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Service strategy's effect on firm performance: A meta-analysis of the servitization literature

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Service strategy's effect on firm performance: A meta-analysis of the servitization literature

Abstract

The servitization literature has evolved into a rich field of academic inquiry that today calls for a consolidation of extant knowledge and opens new opportunities for meta-analytic reviews. The present research provides a fine-grained understanding of the servitization–firm performance relationship. We first develop an integrative conceptual framework that systematically ties together factors identified in prior research that affect the relationship. Through a meta-analysis of 379 effect sizes across 85 studies, we then provide broad-based empirical evidence that servitization indeed exerts a positive effect on firm performance. We further examine a broad set of potential moderators affecting the servitization–performance relationship to understand and explain the heterogeneity and, at times, the inconsistency of prior results regarding the relationship's directionality and strength. Finally, we provide guidance for future research, from both a substantive and methodological standpoint, and sketch out an integrative conceptual model for future research.

Keywords Service transition, Servitization, Firm performance, Meta-analysis

Manufacturing firms' ambitions to reach beyond their traditional product core and develop value-adding service activities have long been recognized as a major growth avenue. More than 30 years ago, Vandermerwe and Rada (1988, p. 314) coined the term "servitization of business" to describe firms' move toward "offering fuller market packages or 'bundles' of customer-focused combinations of goods, services, support, self-service, and knowledge." Since then, this strategic approach has been characterized in different ways, such as a "transition from products to services" (Oliva & Kallenberg, 2003), "service infusion" (Brax, 2005), or the more widely used term "servitization" (Vandermerwe & Rada, 1988). We thus define servitization as firms' transition from marketing tangible products or goods to offering a more comprehensive set of services or hybrid product-service combinations (Ulaga & Reinartz, 2011). Servitization thus differs from service management in that focal firms move from product manufacturers to service providers. This meta-analysis focuses on the performance outcomes of servitization but leaves empirical generalizations about other servitization-related questions (see, e.g., Raddats et al., 2019) to future studies. Existing research provides an incomplete and, at times, conflicting picture of the servitization-performance relationship and offers limited insight into contingencies determining its directionality and strength. Our study aims to resolve these divergences and uncovers the moderators driving them.

The importance of servitization for business practice and interest among managers are significant. Servitization originated in the business-to-business (B2B) sector but, in recent years, has become a broad-based phenomenon across both B2B and business-to-consumer (B2C) firms. Especially B2C markets will likely see further acceleration of servitization (Marr, 2021). For example, Apple's revenue share from services has grown in recent years to almost 20%, making services its second-largest and also fastest-growing business segment. Its service revenues exceed the combined revenues of the Mac computer and iPad businesses

(Richter, 2022), and at 60%, margins are also superior to those of the iPhone, iPad, and Mac (38%, 25%, and 25%, respectively; Morgan Stanley 2017).

While servitization has been a trend in business for some time now, it is becoming even more relevant in today's economy. As companies seek to provide more personalized experiences and generate recurring revenue, they venture into new business models that disrupt traditional marketplaces (Kanatlı & Karaer, 2022; Kohtamäki et al., 2022). This drives innovation and growth across industries, and the shift toward service-based models is likely to further accelerate in the years to come. Rapidly changing business models and market conditions necessitate a broader study of the impact of servitization on performance.

Several emerging trends are also shaping the future of servitization. For example, the rise of the sharing economy enables companies to offer new services based on the renting or sharing of resources (Rojanakit et al., 2022). Meanwhile, advancements in technology and digitalization create new opportunities for companies to offer smart solutions that are delivered digitally (Kohtamäki et al., 2022), such as artificial intelligence-powered diagnostic services, remote diagnostics and advisory services, predictive maintenance services, and training based on virtual and augmented reality.

Another important driver of servitization is the growing focus on sustainability. As companies work to reduce their environmental impact and promote sustainability, servitization is becoming an increasingly important consideration (Kanatlı & Karaer, 2022). By adopting service-based models, companies can promote the circular economy and minimize waste, while offering more efficient and sustainable solutions for customers. We provide more details in Table 1. The broad-based push toward servitization creates a pressing need for managers to comprehend the mechanics of its performance consequences in depth. Our meta-analysis addresses this need by leveraging the combined evidence from 85 empirical studies.

Despite a notable body of work, inconclusive or even conflicting findings blur our picture of the servitization–performance link. Nine important questions must be considered to advance knowledge. Our meta-analytic study sheds light on these questions and, in doing so, makes several important contributions. First, what empirical generalizations can be made from the servitization literature? Although qualitative reviews exist in this domain (see Table 2 for an overview), quantitative meta-analytic insights are scarce. Only Wang et al.’s (2018) meta-analysis makes important relevant contributions, but it is constrained by sample size, methodological choices, theory development, and a limited set of moderators. We derive empirical generalizations about the servitization–performance relationship from 85 studies (379 effect sizes) to provide a big-picture overview of the state-of-the-art, empirical knowledge. As the first servitization meta-analysis to employ meta-analytic regression analysis (MARA) and meta-analytic structural equation modeling (MASEM), our study allows for (1) estimation of a baseline effect of servitization on performance, (2) the simultaneous estimation of moderating effects, and (3) mediation analysis. Our study provides single-glance access to the knowledge and gaps in the growing body of quantitative research on servitization (Hanssens, 2018; Palmatier et al., 2018).

Second, what is the effect of servitization on firm performance, and how does it differ between alternative performance metrics? Perspectives and findings diverge on how servitization affects firms’ financial performance. While many firms have successfully shifted to a servitization business model, such as Rolls-Royce Aerospace’s Power-by-the-Hour and Xerox’s document management, failure is also common. Siemens Business Services has struggled to be profitable, Intel shut down its web-based services unit, and ThyssenKrupp divested its service division because of financial issues (Gebauer et al., 2009; Kowalkowski et al., 2017; Sawhney et al., 2004). This controversy is well reflected in the growing servitization literature (e.g., Dotzel and Shankar, 2019; Fang et al., 2008; Worm et

al., 2017). However, at times, findings are inconclusive or even contradictory and require consolidation (Hanssens, 2018). A meta-analysis will help managers and researchers understand the effect's direction and magnitude (Szymanski et al., 1993). Furthermore, given the differences between backward-looking accounting performance measures and forward-looking financial market–performance ones, examining how outcomes vary by performance indicator is important. Overall, we find a positive effect of servitization on firm performance.

Third, which theoretical lenses can best explain the performance outcomes of servitization? Existing research draws on a host of different lenses to conceptualize the servitization–performance relationship. Our conceptual framework synthesizes, contrasts, and tests three predominant lenses, accounting for 85% of studies: resource-based theory (RBT), theory of cost (TOC), and transaction cost economics (TCE). Specifically, we follow Szymanski et al.'s (1993) and Edeling and Himme's (2018) approach and formulate and compare the three lenses' at-times-contradictory predictions on moderating effects. RBT displays the best predictive power to explain variance in servitization outcomes.

Fourth, through which concrete theoretical mechanisms does servitization affect firm-level outcomes? To answer this question, we use MASEM (Bergh et al., 2016) to provide a simultaneous meta-analytic test of four empirical mechanisms related to RBT and TOC identified from a review of the literature. This analysis reveals whether the relationship between servitization and performance is fully explained (i.e., fully mediated) by the four empirical mechanisms we identify or whether more mechanisms need to be identified in future research.

Fifth, how should servitization be conceived? Do the outcomes of servitization depend on how servitization is defined and implemented? The field's understanding of servitization has gradually evolved from merely conceiving ancillary services to using service-centric models (Macdonald et al., 2016; Raddats et al., 2019; Tuli et al., 2007; Ulaga

& Reinartz, 2011). Research uses a diverse range of servitization conceptualizations (Calabrese et al., 2019), including breadth-based (e.g., service breadth), depth-based (e.g., service offering type), and breadth- and depth-based (e.g., service ratio, service orientation) conceptualizations, but fails to compare them. In parallel, firms' servitization approaches on these two dimensions vary. While some firms just add more services (breadth), others invest significantly in novel service offerings, developing a people- and relationship-focused culture in addition to formal processes for service development, supporting the transformation to service-dominant business models, and collaborating with customers to offer more advanced and customized services (depth) (Tuli et al., 2007). Our study provides insights into the effectiveness of disparate conceptualizations of servitization and service types, addressing Kowalkowski et al.'s (2017, p. 6) call for greater conceptual clarity, as "the servitization community seems to lack a common lexicon and analytical tools that might structure scholarly or practice-led debate."

Sixth, can servitization protect firms from recessionary downswings (Wiersema, 2013)? Both researchers and managers vividly debate a potential isolation and cushioning effect from servitization, viewing "service-oriented" business models as perhaps more resilient in times of economic crises (e.g., Bond et al., 2020; Visnjic et al., 2016). Our examination concludes that, on the contrary, servitization may be less effective in fighting recessions than expected.

Seventh, is servitization still effective now that many manufacturing firms are following servitization strategies? Scholars and managers may often question whether the performance benefits from servitization still exist when it has become a broadly practiced strategy, but provide no definitive empirical answer. Indeed, our inquiry indicates that the positive performance outcomes of servitization may weaken over time.

Eighth, are the beneficial outcomes of servitization contingent on country, industry,

and market characteristics? Research into the boundary conditions of successful servitization is limited. We provide insights into the generalizability of servitization outcomes across geographies, between B2B and B2C markets, and between low- and high-tech markets to help identify settings in which servitization is a fruitful strategy.

Ninth, which methodological choices bias effect size estimates? Our meta-analysis reveals how researchers' and managers' choices about estimation, performance measurement, and endogeneity might affect their estimates of servitization outcomes.

In the following sections, we first review existing empirical generalizations. We then discuss our conceptual framework, define the scope of the study, and describe the search procedure and dataset we generated. Next, we present our findings based on three meta-analytic procedures: Hedges–Olkin meta-analysis (HOMA) (Hedges & Olkin, 1985), MARA (Lipsey & Wilson, 2001), and MASEM (Bergh et al., 2016). Then, we present the theoretical contributions and managerial implications. Ultimately, building on our findings and the white spots identified, we present 13 directions for further research in the form of an integrative conceptual model for future research.

Existing empirical generalizations on servitization

A wealth of qualitative review articles exists on servitization (see Table 2). For example, in their review of 219 articles, Raddats et al. (2019) identify five major themes in the servitization literature: research on service offerings; strategy and structure; motivations and performance; resources and capabilities; and service development, sales, and delivery.

Although the authors report selected empirical findings on servitization's performance outcomes from key studies, a qualitative review cannot identify replicable patterns in the data to make quantitative empirical generalizations of a meta-analysis and explain the heterogeneity of results using meta-regression (Hanssens, 2018). Ultimately, full-fledged quantitative meta-analyses are required to (1) comprehensively synthesize the empirical

knowledge and (2) generate new quantitative insights from moderation (MARA) and mediation (MASEM) analysis (Hanssens, 2018; Palmatier et al., 2018).

Wang et al.'s (2018) meta-analysis is the first effort to accumulate empirical findings about the direction and magnitude of the servitization–performance relationship, and they confirm a positive servitization–performance relationship. Although their study provides first insights, theoretical and methodological limitations in their study leave some debates unresolved.

Our meta-analytic study addresses these limitations and, in doing so, makes several contributions (see Table 3 for the key differences). We base our meta-analysis on more studies and effect sizes. The larger sample size allows use of more powerful analytical techniques (e.g., MARA, MASEM), which enables simultaneous estimation of all moderators. It also facilitates additional and more fine-grained (e.g., five different performance metric categories) moderators and multiple mediators. Moreover, the additional studies broaden the diversity of research contexts, datasets, and sources and cover more recent digitalization, cloud services, and software-as-a-service trends. Last, the higher number of effect sizes based on partial correlations allows us to take into account many substantive and methodological factors.

Conceptual framework

We review, synthesize, and contrast the different (and sometimes contradictory) theoretical perspectives on the servitization–performance relationship in three steps. First, we summarize three predominant theoretical lenses (RBT, TOC, and TCE) and their mechanisms from the literature on the effect of servitization on performance. Second, we adopt Szymanski et al.'s (1993) and Edeling and Himme's (2018) approach and juxtapose the three lenses' predictions on moderating effects. We hypothesize how factors related to the focal relationship (e.g., conceptualization of servitization and performance) and contextual factors (i.e.,

macroeconomic, industry, and geographic) may moderate the focal link. Third, we delve into RBT- and TOC-based mediating mechanisms of the focal relationship and identify specific mediators.

Theoretical mechanisms of the servitization–performance relationship

Drawing from servitization literature, we summarize the mechanisms behind a potential positive or negative relationship between servitization and firm performance using different theoretical lenses and provide hypotheses accordingly. Table W1 in the Web Appendix displays the theoretical perspective of each study in our sample. Fig. W1 shows that RBT (53%) (e.g., Kozlenkova et al. 2014), TOC (17%) (e.g., Shephard 2015), and TCE (15%) (e.g., Rindfleisch and Heide 1997) are the most frequently used theoretical lenses. The selection of these three lenses is also implied from a theoretical point of view. Together, they exhaustively cover the key mechanisms—relationships, differentiation, cost, and agency-related issues—that qualitative studies have consistently identified from in-depth interviews with managers. We build on all three lenses simultaneously rather than focusing on a single lens because they complement each other in capturing the mechanisms that link servitization to performance. That is, performance outcome of servitization will be the net effect (i.e., sum) across these mechanisms.¹ Therefore, in the following subsections, we draw on these three to examine the servitization–performance relationship.

RBT Research advances four major RBT-based mechanisms to uncover the effect of servitization on firm performance (e.g., Fang et al. 2008; Nezami et al. 2018): enhanced leverage of knowledge and resources, increased customer loyalty, loss of strategic focus, and organizational conflict. First, by venturing into the service domain, firms can leverage their knowledge and resources from manufacturing products for service development and delivery.

¹ Likewise, Palmatier et al. (2007) find that interorganizational relationship performance is explained best by integrating various theoretical lenses.

Doing so results in synergies between manufacturing and services, better asset utilization and cost savings,² and competitive advantage gains (Fang et al., 2008; Reinartz & Ulaga, 2008). In addition, the resource spillover between product and service offerings can create greater complexity and differentiation, which potentially protect firms' offerings from imitation (Reed & Defillippi, 1990).

Second, servitization has the potential to improve customer relationships by strengthening customer intimacy (customer centricity and relationship learning). By providing value through services, companies can build closer and more personal relationships with customers and continuously learn about their customers and refine their services. These activities result in greater supplier credibility and customer satisfaction, trust, and loyalty (Hawes, 1994; Oliva et al., 2012). The higher perceived risk of purchasing services also makes intangible customer relationships more valuable, leading to stronger customer loyalty, more cooperative customers, and even stronger relationships over time (Dotzel et al., 2013; Palmatier et al., 2006). Therefore, servitization can provide companies with a competitive advantage, differentiation power, and improved relationships, all of which enhance firm performance.

Third, previous research has pointed out that servitization-induced loss of strategic focus and organizational conflict can potentially harm firm performance (e.g., Fang, Palmatier, and Steenkamp 2008). However, from an RBT perspective, these two challenges represent a double-edged sword³. RBT predicts that servitization can enhance firm performance just because it is so challenging and resource-intensive to implement. The need to develop, reconfigure, and leverage unique bundles of resources and capabilities makes it

² Cost savings due to these synergies help firms in their transition. However, firms transitioning to higher service revenues also need to overhaul their fundamental business models, which represents a costly shift (Crozet & Milet, 2017).

³ We thank an anonymous reviewer for suggesting that RBT-based mechanisms of the impact of servitization on performance should be positive and related to the creation of an SCA.

hard for competitors to imitate a successful servitization strategy, creating a sustainable competitive advantage (SCA). These resource bundles will likely satisfy the VRIO (valuable, rare, inimitable, and organizationally exploitable) criteria required for an SCA. For example, the allocation of limited financial and management resources between core product-related activities and new service-related endeavors (Josephson et al., 2016) poses a significant hurdle for competitors. Relatedly, organizational conflict, arising from the distinct resource requirements and conflicting interests of product and service businesses, will deter followers. Product and service businesses demand different resources such as culture, structure, talent, and processes, potential conflicts can be mitigated through strategic alignment. While a culture emphasizing technological innovation and product performance is advantageous in product markets, services thrive with a people- and relationship-focused culture (Fang et al., 2008; Neu & Brown, 2005). Furthermore, the development of services necessitates customer centricity and a market-oriented approach (Kindström et al., 2013; Kowalkowski & Ulaga, 2017). Through continuous learning and adaptation, servitized businesses refine their ability to effectively allocate resources, leading to improved performance and the creation of an SCA. Additionally, by adopting a customer-centric mindset during service development and learning process, firms can boost customer centricity. Services developed with a deep understanding of customer needs, encompassing flexibility, variety, and customization, instead of a product-centric approach focused solely on efficiency and standardization, can enhance customer satisfaction (Benedettini et al., 2015; Fang et al., 2008).

Taking all RBT points together, we hypothesize the following:

H1a Servitization positively affects firm performance.

TOC TOC accounts for cost concepts, costs in the long versus short run, and economies of scale and scope (e.g., Koutsoyiannis 1979). Economies of scale and scope for both buyers and suppliers are often viewed as underlying the servitization–performance relationship (e.g.,

Reinartz and Ulaga 2008). Servitization research frequently mentions these cost- and efficiency-related arguments without explicit reference to TOC as a basis. Cost effects of servitization could materialize in opposite ways. On the one hand, customers and manufacturers can save cost. Customers experience better cost-effectiveness by sourcing both products and services from the same seller than by servicing products in-house. This stems from the complementarities between products and services (e.g., interoperability), reduction in costs (e.g., procurement costs), and reduction in information asymmetries related to product and service quality (Kastalli & Van Looy, 2013; Nayyar, 1993). In addition, manufacturers reap economies of scale and scope by servicing a broad customer base and by leveraging managerial, technological, and marketing capabilities across products and services (Gebauer et al., 2009; Kastalli & Van Looy, 2013). The necessities of servitization can also lead to cost orientation and efficiency of the provider by streamlining operations, improving supply chain management, enhancing maintenance and repair management, and providing valuable customer feedback, all as part of the organizational learning. These cost-efficiencies can help increase the competitiveness of the provider and improve its bottom line.

