		0.53	0.82
1 There are frequent new competitive moves in the market.	0.63		
2 There is frequent price competition in the market.	0.68		
3 There is frequent promotion competition in the market.	0.80		
4 In general, the intensity of market competition is high.	0.78		
Servitization approaches *(1 = "not important at all" and 7 = "extremely important")*			
The following questions focus on the services that your company offers to your key customers in combination with your core products. Please indicate the level of importance of the following services as part of your offering to key customers over the last two years.			
- Services that support the installation and use of the core products and ensure they are properly functioning (e.g., installation, product inspections, product repair or maintenance, helpdesk, training, finance, and warranty).			
- Services that support the customer's actions in relation to the core products (e.g., process optimization, research & development, business consultancy).			

Firm financial performance *(1 = "much worse than main competitors" to 7 = "much better than main competitors")*		0.52	0.81
Indicate how your company performs overall compared to your main competitors over the previous year regarding ...			
1 … revenue	0.84		
2 … sales growth	0.69		
3 … market share	0.70		
4 … profitability	0.64		

Notes: AVE = average variance extracted; CR = composite reliability. Source: Authors own creation.

Table 4. Correlation table and descriptive

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1 SSP	–							
2 SSC	0.55**	–						
3 Service innovation capability	0.18*	0.17*	**0.87**					
4 Customization capability	0.18*	0.19*	0.57**	**0.85**				
5 Digitalization capability	0.22**	0.40**	0.31**	0.39**	**0.79**			
6 Competitive intensity	0.28**	0.20*	0.13	0.17*	0.24**	**0.73**		
7 Firm size	0.11	-0.05	-0.08	-0.06	-0.01	0.02	–	
8 Firm performance	0.32**	0.18*	0.48**	0.39**	0.10	0.23	0.15	**0.72**
Mean	5.18	5.05	3.19	4.22	4.46	5.22	–	4.55
SD	1.15	1.21	1.41	1.46	1.24	0.93	–	0.95
AVE	–	–	0.76	0.73	0.62	0.53	–	0.52
CR	–	–	0.93	0.92	.89	0.82	–	0.81

Notes: Diagonal values in bold show the square roots of average variances extracted; other values show correlation coefficients; *: $p < 0.05$, **: $p < 0.01$ (two-tailed).
Source: Authors own creation.

Table 5. Sufficiency analysis for specific and advanced servitization, with financial performance as the outcome

Conditions	Consistency as sufficient condition	Coverage as sufficient condition
SSPs	0.78	0.92
SSCs	0.78	0.88
Advanced servitization (i.e., SSPs • SSCs)	0.82	0.86
~SSPs	0.85	0.37
~SSCs	0.87	0.42
~Advanced servitization (i.e., ~SSPs + ~SSCs)	0.84	0.48

Notes: ~ = logical *not*; • = logical *and*; + = logical *or*; sufficiency threshold = 0.8; outcome condition: financial performance. Source: Authors own creation.

Table 6. Sufficiency analysis for servitization approaches, organizational capabilities, and contextual factors, with financial performance as the outcome

	Configurations		
Conditions	1	2	3
Servitization approaches			
SSPs	●	●	●
SSCs	⬤	●	●
Organizational capabilities			
Service innovation capability		⬤	⬤
Customization capability	⬤		●
Digitalization capability		⊗	●
Contextual factors			
Competitive intensity	⬤	●	●
Firm size	⬤	●	
Consistency	0.97	0.99	0.97
Raw coverage	0.52	0.27	0.42
Unique coverage	0.16	0.02	0.07
Overall solution consistency		0.96	
Overall solution coverage		0.62	

Notes: Analysis thresholds: frequency = 2; raw consistency = 0.96; PRI = 0.80; black circles indicate the presence of a condition; circles with "x" indicate the negation of a condition; blank spaces indicate that a condition has a subordinate role in a configuration; large circles indicate core conditions; small circles indicate peripheral conditions. Source: Authors own creation.