

Different roads to servitization success – A configurational analysis of financial and non-financial service performance

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ABSTRACT

Much servitization research is ambiguous regarding its conceptualization of servitization success and the results are often inconclusive or even contradictory. The present study argues that this is because servitization success is understood best as a multidimensional, causally complex phenomenon, and adopts a configurational approach. The purpose of this study is to shed light on prominent, but inconclusive success factors, their interdependencies, and their causal role in leading to servitization success. A state-of-the-art fuzzy set qualitative comparative analysis is applied to a sample of 143 German manufacturing companies. The complex relationships between focus of the service offering on services supporting the product and services supporting the clients actions, the existence of a separate service organization, decentralization of decision making, management commitment to services, service orientation of corporate culture, and financial, non-financial, and overall service success are disentangled. A service oriented corporate culture, decentralized decision making, and management commitment to services are identified as necessary for servitization success; 3 configurations as sufficient for servitization success and 3 configurations as sufficient for a lack thereof. These findings paint a more realistic and multifaceted image of the causal relationships underlying servitization success, thus yielding useful suggestions for the management of servitizing businesses.

1. Introduction

Servitization is a global trend in manufacturing, with businesses like IBM, Rolls Royce and ABB serving as prominent examples for the “transformational process of shifting from a product-centric business model and logic to a service-centric approach” (Kowalkowski, Gebauer, Kamp, & Parry, 2017, p. 8). It entails the offering of simple, product-related services, as well as more advanced services, referred to as hybrid offerings (Uлага & Reinartz, 2011), integrated solutions (Brax & Jonsson, 2009) or product service systems (Tukker, 2004). Servitization is driven financially by the desire to realize higher profit margins and more stable revenue flows through service offerings (Fang & Palmatier, 2008). Defense against commoditization and competitive pressure, particularly from low-cost economies (Oliva & Kallenberg, 2003), strengthening the competitive position through differentiation and the provision of unique value to customers (Kowalkowski, Windahl, Kindström, & Gebauer, 2015), as well as meeting increasingly complex customer needs for customized solutions (Baines, Lightfoot, Benedettini, & Kay, 2009) are the main strategic drivers of servitization.

However, not all servitizing companies achieve these intended objectives, with some even facing negative effects and bankruptcy (Benedettini, Neely, & Swink, 2015; Benedettini, Swink, & Neely, 2017). Even though several studies have attempted to explain this phenomenon, called the service paradox (Brax, 2005; Gebauer, Fleisch,

& Friedli, 2005), the question why some companies are successful with their servitization while others fail has not received a conclusive answer (see Fliess and Lexutt (2019) for a comprehensive literature review). A large number of possible success factors is identified in the literature, with many interconnected, some inconclusive and others even contradictory (e.g. Antioco, Moenaert, Lindgreen, & Wetzels, 2008; Eggert, Hogreve, Uлага, & Muenkhoff, 2014; Oliva, Gebauer, & Brann, 2012).

Furthermore, it remains unclear what exactly constitutes servitization success. (Fliess & Lexutt, 2019). Only 18% of servitization related studies examine specific performance criteria for servitization success (Fliess & Lexutt, 2019), with the majority of those focusing on revenue or profitability. However, the objectives of servitization cannot always be captured by purely financial measures alone. Depending on the approach to servitization, it can also be considered successful if it leads to better product functionality and cross-selling (Raddats, Burton, & Ashman, 2015), to higher customer loyalty and satisfaction (Pan, Nguyen, & Ngoc, 2015), or to higher mutual value creation (Forkmann, Henneberg, Witell, & Kindström, 2017). Consequently, in order to fully understand servitization success, both financial and non-financial aspects need to be considered, something that is rarely done in present research (Gebauer & Pütz, 2007, 2009; Gebauer, 2008; Ceci & Masini, 2011; Oliva et al., 2012, and Pan et al., 2015 are noteworthy exceptions).

The purpose of this study is to shed light on inconclusive success

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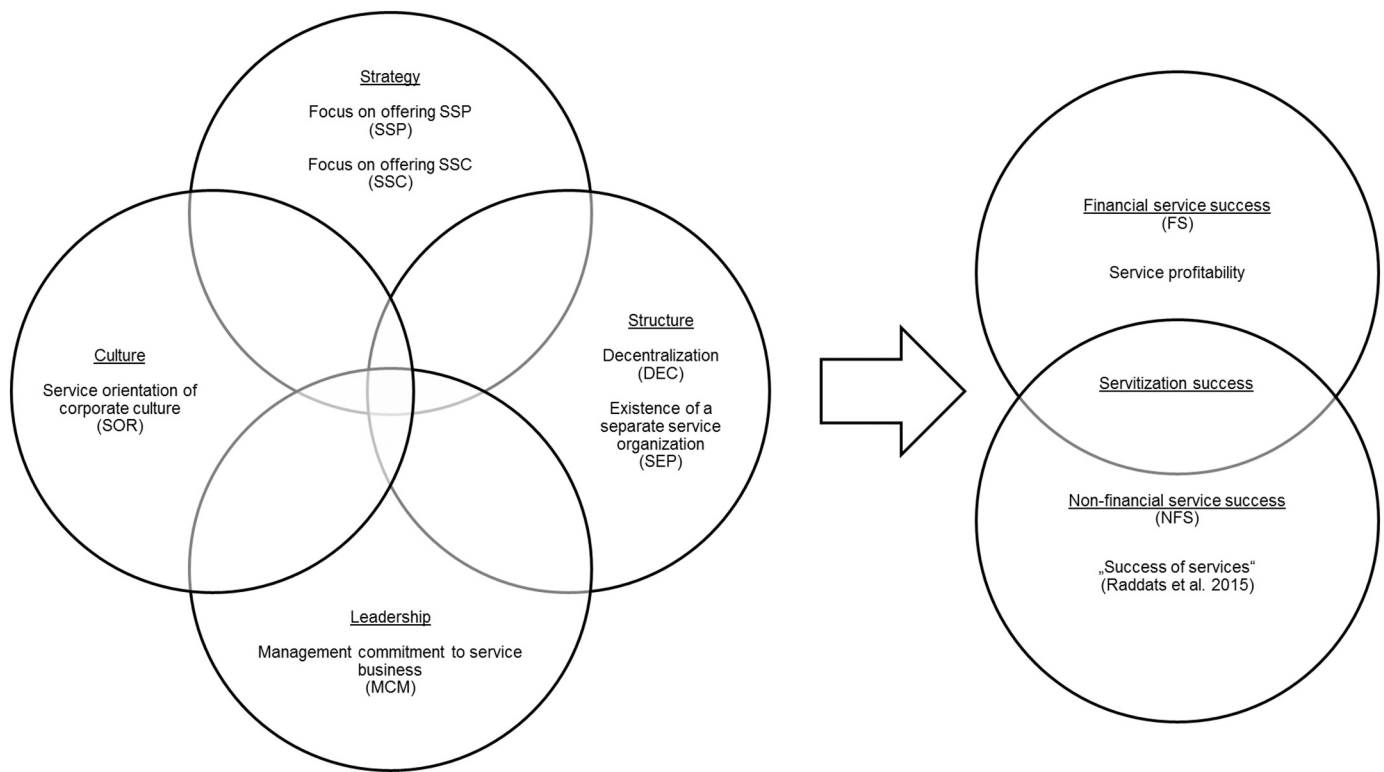