On the other hand, servitization reportedly needs cost increases as service providers struggle with the lack of economies of scale from the high degree of customization and customer-specific setup costs, especially for complex services (Ulaga & Reinartz, 2011; Worm et al., 2017). Unlike capital-intensive manufacturing activities, service businesses are “people businesses” and more difficult to scale up. Further cost increases are also likely in the short run, due to the up-front investment in building a service organization and infrastructure (Nezami et al., 2018). Taking all TOC points together, we hypothesize the following:

H1b Servitization negatively affects firm performance.

TCE In explaining the servitization–performance relationship, TCE is mainly concerned

with the risks and costs of transactions (e.g., asset specificity, idiosyncratic investments), offsetting investments, and governance mechanisms (e.g., agreements, relational capital). TCE-based arguments suggest that offering services (especially more advanced and customized ones) (1) requires a high degree of customer-specific idiosyncratic investments by providers and (2) transfers risks to providers (Kwak & Kim, 2016; Worm et al., 2017); both increase transaction costs (i.e., search, information, contracting, and enforcement costs). The transaction's asset specificity is likewise quite high, as face-to-face interactions between the provider and the customer are frequently necessary (site and temporal specificity), developing and implementing services require specific knowledge and involve human investments and interactions (human asset specificity), and customization often needs some specialized components (dedicated assets) (Masten et al., 1991). Higher levels of asset specificity increase the chance of the investments being exploited opportunistically by buyers, engendering uncertainty and elevating transaction costs.

At the same time, the same customer-specific idiosyncratic investments by providers lead to the development of trust among buyers and establish relational norms (Rindfleisch & Heide, 1997), which can attenuate the aforementioned risks of these investments and specific assets. Nonformal governance mechanisms such as relational capital (e.g., trust) and norms can help reduce transaction costs related to interactions between the supplier and the customer, competitive bidding and switching suppliers, and monitoring and controlling (Kohtamäki, Partanen, & Möller, 2013; Rindfleisch & Heide, 1997). Governance mechanisms can be important in the context of servitization because they can help ensure that the service-based business model is carried out efficiently and fairly. Furthermore, idiosyncratic investments can increase the use of formal governance mechanisms (e.g., contracts, laws) or a service-level agreement that specifies the terms and conditions of a service-based relationship, which can help reduce the risk of misunderstandings or disputes

arising between the service provider and the customer. Taking all TCE points together, we hypothesize the following:

H1c Servitization negatively affects firm performance.

Given the many mechanisms from all these theories, we expect both positive and negative impacts of servitization on firm performance, and therefore the nature of the effect remains an empirical question to be answered by our meta-analysis. Panel A of Table 4 summarizes the theoretical main mechanisms discussed.

Selection of moderator variables

Next, we examine the role of moderators, including important conceptual and methodological factors, following standard meta-analytic procedures (D. Grewal et al., 2018) to resolve inconsistent findings on the servitization–performance relationship (see Fig. 1) and to generate insights into how the relationship’s strength and directionality depend on these factors. We selected the moderators by considering the theoretical main-effect mechanisms, the three underlying lenses (RBT, TOC, and TCE), and the moderators advanced in literature.⁴ First, we identified moderators from a thorough review of the servitization literature, selecting those pertinent to the focal servitization–performance relationship and critical contextual characteristics. Second, the technical layer includes common moderators related to methodological and publication-related characteristics (Babić Rosario et al., 2016; Edeling & Himme, 2018; Rubera & Kirca, 2012). Panel B of Table 4 summarizes the theoretical explanations behind the substantive moderation effects based on each of the three lenses. For brevity, we tackle the technical moderators in the “Discussion” section.

Moderator variables related to the focal relationship

Researchers have suggested moderators related to the conceptualization of the focal variables

⁴ We base our choices of moderators on their theoretical and practical relevance. However, we also view an occurrence of at least 5% of all observations for each variable (cutoff value Farley et al. [1995] suggest) as feasible for a moderator.

and the specification of the focal effect (Babić Rosario et al., 2016; Edeling & Himme, 2018). We first examine how the conceptualization of servitization (i.e., the independent variable) and the service type affect the magnitude of servitization's performance outcomes. We then examine whether a mediator and a time lag are included in the model specification of the focal effect. Then we turn to firm performance metric (i.e., the dependent variable).

Service-related characteristics: Conceptualization of servitization Researchers have conceptualized servitization in different ways (Calabrese et al., 2019; Kowalkowski & Ulaga, 2017). For example, a group of studies has relied on service breadth (i.e., the number of service offerings) (e.g., Homburg et al. 2002). Another group has examined the types of services offered, capturing depth (e.g., Worm et al. 2017), in recognition that the degree of servitization depends not only on the breadth but also on the depth of firms' shift toward services. A last group captures a mix of breadth and depth, by calculating service ratio (i.e., ratio of service revenues to overall revenues) or relying on the extent of service orientation (e.g., Fang et al., 2008; Kohtamaki et al., 2015).

The RBT-, TOC-, and TCE-based lenses suggest differences between servitization defined by breadth and depth. Considering RBT, we expect depth-based conceptualizations of servitization to yield stronger positive effects, because an emphasis on depth will lead to more complex and sophisticated service offerings (e.g., solutions), increasing differentiation, deepening customer relationships, and boosting inimitability (Tuli et al., 2007).

According to TOC, an emphasis on a high breadth of servitization could mean offering more services across different categories (i.e., increasing service business scope). This may require more investments, increase fixed costs, and reduce economies of scale (Nezami et al., 2018). In other words, breadth would reduce cost-efficiency.

TCE suggests opposing effects. Depth-based conceptualizations of servitization will emphasize more advanced and complex services (e.g., solutions), potentially increasing

transaction costs as a result of higher customer-specific idiosyncratic investments, greater asset specificity, and risk transfer to the provider (Worm et al., 2017). However, these seller relationship-specific investments could also strengthen relationships by enhancing buyers' trust, causing a positive performance effect (Palmatier et al., 2007). Taking all points together, we hypothesize the following:

H2 The effect of servitization on performance is greater for depth-based than breadth-based conceptualizations and is intermediate for a mix of breadth and depth.

Service-related characteristics: Service type Extant literature reveals a great deal of heterogeneity among service offerings. Mathieu's (2001) widely used typology classifies service offerings into "services in support of the product" (SSPs), such as product maintenance, installation, and monitoring, and "services in support of the client's actions" (SSCs), such as financing, process-oriented training, and business-oriented consulting.⁵ SSPs feature standardized services, low customization, and lesser relationship intensity, whereas SSCs represent advanced and customized services with greater relationship intensity.

Through an RBT lens, SSCs, with the potential to enhance differentiation, credibility, loyalty, and, most importantly, inimitability, can be a source of greater sustainable competitive advantage (Antioco et al., 2008). However, TOC suggests that SSCs' traits of customization and greater diversion from manufacturing can prevent economies of scale, meaning potentially higher costs and lower profits (Worm et al., 2017). From a TCE perspective, SSCs require greater customer-specific investments and deeper interactions with customers and create higher asset specificity, which all translate into higher transaction costs, greater chance for customer opportunistic behavior, and more internal conflicts (Eggert et al., 2014).

However, developing and implementing of SSCs requires more engagements, interactions,

⁵ Ulaga and Reinartz (2011) develop a different typology of four hybrid offering types, but for reasons of data availability and sample size, we stick with the distinction between SSP and SSC.

and investments among parties, which can lead to the emergence of stronger relational norms and capital. As a result of these nonformal governance mechanisms, we expect an attenuation of the costs and risks of the relationship (e.g., opportunistic behavior). All things considered, we propose the following:

H3 SSCs exert a greater positive impact on firm performance than SSPs.

Servitization–performance link Mediation captures whether a theoretical mediator is included in an estimation of the focal servitization–performance effect. In accordance with Baron and Kenny’s (1986) mediation test, we expect to observe a weaker direct focal effect (i.e., effect size estimate) in the presence of a mediator. Researchers frequently attribute servitization’s performance outcomes to theoretical mediators, but only a few studies (e.g., Kohtamäki & Partanen, 2016; Kohtamäki, Partanen, & Möller, 2013) have explicitly tested mediation. According to RBT, servitization creates a competitive advantage, improves differentiation, and enhances customer relationships. Thus, servitization can affect performance (partially or fully) through its effect on the total value of offerings and, consequently, on customer satisfaction and loyalty (Crozet & Milet, 2017; Dotzel et al., 2013). Thus:

H4 The servitization–performance relationship is weaker when controlling for a mediator.

Servitization–performance time difference Time difference indicates whether a time lag occurred between measuring servitization and performance. Researchers often speculate about a time lag for servitization’s desired performance outcomes to materialize (Fang et al., 2008). According to RBT and TOC, it takes time for firms to realize servitization benefits and amortize investments into unique resources. Firms require time to gain experience and build the necessary skills and know-how for developing and offering services; only then will the benefits of servitization fully unfold to offset costs (Dotzel et al., 2013; Eggert et al., 2015). Furthermore, TCE suggests that, while providers make idiosyncratic investments right

from the start, the resulting dependence asymmetry will shrink over time as customers, in turn, also grow increasingly dependent on providers when they stop performing certain tasks or services in-house and as service providers gain a greater unique knowledge of their customers' processes, needs, and requirements. With increased mutual dependence, both sides develop and improve relational capital (i.e., resolving governance issues and committing more to the relationship). Thus,

H5 The positive effect of servitization on performance is stronger when performance is measured after servitization.

Performance-related characteristics: Firm performance measure The impact of servitization on performance will likely vary depending on how performance is measured. This is due to the directness of the effects of servitization on different performance metrics, as well as differences between performance metrics in capturing costs. According to RBT, benefits of servitization directly affect nonfinancial measures, while the mediated effect on financials is indirect and, thus, smaller. In addition, TOC and TCE suggest that profit- and financial market-based performance capture bottom-line performance, including costs related to inefficiencies, customization, risks, conflicts, and safeguarding. By contrast, other measures, such as revenue and nonfinancial performance (e.g., customer satisfaction, loyalty), disregard these cost effects. In line with these arguments, we posit the following:

H6 The effect size is the smallest for profit and stock market measures.

Moderation by contextual factors

Many of the highly cited studies on servitization are set in specific contexts. Therefore, we proceed to examine whether and to what extent the effects generalize across macroeconomic (economic cycles and a time trend), industry (B2B vs. B2C market type and technology intensity), and geographic contexts.

Macroeconomic environment: Economic cycle Similar to pure manufacturers, servitized firms' performance can be hurt by recessions. From an RBT perspective, servitization could

provide firms with an alternative source of revenue (e.g., by servicing installed products⁶), higher levels of differentiation power, and more cash flow and customer relationship stability (Benedettini et al., 2015; Fang et al., 2011; Kohtamäki, Partanen, & Möller, 2013).

Therefore, the economic impact of recessions could be cushioned and reduced from services (R. Grewal & Tansuhaj, 2001).

However, TOC and TCE arguments are not in favor of the reduced negative impact due to services. From a TOC-based view, during recessions, customers often become more price-sensitive and may turn to lower-priced offerings, which can affect service revenues (Bond et al., 2020; Lamey et al., 2007). In addition, the fixed and variable costs associated with transforming into a service-dominant business model (i.e., developing the necessary culture, structure, talent, and processes; and ensuring service development and delivery) can be higher for the service provider during tough economic times (Kohtamäki, Partanen, Parida, et al., 2013). Further, providers of complex, output-based services (e.g., solutions) will bear the risk of capacity underutilization during recessions (Bond et al. 2020). As a result, service providers may need to find ways to reduce their costs while still delivering high-quality services to their customers.

From a TCE standpoint, recessions increase uncertainty (environmental and behavioral) (Rindfleisch & Heide, 1997). Therefore, higher transaction costs could occur. In accordance with these arguments, we posit the following:

H7 Economic downturns weaken servitization's (positive) impact on performance.

Macroeconomic environment: Time trend Both scholars and managers have questioned whether servitization's documented desirable effects still hold in an increasingly servitized world. More firms are adopting servitization strategies; for example, in China, the percentage

⁶ Instead of replacing capital goods, customers might try to stretch the lifetime of an equipment by spending more on (repair and maintenance) services.

of manufacturing firms offering services increased from less than 1% in 2007 to 19.33% in 2011 (Neely et al., 2011). As a result, servitization could increasingly become the “new normal” rather than a source of competitive advantage (Kumar et al., 2011).

According to RBT, firms will benefit less from servitization-based differentiation and customer loyalty when many competitors also build and leverage servitization capabilities and resources (i.e., reduced rarity of unique resources). Even worse, providers of basic services might engage in price competition over time (He et al., 2017; Wang et al., 2018). TOC and TCE offer opposing insights. Over time, given shared experiences and accumulated knowledge, firms become more skillful in reaching cost-efficiency and economies of scale and controlling transaction costs and risks (Fang et al., 2008). However, owing to competition and customers’ expectations, firms must invest more in increasingly complex and customized service offerings, which are costlier and riskier (Worm et al., 2017). Competition and saturation in addition to costlier and riskier services are likely to outweigh the accumulated knowledge. Thus:

H8 Time trend has a negative moderating effect on the servitization–performance relationship.

Industry environment: B2B versus B2C market type Services are more customized and customer relationships are deeper and more tailored in B2B than B2C (Anderson & Narus, 2004; Ulaga & Eggert, 2006). Servitization not only requires strong customer relationships but also improves them. As relationship marketing is more effective when relationships are more critical to customers (Palmatier et al., 2006), we expect servitization to be more effective in B2B than B2C markets under the RBT perspective.

From a TOC perspective, because B2B markets tend to be more concentrated and B2B firms often cater to a more homogeneous group of high-revenue customers, B2B services often have lower development and customization costs (Dotzel & Shankar, 2019). TCE implies that B2B services (e.g., solutions), due to higher idiosyncratic investments and

greater asset specificity, incur more transaction costs and risks (Tuli et al., 2007; Worm et al., 2017), but given the stronger asset investments made by both parties, the scale of the relationships, and the development of high levels of relational capitals and relationship commitments, we expect transaction costs and risks to be reduced heavily. Thus,

H9 The effect of servitization on performance is stronger in a B2B than a B2C context.

Industry environment: Technology intensity Industries with greater tech intensity are fraught with technological uncertainty, market ambiguity, and competitive volatility (Mohr et al., 2010; Moriarty & Kosnik, 1989). Firms in high-tech markets must meet rapidly changing customer needs, keep existing and acquire new customers, and differentiate themselves through innovation. Therefore, from an RBT perspective, sustainable competitive advantage from servitization could play a more important role in high-tech industries. Service offerings could also increase providers' credibility while reducing customers' perceived risk of purchasing complex high-tech products (Covin et al., 1990; Hills & Sarin, 2003).

Furthermore, digital technologies seem to be a particularly effective enabler of service development and growth (Bond et al., 2020) when leveraged to deliver smart service innovations (Grubic & Peppard, 2016; Lightfoot et al., 2011). However, TOC suggests the opposite effect as, in high-tech markets, differentiation from service innovation (i.e., innovation outside the lab) could be relatively more costly than technology-based innovation in the lab, due to customization investments and the transition to services. Similarly, TCE suggests higher costs from opportunism, safeguarding costs, and uncertainty in dynamic high-tech markets (Worm et al., 2017). Thus, the RBT lens predicts a positive moderation effect of technology intensity, while the TOC and TCE lenses predict the opposite. Thus:

H10 The effect of servitization on performance is weaker in a high- than low-tech market.

Geography We also examine whether the outcomes of servitization generalize across four geographical areas: Western Europe, North America, emerging markets, and other

industrialized countries. The impact of servitization on performance might differ among these regions because of region-specific factors (e.g., competition, growth potential, market size, cultural willingness to pay for services, available resources) (Kastalli & Van Looy, 2013) and timing differences in the adoption of servitization (Neely et al., 2011).

Through an RBT lens, differentiation and the sustainable competitive advantage provided by servitization could be stronger in emerging markets, in which servitization is still less prominent. This is because service offerings and service-specific skills and capabilities are rarer and more inimitable when fewer competitors are servitized (saturation effect). Moreover, while developed countries are stagnant, emerging markets enjoy high growth rates (Sheth, 2011). Emerging markets' largely untapped market potential could render firms' service-specific skills and capabilities more valuable by enabling companies to grow their service business more easily without provoking aggressive competitive behavior (Edeling & Himme, 2018). Considering TOC, country-specific advantages of emerging economies such as low labor costs and economies of scale (Bhaumik et al., 2016) help contain the costs of labor-intensive service delivery (Khanna et al., 2005). By contrast, TCE implies that firms in emerging economies might face more environmental and behavioral uncertainty, less effective governance mechanisms, and, thus, elevated transaction risks and costs. This is due, for example, to higher variability of governmental regulations, weaker legal systems, and lack of standards and norms defined to evaluate service quality and outcomes (Brown, 1997; Luo, 2006). Considering all three lenses, we posit the following:

H11 The effect of servitization on performance is stronger in emerging markets than developed economies.

Mediators of the servitization–performance relationship

We now turn to the specific mediating mechanisms that account for the servitization–performance effect. We identified theoretical mediators from the literature. The prerequisite was that the mediating relationships had to be testable in a meta-analysis based on pairwise

correlations reported in primary studies. Not many studies contain mediators, and most of the mediators available for meta-analytic purposes are RBT-based. We thus identified three RBT- and one TOC-based categories of mediators: (1) customer centricity, which focuses on strong relationships with customers (Gebauer et al., 2011); (2) relationship learning, which refers to knowledge sharing, joint sense-making and knowledge integration, trust, and open interactions between suppliers and customers (Johansson et al., 2019; Kohtamäki & Partanen, 2016; Kohtamäki, Partanen, & Möller, 2013); (3) organizational learning, which involves improving knowledge and skills, developing necessary processes, and attaining experiences with the service business of the firm (Liu et al., 2017; Oliva et al., 2012); and (4) cost orientation, which entails the pursuit of efficiency throughout all parts of a firm's value chain (Grawe et al., 2009). Table W2 in the Web Appendix presents mediators and their categories. For brevity, we do not hypothesize about the mediation effects but leave them to the empirical analysis.

Methodology

Our meta-analysis uses effect size estimates (i.e., model coefficients and pairwise correlations) for the relationship between servitization and firm performance reported in prior primary studies. We manually code a database such that each effect size represents one observation, along with its values on the moderator variables. We then use HOMA, MARA, and MASEM to examine the effect of servitization on performance in general, to identify variations in the effect sizes, and to investigate mediation.

Scope of study

A primary study must meet four criteria to be considered in the database. First, the study must include a regression model or structural equation (path) modeling (SEM); we do not consider descriptive statistics or correlation analyses (e.g., Böhm et al. 2017; Forkmann et al. 2017). Second, the dependent variable must be related to firm performance, either financial-

based (e.g., profit, sales, Tobin's q, stock return) or nonfinancial-based (e.g., customer satisfaction, brand equity). Third, sufficient statistical information enabling the computation of the effect size with the formulas provided by Rosenthal (1991) must be reported. Fourth, the studies must be independent (i.e., report effect sizes from different samples). We excluded theoretical articles, qualitative investigations, and quantitative studies that did not report quantitative findings on the outcomes of servitization. After identifying studies for potential inclusion in the dataset, we evaluated the appropriateness of each study.

Database compilation

To identify the primary empirical studies investigating the effects of servitization on firm performance, we conducted a rigorous and thorough literature search. We used multiple approaches to obtain published and unpublished studies relevant to the purpose of our study. We began by searching several online databases (e.g., EBSCO, Google Scholar) using various keywords (e.g., “service,” “servitization,” “service-oriented strategy,” “hybrid offering,” “integrated solution,” “product service system,” “service integration”). We then supplemented the electronic search by carrying out an issue-by-issue search of the top journals (*Financial Times* list of 50 journals). To identify additional relevant studies, we also used both backward (searching references cited in the articles) and forward (searching subsequent references cited by those articles) searches (Johnson & Jaramillo, 2017). To address the file-drawer problem and publication bias (Rosenthal, 1979; Rust et al., 1990), we searched for unpublished work, including dissertations and working papers in databases such as ProQuest's dissertations and SSRN, as well as papers in the proceedings of major conferences in different research fields. Finally, we called for additional studies by posting messages on the electronic mailing list ELMAR.

Database scope

The final dataset consists of 379 effect sizes, retrieved from 85 studies (see Table W3 in the

Web Appendix). The average number of effect sizes reported per study is 4.4, with a minimum of 1 and a maximum of 27. Our sample includes 76 articles (89%) published in different journals and nine unpublished studies (11%) (e.g., conference papers, working papers, doctoral dissertations), all between 2003 and 2022, that use data spanning from 1990 to 2020. In our sample, 35.2% of studies come from Western Europe, 14.1% from the United States, 28.2% from emerging countries, 22.5% from other industrialized countries.

Data coding

Database development followed the meta-analytic process outlined in recent meta-analytic research (e.g., Grewal et al. 2018; Johnson and Jaramillo 2017). To reduce coding errors, we prepared a coding form (Table W4, Web Appendix) specifying the information to be extracted from each study (Lipsey & Wilson, 2001; Rubera & Kirca, 2012). The first author initially coded all articles. To ensure reliability, two other coders (well-trained postgraduate students) independently coded all studies. Cohen's kappa coefficient is 0.95, which is satisfactory (Landis & Koch, 1977). The remaining inconsistencies were resolved through discussion.

Meta-analytic model and estimation of effect sizes

To measure the effect size of servitization on firm performance, we use partial correlations, a common approach for meta-analytic reviews in marketing and management (Babić Rosario et al., 2016; Heugens & Lander, 2009). Using partial correlations helps us reduce both sampling errors (increasing the precision of meta-analytic estimates) and nonsampling errors (enhancing the generalizability of meta-analytic estimates) (Peterson & Brown, 2005).

The partial correlations ($r_{xy,z}$) are based on econometric regression models or (path) SEM that capture the relationship between servitization (X) and firm performance (Y), given a set of n control variables (Z). We compute partial correlations using the t-statistics and degrees of freedom reported in the primary studies (Greene, 2008). We transformed the

correlations into Fisher's z-coefficients. These are easy-to-interpret, scale-free measures that have the desirable statistical properties of (1) being approximately normally distributed and (2) having a sample variance that depends only on sample size, not on the population correlation itself (Babić Rosario et al., 2016; Geyskens et al., 2009). We then weighted all effect sizes by an estimate of the inverse of their variance ($N - 3$) to give greater weight to more precise estimates with larger sample sizes. Finally, we transformed the z-scores back to obtain the revised correlation coefficients (Hedges & Olkin, 1985). We also calculated the fail-safe sample size (3952) using Rosenthal's (1979) method and ensured that the analysis was not susceptible to the file-drawer problem.

HOMA

We used HOMA to calculate mean effect sizes for different relationships between servitization and firm performance and the corresponding confidence intervals (Geyskens et al., 2009; Hedges & Olkin, 1985). When multiple measurements of the focal effect were reported, we included all of them in our analyses (Bijmolt & Pieters, 2001). For the HOMA procedure and to calculate the meta-analytic mean estimate, we employed a random-effect model instead of a fixed one.⁷ Given the variability in the sample sizes of the primary studies, we also needed to account for differences in precision across effect sizes (Hedges & Olkin, 1985). Therefore, we weighted them by their inverse variance weight and calculated the mean, its standard error, and the corresponding confidence interval.

MARA

To examine the relationship between effect sizes and moderator variables, we used MARA (Lipsey & Wilson, 2001). MARA is a particular type of weighted least squares regression analysis and is designed to assess the moderation effects by modeling previously unexplored

⁷ We used a random-effect model for two reasons. First, from our theoretical discussion, we expect the mean to vary systematically under the influence of moderator variables. Second, in line with meta-analytic standards, we use the Q-test for homogeneity, which confirms that the assumptions of the fixed model do not hold (Table 5).

heterogeneity in the effect size distribution and to meaningfully interpret the intercept with meaningful zero points of the other predictors (Lipsey & Wilson, 2001). As in HOMA, we weighted effect sizes by the inverse variance weight w (Hedges & Olkin, 1985). To address the concern about the inaccuracy of fixed-effects models (Geyskens et al., 2009), we estimated the regression parameters with mixed-effects models, in which variability in the effect size distribution is attributed to systematic between-study differences, firm-level sampling error, and an unmeasured random variance component (Lipsey & Wilson, 2001). Table W5 in the Web Appendix shows the variable operationalization, and Table W6 displays variable correlations.

MASEM

To examine the relationship among servitization, performance, and the mediators, we relied on MASEM (Cheung & Chan, 2005), which uses a two-stage procedure. First, we used separate HOMAs to construct a table of mean correlations between variables of interest based on bivariate correlations (Table W7). Second, we used SEM on the matrix of mean correlations, with maximum likelihood estimation (Cheung & Chan, 2005). We incorporated three control variables (firm size, firm age, and competitive intensity) frequently used in literature. We control for firm size and age as both are important for firm performance, decisions related to servitization, and available resources (Dotzel et al., 2013; Kwak & Kim, 2016). We control for competitive intensity because the differential competitive advantage of servitization becomes critical as competition increases (Fang et al., 2008; Nezami et al., 2018). We estimate the path model shown in Figure 2. To account for sample size differences across the various cells of the correlation table (Table W7), we used the harmonic mean as the overall sample size of our analyses ($N = 1379$).⁸

⁸ The harmonic mean is less sensitive to outliers and more conservative than the arithmetic mean (Drees & Heugens, 2013).

HOMA results

For the HOMA of the effect of servitization, we have 379 back-transformed z effect sizes with a minimum of -1.39 and a maximum of 1.24 . We observe 54% significant and positive effects (205 effects), 13.4% significant and negative effects (51 effects), and 32.4% nonsignificant effects (123 effects). Table 5 shows the HOMA results for the focal relationship.⁹ In line with H1a, the random-effects HOMA reveals an overall modest but positive and significant relationship between servitization and firm performance ($\bar{r} = 0.064$, $p < .001$). The result is consistent across the different performance outcomes and servitization measures.

We employed Cochran's Q -statistic and the scale-free index of homogeneity I^2 to assess potential heterogeneity in the studies. The Q test is the usual way to determine whether a set of studies is homogeneous, and the I^2 index helps quantify the degree of heterogeneity in a meta-analysis (Huedo-Medina et al., 2006). Given the reported Q -statistic and I^2 index in Table 5, we confirm a considerable amount of heterogeneity in the studies. The presence of heterogeneity implies that the overall mean correlation must be interpreted as an average rather than a common true correlation value (Hedges & Olkin, 1985), requiring additional moderator analyses.

MARA results

Table 6 and panels A–C of Table W8 in the Web Appendix present the results of our moderator analyses. We show how different conceptual, contextual, methodological, and publication-related characteristics change the link between servitization and performance outcomes. In addition to the overall MARA, we conduct separate MARAs for the subsamples (1) measures of servitization, (2) B2B, (3) SSP and SSC, (4) measures of performance, (5)

⁹ We also analyze the curvilinear effect of servitization on performance in part 2 of the Web Appendix. Given the main focus of our study, we did not include this analysis in the main text.

United States, (6) Western Europe, (7) emerging markets, (8) low-/medium-tech industry, and (9) high-tech industry. We use this moderated-moderation or three-way interaction approach (Babić Rosario et al., 2016; Edeling & Himme, 2018) to gain a better understanding of the relationship between servitization and performance. We also test how changing the bases of independent and dependent variables affects the overall results and the intercept (Table W9).

To examine and overcome the potential multicollinearity problem, we take the following steps as part of a standard procedure. First, we include only variables with more than seven observations stemming from at least three studies (Edeling & Himme, 2018). Second, we were unable to include three variables (IV_source [survey vs. secondary], DV_source [survey vs. secondary], and the number of years of the sample data) out of all the variables coded initially, given the signs of high multicollinearity in the initial analysis (Babić Rosario et al., 2016; Farley et al., 1995). We analyze the dataset after these considerations, and the highest reported variance inflation factor (VIF) is 4.98, which is under 10 and acceptable (average VIF = 2.80, median VIF = 2.49). To assess the robustness of the results, we also check the correlation matrix for high correlations among the variables. To rule out the possibility that results are biased by highly correlated moderating variables, we excluded variables with a bivariate correlation with other independent variables that exceeds |0.40| one at a time; doing so, however, did not change the findings. Therefore, we keep all variables in the analyses to prevent potential omitted variables biases (Babić Rosario et al., 2016).

Focal relationship

Conceptualization of servitization In line with H2, depth-based conceptualization (service offering type) is associated with a stronger firm performance effect than purely breadth-based measures (service breadth) ($\beta = 0.113, p < .01$). For a mix of depth and breadth (service ratio

and orientation), the effects are intermediate ($\beta_{\text{ratio}} = 0.045, p < .01$; $\beta_{\text{orientation}} = 0.086, p < .01$). These results are consistent with the RBT-, TOC-, and (partly) TCE-based views. The results hold true for the subsample analyses.

Service type In support of H3 and in line with RBT's and (partly) TCE's predictions, servitization's effect on performance is stronger for SSCs ($\beta = 0.075, p < .01$) and mixed service types ($\beta = 0.063, p < .01$) than SSPs. The stronger impact of SSCs is more pronounced for B2B firms ($\beta = 0.076, p < .05$), Western Europe ($\beta = 0.085, p < .01$), emerging markets ($\beta = 0.166, p < .01$), and low-tech industries ($\beta = 0.086, p < .01$).

Mediation of the servitization–performance link In support of H4 and our RBT-based expectation, the lack of a mediator as a predictor in a model results in a larger direct effect size ($\beta = 0.072, p < .01$). This result hints at the presence of a chain of effects (e.g., Nezami et al. 2018).

Time difference in the servitization–performance link Contrary to H5 and expectations (from RBT, TOC, and TCE) that servitization benefits take time to materialize (e.g., Fang et al. 2008), lack of time difference in the measurement of servitization and performance does not affect the servitization–performance relationship ($\beta = 0.004, p > .10$).

Firm performance measure The operationalization of firm performance also matters, in line with all three lenses and H6. Compared with profit, firm performance in the form of sales ($\beta = 0.062, p < .01$), general performance ($\beta = 0.130, p < .01$), and nonfinancial performance ($\beta = 0.090, p < .01$) produces significantly stronger effects. Financial market–based performance shows no significantly different effect than profit, despite its forward-looking properties. These results mainly hold true for the subsample analyses.

Contextual factors

Macroeconomic environment: Economic cycle In line with H7 and consistent with our expectations from TOC and TCE, a higher percentage of recessionary months within the data

period results in a weaker impact of servitization on performance outcomes ($\beta = -0.036, p < .05$).

Macroeconomic environment: Time trend A negative moderation effect of time trend (as the mean year of data collection: before and after 2009) in the overall results ($\beta = -0.061, p < .01$) supports H8 and the RBT-based notion of a weakened effect of servitization on firm performance over time.

Industry environment: B2B versus B2C markets The servitization–performance relationship is weaker in the mixed group than in the pure B2B sample ($\beta = -0.052, p < .01$), confirming H9 and in line with RBT and TCE. The relationship is even weaker for servitization measures of service breadth and orientation, for profit- and financial market-based performance measures, for US and emerging markets, and for high-tech industries.

Industry environment: Technology intensity In line with RBT's predictions but contrary to those of TOC and TCE, servitization has a greater impact on performance in high-tech industries ($\beta = 0.030, p < .05$) than low-tech ones, rejecting H10. The greater impact of servitization in high-tech industries is more pronounced for pure B2B firms ($\beta = 0.079, p < .01$), SSP services ($\beta = 0.132, p < .01$), and firms in Europe ($\beta = 0.040, p < .01$) and emerging markets ($\beta = 0.114, p < .01$).

Geography In support of H11 and in accordance with our RBT- and TOC-based expectations but contrary to TCE's predictions, the effect size is larger in emerging markets than in Europe ($\beta = 0.092, p < .01$) and the United States. This moderation is even more pronounced for B2B firms ($\beta = 0.189, p < .1$), both SSPs ($\beta = 0.115, p < .5$) and SSCs ($\beta = 0.124, p < .1$), and high-tech industries ($\beta = 0.167, p < .01$). For the overall result, the effect size shows no difference between the United States and Europe ($\beta = -0.009, p > .10$).

In summary, RBT predicts the moderating effects more precisely than TOC and TCE.

Methodological characteristics

The results show that not accounting for endogeneity leads to significantly stronger effects ($\beta = 0.030, p < .05$), underscoring the importance of dealing with different sources of endogeneity (e.g., reverse causality, unobservable private information related to offering services, self-selection of firm strategy) in servitization research. We find that cross-sectional data lead to stronger effects than panel data ($\beta = 0.027, p < .1$). The servitization–performance relationship is also stronger if the measure of performance is in absolute-level form ($\beta = 0.036, p < .01$) rather than in growth rate form, perhaps because panel data and growth rates allow controlling for time-invariant unobserved variables. Log-transformation of the performance measure shows no significant difference ($\beta = 0.007, p > .10$).

We also find no significant difference between samples of firm-level data and samples of product/business-unit data ($\beta = -0.018, p > .10$), indicating the appropriateness of examining servitization at the firm level, in which data availability is more likely.

Measurement of performance using continuous or categorical data also shows no significant difference ($\beta = -0.019, p > .10$). In addition, we find no significant difference between estimation methods ($\beta = -0.011, p > .10$) (regression vs. SEM); not including market factors in the model results in a weaker effect ($\beta = -0.056, p < .01$), and not having the lag of performance in the model results in a stronger effect ($\beta = 0.066, p < .01$). Finally, controlling for year, industry, and firm size does not change the servitization–performance relationship.

Publication-specific characteristics

The effects from unpublished studies ($\beta = 0.008, p > .10$) and articles in less prestigious journals ($\beta = 0.016, p > .10$) show no significant difference from the effects from top journals. Marketing and nonmarketing journals also show no significant difference.

MASEM results

Table 7 and Figure 2 show the results of mediation analyses. The model fits the data well ($\chi^2 = 101.52$; goodness of fit = 0.95; root mean square error of approximation = 0.07;

standardized root mean square residual = 0.03). The results confirm the mediating role of customer centricity, relationship learning, organizational learning, and cost orientation in the relationship between servitization and firm performance. First, servitization is positively related to customer centricity ($\beta = 0.07, p < .01$), and customer centricity is positively related to firm performance ($\beta = 0.31, p < .01$); the total indirect effect of servitization channeled through customer centricity is 0.02 ($p < .01$). Second, servitization is positively related to relationship learning ($\beta = 0.37, p < .01$), which in turn has a positive effect on performance ($\beta = 0.31, p < .01$); the total indirect effect through relationship learning is 0.11 ($p < .01$). Third, servitization is positively related to organizational learning ($\beta = 0.39, p < .01$), and organizational learning is positively related to firm performance ($\beta = 0.49, p < .01$); the total indirect effect of servitization flowing through organizational learning amounts to 0.19 ($p < .01$). Fourth, servitization has a positive and significant effect on cost orientation ($\beta = 0.12, p < .01$), and cost orientation positively affects firm performance ($\beta = 0.24, p < .01$); the total indirect effect of servitization flowing through cost orientation is 0.03 ($p < .01$).

Despite the significant mediation effects (sum of mediated effects $\beta = 0.35$), the mediators only partially account for the relationship between servitization and performance, as the focal effect remains significant ($\beta = -0.24, p < .01$) with their inclusion. The negative sign of the remaining focal effect suggests that servitization is connected with performance through additional causal paths, such as TOC- and TCE-based mediators. The presence of such mediators would indicate that the theoretical mechanisms linked to the three theoretical lenses coexist, and thus the three lenses could offer complementary explanations for the observed effects. For example, Worm et al. (2017) identify cost-efficiency and differentiation as complementary mediators. This finding calls for an integration of the three lenses in a single mediated conceptual model, which we respond to with the integrated conceptual model for future research in Figure 3.

Discussion

Research contributions

This meta-analysis contributes to the literature by answering nine important questions researchers and practitioners ask. With regard to the first question, this study derives empirical generalizations about the servitization–performance relationship based on 85 studies and 379 effect sizes, including market position, financial position, and firm value as outcomes. To the best of our knowledge, our meta-analysis is the first to examine servitization using a large and comprehensive database of primary studies. Further, our study is the first to use MARA for moderation analysis and MASEM for mediation analysis. We therefore provide a more accurate analysis of the main effect (i.e., a baseline effect), moderators, and mediators in the servitization–performance relationship.