Fig. 1. Configurational model.

factors, their interdependencies, and their role in leading to financial and non-financial service success. This study argues that one of the reasons why previous research on servitization success has been conflicting and fragmented is that servitization success is a causally complex phenomenon. This means that there is no one best way to be successful with services but several roads can lead to servitization success. Indeed, companies have been shown to achieve superior performance following different paths, e.g. with different servitization strategies (Ambroise, Prim-Allaz, & Teyssier, 2018), service capabilities (Forkmann, Henneberg, et al., 2017) and resource and knowledge sources (Böhm, Eggert, & Thiesbrummel, 2017). Furthermore, it has been argued that it is not as much isolated success factors that lead to servitization success, but the right fit between them (Gebauer, 2008; Rabetino, Kohtamäki, & Gebauer, 2017).

Consequently, servitization success is best understood from a configurational perspective. Understanding complex phenomena like organizational success in terms of different, equifinal configurations of relevant factors is considered a more accurate description of reality than possible with linear and additive models (Fiss, 2011). Configurational logic also recognizes that the configurations leading to success are not necessarily identical to the ones leading to a lack of success, therefore painting a more complete picture of the examined phenomenon (Fiss, 2011).

However, only few studies in servitization follow configuration logic consistently and even fewer regard the resulting methodological implications. By both conceptually and methodologically following a configurational approach, this study provides a more nuanced and realistic image of the causal mechanisms underlying servitization success as well as the differential effects on financial and non-financial performance, and facilitate the formulation of meaningful suggestions for management. Specifically, the present study examines configurations of the conditions focus of the service offering on product- or process oriented services, decentralization of decision making, existence of a separate service organization, management commitment to services, and service orientation of corporate culture, as they have been

shown to be particularly interrelated. Similarities and differences in how they are aligned to be causally relevant for financial and non-financial service success are discussed. Both the presence and the absence of servitization success are studied, therefore unveiling not only what can be done to achieve success, but also to avoid underperformance.

The rest of the paper is structured as follows: in the following section, servitization success is defined as consisting of financial and non-financial service performance and the configurational approach is introduced as conceptual foundation. The configurational model is then presented. After introducing fuzzy set qualitative analysis as the appropriate method for configuration research in Section 3, the results are presented and discussed in Section 4. The results are analyzed in light of three important themes in servitization research: the importance of service culture, the service transition continuum and the lack of success. The paper concludes with implications for management and future research.

2. Servitization success from a configurational perspective

2.1. Servitization success

Servitization success is not a clearly defined construct in servitization research (Fliess & Lexutt, 2019). Consequently, there is a need for improved conceptual clarity on the dimensions and drivers of servitization success. This is addressed in this study by adopting a set-theoretic conceptualization.

While most qualitative studies don't explicitly state when they consider servitization successful, quantitative studies use different measures to capture success. Some studies measure the effects of servitization on general company revenue or profitability (e.g. Ambroise, Prim-Allaz, & Teyssier, 2018; Kohtamäki, Partanen, Parida, & Wincent, 2013). Others consider service related revenue or profitability (e.g. Eggert et al., 2014; Parida, Rönnerberg, Wincent, & Kohtamäki, 2014) or non-financial-measures such as customer satisfaction (e.g. Ceci & Masini, 2011), quality of the customer relationship (e.g. Gebauer &

Table 1
Quantitatively identified complex relationships in servitization success research.

Author(s)	Year	Conditions	Decentralization of decision making	Separation vs. integration of the service organization	Managerial commitment to services	Service orientation of corporate culture	Outcomes	
							Financial performance	Non-financial performance
Antioico et al.	2008	SSC lead to higher relative product sales, a relationship that becomes stronger in companies with high cross-functional communication, while SSP lead to higher service volume, particularly when high levels of service technology are used.			Management commitment to services has a positive effect on business orientation on SSP, but no significant effect on business orientation on SSC		Product sales, service sales	
Eggert, Hogreve, Ulaga & Muenkhoff	2011	SSP directly increase firm profitability in companies with high product innovation activity. SSC have the same effect in companies with low product innovation activity, where SSP only have an indirect effect on the outcome.			Management commitment to services has a direct influence on the creation of service volume		Firm profitability	
Eggert et al.	2014	SSP and SSC affect revenue and profit streams in different ways, with only SSC directly affecting financial performance.	Decentralization has a positive moderating effect on the relationship between offering SSC and financial performance.				Revenue and profit growth	Mutually created value
Forkmann, Henneberg, et al.	2017	Identify different configurations in which offering SSC as well as offering SSP leads to mutual value creation, while only offering SSP is causally related to the absence of mutual value.					Firm profitability	
Gebauer,	2007	Customer support services	Service managers' decision making authority positively influences the effect of customer support services on overall profitability				Firm profitability	
Gebauer, Edwardsson & Bjurko	2010			An integrated organization restricts the positive influence of the service orientation of management behavior and the service orientation of employee values		Direct effect of service orientation in corporate culture on business performance.	Firm profitability	
				Separating the service organization however does not strengthen the impact of service culture on business performance				