With regard to the second question, the servitization–performance correlation of 0.064 is significant, suggesting that, in general, servitization enhances performance and that the positive RBT-, TOC-, and TCE-based mechanisms prevail. However, our analysis also reveals that servitization affects various firm performance metrics to a differing degree, in line with the notion that bottom-line metrics suffer more from the cost of transitioning to services while top-line metrics only capture the revenue component (Nezami et al., 2018). The effect on marketing and subjective firm performance metrics is strongest, presumably because they are more directly affected by servitization, but is weakest for profit- and financial market–based performance metrics; the effect on sales is intermediate.

With regard to the third question, we draw on the key theoretical lenses and their respective mechanisms (based on RBT, TOC, and TCE) from the literature and test the different theories' predictions on the moderators against each other. We find that RBT appears more pertinent to servitization than TOC and TCE.

For the fourth question on the theoretical mechanisms, we shed light on the mediators

of the servitization–performance relationship, an issue on which the literature is inconclusive. We demonstrate that the four RBT/TOC-based mediators (customer centricity, relationship learning, organizational learning, and cost orientation) partially mediate the effect of servitization on firm performance. Apparently, additional unobserved mechanisms exist, which we aim to integrate in our proposed conceptual framework for future research.

With regard to the fifth question, we find that, though the literature frequently relies on breadth-based conceptualizations of servitization, these are less powerful conceptualizations. In line with studies that emphasize the depth, and echoing the RBT view that depth helps establish a stronger sustainable competitive advantage (e.g., Kohtamaki et al., 2015; Ulaga & Reinartz, 2011), we find that servitization captured by the type of service offering has more beneficial performance effects than servitization based on the sheer breadth of service offerings. Our results also lend support to the TOC-based view that a focus on servitization breadth can exacerbate costs. Likewise, we demonstrate that the types of services offered by firms matter for performance. SSCs, due to their greater differentiation and inimitability implied by RBT and higher levels of relational norms and capital implied by TCE, drive firm performance more than SSPs.

With regard to the sixth question, a recessionary period might be problematic for servitization, as suggested by the TOC and TCE lenses and contrary to what some managers anticipate (e.g., Kowalkowski & Ulaga, 2017) and what RBT implies. Recessions lead to customers' budget limitations, higher fixed and variable costs of transforming into a service-dominant business model, and amplified uncertainties and asset specificity, all of which can lessen the cushioning effect of servitization.

In terms of the seventh question, we find that servitization's effect on performance is reduced over time as more firms, industries, and economies become increasingly servitized. This echoes the RBT-based notion that competitive advantage from services vanishes when

servitization strategies become commonplace.

With regard to the eighth question, related to market type, we find that while firms across all industries generally benefit from servitization strategies, B2B firms benefit the most, in line with the RBT- and TCE-based reasoning that buyer-seller relationships bear a strong potential for unleashing value creation opportunities through services. For example, Kowalkowski and Ulaga (2017) explain that many B2B companies' installed base represents substantial service growth opportunities. With regard to industry technology intensity, high-tech industries emerge as particularly fertile for implementing servitization strategies. Beyond embedding value in technology-driven components, products, or systems, companies have increasingly moved toward creating and capturing value through customer solutions, new ecosystems, and platform-based business models. Against this backdrop, digital technologies are a particularly effective way to fuel service growth (Bond et al., 2020). Finally, with regard to geographic characteristics, among all regions, emerging markets show greater potential for servitization. The main reasons for this include more opportunities for growth and offering services, greater effectiveness of services due to lower levels of service penetration, and country-specific advantages (e.g., cost of labor, economies of scale).

Regarding the ninth question, we find that servitization research should account for endogeneity and rely on panel data to avoid overestimating effects. Contrary to some researchers' expectation that servitization effects would only show at the business-unit level, we find that firm-level analyses are appropriate. Thus, we assist researchers in identifying servitization research design options and making their methodological choices (D. Grewal et al., 2018; Johnson & Jaramillo, 2017).

Managerial implications

This study also has implications that are highly relevant for managers. First, from a senior management perspective, our findings support executives who argue that servitization

represents an effective strategy for improving firm performance overall. Against this backdrop, our research provides managers with more fine-grained insights into how servitization affects performance outcomes in terms of both financial and nonfinancial measures. It also helps executives understand the industry contexts and competitive environments in which servitization is a particularly attractive firm strategy.

Second, senior decision-makers need to realize that servitization is a long-haul strategy, not a short-term remedy. Senior management must provide consistent support over time to allow service growth initiatives to emerge and profitability to increase. This also implies that managers must identify and monitor service revenues and profitability early on, through separate structures and processes, to document when intermediary milestones are achieved and critical thresholds reached.

Third, our study suggests that managers must carefully plan, design, and increase the nature, breadth, and depth of their future service portfolio over time. Ulaga and Reinartz (2011) argue that firms successfully mastering service growth systematically begin with straightforward life-cycle SSP before venturing into more complex services. Against this backdrop, we find that, over time, SSCs contribute more to long-term performance growth than SSPs. Informed by our mediation analysis, we contend that this is mainly because of higher levels of customer centricity and deeper customer–supplier relationships based on knowledge sharing and trust. By investing in SSCs, managers can expect to create and capture more value, achieve sustainable competitive advantage, and drive long-term revenue growth, over and above SSPs. However, managers must be prepared to invest in service innovation and design, human resources, training, customer relationships, and market monitoring to fully take advantage of profitable SSC growth.

Fourth, our findings also caution those who view servitization as a panacea in times of recession (Bond et al., 2020). The same holds for the role of servitization as a key

differentiator. As service growth becomes the “new normal” across industries, executives must be mindful of the strategy’s diminishing differentiation impact over time, as it may become a cost of doing business.

Fifth, our findings provide guidance on how managers can deploy servitization strategies across different geographic regions or countries. Managers operating in emerging markets and managers with regional responsibilities should realize that servitization can be a major opportunity for their companies to gain an advantage over competition and enhance their bottom lines.

Sixth, managers must pay attention to the type of customers they are dealing with as well as the industry in which their firms are operating. We show that managers of B2B companies and managers of companies in high-tech industries benefit more from servitization. This is in line with Fang et al. (2008), who argue that managers should recognize the strong effect of industry factors on the effectiveness of servitization strategies.

Seventh, and in line with the previous two findings, managers must still be mindful of organizational culture when pursuing service growth strategies. Barriers to servitization are manifold, such as lack of channel infrastructures in emerging markets or opportunities to differentiate predominantly through product features in tech-driven industries. Therefore, especially in firm contexts characterized by a strong product-centric culture, companies must also overcome major cultural hurdles to growing their service business (Kowalkowski & Ulaga, 2017).

If managers pay attention to these insights, servitization strategies will likely thrive, as a general move toward “everything-as-a-service” (Bond et al., 2020) will continue to fuel growth in many industries. As the boundaries between goods and services, hardware and software, and analytics and data become increasingly blurred, servitization will continue to gain traction, fueled by digital technologies and the growing emphasis on cloud-based

business models across industries (see, e.g., Loukis et al. 2019).

Limitations and future research directions

Ultimately, by taking stock of the current state of the rapidly evolving servitization literature, we identify important research gaps and provide guidance on how scholars might close these gaps (Palmatier et al., 2018). Our research directions partially emanate from our meta-analysis findings (e.g., the MARA highlights the need to account for service type); they further reflect major gaps identified during the thorough literature review when compiling our meta-analytical database (e.g., the lack of effect sizes for the mediators). From these insights gained, we develop an integrated conceptual model for future research shown in Figure 3. This framework integrates the constructs, lenses, and relationships covered by the research directions in a single nomological network. Due to their complementary nature in explaining servitization performance, we integrate all three theoretical lenses (RBT, RBT, and TOC). The framework comprises three building blocks, the servitization concept, the customer relationship perspective, and the service provider perspective. While we are cognizant that our framework might not be exhaustive, we contend that the model nonetheless provides guidance for identifying promising new research directions in this prolific research domain.

Building block A: The servitization concept

Research direction 1 Exploring the different typologies of services and how and under which conditions different types contribute to performance. This direction is also related to some of our study's limitations. As with any meta-analysis, ours is limited to the original studies on which it is based. Therefore, we could only test the moderation effects of variables that were codable in the studies. For example, regarding service typology, we could only code product- and customer-oriented services. However, other typologies of services exist, including internet- and people-enabled services (Dotzel et al., 2013) and integration-,

product-, service-, use-, and results-oriented services (Tenucci & Supino, 2019). In addition, some variables are only available in a few studies (e.g., service relatedness), so we were unable to code them. Also, our coding of the contextual moderators is limited by low occurrences of certain levels which do not allow modeling interactions between service type and context. Further, in coding the business type, we needed to combine the B2C category with the mixed group because of a low number of observations. More future empirical studies examining servitization in different contexts are therefore required. Additional studies would provide the freedom to test a larger number of moderators, avoid multicollinearity, and use hierarchical linear modeling for the analysis.

Research direction 2 Examining the role of new smart technologies such as artificial intelligence and Internet of Things in companies' service offerings, and testing whether this combination is synergistic in boosting performance.

Building block B: The customer relationship perspective

Research direction 3 Examining servitization strategies and outcomes at the relationship-level unit of analysis. This includes the use of account metrics (e.g., retention, cost to serve, customer lifetime value, and volatility,) as performance outcomes, use of relationship-specific variables (e.g., relationship specific investments, relationship quality and intimacy, customer resources, customer characteristics, cost to serve) as mediators and moderators, and segmentation strategies to select the right customers for servitized offerings.

Research direction 4 Assessing customers' acceptance of servitization and value created for them in both B2B and B2C contexts. For example, many customers might not be in favor of losing ownership and following usership.

Building block B: The service provider perspective

Research direction 5 Generating more insights into the mediating and moderating mechanisms. Our integrative conceptual model for future research, comprising RBT, TOC,

and TCE mediators and moderators, should be tested to tease out the three lenses' relative importance, their respective mechanisms, and their linkages.

Also, our focus on the three dominant theoretical lenses may have overlooked valuable insights from the rest of literature that employed alternative frameworks (Table W1), limiting the comprehensiveness of the findings. Future studies should explore these alternative theoretical lenses to gain a more complete understanding of the servitization-performance relationship.

Research direction 6 Exploring the role of servitization in revitalizing financially distressed firms and/or during recessions. Relevantly, research on the risk implications of servitization is quite limited, and therefore we could not examine the risk implications of firms transitioning to service. Further research could test the servitization–risk relationship.

Research direction 7 Examining different industries and markets. For example, what is the role of different regulations and governance protocols in different countries in affecting the adoption of servitization and its outcomes?

Relatedly, the moderating role of service saturation in the market is of interest, but we could not explore it because of data limitations. Saturation can dampen the positive effect of services on firm performance and make services a necessity rather than a competitive advantage. Further research could aim to understand the impact of saturation in different markets.

Research direction 8 Investigating the potential benefits of servitization for sustainability and environmental protection. Such research could focus on understanding if and how servitization can help firms reduce their environmental impact and support the transition to a more sustainable economy.

Research direction 9 Examining the role of servitization in driving the transition to a circular economy or in driving consumer behavior and preferences for more sustainable

products and services.

Research direction 10 Focusing on understanding the ways servitization can support the development of new products and services and how firms can leverage servitization to drive innovation and growth (innovation process).

Research direction 11 Further exploring internal performance, such as the potential impact of servitization on the employment landscape.

Research direction 12 Analyzing the role of servitization in driving international expansion and globalization, including how servitization can support entry into new markets and the development of international partnerships.

Research direction 13 Conducting meta-analyses to investigate the antecedents of servitization.

In summary, in this meta-analysis, we provide empirical generalizations about the relationship between servitization and firm performance. We find that, on average, servitization positively affects performance. We also identify the theoretical lenses of RBT, TOC, and TCE as relevant in explaining the servitization-performance relationship, with RBT being the most pertinent. Our study highlights the importance of considering service type and contextual factors when implementing servitization strategies.

Conflict of interest

The authors declare that they have no conflict of interest.

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Table 1 New trends in servitization

Main Point	Sub point	Description
Business model innovation	Marketplace disruption	Service-based business models have created marketplace disruptions and challenged the traditional product-based models of established companies. An appliance manufacturer moving from selling appliances to offering a subscription-based appliance repair and maintenance service and a health care company moving from selling medical equipment to offering a telemedicine service are examples of new marketplace/business model disruptions that require more attention.
	Recurring revenue business models	By shifting from a product-based business model to a service-based model, companies can move from a one-time sales model to a recurring revenue model, which can help stabilize and grow their businesses. For example, a company that sells software might offer it as a subscription-based service, rather than selling it as a one-time purchase.
	Product as a service)	A new business model is when a company provides a product as a service, rather than selling it outright. This can help the company generate more revenue from its customers and provide a more flexible and customizable service.
	Sharing economy	Opportunities abound for companies to offer services that are based on the sharing or renting of resources, such as car sharing or vacation rentals. For example, the term "mobility as a service" (MaaS) describes the integration of various forms of transportation into a single service. In the context of servitization, MaaS can help companies offer a more comprehensive and convenient transportation service to their customers, without the need for them to own a car.
Technologies and digitalization	Technology	Technology is a key driver of servitization, and new technologies enable companies to offer services that were not previously possible. Examples include offering predictive maintenance services based on the Internet of Things; offering subscription-based access to cloud-based software; and offering training, simulation, and visualization services based on virtual and augmented reality technologies.
	Digitalization	Digitalization enables businesses to offer services and smart solutions that are delivered digitally, which was previously not possible. This can make it easier for companies to reach a wider audience and provide their services more efficiently.
Multidimensional benefits of servitization	For customers	In addition to benefiting from personalized and customized experience, cost savings, convenience, and product risk reduction, customers can benefit from usership as a new type of ownership. Usership allows customers to access services on a flexible and customizable basis, without the need to commit to a long-term purchase or ownership.
	For firms	Servitization can allow companies to continuously improve and update their services, rather than being limited by the lifespan of a specific product. This can help them remain competitive and innovate in their industry.
	For societies	Servitization can help companies reduce their environmental impact and promote sustainability. This is especially relevant for industries with high carbon emissions, such as transportation and energy. Adopting servitization can also support the circular economy, which aims to minimize waste and efficiently use resources. In light of increasing focus on sustainability in firm strategies, servitization is becoming increasingly important.

Table 2 Review studies on servitization

Type	References	Focus	Method	Sample	Period	Performance-related conclusion
Qualitative	Baines et al. (2009)	Concept, origin, features, and drivers of servitization	Review of literature	58 articles	1976–2008	Servitization frequently occurs because of financial drivers (e.g., revenue stream, profit margin), strategic drivers (e.g., competitive opportunities and advantage), and marketing drivers (e.g., customer relationships, product differentiation)
Qualitative	Fliess & Lexutt (2019)	Servitization success factors	Systematic literature review	265 articles	1988–2015	Three groups of factors (related to the company, customer, and organizational environment) influence the success of the service transition.
Qualitative	Beuren et al. (2013)	Features, benefits, and drawbacks of the product service system	Systematic literature review	149 articles	2006–2010	The providers of product-service system benefit from greater competitiveness, improved potential for innovation, and higher profit.
Qualitative	Khanra et al. (2021)	Delivering valuable insights from prior research on servitization	Co-citation analysis	275 articles	2004–2019	The literature on the revenue and profit generation of servitized business models needs further enrichment.
Qualitative	Rabetino et al. (2021)	Identifying the servitization substreams and to discover patterns of evolution	Dynamic topic modeling	550 articles	2001–2018	Strategic fit for a profitable service transition is the substream that evolves, from strategies for competitive advantage in industrial services to risk management, and performance implications for servitization success in manufacturing companies.
Qualitative	Raddats et al. (2019)	Identifying the key themes and research priorities in servitization literature	Systematic literature review	219 studies, only published	2005–2017	Services may not be profitable for manufacturers unless a critical mass is reached, though a critical mass appears unnecessary for SSPs. Clarity is lacking on the implementation path to improved service performance when considering whether to develop SSPs and/or SSCs.
Qualitative	Zhang & Banerji (2017)	Building a theoretical model explaining the underlying relationships between the challenges of servitization and improvements in business performance.	Systematic literature review	48 studies	1988–2016	A theoretical model with untested hypotheses on the connection among servitization challenges, benefits, and business performance.
	Uлага & Kowalkowski (2022)	Discussing the conceptual foundations, main drivers of servitization, and key insights of the literature	Literature review			Service performance depends on many service- and firm-related factors, including service type, service development stage, and firm capabilities
Quantitative	Wang et al. (2018)	Providing a quantitative review on the servitization–performance relationship	Quantitative meta-analysis	41 studies	2002–2017	A positive servitization–performance relationship is influenced by the operationalization of constructs and control variables (industry and region).
Quantitative	This article	Providing a quantitative review on the servitization–performance relationship and examining the mediators and moderators in this relationship	Quantitative meta-analysis	85 studies	2002–2022	We provide answers to nine important gaps in the servitization–performance relationship using three different analyses (HOMA, MARA, and MASEM). Using HOMA, we show a significant positive relationship between servitization and performance. By conducting MARA and MASEM, we provide insights into the moderators and mediators of this relationship.