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Table 1 (continued)

Author(s)	Year	Conditions				Outcomes		
			Decentralization of decision making	Separation vs. integration of the service organization	Managerial commitment to services	Service orientation of corporate culture	Financial performance	Non-financial performance
Gebauer, Edvardsson, Gustafsson & Witell	2010	Outsourcing Partner, Development Partner, Customer Service Strategy, After sales service provider, Customer support service provider		A separate service organization, does not strengthen the impact of service orientation of corporate culture on business profitability, thus showing no immediate effect of service structure on performance.		Service orientation is higher in separate service organizations Different degrees of service orientation, combined with different offering-structure configurations, are found to lead to success, while mismatch can lead to failure	Firm profitability	
Gebauer & Fleisch	2007				Higher managerial commitment to services will lead to higher investments in the service business and ultimately to higher performance.		Firm profitability	
Gebauer & Pütz	2007		No negative effect of separating the service business on quality of customer relationships found			While service orientation of corporate culture moderates the relationship between breadth of service offering and financial and non-financial service performance, adverse effects might also occur, when high service orientation of corporate culture leads to an increased offering of free services and therefore to higher costs without the corresponding higher returns.	Service profitability, firm profitability	Quality of customer relationships
Gebauer & Pütz	2009		Separated and integrated service organizations receive a similar level in quality of customer relationship and in direct service profitability. Share of service revenue is higher in separated service organizations.			Service orientation is higher in separate service organizations	Share of service revenue, service profitability	Quality of customer relationships
Kohamaki et al.	2015	R&D, customer services, finance and insurance, operational, and procurement services				service orientation of human resource management and employee behavior mediates the relationship between service offerings, revenue, and profits	Sales performance (sales levels and sales growth rate) and profit performance (gross profit margin, net profit from operations, profit to sales ratio, return on investment).	

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Table 1 (continued)

Author(s)	Year	Conditions	Outcomes			
			Decentralization of decision making	Separation vs. integration of the service organization	Managerial commitment to services	Service orientation of corporate culture
Oliva et al.	2012	Kind of service offering		The creation of a separate service organization with profit and loss responsibility positively mediates the relationship between managerial commitment to the service strategy and services' financial performance The creation of a separate service organization with profit and loss responsibility has a negative effect on non-financial service performance	The relationship between managerial commitment to services and financial service success is mediated by the creation of a separate service organization.	Service orientation of corporate culture
						Financial performance
						Non-financial performance
						Service profitability
						Non-financial service performance / quality of customer relationships

Pütz, 2007, 2009) or the construct “Success of Services” by Raddats et al. (2015). While also having financial implications for the firm, these are less direct than the financial measures of revenue or profitability, and are therefore considered non-financial in the context of this study.

The present study considers servitization success to have a financial as well as a non-financial dimension (Oliva et al., 2012; Raddats et al., 2015, see Fig. 1). The most straightforward objective of servitization is to achieve higher returns by offering services that are profitable (Eggert et al., 2014; Oliva et al., 2012). Sometimes the objective of offering services, however, is not to generate direct service profitability, but to strengthen the product-related business (Salonen & Jaakkola, 2015; Salonen, Saglam, & Hacklin, 2017). Therefore it is important to also consider the more indirect performance implications of services when talking about servitization success. Consequently, in this study, servitization is considered successful if it has 1) a positive, direct impact on the financial performance of the service business, meaning that the offered services are profitable (Oliva et al., 2012), and 2) a positive, indirect or non-financial, impact on the performance of the firm, meaning that the offered services have a positive effect in terms of gaining and retaining customers and contributions to the product business (Raddats et al., 2015). In set-theoretic terms, this means that both financial and non-financial success has to be present for a firm to be considered to have achieved overall servitization success (see Fig. 1).

2.2. The configurational approach and complex causality in servitization success research

The question why some companies are successful with their servitization while others fail has not received a conclusive answer and a large number of possible success factors is identified in the literature (see Fliess and Lexutt (2019) for a comprehensive literature review on servitization success factors. See also Wang, Lai, and Shou (2018) and Rabetino, Harmsen, Kohtamäki, and Sihvonen (2018) for the state of the art in servitization research). Table 1 provides an overview of the success factors that have, on the one hand, been shown empirically to impact performance, but the results have been 1) interconnected, e.g. the kind of service offering with decentralization (Eggert et al., 2014) or service orientation of corporate culture with service strategy and structure (e.g. Gebauer, & Edvardsson, B. & Bjurko, M., 2010; Gebauer, Edvardsson, Gustafsson, & Witell, 2010); 2) inconclusive, e.g. service orientation of corporate culture (Gebauer & Pütz, 2007) and management commitment to services (Antioico et al., 2008); or 3) even contradictory e.g. the effect of the creation of a separate service organization on financial and non-financial performance (Gebauer & Pütz, 2007; Oliva et al., 2012).

This study argues that one of the reasons for the inconclusive, interconnected and contradictory results is the causal complexity of servitization success. This is why a configurational perspective is adopted to gain a better understanding of the causal mechanisms underlying servitization success.

The configurational approach has been widely used in organization research to explain why some companies succeed while others fail (e.g. Deng & Smyth, 2013; Sirmon & Hitt, 2009; Vorhies & Morgan, 2003). The core assumption is that companies reach their strategic goals by orchestrating their organizational characteristics to achieve “fit” (Zaefarian, Naudé, & Henneberg, 2010). The notion of “fit” generally states that it is not the presence or the degree of certain conditions that is important for a certain outcome, but how they are aligned in a given context (Venkatraman, 1989).

The understanding of “fit” between different organizational and environmental characteristics as critical for success can be found in some servitization success related studies (e.g. Neu & Brown, 2008; Antioico et al., 2008; Gebauer, 2008; Gebauer et al., 2010; Kohtamäki & Helo, 2015; Ambroise, Prim-Allaz, Teyssier, & Peillon, 2018). However, many use contingency theory as theoretical foundation. In contingency

theory, the success of an organization is conceptualized as a function of environmental conditions (Ketchen, Thomas, & Snow, 1993), suggesting that the relationship between independent and dependent variable depends on, or is contingent upon, a third variable (Donaldson, 2001; Gilbert & Heinecke, 2014). While contingency theory acknowledges that there is more than one ideal way to be successful, the underlying relationships are still assumed to be unidirectional and linear (Harms, Kraus, & Schwarz, 2009; Longenecker & Pringle, 1978).