Table 3 Key differences across meta-analyses on servitization

	Wang et al. (2018)	This study
Number of studies (effect sizes)	41 (41)	85 (379)
Unpublished studies	No, only peer-reviewed journal articles	Yes, both published and unpublished
Publication year of the sampled articles	2002–2017	2002–2022
Type of effect size	Correlation coefficients (pairwise)	Fisher Z-transformed correlations (from model coefficients)
Countries represented	Austria, China, Finland, France, Germany, Global, Korea, North America, Norway, Switzerland, Taiwan	Austria, Belgium, Brazil, China, Croatia, Denmark, Finland, France, Germany, Global, India, Indonesia, Korea, Netherlands, North America, Norway, Russia, South Africa, Spain, Sweden, Switzerland, Taiwan, UK
Dependent variable categories	Financial performance and nonfinancial performance	Profit, sales, financial market-based, general performance, nonfinancial performance
Meta-analytic procedures	1. Weighted HOMA with subgroup analysis (without test of differences between groups)	1. HOMA 2. MARA 3. MASEM
Outliers	N/A	Included
Minimum observations required for inclusion of variable	N/A	7
Servitization–performance relationship: theoretical lens	Resource-advantage theory	RBT, TOC, TCE
Moderators	Service type, servitization measurement, performance measurement, industry, and region	Servitization–performance link (mediator, time difference), service-related characteristics (conceptualization of servitization, service type), conceptualization of firm performance, macroeconomic environment (economic cycle, time trend), industry/market characteristics (B2B, high-tech, market & industry controls), geography, sample, estimation (data, estimator, endogeneity), lagged performance, firm size and year controls, performance measurement (absolute/growth, scale type, transformation), and publication characteristics (publication status, journal subject)

Table 4 Theoretical mechanisms

A: Direct effect

	Positive effect	Negative effect
RBT	<ul style="list-style-type: none"> - Enhanced resource leverage and utilization (synergies between product and service resources). - Differentiation through unique service capabilities. - Services, due to their intangibility, strengthen the importance of existing customer relationships and brands. - Stronger customer relationships (customer intimacy, loyalty, and customer equity) due to service delivery. - Complex bundles of resources and capabilities required for servitization better satisfy VRIO criteria. - Establish an SCA through continuous learning and adaptation to effectively allocate product- vs. service-related resources. 	<ul style="list-style-type: none"> [- Loss of strategic focus - Organizational conflict (cultural clash and difference in objectives) between product and service business]¹⁰
TOC	<ul style="list-style-type: none"> - Extract more value from existing customer relationships. - Improved efficiency from supplier’s specialization in a process otherwise performed by each customer. Cost-savings shared between buyer and seller (Reinartz & Ulaga, 2008). 	<ul style="list-style-type: none"> - (Lack of) economies of scale. Customization and limited scalability of services (Worm et al., 2017) - Cost increases in the short run, due to the up-front investment in building service-related capabilities, and organizational structure.
TCE	<ul style="list-style-type: none"> - Idiosyncratic investments build trust and establish relational norms - Reduced transaction costs from provider’s specific investments - Idiosyncratic investments can increase the use of formal governance mechanisms 	<ul style="list-style-type: none"> - Risk transfer from buyers to sellers - Moral hazard of buyers - Agency problems of seller - Increased transaction costs

¹⁰ These negative outcomes are mentioned in the literature as RBT-based mechanisms. However, we list them here in brackets because, as we point out in the theory section, these two challenges represent a double-edged sword from an RBT perspective. Servitization can enhance firm performance by establishing an SCA just because it is so challenging and resource-intensive to implement, according to RBT.

B: Selected moderators

	Moderator: Conceptualization of servitization	Moderator: Service type	Moderator: Performance	Moderator: Recession	Moderator: Time trend	Moderator: Business type (B2B vs. B2C)	Moderator: Technology intensity	Moderator: Geography
Expected relationship	Ratio, offering, breadth orientation	SSC stronger than SSP	Profit smaller than others	Alternative hypotheses	Alternative hypotheses	B2B stronger than B2C	Alternative hypotheses	Emerging markets stronger than the rest
RBT	Offering: - Service depth leads to more differentiated offerings, better relationship enhancement, and greater inimitability [+]	SSCs Create credibility, differentiation and SCA ^a [+]	- Differentiation and customer relationship directly related to nonfinancial and indirectly to profit	- Alternative source of revenue [+] - Differentiation, customer satisfaction, and loyalty [+]	- Less differentiation over time [-] - Lower switching costs and loyalty [-] - Price competition [-]	B2B: - Relationships more important and deeper [+] - Difficult to imitate and more differentiation [+]	High-tech: - More differentiation and credibility by service innovation [+] - Reduce risk and fear of customers [+] - Digital technologies as enabler of service development and growth [+]	Emerging markets: - Stronger differentiation and SCA [+] - High growth rates [+] - Huge untapped market potential [+]
TOC	High breadth means more services across different categories and less cost-efficiency [-]	SSCs can prevent economies of scale, increasing costs and lowering profits [-]	- Profit- and financial-based measures capture cost, but others do not	- Reduced demand and lower level of purchasing services [-] - Higher fixed and variable costs [-] - Provider bears fixed cost in case of capacity underutilization	More experience to realize economies of scale and attain cost-efficiency[+]	B2B: lower development costs [+]	- Differentiation from service innovation more costly than technology-based innovation [-]	Emerging markets: - Country-specific advantages such as low labor costs and economies of scale [+]
TCE	- Service depth leads to more transaction costs [-] - Service depth results in stronger relationships [+]	- SSCs lead to more more transaction costs [-] - SSCs can reinforce relational norms and capital [+]	- Transaction costs and additional investments for safeguarding lower profitability, but not sales or nonfinancial measures	- More uncertainty (environmental and behavioral) [-] - Higher transaction costs [-]	- More experience in controlling transaction costs and risks [+] - Need to invest more in advanced services which are costlier and riskier [-]	B2B: - More transaction costs [-] (more idiosyncratic investments and greater asset specificity) - Higher levels of relational capitals [+]	- Higher costs from opportunism, safeguarding costs, and uncertainty in dynamic high-tech markets [-]	Emerging markets: - More environmental and behavioral uncertainty [-] - Less effective governance mechanisms [-] - Elevated transaction risks and costs [-]

^aSustainable competitive advantages.

Table 5 HOMA results

Variable (X)	K	NS	N	+ & Sig	- & Sig	r (SE)	p-Value	Q	I ²
Overall	379	85	1,207,489	205	51	0.064 (0.003)	0.000	3954.96	.90
Profit	166	44	851,030	77	34	0.029 (0.004)	0.000	1973.72	.91
Sale	85	27	284,743	49	4	0.059 (0.006)	0.000	501.57	.82
FMB	38	11	35,455	11	12	0.001 (0.010)	0.859	131.46	.70
General performance	58	22	15,629	44	0	0.226 (0.022)	0.000	445.45	.86
Nonfinancial	32	10	20,632	24	1	0.133 (0.020)	0.000	248.06	.86
Service offering	151	31	888,271	102	6	0.087 (0.005)	0.000	2320.80	.93
No of service	98	26	185,314	44	19	0.027 (0.006)	0.000	447.19	.77
Service ratio ^a	73	18	115,906	21	24	0.010 (0.008)	0.209	393.16	.81
Service orientation	57	23	17,998	38	2	0.158 (0.021)	0.000	453.80	.87

^a Fixed effect shows a significant, negative effect (-0.015 [0.002]).

Notes: FMB = financial market-based, NS = number of studies, r (SE) = weighted average random-effect r (SE).

Table 6 MARA results

Variable	Level	Base	β (SE)	Variable	Level	Base	β (SE)
Focal Relationship				Technical Factors			
Servitization-Performance Link				Sample/Firm-Level Characteristics			
Mediator controlled for	Included	Base		Organizational entity	Firm	Base	
	Not included		.072(.020)***		Product/business unit		-.018(.018)
Time difference ^a	With time difference	Base		Estimation			
	No time difference		-.004(.014)	Data structure	Panel	Base	
Service-Related Characteristics					Cross-sectional		.027(.015)*
Conceptualization of servitization (IV)	No of services/service breadth	Base		Estimation method	Regression	Base	
	Service offering type		.113(.014)***		SEM		-.011(.015)
	Service ratio		.045(.016)***	Endogeneity control	Accounted for	Base	
	Service orientation		-.086(.015)***		Not accounted for		.030(.012)**
Service type	SSP	Base		Lagged performance ^c	Lagged performance	Base	
	SSC		-.075(.012)***		No lagged performance		.066(.014)***
	Mix		.063(.016)***	Firm-size control	Included	Base	
Conceptualization of Firm Performance (DV)					Not included		-.006(.017)
Performance metric	Profit	Base		Year control	Included	Base	
	Sales		.062(.012)***		Not included		.020(.018)
	Financial market-based		-.010(.013)	Performance Measurement			
	General performance		.130(.016)***	Performance growth vs. absolute	Growth	Base	
	Nonfinancial		-.090(.016)***		Absolute		.036(.011)***
Contextual factors				Performance variable category	Continuous	Base	
Macroeconomic environment					Categorical		-.019(.017)
Economic cycle (recession period) ^b	Months of recession		-.036(.018)**	Performance variable transformation	Log-transformation	Base	
Time trend: mean year of data collection	Before 2009	Base			No transformation		.007(.017)
	After 2009		-.061(.017)***	Publication Characteristics			
Industry/market characteristics				Publication status	Top journal	Base	
Market type	B2B	Base			Other journal		.016(.019)
	Not B2B		-.052(.011)***		Unpublished		.008(.017)
Industry technology intensity	Low-/medium-tech	Base		Journal subject	Marketing	Base	
	High-tech		.030(.013)**		Not marketing		-.017(.013)
Market factors control	Included	Base		Intercept			-.202(.045)***
	Not included		-.056(.011)***	N (observations/studies)			
Industry control	Included	Base		R²			
	Not included		-.014(.011)	379 (85)			
Geographical characteristics				0.36			
Geography	Western Europe	Base					
	North America		-.009(.017)				
	Emerging markets		.092(.016)***				
	Other industrialized countries		-.034(.017)**				

^a Time difference between servitization and performance measurement, ^b All continuous variables are mean-centered, ^c Lagged performance included as a control. *** $p < .01$; ** $p < .05$; * $p < .1$

Table 7 MASEM results

Predictors	Servitization	M1	M2	M3	M4	Firm performance
Servitization		.071(.01)***	.379(.01)***	.395(.01)***	.126(.01)***	-.242(.01)***
M1:Customer centricity						.316(.01)***
M2:Relationship learning						.314(.01)***
M3:Organizational learning						.499(.01)***
M4:Cost orientation						.248(.01)***
Firm size	.102(.02)***	-.054(.02)***	-.038(.01)**	-.040(.01)**	.081(.01)***	.107(.01)***
Firm age	-.080(.02)***	.176(.02)***	.030(.01)	.031(.01)*	-.190(.01)***	-.090(.01)***
Competitive Intensity	.075(.01)***	.001(.01)	-.02(.01)	-.029(.01)	-.016(.01)	.039(.01)**
R ²	.01	.03	.14	.15	.05	.44
Harmonic mean N	1379	GFI	.95	*** <i>p</i> < .01; ** <i>p</i> < .05; * <i>p</i> < .1. Notes: Standard errors are in parentheses.		
χ ²	101.52	SRMR	.03	GFI = goodness of fit; SRMR = standardized root mean square residual.		

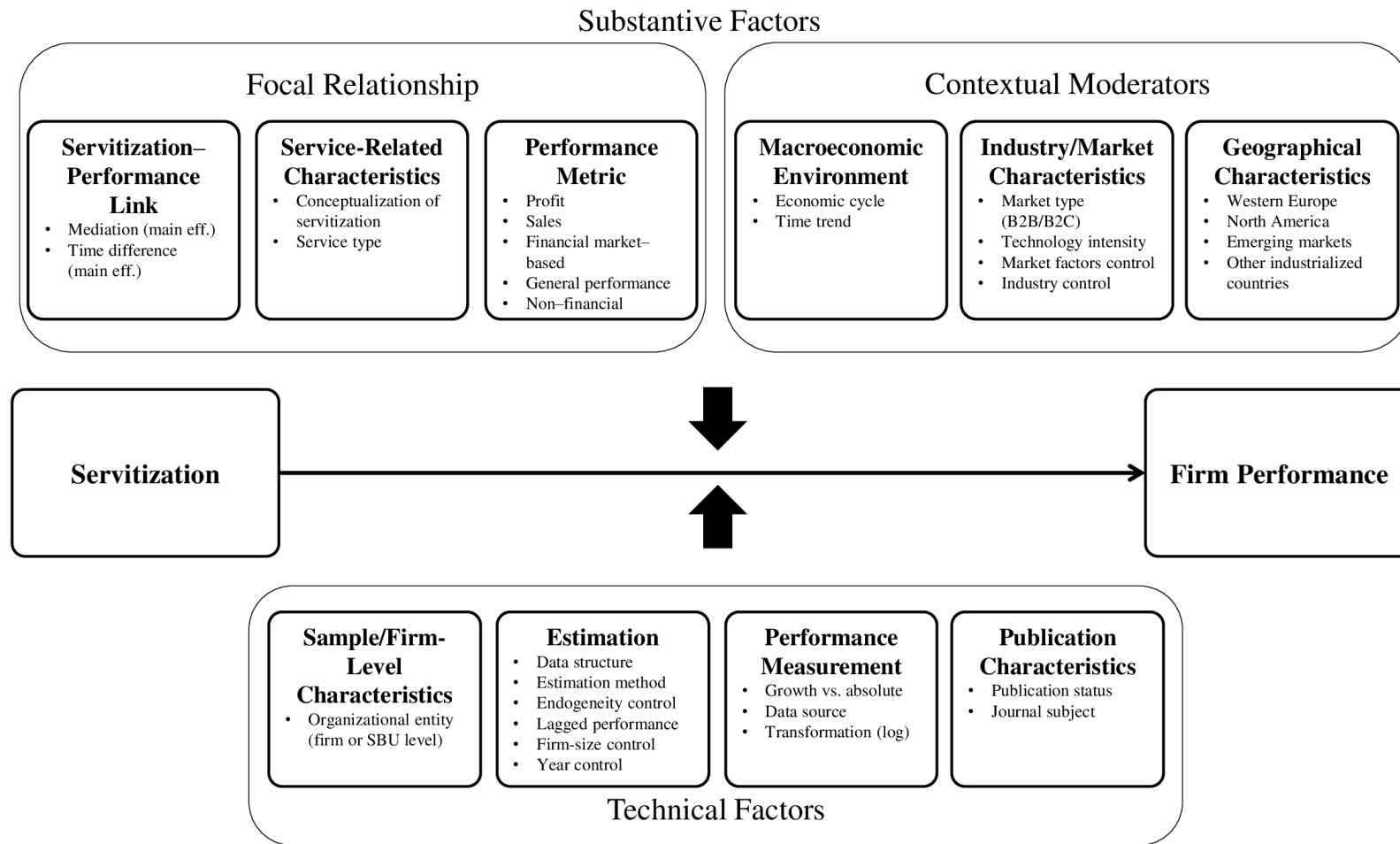


Fig. 1 Theoretical framework

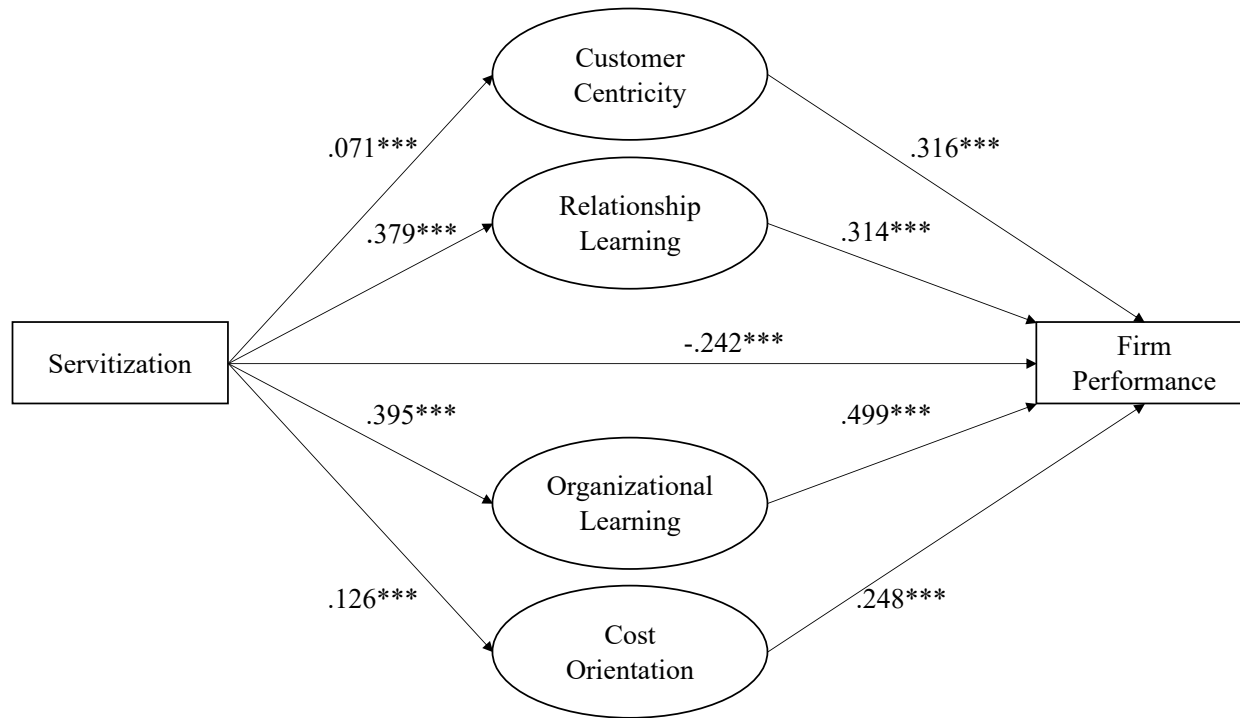


Fig. 2 The direct effect model

Notes: For clarity of presentation, figure does not include control variables. *** $p < .01$.