The configurational approach, on the other hand, explicitly addresses nonlinearity (Meyer, Tsui, & Hinings, 1993), since configurations are defined as “inherently multidimensional entities in which key attributes are tightly interrelated and mutually reinforcing” (Dess, Newport, & Rasheed, 1993, p. 784). In other words, complex causality is assumed (Fiss, 2007; Ordanini, Parasuraman, & Rubera, 2014). Complex causality means equifinal, conjunctural and asymmetric causality and is generally considered to provide a more accurate prescription of how complex phenomena, like organizational success, occur in reality (Fiss, 2011).

Equifinality means that different configurations of causal factors can lead to the same result (Ragin, 2008). Indeed, there is not only one ideal way to be successful with services, as indicated by the many different studies identifying various success factors and models related to higher servitization performance (Fliess & Lexutt, 2019). Rather, several equifinal paths can lead to servitization success (Ambroise, Prim-Allaz, & Teyssier, 2018; Böhm et al., 2017; Forkmann, Henneberg, et al., 2017).

Conjunctural causation means that a causal condition might not have an effect on the outcome on its own, but only in combination with other causal conditions, and that it might even have opposing effects when combined with different factors (Schneider & Wagemann, 2012). Several identified servitization success factors have been found to have different effects on success, depending on how they are combined with each other or with other factors (e.g. Gebauer & Pütz, 2009; Gebauer, & Edvardsson, B. & Bjurko, M., 2010, see Table 1), indicating conjunctural causation.

Finally, *asymmetric causation* means that different combinations of causal conditions explain the presence and the absence of an outcome (Schneider & Wagemann, 2012). Accordingly, servitization failure is not just a mirror image of success. The factors that are studied to examine servitization failure, like costs and risks (Benedettini et al., 2015; Benedettini et al., 2017; Neely, 2008) differ from the factors commonly assumed to lead to success, therefore indicating asymmetric causality.

Consequently, servitization success is not only a matter of “fit” between contingency factors but is characterized by equifinality, conjunctural causation and asymmetry. Implicitly, the notion that the causal mechanisms leading to servitization success are complex and multidimensional, rather than simple and linear, is present in servitization research (Kohtamäki & Helo, 2015; Rabetino et al., 2017; Storbacka, Windahl, Nenonen, & Salonen, 2013). To the best of the author's knowledge, however, only three studies explicitly examine servitization success from a configurational perspective and consequently account for complex causality (Ambroise, Prim-Allaz, & Teyssier, 2018; Böhm et al., 2017; Forkmann, Henneberg, et al., 2017).

While these studies constitute important contributions, they study either only financial (revenue growth (Böhm et al., 2017); overall profitability (Ambroise, Prim-Allaz, & Teyssier, 2018) or non-financial (mutual value creation (Forkmann, Henneberg, et al., 2017)) outcomes of servitization. Furthermore, even though the factors service culture, structure of the service organization, the kind of the service offering, and strategic commitment to services are particularly prominent in servitization research and have repeatedly been found to affect servitization success (e.g. Antioco et al., 2008; Oliva et al., 2012; Fliess & Lexutt, 2019, see Table 1), they have not been studied collectively. To the best of the author's knowledge, no previous research examines the factors presented in this study, or addresses their differential impact on financial and non-financial performance from a configurational point of

view. The following section introduces the configurational model (Fig. 1).

2.3. Configurational model of servitization success

Drawing on contingency theory, configuration research and servitization literature, conditions from the core domains of organizational theory – strategy, structure, leadership, and culture (Deng & Smyth, 2013; Miller, 1987; Storey & Hull, 2010) – are chosen for the configurational model (see Fig. 1). The most commonly studied organizational attributes in configuration research are strategy and structure, as they have repeatedly been shown to impact on organizational performance in complex ways (e.g. Miller, 1987; Storey & Hull, 2010; Vorhies & Morgan, 2003). Elements of strategy and structure have been shown to be particularly critical for servitization performance as well (Fliess & Lexutt, 2019; Gebauer et al., 2010).

The first step in the transformation from a product-centric to a service-centric business model (Kowalkowski et al., 2017) is to assign strategic importance to the offering of services (Fliess & Lexutt, 2019; Oliva & Kallenberg, 2003). The type and breadth of service offering have often been used in servitization research to indicate different service strategies (Homburg, Fassnacht, & Guenther, 2003; Kohtamäki, Hakala, Partanen, Parida, & Wincent, 2015). This study follows this approach, differentiating between a focus on offering services supporting the product (SSP) which “...ensure the proper functioning of the product and/or facilitate the client's access to the product”, and services supporting the client (SSC), which aim at supporting different processes, actions and strategies of the customer (Mathieu, 2001a, p. 40). While it has been argued that a servitization strategy encompasses more than the kind and number of services in the portfolio (Raddats & Kowalkowski, 2014), offering mostly SSP as opposed to mostly SSC or a combination of both has strategic implications (Mathieu, 2001a).

SSP and SSC have been shown to impact differently on financial and non-financial performance (e.g. Forkmann, Henneberg, et al., 2017; Eggert et al., 2014; see Table 1). These effects differ depending on how they are aligned with various other organizational contingencies (e.g. Eggert, Hogreve, Ulaga, & Muenkhoff, 2011; Antioco et al., 2008; see Table 1), indicating equifinality and conjunctural causality. The kind of service offering is also considered connected to a cultural reorientation to services (Mathieu, 2001a, 2001b). Specifically, the category of SSC contains advanced services and performance based models, which require intimate customer knowledge and are related to significant changes in a manufacturer's business model and consequently also its culture (Baines et al., 2017; Mathieu, 2001a, 2001b). This relationship has not been examined quantitatively, and also the relationship with the horizontal structure of the service organization remains unclear.