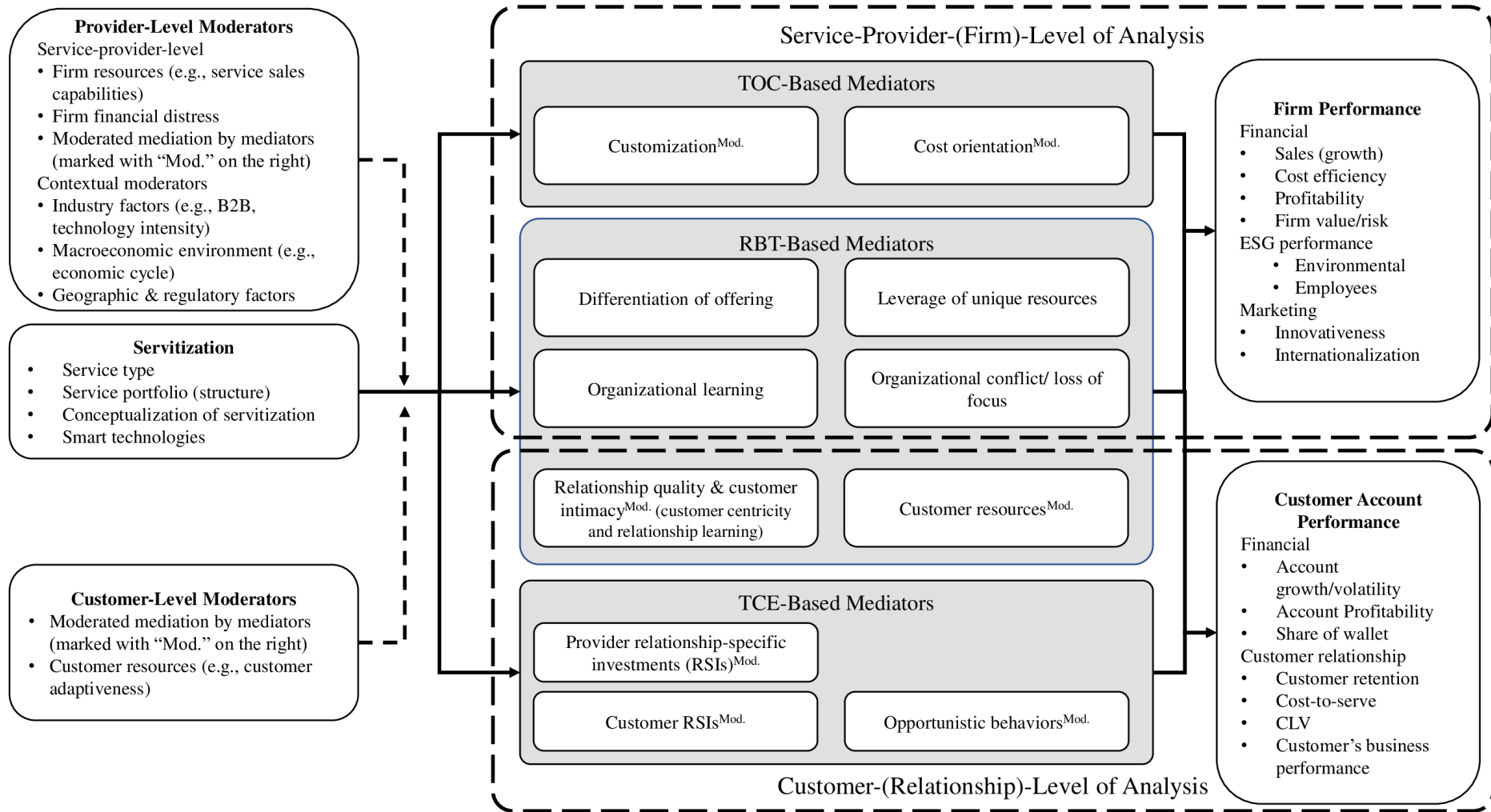


Fig. 3 The integrated conceptual model for future research

Service strategy's effect on firm performance: A meta-analysis of the servitization literature

Web Appendix – Part 1

Table W1 List of studies and theories on the servitization–performance relationship

		Key insights	Theory ^a
1.	Aas and Pedersen (2011)	Firms focusing on service innovation in the manufacturing industry had a higher operating result growth than firms without this focus. However, service innovation did not affect the profitability (BEP ratio) of the firms.	RBT and TOC
2.	Abou-foul et al. (2021)	Servitization significantly increased firm financial performance. Digitalization plays a pivotal role in enabling servitization.	RBT and TCE
3.	Antioco et al. (2008)	The findings show that services in support of the client's action leverage relative product sales, while services in support of the product generate service volume.	RBT
4.	Bascavusoglu-Moreau and Tether (2010)	Servitization increases the productivity level of manufacturing firms.	RBT
5.	Bustinza et al. (2017)	Manufacturers in R&D-intensive industries are more likely to benefit from implementing service provision than firms in other sectors	RBT
6.	Chen and Tsou (2011)	Customer service (the customized and integrated combination of goods and services) improves firm performance.	RBT and TCE
7.	Chen et al. (2016)	A firm's service innovation is positively associated with new product development performance.	RBT
8.	Crozet and Milet (2017)	Firms that start selling services increase their profitability by 0.4%, their employment by 2.1%, and their total sales by 0.6%.	RBT
9.	De Souza et al. (2018)		
10.	Dotzel and Shankar (2016)	The results show that B2B-SIs have a positive effect on firm value and a nonsignificant influence on firm risk. By contrast, B2C-SIs are associated with higher firm risk.	RBT, TCE, economic theory
11.	Dotzel and Shankar (2019)	B2B-SIs have a positive effect on firm value and an insignificant influence on firm risk. Importantly, the effect of a B2B-SI on firm value is significantly greater than that of a B2C-SI.	RBT, TCE, economic theory
12.	Dotzel et al. (2013)	E-innovativeness has a positive and significant direct effect on firm value. P-innovativeness has an overall significantly positive effect on firm value through its positive effect on customer satisfaction. Both e- and p-innovativeness are positively associated with idiosyncratic risk.	RBT, TOC
13.	Eggert et al. (2011)	Industrial services can help manufacturing companies enhance their long-term profitability.	RBT

14.	Eggert et al. (2014)	Industrial service strategies increase both the level and the growth of manufacturing firms' revenue streams, but they reduce the level but improve the growth of manufacturers' profits.	RBT
15.	Eggert et al. (2015)	The profitability of the average industrial firm remains unaffected by its service innovation activities. Service innovation help companies increase their overall revenue streams. Industrial firms face severe problems managing the costs incurred in service innovation.	RBT, TOC, TCE
16.	Eggert et al. (2015)	Hybrid innovations have a positive effect on firm profits over and above pure product innovation.	Resource-advantage theory (an extension of RBT)
17.	Fang et al. (2008)	The impact of a firm's transition to services on firm value remains relatively flat or slightly negative until the firm reaches a critical mass of service sales (20%–30%), after which point they have an increasingly positive effect.	RBT
18.	Gao et al. (2021)	For technology-intensive firms, service is an effective way to improve firm performance.	RBT
19.	Gebauer (2007)	The overall profitability is influenced positively by the organization of development activities, service manager decision-making authority, and creation of an innovation culture in the service organization.	RBT, contingency theory
20.	Gebauer (2009)	The formation and implementation of service orientation in the business strategy is influenced strongly by managerial attention	RBT, attention-based theory
21.	Gebauer et al. (2010)	The positive association between the service orientation of corporate culture and business performance,	RBT
22.	Gebauer and Fleisch (2007)	A significant effect on the share of overall operating margin attributable to service revenue in manufacturing companies	RBT
23.	Gebauer and Pütz (2007)	After a machine or equipment manufacturing company has formally decided to extend the breadth of service offerings, both service-related performance outcomes, the quality of customer relationships and direct service profitability, improve.	RBT
24.	Grawe et al. (2009)	Service innovation capability is positively related to a firm's market performance.	RBT, TOC
25.	He and Lai (2012)	Customer action-based service has a more positive direct effect on firm performance than product-based service. However, these two types of transformation strategies have nearly the same total effects on firm performance because product-based service has an indirect positive effect on firm performance through customer action-based service.	RBT
26.	He et al. (2015)	Service strategy in manufacturing companies is positively related to business performance.	RBT, TCE, TOC

27.	Homburg et al. (2003)	Service profitability is positively affected by the service orientation of corporate culture and the service orientation of human resource management.	RBT, TOC
28.	Hong et al. (2014)	Firms with a strategic customer service orientation implement both human and technical aspects of lean manufacturing practices leading to better performance results.	Goal theory
29.	Hong et al. (2015)	Product-service system influences a firm's performance through process technological innovation at the company.	RBT
30.	Hsiao (2017)	Service innovation is positively related to network relationships, which in turn have a positive effect on customer satisfaction.	RBT
31.	Jia et al. (2016)	The strategic fit of service extension and service skill improvement significantly influence the business performance.	RBT
32.	Johansson et al. (2019)	Service innovation performance is positively related to firm performance. A focus on radical service innovation drives manufacturers' performance, whereas a focus on incremental service innovation defends the present market position.	RBT, TCE
33.	Kastalli and Van Looy (2013)	A positive but nonlinear relationship between the scale of service activities and profitability.	RBT, TOC
34.	Kharlamov and Parry (2020)	Servitized firms are more productive than pure product firms, but there is no support for the hypothesis that servitized firms are more financially profitable than pure product firms.	RBT, TCE
35.	Kohtamäki et al. (2021)	At low to low-moderate levels, servitization has no effect on profits. At moderate to high levels of servitization, the effect of servitization on company profitability becomes positive.	RBT
36.	Kohtamäki et al. (2015)	Both service offerings and service orientation are important when manufacturing companies attempt to position themselves as industrial service providers.	RBT, TCE
37.	Kohtamäki et al. (2020)	Significant nonlinear, U-shaped effect of the interaction between digitalization and servitization on company financial performance.	RBT, TCE
38.	Kohtamäki and Partanen (2016)	The relationship between knowledge-intensive business services offerings and sales performance is linear, with a moderating role of relationship learning.	RBT
39.	Kohtamäki, Partanen, and Möller (2013)	The existence of relational capital increases the positive impact of R&D services on profits.	RBT
40.	Kohtamäki, Partanen, Parida, et al. (2013)	A nonlinear effect of the service offering on sales growth	RBT, TCE, TOC
41.	Kwak and Kim (2016)	The relationship between service integration and profitability has an inverted U shape, likely stemming from political costs, a loss of	RBT, TCE, TOC

		opportunity in manufacturing improvements arising from resource constraints, and an increase in transaction costs.	
42.	Li et al. (2018)	Advanced services improve market, financial, and operational performance, while the basic services only improve market performance.	RBT
43.	Li et al. (2021)	Basic services are positively related to sales growth, while advanced services are positively related to return on sales growth.	RBT
44.	Li et al. (2015)	There is a significant positive relationship between servitization and business performance for manufacturing firms and a U-shaped relationship between servitization and profit. The strategy of servitization is more suitable for larger firms.	RBT, TOC
45.	Lin et al. (2019)	Service orientation has direct positive impacts on firm performance in the manufacturing sector.	RBT
46.	Liu et al. (2017)	Organizational learning ambidexterity mediates the relationship between service orientation and firm performance.	Dynamic capability theory
47.	Long et al. (2021)	A curve between servitization and return on assets shows a positive “U” shape, but the relationship between servitization and revenue per employee shows an inverted “U” shape. Manufacturing enterprises with relatively low technical complexity and relatively high industry competition will reach the inflection point of service performance “U” curve more quickly and eliminate “service trap” more easily.	RBT, TOC
48.	Loukis et al. (2019)	A firm's adaptation to the SaaS model as well as its absorptive capacity positively affects operational and innovation benefits.	RBT, TCE
49.	Manresa et al. (2021)	The provision of base and intermediate services had nonsignificant effects on financial performances, while advanced services had a positive and significant relationship.	RBT, dynamic capability theory
50.	Martín-Peña et al. (2019)	Servitization and digitalization are positively related to firm performance.	RBT
51.	Min et al. (2015)	The servitization decision was positively correlated with the market performance (Tobin's q), and the servitization level was negatively correlated with the financial performance, including return on assets, economic value-added change rate, and earnings per share.	Signal theory and diversification discount theory
52.	Moreno et al. (2019)	A medium level of development of the country in which a firm is based corresponds to a stronger relationship between servitization and firm performance, whereas higher levels of development diminish the increase in performance	RBT, TOC
53.	Nataya and Sutanto (2018)	A combination of product innovation and service innovation together leads to revenue growth and greater profitability.	RBT

54.	Neely (2008)	While servitized firms generate higher revenues, they tend to generate lower net profits as a % of revenues than pure manufacturing firms.	RBT, TOC
55.	Neely et al. (2011)	Building the right organizational capabilities and culture is essential to successful delivery of a servitization strategy.	RBT
56.	Nezami (2016a)	Although providing services monotonously boosts sales growth, it has a U-shaped curvilinear relationship to profitability, and it has an inverted U-shaped effect on earnings volatility.	RBT, TCE, TOC
57.	Nezami (2016b)	While service innovations affect shareholder value, their impact depends on the stages of service transition; negative in early stages, then becoming positive in later stages.	RBT, TCE, TOC
58.	Nezami et al. (2018)	Although the service ratio monotonously boosts sales growth, it has a U-shaped curvilinear relationships to profitability and earnings volatility. These effects also depend on industry- and firm-level factors.	RBT, TCE, TOC
59.	Oliva et al. (2012)	A separate service organization is more supportive of the efforts to deploy a service strategy by product manufacturers.	RBT, organizational theory
60.	Opazo-Basáez et al. (2018)	Implementation of digital and green servitization is positively associated with higher productivity outcomes when the two forms of servitization coexist and operate jointly.	RBT, TOC, synergy theory
61.	Pei et al. (2019)	Service support products has a positive impact on operational performance, while the relationship between service support clients' actions and operational performance is U-shaped.	Knowledge-based view, information-processing theory
62.	Queiroz et al. (2020)	There is a positive relationship between servitization and small and medium-sized enterprises (SME) performance. The strategy of offering base services affects SME performance. Furthermore, servitization promotes a fit between environmental pressures and SME performance.	RBT, organizational theory, dynamic capability theory
63.	Restuccia and Legoux (2019)	Solutions have a positive impact on customer outcomes depending on the stage of the relationship life cycle.	RBT, relational theory
64.	Ruiz-Alba et al. (2019)	When the level of cocreation of the design of services is high, servitization has a significant effect on firm performance.	RBT, organizational theory, dynamic capability theory
65.	Schaarschmidt et al. (2021)	Developing a capability to sell hybrid offerings pays off in terms of firm performance.	RBT
66.	Shah et al. (2020)	An nonsignificant effect of the provision of basic services on sales growth and a negative, significant effect of basic service provision on return-on-sales (ROS) growth. The provision of advanced services also has significant, positive effects on sales and ROS growth.	RBT, TOC
67.	Sousa and da Silveira (2017)	Manufacturing capabilities influence the offering of basic services only, while service capabilities influence the offering of both basic and advanced services. Basic services have no impact on financial	TCE, TOC

		performance, but performance increases with significant levels of offering of advanced services.	
68.	Suarez et al. (2013)	A convex, nonlinear relationship between a product firm's fraction of total sales coming from services and its overall operating margins. Firms with a high level of product sales are most profitable, and rising services are associated with declining profitability. However, additional services start to have a positive marginal effect on the firm's overall profits when they reach a majority of a product firm's sales.	TCE, TOC
69.	Szász et al. (2017)	Service provision has a positive direct effect on service return. The service paradox occurs more frequently in less-developed economic contexts, where the probability of a relatively low service return coupled with high service provision is significantly higher.	TCE
70.	Tenucci and Supino (2019)	Profitability could be represented by an ideal bell curve with the horizontal axis a spectrum of product service systems with an increasing servitization level.	RBT, TOC
71.	Tian et al. (2012)	With better service capability, manufacturers can improve their business performance by extension of service business.	RBT, dynamic capability theory
72.	Valtakoski (2011)	Services have an important impact on the revenue and profitability of SMEs.	RBT, TCE, knowledge-based view
73.	Vendrell-Herrero et al. (2021)	Manufacturers with service-augmented products perform better; the longer the lifespan of manufacturers' servitized products, the higher is the resulting performance.	RBT, TCE
74.	Vickery et al. (2003)	A positive direct relationships between supply chain integration and customer service, and customer service and firm performance.	RBT, TCE
75.	Visnjic et al. (2012)	Service investments represent a prerequisite for growth. With respect to profit performance, a negative effect of increasing service breadth, while increasing service depth, results in higher margins and an increase in market value. Depth of service offering also has a positive effect on market value.	RBT, TOC
76.	Visnjic et al. (2016)	The interplay between service business model innovation and product innovation results in long-term performance benefits coupled with a degree of short-term performance sacrifice. Service business model innovation in isolation from product innovation results in short-term profit gains but long-term knowledge loss and, thus, market performance decline.	RBT, TOC, demand-based view
77.	Wang (2014)	Service innovation strongly influences performance in a high-tech industry.	RBT

78.	Worm et al. (2017)	On average, customer solutions enhance the provider's profitability.	RBT, TCE
79.	Yan et al. (2019)	The SSP–culture–structure configuration and the SSC–culture–HR configuration are positively associated with firm performance.	RBT, TOC, TCE, capability theory
80.	Yan et al. (2020)	Compared with service-oriented human resource management, which positively affects both financial performance and service support performance, service oriented organizational structure only positively affects service support performance, indicating that intellectual resource may play a more important role in servitization implementation.	RBT, structural contingency theory
81.	Zhang et al. (2022)	Servitization helps increase a firm's market power. Furthermore, heterogeneity analysis suggests that embedded servitization increases a firm's market power, whereas hybrid servitization reduces it.	RBT
82.	Zhang et al. (2019)	A negative servitization–performance relationship occurs at low levels of servitization as adjustment costs would be dominant. At moderate servitization levels, a positive relationship occurs. As servitization levels further increase, coordination costs become dominant and a negative servitization–performance relationship reappears.	RBT, TCE
83.	Zhang et al. (2021)	The relationship between servitization and firm performance is contingent on the size of the firm. Small firms can benefit from providing basic services, rather than advanced services, while only advanced services can improve the performance of large firms further.	RBT
84.	Zhou et al. (2021)	Basic and advanced services reinforce each other's positive effects on a manufacturer's market performance.	RBT
85.	Zhou et al. (2020)	Servitization has a U-shaped relationship to a manufacturer's financial performance.	RBT, TOC

^aSome studies use more than one theory, and some do not explicitly mention a theory. In the latter case, we identified the theory from the reasoning provided.