As “structure follows strategy”, refocusing the strategy on services comes with adaptations in the vertical and horizontal elements of organizational structure (Chandler, 1962; Mintzberg, 1990). While several elements of horizontal structure can be identified, the degree in which decision making authority is either centralized at few, high hierarchical levels or decentralized to more, also lower levels, is of particular importance for marketing research in general (e.g. Jaworski & Kohli, 1993) and for servitization research specifically (e.g. Eggert et al., 2014, see Table 1). Neu (2005) and Neu and Brown (2008) argue that decentralization is one of the key structural factors that enable the formation of successful services, as it allows for service managers to take better decisions. It has been shown to be interconnected with the type of service offering (Eggert et al., 2014; Gebauer, 2007), its effect on non-financial performance as well as its relationship to the other conditions in the model are yet unclear, however.

Regarding the vertical structure, one key theme in servitization research is whether or not a separate service organization should be created (Fliess & Lexutt, 2019). Several authors have examined under which conditions a separated or an integrated service organization leads to higher performance (e.g. Gebauer et al., 2010; Gebauer & Pütz,

2009; Oliva et al., 2012). The inconclusive and interconnected results indicate that the creation of a separate service organization with profit and loss responsibility has different effects on financial and non-financial performance, and that these effects depend on several other factors, e.g. managerial commitment to services and service orientation of corporate culture, again demonstrating equifinality and conjunctural causation (see Table 1).

Different strategy-structure configurations also require different aspects of leadership (Daft, 2016). While the role of leaders and leadership styles has received less attention in servitization research (Fliess & Lexutt, 2019), some studies have considered the impact of managerial commitment to services on performance (e.g. Gebauer & Fleisch, 2007; Antioco et al., 2008; Oliva et al., 2012, see Table 1). Overall, managerial commitment is considered essential for any kind of successful organizational change (Kotter, 1995). Management commitment to services, in terms of formulating clear service related strategies and objectives, and committing resources and attention for their implementation, has been shown to be interconnected with offering SSP and SSC (Antioco et al., 2008), and the existence of a separate service organization (Oliva et al., 2012). Its impact on non-financial service performance, however, remains unclear, as well as its relationship with culture and decentralization (see Table 1).

Finally, the organizational culture has to support and reinforce the strategy-structure configuration (Daft, 2016). At the same time, strategy, structure, and leadership form organizational culture (Kotter & Heskett, 1992), clearly indicating complex causality. The importance of a cultural reorientation towards services is generally acknowledged in servitization research (e.g. Brax, 2005; Paiola, Gebauer, & Edvardsson, 2012; Salonen, 2011). Particularly the impact of service orientation of corporate culture on performance has received attention (Homburg et al., 2003). Service orientation of corporate culture describes the abstract value of services within an organization as well as the extent to which employees' attitudes and behavior reflect the value of services (Homburg et al., 2003). While distinct from service orientation of strategy (Homburg et al., 2003), service orientation of corporate culture is particularly interconnected with service strategy and structure (e.g. Gebauer et al., 2010; Gebauer, & Edvardsson, B. & Bjurko, M., 2010). The results have been inconclusive, however, indicating complex causality (see Table 1). Furthermore, the relationship with decentralization and management commitment to services has not been examined (see Table 1).

This study hypothesizes that different configurations of these conditions are sufficient for servitization success; that the conditions display their causal effects in conjunction with each other rather than independently; and that the configurations for the presence of success are different from the configurations for the absence of success. Furthermore, as different conditions and their configurations lead to financial and to non-financial success (e.g. Oliva et al., 2012; Gebauer & Pütz, 2007, 2009, see Table 1), configurations for financial and non-financial success as well as for overall success are examined separately. Consequently, the present study adds to the literature, by disentangling the complex causalities surrounding servitization success. Specifically, it clarifies how the aforementioned factors 1) influence financial and non-financial success differently or in similar ways, 2) interact with each other to produce these effects, and 3) are connected to the absence of servitization success.

3. Methodology

Many studies of organizational performance fail to capture the causal relationships between performance variables and independent variables, due to a discrepancy between conceptual argumentation and applied methodology (see for example March and Sutton (1997) and Kieser and Nicolai (2005) for a detailed criticism of traditional success factor research). Also most of the current servitization research does not account for causal complexity. It is either qualitative, case study based,

or adopts statistical, net-effects approaches (Fliess & Lexutt, 2019). Correlational net-effects approaches focus on the relative importance of competing variables in explaining variation in outcomes (Fiss, 2007), making it difficult to capture the configurational nature of cases that is assumed in configuration research, meaning that these methods are limited in capturing complex causality (Frösén, Luoma, Jaakkola, Tikkanen, & Aspara, 2016; Tóth, Henneberg, & Naudé, 2017; see also Mahoney and Goertz (2006) or Woodside (2015) for detailed argumentation).

Particularly when it comes to complex, configurational phenomena like organizational performance, causal relations can better be captured and understood in terms of set-theoretic relations rather than correlations or covariance (Fiss, 2011). Following the recommendations for adopting set-theoretic methods in configuration research (e.g. Fiss, 2007; Fiss, 2011; Zaefarian, Thiesbrummel, Henneberg, & Naudé, 2017), fuzzy set qualitative comparative analysis (fsQCA) is used in the present study.

FsQCA is a case-based method that uses Boolean algebra and the rules of logical minimization to identify configurations of conditions that are necessary or sufficient for the occurrence of an outcome and is therefore suitable to capture complex causation (Ragin, 2008; Schneider & Wagemann, 2012). Instead of net-effects of independent variables on a dependent variable, QCA examines causal effects in terms of cases' memberships in different sets, i.e. the examined conditions and the outcome sets (Ordanini et al., 2014).

While fsQCA is not unknown in business research (see Kan, Adegbite, El Omari, and Abdellatif (2016) for a comprehensive overview on the use of QCA in management. See also Wageman, Buche, and Siewert (2016) and Schneider and Eggert (2014)) to the best of the author's knowledge, only 3 studies have adopted fsQCA to explain servitization success (Ambroise, Prim-Allaz, & Teyssier, 2018; Böhm et al., 2017; Forkmann, Henneberg, et al., 2017). The full potential of set theoretic methodology has not been utilized yet, as indicated by the omission of reporting results on necessity (Forkmann, Henneberg, et al., 2017) and on the absence of the outcome (Ambroise, Prim-Allaz, & Teyssier, 2018; Böhm et al., 2017). There also appears to be some conceptual ambiguity regarding the underlying logic of set theoretic methodology, as indicated by the interpretation of fsQCA as a variable based method (Ambroise, Prim-Allaz, & Teyssier, 2018). Also the implications of logical contradictions and skewed set memberships have been largely overlooked, as indicated by the lack of applying the enhanced standard analysis (Schneider & Wagemann, 2012) and of reporting the distribution of the cases (Schneider & Wagemann, 2010). This study aims to fill this gap from a methodological standpoint, demonstrating the strengths of a state-of-the-art application of fsQCA for servitization success research.

3.1. Sample and operationalization

An online survey of the German manufacturing sector was conducted in December 2017. The German manufacturing industry is internationally competitive and is increasingly servitizing, with 25% of manufacturers also offering services (Neely, 2013). This number is comparable to the state of servitization in other developed economies (Neely, 2013), wherefore this context is deemed suitable for studying servitization in developed countries. CEOs and higher management with extensive knowledge about the service business and financial performance of the firm were addressed. 143 cases of companies belonging to the manufacturing sector and undergoing servitization were selected for the analysis. Table 2 illustrates the diversity of the sample, both in terms of sub-industry and of company size. To test for non-response bias independent sample *t*-tests for early and late respondents were conducted. No significant differences were found, so non-response bias appears not to be an issue in the sample (Hair Jr., Black, Babin, & Anderson, 2014).

Operationalizations from previous studies were used for the

Table 2
Sample characteristics.

Industry	Frequency
Mechanical engineering	28.7%
Electrical engineering	43.4%
Automotive industry	20.3%
Chemical production	7.7%
Size	
Less than 250 employees	39.9%
250–1000 employees	44%
More than 1000 employees	16.1%

measures (see Appendix C). The content validity of the items was discussed in 5 interviews with industry experts and the wording adjusted accordingly. A small-range pretest with 16 cases was conducted to ensure the comprehension of the questions by the respondents. The items in the original questionnaire were in German, the translations were examined by 2 English- and German-speaking researchers.

To assess the suitability of the latent constructs to capture the intended meanings, a confirmatory factor analysis was conducted, which resulted in satisfactory model fit, given the size of the sample and the number of constructs (RMR = 0.051, CFI = 0.936, RMSEA = 0.075, $X^2/df = 1.8$) (Hair Jr. et al., 2014). The used measurement scales, items, as well as loadings and composite reliabilities for the latent constructs are found in Appendix C.

3.2. Calibration

Table 3 summarizes the rules of calibration for this study. Calibration should always be informed by theoretical reasoning and the qualitative knowledge of the researcher regarding the constructs (Ragin, 2008). A detailed justification for the applied calibration rules is given in the supplementary material.

3.3. Analyses of necessity and sufficiency

Differentiating between necessity and sufficiency is a central tenet of complex causality in general and QCA in particular (Ragin, 2008). Necessity means that an outcome cannot be achieved without the condition, i.e. the necessary condition is always present when the outcome occurs (Schneider & Wagemann, 2012). In set-theoretic terms, this means that the necessary condition is a superset of the outcome (Ragin, 2008). Sufficiency means that whenever the condition is observed, the outcome is also observed, i.e. the outcome always occurs when the sufficient condition is present (Schneider & Wagemann, 2012). In set-theoretic terms, this means that the sufficient conditions (or sufficient combinations of conditions) are subsets of the outcome (Ragin, 2008).

The Set Methods (Medzihorsky, Medzihorsky, Oana, Quaranta, & Schneider, 2016) and QCA packages (Dusa, 2007) in R 3.32 (R Core Team, 2016) are used for the analyses. The analyses for necessity and sufficiency are performed separately, for both the presence and the absence of the outcome (Schneider & Wagemann, 2010). The results of the analyses of necessity are presented in Section 4.1 and Section 4.2. No necessary conditions were identified for the absence of the outcomes (see online appendix C).

The analysis of sufficiency begins with the construction of the truth table, which lists all $2^k = 64$ (k = number of conditions in the model) logically possible configurations of the causal conditions (Ragin, 2008). To avoid logical contradictions, the Standard Analysis as well as the Enhanced Standard Analysis is applied (Schneider, 2018). The Enhanced Standard Analysis accounts for the logical implications of necessary conditions and simultaneous subset relations when examining both the presence and the absence of the outcome (Schneider, 2018; Schneider & Wagemann, 2012). Models for the two outcomes financial

Table 3
Fuzzy-set calibration rules.

Construct	Original scale	Full membership (1)	Full non-membership (0)	Cross-over point (0.5)
Financial service success (FS)	5-point Likert scale	5	1	3.9
Non-financial service success (NFS)	5-point Likert scale	5	1	3.9
Offering focused on SSP (SSP)	Summed (0–12)	12	0	2.9
Offering focused on SSC (SSC)	Summed (0–9)	9	0	1.9
Decentralization of decision making (DEC)	5-point Likert scale	5	1	3.9
Existence of a separate service organization (SEP)	3 binary items	Service business separated from product business, with profit and loss responsibility and no shared resources	Service business not separated from product business, no profit and loss responsibility, and shared resources	NA
Management commitment to services (MCM)	5-point Likert scale	5	1	3.9
Service orientation of corporate culture (SOR)	5-point Likert scale	5	1	3.9

and non-financial service success, as well as for the conjunction of both sets, i.e. the simultaneous presence of both financial and non-financial success, which indicates overall servitization success (see Fig. 1), are tested. In total, 18 analyses were performed; the results are presented and discussed in Section 4.

Inclusion consistency thresholds of 0.93 are set for the analysis of service profitability, 0.95 for the analysis of non-financial success, and 0.92 for overall success. All thresholds are supported by the data (as indicated by a noticeable gap in the PRI scores, see truth tables for all 3 conditions in online appendix B) and are well above the established 0.75 threshold (Frösén et al., 2016; Schneider & Wagemann, 2012). A frequency threshold of 2 cases is set, to avoid drawing conclusions based on single cases (Fiss, 2011; Greckhamer, Misangyi, & Fiss, 2013). As robustness checks, analyses with different consistency and frequency thresholds as well as with different calibrations were conducted (Böhm et al., 2017). However, no major differences in the results occurred, which indicates that the presented results are robust (Thomann & Maggetti, 2017).