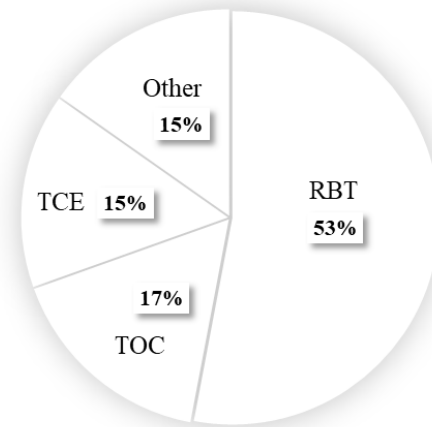


Fig. W1 Share of theories used in our sample's articles

Table W2 Mediators and their categories

Mediator	Definition used in the original studies	Category
Centricity	Customer centricity (CC) CC1. Improvements in customer satisfaction and loyalty are key drivers of running a profitable business. CC2. Customer satisfaction has a high priority in comparison to other goals of the business. CC3. Customer focus is an important strategy to improve the results of an organization. CC4. We work to develop long and strong relationships with our customers.	Customer centricity
Relational capital	Relational capital reflects the social integration (Barki & Pinsonneault, 2005) between the supplier and the customer. In the present study, we define relational capital as a form of social capital embedded in a single business relationship that includes dimensions such as trust, open interaction, and a sense of shared destiny between the supplier and the customer (Chang & Gotcher, 2007; Kale et al., 2000)	Relationship learning
Relationship Learning	Relationship-level learning is measured as the shared variance among knowledge sharing, joint sense-making, and knowledge integration within relationship-specific memory. Knowledge sharing increases the supplier's understanding of the customer's needs during the exchange process	Relationship learning
Organizational clarity	A four-item factor indicating the service business is structured and defined in such a way that both internal personnel and external customers can easily identify the responsible parties in the service business. 1. OC-1: Our service organization effectively provides "professional-grade" services. 2. OC-2: Within our enterprise (or relevant business unit), it is known who is responsible for services.	Organizational learning

	3. OC-3: Regarding services, our customers can easily find a capable contact person. 4. OC-4: Within our organization, it is clear who is responsible for each service.	
Profit center	A measurement indicating the service business is an entity responsible for its profits and losses, usually organized as a separate, functional business unit. 1. PC-1: Our service business is organized as a profit center (P & L accountability).	Organizational learning
Customer participation	Customer participation should have a positive effect on service innovation performance (Carbonell et al., 2009; Cheng & Krumwiede, 2012). Hakanen et al. (2014) further suggest that customer participation increases the adaptability of solutions to existing customer processes. Building on Witell et al. (2014), we argue that the direct participation of customers in the development team can provide additional interpretations of customer needs, over and above what the manufacturer could do alone. When customers actively participate in the NSD process, they are more likely to provide contextual knowledge that is important for understanding how the customer will actually use an offering (Mahr et al., 2014). Customer participation (Witell et al., 2014) (composite reliability = 0.81) To what degree is the customer integrated into a certain phase of the service development process? -Idea generation and evaluation phase -Business analysis phase -Concept development phase	Relationship learning
Retention	The improved length of the customer relationship Retention was operationalized as a binary variable ($R_{it} + 1$) based on repeated purchase activity by customer i in year $t + 1$ (van Triest et al., 2009). $R_{it} + 1$ takes the value 1 if customer i active in year t made at least one purchase in the following year and 0 otherwise.	Customer centricity
Organizational learning	In this research we propose that organizational learning ambidexterity which refers to simultaneously exploiting current knowledge and skills while exploring new knowledge and skills (March, 1991), mediates the relationship (or main effect) between servitization and firm performance.	Organizational learning
Cost orientation	Cost orientation refers to the pursuit of efficiency throughout all parts of a firm's value chain.	Cost orientation

Table W3 List of studies included in the meta-analysis

<ol style="list-style-type: none"> 1. Aas, T. H., & Pedersen, P. E. (2011). The impact of service innovation on firm-level financial performance. <i>The Service Industries Journal</i>, 31(13), 2071–2090. https://doi.org/10.1080/02642069.2010.503883 2. Abou-foul, M., Ruiz-Alba, J. L., & Soares, A. (2021). The impact of digitalization and servitization on the financial performance of a firm: an empirical analysis. <i>Production Planning & Control</i>, 32(12), 975–989. https://doi.org/10.1080/09537287.2020.1780508 3. Antioco, M., Moenaert, R. K., Lindgreen, A., & Wetzels, M. G. M. (2008). Organizational antecedents to and consequences of service business orientations in manufacturing companies. <i>Journal of the Academy of Marketing Science</i>, 36(3), 337–358. https://doi.org/10.1007/s11747-008-0085-1 4. Bascavusoglu-Moreau, E., & Tether, B. (2010). Servitization, survival and productivity. In <i>DRUID Conference, Copenhagen Business School</i>. 5. Bustinza, O. F., Gomes, E., Vendrell-Herrero, F., & Baines, T. (2017). Product–service innovation and performance: the role of collaborative partnerships and R&D intensity. <i>R&D Management</i>, 49(1), 33–45. https://doi.org/10.1111/radm.12269 6. Chen, J.-S., & Tsou, H.-T. (2011). Performance effects of IT capability, service process innovation, and the mediating role of customer service. <i>Journal of Engineering and Technology Management</i>, 29(1), 71–94. https://doi.org/https://doi.org/10.1016/j.jengtecman.2011.09.007 7. Chen, K.-H., Wang, C.-H., Huang, S.-Z., & Shen, G. C. (2016). Service innovation and new product performance: The influence of market-linking capabilities and market turbulence. <i>International Journal of Production Economics</i>, 172, 54–64. https://doi.org/https://doi.org/10.1016/j.ijpe.2015.11.004
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Table W4 Coding forms for servitization–performance meta-analysis

General Study Information

Bibliographic reference:

Study ID Number:

Type of Publication: 1. Published in top journal (FT50) 2. Published in other journals 3. Unpublished

Journal category: 0. Marketing 1. Not Marketing

Publication Year:

Publication Outlet:

Independent Variable

	Description	INDES	á	IV SSP SSC	IV cat	IV source	IV trans
1							
2							
3							
4							
5							

Independent variables description [INDES]:

1. Service offering
2. No of services/broadness
3. Service ratio
4. Service orientation

IV_SSP_SSC

1. SSP
2. SSC
3. Mix

IV_cat

1. Binary
2. Continuous
3. Categorical

IV_source

- 0. Survey
- 1. Secondary

IV_trans

- 0. No transformation
- 1. With transformation

Dependent Variable

	Description	DVT	$\acute{\alpha}$	DV_cat	DV_source	DV_trans	DV_absolute
1							
2							
3							
4							
5							

Dependent variables description [DVT]:

- 1. Profit (ROA, ROI, ROE, ROS, net income)
- 2. Financial market-based (e.g., Tobin's q, stock return)
- 3. Sales
- 4. Mix
- 5. Nonfinancial

DV_cat

- 0. Continuous
- 1. Categorical

DV_trans

- 0. No transformation
- 1. With transformation

DV_absolute

- 0. Absolute
- 1. Growth

Effect Size Information

Page number of effect size [PAGENUM]:

Relation tested (IV-DV)	Correlation coefficient	Beta coefficient	P-value	T-value	SE	Sample size N	df	Mean-IV	S.D.IV	Mean-DV	S.D.DV	Time_dif_between_IV_DV (yes/no)

Context Moderators

Type of data: 0. Cross-sectional 1. Panel

Data collection period:

Industry Type: 1. B2B 2. B2C 3. Mix

Industry technology intensity: 1. Low 2. Medium 3. High

Country: 1. Western Europe 2. North America 3. Emerging markets 4. All (other industrialized countries)

Estimation technique: _____

Control for endogeneity: yes/no

If yes, describe the approach:

Level of analysis: 1. Firm 2. Strategic business unit 3. Product-line level

Control for year: yes/no

Number of years:

Control for industry: yes/no

Control for market contingencies: yes/no

Mediators available: yes/no

If yes, description of the relationship and mediator (s) (IV-M-DV):

Bivariate correlations	
IV-M	
DV-M	

Control for firm size: yes/no

Methodological Moderators

Sample size [N]: _____

Data type [DATATYPE]: 1. Primary 2. Secondary 3. Both

Time period covered [TIMEPER]: -

Table W5 Moderator variables used in the meta-analytic model

Conceptualization of the focal relationship	
Variable/ Level	Operationalization
Focal Relationship	
Servitization–Performance Link	
Mediator controlled for (financial/ nonfinancial) <ul style="list-style-type: none"> Not included Included (base) 	Dummy variable that takes the value 0 if a mediation analysis is conducted and 1 otherwise.
Time difference between servitization & performance measurement <ul style="list-style-type: none"> No time difference With time difference (base) 	Dummy variable indicating whether there is a time difference between the main independent variable (servitization) and dependent variable (firm performance) in the model. Lag of independent variable by a year (or more) helps overcome potential endogeneity and eliminate potential reverse causality.
Service-Related Characteristics	
Conceptualization of servitization (IV) <ul style="list-style-type: none"> Service offering type No. of services/service breadth (base) Service ratio Service orientation 	Indicates the operationalization of servitization. Service offering reflects whether a firm sells and offers services to the market and its customers: the extent of offering different types of services (e.g., Worm et al. 2017). No. of services/broadness indicates the number of different categories of services offered by each firm (e.g., Neely 2008). Service ratio is based on the definition by Fang et al. (2008), which refers to a firm’s progress in implementing a service transition strategy, according to the portion of the firm’s total revenue that results from services. Service orientation reflects the extent to which an organization and its employees are service oriented (e.g., Gebauer et al. 2010; Homburg et al. 2002). The support of services by management, the integration of services into the firm’s marketing strategy, and the cultivation of organizational values and culture that leverages service offering and development reflect a firm’s service orientation.
Service type in sample (type of services predominantly offered by firms in sample) <ul style="list-style-type: none"> SSP (base) SSC Mix 	Indicates the type of service offering: (1) services in support of the product (SSP) and (2) services in support of the client’s actions (SSC). We code datasets with a mix of both service types as mix. We code services of studies with direct mentioning of SSP, basic services (product repair and spare parts, product documentation, maintenance, and product recycling and dismantling), and product-related services as SSP. We code services of studies directly mentioning SSC, advanced services (consulting, training, financing services, and R&D), solutions, knowledge-intensive services, and customer-related services as SSC. We code the rest with no clear indication of the types of services also as mix.
Conceptualization of Firm Performance (DV)	
Performance metric <ul style="list-style-type: none"> Profit (ROA, ROI, ROE, ROS, net income) (base) Financial market–based (e.g., Tobin’s q, stock return) Sales 	Indicates the type of firm performance measure used. We merge different profitability measures (e.g., ROA, ROI, ROE, ROS, net income) into one group because of the small number of observations for each one. For the same reason, we also merge financial market–based measures (e.g., Tobin’s q, stock return) into one group.

<ul style="list-style-type: none"> • General performance (mix of metrics) • Nonfinancial mediators (e.g., brand, satisfaction) 	<p>If a multi-item factor was used to examine firm performance, we code the measure as general performance. Nonfinancial indicates whether the performance measure is related to nonfinancial measures such as customer satisfaction and loyalty.</p>
Contextual Factors	
Macroeconomic Environment	
Economic cycle (recession period (metric [mean centered]))	<p>Indicates the number of months that the economy is in a recession as a proportion of total months in the estimation period (Edeling & Himme, 2018). We take recession data from the National Bureau of Economic Research (2019). For studies with no information on the data period, we impute (Imputed mean year of data collection \pm Average data collection period/2) for the first year and the last year of data collection.</p>
Time trend <ul style="list-style-type: none"> • Before 2009 (base) • After 2009 	<p>Time trend is based on the mean year of data collection period of all studies. The mean year in our sample is 2008.4. Therefore, we added a dummy variable based on the mean year of data collection period being before or after 2009 to have a comparison based on time.</p>
Industry/Market Characteristics	
Market type <ul style="list-style-type: none"> • B2B (base) • B2C & Mix of business types 	<p>Specifies whether the firms' customers are other businesses (B2B), consumers (B2C), or a mix of both types of businesses (mix). Of the 379 effect sizes, 8 (2.1%) are related only to B2C firms, 115 (30.3%) only to B2B, and the rest (256, 67.5%) are both. Given the low number of B2C observations, we combine them with the mixed group.</p>
Industry technology intensity <ul style="list-style-type: none"> • Low/medium (base) • High 	<p>Indicates industry classification by technological intensity (technology classification) presented by the United Nations Industrial Development Organization). Technology classification is based on R&D expenditure incurred in the production of manufactured goods. Manufacturing industries with a higher R&D intensity are considered high-technology industries. There are three groups in this taxonomy of industries: high-technology, medium-technology, and low-technology. Given the limited number of observation, we combined the low and medium groups together.</p>
Market factors included as control <ul style="list-style-type: none"> • Not included • Included (base) 	<p>Indicates whether market factors (e.g., competitive intensity, market growth) are used to control for the environmental context.</p>
Industry control <ul style="list-style-type: none"> • Not included • Included (base) 	<p>Indicates whether dummy variables are used to control for heterogeneity among industries.</p>
Geographic Characteristics	
Geography <ul style="list-style-type: none"> • Western Europe (base) • North America • Emerging markets • Other industrialized countries 	<p>Captures the geographic region based on the geography source of each primary study's data. Similar to Edeling and Himme (2018), we coded a study with worldwide data as "other industrialized countries." The coding as "emerging markets" is based on the market classification by MSCI 2019 annual market classification review.</p>

Technical Factors	
Sample/Firm-Level Characteristics	
Organizational entity <ul style="list-style-type: none"> Firm (base) Product/business unit 	Captures whether servitization is measured at the product/business-unit level or at the overall firm level. Among the studies in our dataset, we have no study with product-level data, only strategic business unit or firm level.
Estimation	
Data structure <ul style="list-style-type: none"> Cross-sectional Panel (base) 	Datasets with many individual firms at a given point in time are coded as cross-sectional, and datasets with many individual firms over time are coded as panel.
Estimation method <ul style="list-style-type: none"> Regression (base) SEM 	Captures the estimation method. Dummy variable that takes the value 1 if a form of structural equation modeling is conducted and 0 for different forms of regression analysis.
Endogeneity control <ul style="list-style-type: none"> Not accounted for Accounted for (base) 	Indicates whether the model accounts for potential endogeneity (e.g., instrumental variables, a generalized method-of-moments, simultaneous equations, first-difference model).
Lagged performance included as control <ul style="list-style-type: none"> No lagged performance With lagged performance (base) 	Dummy variable indicating whether a lagged term of performance measure was included in the model.
Firm-size control <ul style="list-style-type: none"> Not included Included (base) 	Indicates whether a firm-size variable is used as a control variable. Size can refer to assets, sales, or number of employees.
Year control <ul style="list-style-type: none"> Not included Included (base) 	Indicates whether dummy variables are used to control for year effects. Controlling for year is assumed if the data collection period is just 1 year.
Performance Measurement	
Performance growth vs. absolute <ul style="list-style-type: none"> Absolute Growth (base) 	Dummy variable indicating whether the performance is measured in an absolute format (e.g., firm i 's sales in year t) or in a growth format based on the comparison of current and previous years (e.g., growth of firm i 's sales with respect to the previous year).
Performance variable category <ul style="list-style-type: none"> Continuous (base) Categorical 	Indicates the measurement of the dependent variable, firm performance as continuous or categorical.
Performance variable transformation	Dummy variable indicating whether the measure of performance is log-transformed.

Economic cycle (recession period)	0.09	-0.01	-0.01	0.01	0.06	0.09	-0.08	0.06	0	-0.11	0.23	-0.12	0.25	0.06	-0.07	0.01	0.03	-0.06	-0.06	-0.02	-0.05	0.06	0.28	-0.38	0.03	-0.22	-0.06	0.06	-0.02	0.04	0.08	-0.04	0.01		
Industry technology intensity (high-tech vs. low--tech)	0.11	0.14	0.23	0.13	0.1	0.15	0.05	0.06	-0.16	0.14	0.08	-0.16	0.06	0.19	-0.14	0.03	0.38	0.16	0.01	0.12	-0.24	0.11	0	0.17	0.02	0.03	0.16	0.08	-0.12	0.01	0.36	0.04	0.01	1	

Table W7 Meta-analytic correlation table

		1	2	3	4	5	6	7	8	9
1	Performance	1	134441(62)	5085(6)	421(3)	2286(2)	4028(2)	99734(33)	37467(15)	46161(9)
2	Servitization	.139(.01)***	1	5085(6)	421(3)	2286(2)	4028(2)	99734(33)	37467(15)	46161(9)
3	Customer centricity	.287(.14)**	.056(.07)	1				1764(1)	1764(1)	
4	Relationship learning	.224(.08)***	.372(.04)***	0	1					
5	Organizational learning	.405(.06)***	.388(.04)***	0	0	1				
6	Cost orientation	.235(.01)***	.144(.02)***	0	0	0	1	3724(1)	3724(1)	
7	Firm size	.076(.02)***	.082(.01)***	-.010(.02)	0	0	.050(.01)***	1	27293(13)	46161(9)
8	Firm age	-.048(.02)**	-.062(.01)***	.160(.02)***	0	0	-.180(.01)***	.220(.01)***	1	3724(1)
9	Competition	.022(.01)	.076(.02)***	0	0	0	0	-.033(.01)**	-.050(.01)***	1

Notes: Cells below the diagonal contain mean correlations and standard deviations. Cells above the diagonal contain the total number of observations and number of samples. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table W8 Moderated-moderation or three-way interaction
Panel A

Variable	Level	Base	Service breadth β (SE)	Service offering type β (SE)	Service ratio β (SE)	Service orientation β (SE)
Focal Relationship						
Service-Related Characteristics						
Service type	SSP	Base				
	SSC		.059(.026)**	.067(.013)***	.252(.060)***	
	Mix		.083(.025)***	.048(.018)***	-.019(.065)	
Conceptualization of Firm Performance (DV)						
Performance metric	Profit	Base				
	Sales		.076(.014)***	.017(.014)	.030(.016)*	.026(.053)
	Financial market-based		.079(.020)***	-.063(.027)**	.026(.017)	-.040(.064)
	General performance		.154(.035)***	.052(.025)**	.203(.052)***	.154(.046)***
	Nonfinancial		.011(.036)	.009(.018)		.273(.065)***
Contextual factors						
Macroeconomic Environment						
Economic cycle (recession period)	Months of recession		.023(.025)	-.037(.030)	-.490(.084)***	-.027(.065)