Using the Quine-McCluskey algorithm, the truth table is minimized, resulting in configurations of conditions that are sufficient for the occurrence of the outcomes (Schneider & Wagemann, 2012). To account for configurations of conditions that are contained in the 64 rows of the truth table but are not empirically observed, QCA utilizes counterfactual arguments (Zafarian et al., 2017). The explanations of the counterfactual arguments used in this study are given in the online appendix.

In order to account for causal asymmetry, the absence of the outcomes, or their negations, are analyzed separately (Schneider & Wagemann, 2010). Examining the absence of success separately contributes to a more complete understanding of the examined phenomenon, as it unveils not only what can be done to be successful, but also what can be done (or should not be done) in order to avoid underperformance. Consistency thresholds of 0.9, 0.92, and 0.97 respectively, and a frequency threshold of 2 for the analyses for the absence of financial, non-financial and overall success are set (see online appendix B).

4. Results and discussion

4.1. The prominent role of service orientation of corporate culture

The existence of a strong service orientation of corporate culture passes the consistency threshold of 0.9 for accepting statements of necessity for all 3 outcomes (see Table 4). Skewness in the cases' memberships in the conditions or the outcome can lead to false statements of necessity and should therefore be examined closely (Schneider, 2018; Schneider & Wagemann, 2012). The XY-plots (see Fig. 2 and Appendix B) show neither skewed memberships nor quasi-constant conditions,

which is also indicated by the high relevance of necessity (RoN) scores (0.777, 0.798, 0.717 respectively). Since coverage is also considerably high (0.831, 0.851, 0.768), the existence of a strong service orientation of corporate culture is accepted as necessary for all three outcomes.

This finding emphasizes the importance of a cultural reorientation towards services for servitization. It is generally acknowledged that the transition to services encompasses a cultural reorientation from transaction and manufacturing oriented to relationship and service oriented (Kowalkowski et al., 2017; Salonen, 2011). A positive relationship between service orientation of corporate culture and business performance has also been confirmed empirically (e.g. Gebauer, & Edvardsson, B. & Bjurko, M., 2010; Kohtamäki et al., 2015).

Contrary to previous research, however, the present study differentiates between necessity and sufficiency, which is not possible with more traditional statistical methods (Woodside, 2015), providing a more differentiated view. Service orientation of corporate culture is not just positively related to servitization success, it is necessary for its achievement. This means that, in the examined cases, servitization success is consistently not achieved without service orientation of corporate culture.

Adopting service orientation in corporate culture in manufacturing is a challenging task. It requires a radical transformation and refocusing of attention by the entire organization (Brax, 2005), that is often met with resistance (Mathieu, 2001b). It comes with a redefinition of what creates value for the customer and the organization (Gebauer, Friedli, & Fleisch, 2006) and ideally leads to the alignment of relevant activities and processes with those of the customer (Grönroos, C. & Helle, P., 2010). Particularly the co-existence of both manufacturing and service related business logics in one organization is considered a success factor on the one hand (Parida et al., 2014), but challenging to perform successfully, on the other (Kowalkowski et al., 2015; Story, Raddats, Burton, Zolkiewski, & Baines, 2017). While these challenges have to be met in order to be successful, this is not enough to guarantee success, because a service orientation of corporate culture on its own is not sufficient for success. This highlights the organizational challenges that come with servitization (Salonen, 2011).

It has been argued that a service culture is particularly important for advanced services (Salonen, 2011; Story et al., 2017). The present results show that it is necessary regardless of the offering and part of an INUS (i.e. an Insufficient but Necessary part of an Unnecessary but Sufficient configuration (Ragin, 2008)) condition in all solution terms for success (see Table 5). This means that it is causally relevant also with a limited and a product-oriented service offering. This is in line with Kohtamäki et al. (2015) who found that both the kind of service offering and service orientation are important for servitization success, and stresses the importance of combining product and service orientation (Kowalkowski et al., 2015; Kowalkowski et al., 2017; Story et al., 2017).

Table 4

Results of the analysis of necessity upper case letters indicate the presence and lower case the absence of the condition.

Outcome	Financial service success			Non-financial service success			Overall servitization success		
Condition	Cons.	Cov.	RoN	Cons.	Cov.	RoN	Cons.	Cov.	RoN
SSP	0.591	0.780	0.855	0.609	0.825	0.880	0.626	0.725	0.824
ssp	0.667	0.682	0.709	0.660	0.693	0.716	0.690	0.619	0.670
SSC	0.456	0.809	0.916	0.458	0.833	0.926	0.489	0.761	0.897
ssc	0.777	0.663	0.588	0.775	0.679	0.599	0.795	0.595	0.543
DEC	0.856	0.807	0.768	0.863	0.835	0.794	0.913*	0.756*	0.723*
dec	0.442	0.654	0.819	0.445	0.676	0.829	0.455	0.591	0.793
SEP	0.618	0.694	0.756	0.631	0.728	0.777	0.635	0.627	0.718
sep	0.607	0.717	0.788	0.609	0.739	0.801	0.645	0.669	0.761
MCM	0.884	0.879	0.857	0.890	0.908	0.888	0.945*	0.824*	0.805*
mcm	0.485	0.664	0.804	0.507	0.712	0.827	0.513	0.616	0.782
SOR*	0.908*	0.831*	0.777*	0.906*	0.851*	0.798*	0.957*	0.768*	0.717*
..sor	0.607	0.717	0.788	0.449	0.716	0.857	0.454	0.620	0.817