Time trend: mean year of data collection	Before 2009	Base					
	After 2009		.075(.036)**	.032(.020)	-.144(.045)***	-.040(.064)	
Industry/Market Characteristics							
Market type	B2B	Base					
	Not B2B		-.067(.015)***	-.031(.015)**	.074(.031)**	-.123(.051)**	
Industry technology intensity	Low-/medium-tech	Base					
	High-tech		.062(.021)***	-.021(.016)	-.031(.016)*	.161(.050)***	
Geographic Characteristics							
Geography	Western Europe	Base					
	North America		-.003(.020)	.015(.023)	-.173(.040)***	.045(.074)	
	Emerging markets		-.043(.042)	.222(.031)***	.097(.038)**	.147(.068)**	
	Other industrialized countries		-.020(.026)	.025(.023)		-.143(.060)**	
Intercept			-.074(.030)**	-.002(.026)	.084(.072)	.104(.053)**	
N (observations/studies)			98	151	73	57	
R ²			.43	.26	.66	.61	

Panel B: Moderated-moderation or three-way interaction

Variable	Level	Base	B2B β (SE)	SSP	SSC	DV2Prof β (SE)	DV2TQ β (SE)	DV2Sale β (SE)	DV2MixP β (SE)
Focal Relationship									
Service-Related Characteristics									
Conceptualization of servitization (IV)	No of services/Service offering	Base							
	Service ratio		.105(.036)***	.052(.054)	.063(.036)*	.089(.015)***	.000(.029)	-.012(.016)	.173(.071)**
	Service orientation		-.025(.043)		.111(.050)**	.072(.017)***	-.049(.020)**	-.047(.020)**	-.049(.091)
Service type	SSP	Base							
	SSC		.104(.037)***		.008(.046)	.122(.021)***		.049(.029)*	.107(.066)
	Mix								
Conceptualization of Firm Performance (DV)	Profit	Base							
	Sales		.076(.032)**			.061(.018)***		.036(.020)*	.153(.060)**
	Nonfinancial		.113(.033)***			.034(.018)*	.127(.040)***	.065(.029)**	.196(.057)***
Contextual factors									
Macroeconomic environment									
Economic cycle	Months of recession		-.027(.034)	.082(.074)	.053(.044)	-.019(.022)	.073(.071)	.011(.047)	.095(.074)
Time trend: mean year	Before 2009	Base							
	After 2009		-.056(.037)	.005(.035)	-.003(.029)	-.027(.020)		.044(.025)*	.053(.068)
Industry/Market Characteristics									
Market type	B2B	Base							
	Not B2B			-.009(.032)	-.033(.025)	-.077(.013)***	-.087(.029)***	-.032(.014)**	-.084(.051)
Industry technology	Low-/medium-tech	Base							
	High-tech		.079(.025)***	.132(.039)***	-.015(.025)	.023(.012)**		.071(.017)***	.188(.071)***
Geographic Characteristics									
Geography	Western Europe	Base							
	North America		.063(.051)			-.061(.018)***		-.002(.020)	
	Emerging markets		.189(.033)***	.115(.049)**	.124(.036)***	.058(.026)**		.027(.038)	.004(.072)
	Other industrialized		.006(.036)	.175(.079)**	.030(.044)	.025(.019)		.100(.035)***	-.231(.075)***
Intercept			-.086(.038)**	-.188(.051)***	.022(.037)	-.016(.022)	-.024(.047)	-.014(.028)	-.048(.094)
N (observations/studies)			149	65	84	166	38	85	58
R ²			.49	.41	.47	.15	.48	.40	.52

Panel C: Moderated-moderation or three-way interaction

Variable	Level	Base	USA β (SE)	Europe β (SE)	Emgmk β (SE)	L/Mtech β (SE)	Htech β (SE)
Focal Relationship							
Service-Related Characteristics							
Conceptualization of servitization (IV)	No of services/service breadth	Base					
	Service offering type		.009(.040)	.017(.011)	.029(.050)	.059(.010)***	.018(.044)
	Service ratio		-.024(.031)	.022(.021)	-.018(.045)	-.010(.011)	.039(.043)
	Service orientation			.136(.023)***	.079(.036)**	.038(.012)***	.160(.058)***
Service type	SSP	Base					
	SSC			.085(.021)***	.166(.041)***	.086(.012)***	.070(.037)*
	Mix			.101(.021)***	.134(.047)***	-.004(.014)	.094(.041)**
Conceptualization of Firm Performance (DV)							
Performance metric	Profit	Base					
	Sales		.041(.032)	.012(.008)	.005(.052)	.041(.008)***	.047(.031)
	Financial market-based		.035(.030)			.017(.011)	
	General performance			.111(.025)***	.210(.041)***	.137(.015)***	.097(.051)*
	Nonfinancial				.305(.056)***	.071(.012)***	
Contextual Factors							
Macroeconomic Environment							
Economic cycle (recession period)	Months of recession		.216(.223)	.016(.021)	.030(.045)	-.015(.019)	.002(.045)
Time trend: mean year of data collection	Before 2009	Base					
	After 2009			.020(.016)	.003(.063)	-.013(.014)	-.001(.040)
Industrv/Market Characteristics							
Market type	B2B	Base					
	Not B2B		-.102(.050)**	-.031(.011)***	-.135(.039)***	-.059(.009)***	-.090(.033)***
Industry technology intensity	Low-/medium-tech	Base					
	High-tech		.012(.038)	.040(.013)***	.114(.040)***		
Geographic Characteristics							
Geography	Western Europe	Base					
	North America					.002(.011)	-.079(.056)
	Emerging markets					.064(.016)***	.167(.044)***
	Other industrialized countries					-.038(.013)***	.061(.046)
Intercept			.067(.053)	-.066(.024)***	-.012(.091)	.026(.020)	-.004(.037)
N (observations/studies)			76	122	92	267	112
R ²			.04	.43	.61	.43	.27

Table W9 Main table with rotation in bases of IV and DV

	Base		β (SE)			β (SE)	
1	IV: No of services/service breadth	No of services/service breadth	Base	11	IV: Service ratio	No of services/service breadth	-.045(.016)***
		Service offering type	.113(.014)***			Service offering type	.068(.016)***
	DV: Profit	Service ratio	.045(.016)***		Service ratio	Base	
		Service orientation	.086(.015)***		Service orientation	.041(.018)**	
		Profit	Base		Profit	Base	
		Sales	.062(.012)***		Sales	.062(.012)***	

		Financial market-based	.010(.013)			Financial market-based	.010(.013)
		General performance	.130(.016)***			General performance	.130(.016)***
		Nonfinancial	.090(.016)***			Nonfinancial	.090(.016)***
		Intercept	-.202(.045)***			Intercept	-.157(.044)***
2	IV: No of services/service breadth DV: Sales	No of services/service breadth	Base	12	IV: Service ratio DV: Sales	No of services/service breadth	-.045(.016)***
		Service offering type	.113(.014)***			Service offering type	.068(.016)***
		Service ratio	.045(.016)***			Service ratio	Base
		Service orientation	.086(.015)***			Service orientation	.041(.018)**
		Profit	-.062(.012)***			Profit	-.062(.012)***
		Sales	Base			Sales	Base
		Financial market-based	-.052(.016)***			Financial market-based	-.052(.016)***
		General performance	.067(.018)***			General performance	.067(.018)***
		Nonfinancial	.028(.018)			Nonfinancial	.028(.018)
		Intercept	-.140(.042)***			Intercept	-.095(.041)**
3	IV: No of services/service breadth DV: Financial market-based	No of services/service breadth	Base	13	IV: Service ratio DV: Financial market-based	No of services/service breadth	-.045(.016)***
		Service offering type	.113(.014)***			Service offering type	.068(.016)***
		Service ratio	.045(.016)***			Service ratio	Base
		Service orientation	.086(.015)***			Service orientation	.041(.018)**
		Profit	-.010(.013)			Profit	-.010(.013)
		Sales	.052(.016)***			Sales	.052(.016)***
		Financial market-based	Base			Financial market-based	Base
		General performance	.120(.021)***			General performance	.120(.021)***
		Nonfinancial	.080(.019)***			Nonfinancial	.080(.019)***
		Intercept	-.192(.046)***			Intercept	-.147(.045)***
4	IV: No of services/service breadth DV: General performance	No of services/service breadth	Base	14	IV: Service ratio DV: General performance	No of services/service breadth	-.045(.016)***
		Service offering type	.113(.014)***			Service offering type	.068(.016)***
		Service ratio	.045(.016)***			Service ratio	Base
		Service orientation	.086(.015)***			Service orientation	.041(.018)**
		Profit	-.130(.016)***			Profit	-.130(.016)***
		Sales	-.067(.018)***			Sales	-.067(.018)***
		Financial market-based	-.120(.021)***			Financial market-based	-.120(.021)***
		General performance	Base			General performance	Base
		Nonfinancial	-.040(.020)**			Nonfinancial	-.040(.020)**
		Intercept	-.072(.045)			Intercept	-.027(.044)
5	IV: No of services/service breadth DV: Nonfinancial	No of services/service breadth	Base	15	IV: Service ratio DV: Nonfinancial	No of services/service breadth	-.045(.016)***
		Service offering type	.113(.014)***			Service offering type	.068(.016)***
		Service ratio	.045(.016)***			Service ratio	Base
		Service orientation	.086(.015)***			Service orientation	.041(.018)**
		Profit	-.090(.016)***			Profit	-.090(.016)***

		Sales	-.028(.018)			Sales	-.028(.018)
		Financial market-based	-.080(.019)***			Financial market-based	-.080(.019)***
		General performance	.040(.020)**			General performance	.040(.020)**
		Nonfinancial	Base			Nonfinancial	Base
		Intercept	-.112(.045)**			Intercept	-.067(.045)
6	IV: Service offering type DV: Profit	No of services/service breadth	-.113(.014)***	16	IV: Service orientation DV: Profit	No of services/service breadth	-.086(.015)***
		Service offering type	Base			Service offering type	.027(.014)*
		Service ratio	-.068(.016)***			Service ratio	-.041(.018)**
		Service orientation	-.027(.014)*			Service orientation	Base
		Profit	Base			Profit	Base
		Sales	.062(.012)***			Sales	.062(.012)***
		Financial market-based	.010(.013)			Financial market-based	.010(.013)
		General performance	.130(.016)***			General performance	.130(.016)***
		Nonfinancial	.090(.016)***			Nonfinancial	.090(.016)***
		Intercept	-.088(.043)**			Intercept	-.116(.045)**
7	IV: Service offering type DV: Sales	No of services/service breadth	-.113(.014)***	17	IV: Service orientation DV: Sales	No of services/service breadth	-.086(.015)***
		Service offering type	Base			Service offering type	.027(.014)*
		Service ratio	-.068(.016)***			Service ratio	-.041(.018)**
		Service orientation	-.027(.014)*			Service orientation	Base
		Profit	-.062(.012)***			Profit	-.062(.012)***
		Sales	Base			Sales	Base
		Financial market-based	-.052(.016)***			Financial market-based	-.052(.016)***
		General performance	.067(.018)***			General performance	.067(.018)***
		Nonfinancial	.028(.018)			Nonfinancial	.028(.018)
		Intercept	-.026(.040)			Intercept	-.106(.047)**
8	IV: Service offering type DV: Financial market-based	No of services/service breadth	-.113(.014)***	18	IV: Service orientation DV: Financial market-based	No of services/service breadth	-.086(.015)***
		Service offering type	Base			Service offering type	.027(.014)*
		Service ratio	-.068(.016)***			Service ratio	-.041(.018)**
		Service orientation	-.027(.014)*			Service orientation	Base
		Profit	-.010(.013)			Profit	-.010(.013)
		Sales	.052(.016)***			Sales	.052(.016)***
		Financial market-based	Base			Financial market-based	Base
		General performance	.120(.021)***			General performance	.120(.021)***
		Nonfinancial	.080(.019)***			Nonfinancial	.080(.019)***
		Intercept	-.079(.044)*			Intercept	-.054(.043)
9	IV: Service offering type DV: General performance	No of services/service breadth	-.113(.014)***	19	IV: Service orientation DV: General performance	No of services/service breadth	-.086(.015)***
		Service offering type	Base			Service offering type	.027(.014)*
		Service ratio	-.068(.016)***			Service ratio	-.041(.018)**
		Service orientation	-.027(.014)*			Service orientation	Base

		Profit	-.130(.016)***			Profit	-.130(.016)***
		Sales	-.067(.018)***			Sales	-.067(.018)***
		Financial market-based	-.120(.021)***			Financial market-based	-.120(.021)***
		General performance	Base			General performance	Base
		Nonfinancial	-.040(.020)**			Nonfinancial	-.040(.020)**
		Intercept	.041(.043)			Intercept	.014(.046)
10	IV: Service offering type DV: Nonfinancial	No of services/service breadth	-.113(.014)***	20	IV: Service orientation DV: Nonfinancial	No of services/service breadth	-.086(.015)***
		Service offering type	Base			Service offering type	.027(.014)*
		Service ratio	-.068(.016)***			Service ratio	-.041(.018)**
		Service orientation	-.027(.014)*			Service orientation	Base
		Profit	-.090(.016)***			Profit	-.090(.016)***
		Sales	-.028(.018)			Sales	-.028(.018)
		Financial market-based	-.080(.019)***			Financial market-based	-.080(.019)***
		General performance	.040(.020)**			General performance	.040(.020)**
		Nonfinancial	Base			Nonfinancial	Base
		Intercept	.001(.043)			Intercept	-.026(.046)

Web Appendix – Part 2

Curvilinear Effect of Servitization

Fang et al. (2008) show a curvilinear effect of servitization on firm value; at low levels of service ratio, the servitization impact on firm value is minimal (or even slightly negative), which is consistent with their argument that, initially, the negative effects of service transition resulting from a loss of strategic focus and internal conflicts are stronger than the positive effects of customer loyalty and synergy of products and services (RBT perspective). By increasing service intensity beyond a certain level, the positive effects of servitization outweigh its negative effects. Over time, positive effects become reinforced because firms gain the required competencies and skills, become more experienced, and implement the necessary organizational changes for growing and managing the service-based business (Kowalkowski & Ulaga, 2017).

Showing a nonlinear relationship between service ratio and overall operating margins, Suarez et al. (2013) argue that many firms, in their initial phase of servitization, might view services as a handy means to sell more products and not as a separate source of revenue and profit. Therefore, at first, firms may not pay sufficient attention to developing and delivering quality services and finding ways to increase services profitability. Over time, managers may realize the importance of services in improving their firm performance and invest more in developing the best routines for service design and delivery.

Nezami et al. (2018) find support for a U-shaped, curvilinear effect of service ratio on profitability and a convex and strictly monotonically increasing effect on sales growth.

Relatedly, Kohtamäki, Partanen, Parida, et al. (2013) demonstrate a nonlinear effect of service offering on sales growth (significant at moderate to high levels of service offering but not at low levels). By contrast, using surveys of firms in the machinery and equipment sector in Korea, Kwak and Kim (2016) find an inverted U-shaped effect of service integration on

firms' profitability, due to higher levels of political and transaction costs and lower levels of manufacturing improvements after service revenue reaches a certain level.

Taking these studies together, we expect to find a nonlinear relationship between servitization and different metrics of firm performance, especially profitability. The actual shape remains an empirical question to be answered by our meta-analysis.

Nonlinear effect (quadratic). For the nonlinear effect of servitization, we used HOMA once for all 73 effect sizes with a nonlinear effect and once for nonlinear effects for which the service measurement was based on the service ratio (45 effects). The results of the HOMA analysis on all the effects (Table W10) show a U-shaped relationship between servitization and performance only for the financial market-based measure of performance. However, when we consider only the service ratio measure, Table W11 shows a U-shaped relationship between servitization and performance for all the measures, except for profit.

Table W10 HOMA: linear and nonlinear

Panel A: X

Variable (X)	K	NS	N	+ & Sig	- & Sig	r (SE)	p-Value	Q	I ²
Overall	73	16	106266	30	21	0.064 (0.012)	0.000	1054.62	.92
Profit	36	10	53495	14	15	0.067 (0.020)	0.001	661.82	.94
Sale	12	5	24811	1	0	-0.001 (0.013)	0.923	39.42	.67
FMB	9	4	18520	1	6	-0.031 (0.009)	0.001	12.73	.21

Notes: Only two studies for general performance and one study for nonfinancial measures of performance have quadratic effects. Therefore, we did not consider them.

Panel B: X²

Variable (X ²)	K	NS	N	+ & Sig	- & Sig	r (SE)	p-Value	Q	I ²
Overall	73	16	106266	35	13	0.004 (0.011)	0.716	916.65	.91
Profit	36	10	53495	16	11	-0.032 (0.022)	0.161	848.30	.95
Sale ^a	12	5	24811	7	1	0.015 (0.011)	0.173	27.50	.52
FMB	9	4	18520	6	1	0.042 (0.011)	0.000	17.93	.44

^a Fixed effects due to lack of heterogeneity. Notes: FMB = financial market-based.

Table W11 HOMA linear and nonlinear: service measure

Panel A: Service ratio X

Variable (X)	K	NS	N	+ & Sig	- & Sig	r (SE)	p-Value	Q	I ²
Overall	45	8	89879	8	20	-0.018 (0.007)	0.020	192.54	.76
Profit	28	6	49323	7	14	-0.006 (0.012)	0.625	163.19	.82
Sale ^a	8	3	22036	0	0	-0.011 (0.006)	0.086	7	NA
FMB	9	4	18520	1	6	-0.031 (0.009)	0.001	12.73	.21

^a Fixed effects due to lack of heterogeneity

Panel B: Service ratio X²

Variable (X ²)	K	NS	N	+ & Sig	- & Sig	r (SE)	p-Value	Q	I ²
Overall	45	8	89879	28	7	0.032 (0.008)	0.000	217.93	.78
Profit	28	6	49323	16	6	0.032 (0.013)	0.015	186.19	.84
Sale ^a	8	3	22036	6	0	0.022 (0.006)	0.000	9.37	.03
FMB	9	4	18520	6	1	0.042 (0.011)	0.000	17.93	.44

^a Fixed effects due to lack of heterogeneity. Notes: FMB = financial market-based.

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