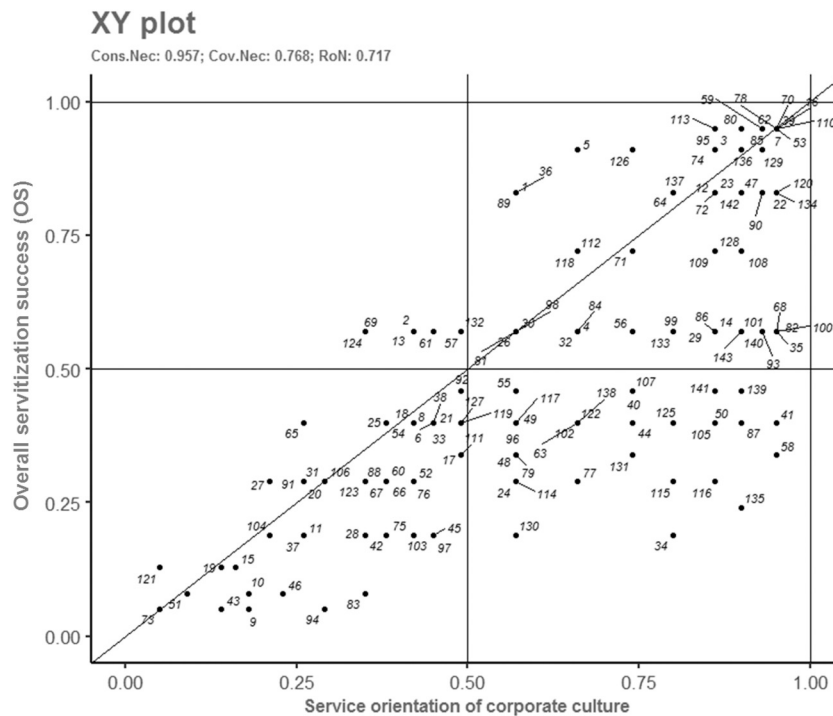


Fig. 2. Necessity relation service orientation and overall success. Each number indicates an individual case.

4.2. Decentralization and managerial commitment as necessary conditions for overall success

When considering the outcome overall success, managerial commitment to services and decentralization of decision making are accepted as necessary conditions as well (see Table 4 and Figs. 3 and 4). Consequently, not only service orientation of corporate culture, but also decentralization and strong managerial commitment to services have to be present to achieve financial and non-financial success at the same time. In other words, overall success is comparatively more difficult to achieve than financial or non-financial success alone (as also indicated by the fewer sufficient paths for overall success, see Table 5).

These findings add to the literature by identifying two success factors, which have received limited attention so far, as necessary for overall success.

Decentralization helps deal with the structural complexities that come with a new business (Eggert et al., 2014; Benedettini et al., 2017) and facilitates better decision making (Neu & Brown, 2008). Eggert et al. (2011) identified a positive moderating effect of decentralization on the relationship between offering SSC and financial performance. The present results show that decentralization is a precondition for overall success, regardless of the kind of service offering.

Similarly, committing time, attention and resources to the service business is required to achieve overall success with services, regardless of the kind of service offering or the structure of the service organization. This is in line with the notion that managerial commitment is essential for any kind of successful organizational change (Kotter, 1995) and previous findings relating it to investments in the service business (Gebauer & Fleisch, 2007) and to higher performance (Oliva et al., 2012).

4.3. Financial and non-financial success along the product-service continuum

Table 5 presents the enhanced intermediate solutions for the presence of financial, non-financial and overall servitization success. The Boolean expressions can be found in the online appendix. Solution

consistency (Cons) is well above the established 0.8 threshold for large-N QCA (Greckhamer et al., 2013), with 0.911, 0.924 and 0.895 for financial, non-financial and overall success, respectively. The high PRI scores (0.836, 0.856 and 0.776, respectively) further indicate that the identified solutions are consistently sufficient for achieving success, while the high solution coverage (CovS, 0.791, 0.798, and 0.844) indicates the high empirical relevance of the results (Schneider & Wagemann, 2012). XY-plots illustrating the distribution of cases are given in online appendix D.

The results of this study demonstrate that service performance can be achieved with different kinds and extents of service offerings (see Table 5 and Fig. 5). The extent and kind of service offering is often used in previous research as an indicator for different levels of servitization (Brax & Visintin, 2017). Even though in reality several different service offerings coexist, the transition towards services is not always linear and sometimes even moves backwards (e.g. Finne, Brax, & Holmström, 2013; Fundin, Wittel, & Gebauer, 2012), the notion of the product-service continuum (Oliva & Kallenberg, 2003) is still commonly adopted. While the amount and names of the stages differ, the core assumption remains that companies begin the servitization journey with a limited service offering, focus on product related services in an intermediate stage, and have an extensive offering including process-oriented services at the more advanced stages of servitization (Luoto, Brax, & Kohtamäki, 2017; Oliva & Kallenberg, 2003; Vandermerwe & Rada, 1988).

Configuration 1FS/1NFS/1OS for financial, non-financial and overall success¹ and configurations 2FS, 2NFS for financial and non-financial success are indicative of a limited offering, as they exhibit the absence of a focused offering of SSC, with either a limited offering of SSP as well (2FS) or the offering of SSP being irrelevant (1FS/1NFS/1OS, 2NFS). These configurations correspond to an early stage of servitization. Configurations 3FS/3NFS/2OS, 4FS, 4NFS and 5NFS are indicative of a more advanced, but still mostly product oriented stage,

¹ Please note that configurations 1FS, 1NFS, 1OS; 3FS, 3NFS, 2OS; and 6FS, 6NFS and 3OS are each identical, resulting in 3 identical configurations sufficient for financial, non-financial and overall success.

Table 5
Configurations sufficient for the presence of the outcomes.

Conditions	Configurations sufficient for financial service success						Configurations sufficient for non-financial service success						Configurations sufficient for overall servitization success		
	1FS	2FS	3FS	4FS	5FS	6FS	1NFS	2NFS	3NFS	4NFS	5NFS	6NFS	1OS	2OS	3OS
Offering focused on SSP		○	●	●	●				●	○	●			●	
Offering focused on SSC	○	○		○	●		○	○		○	●		○		
Decentralization	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Existence of a separate service organization		●		○				●							
Management commitment to services	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Service orientation of corporate culture	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Cons.	0.943	0.941	0.937	0.938	0.944	0.934	0.956	0.949	0.949	0.946	0.945	0.959	0.912	0.895	0.900
PRI	0.875	0.864	0.859	0.793	0.862	0.872	0.900	0.889	0.886	0.845	0.881	0.919	0.780	0.745	0.784
Raw Cov.	0.630	0.362	0.522	0.330	0.267	0.507	0.622	0.423	0.516	0.405	0.368	0.508	0.695	0.568	0.557
Unique Cov.	0.098	0.010	0.040	0.003	0.004	0.014	0.090	0.006	0.040	0.003	0.008	0.017	0.105	0.041	0.016
Solution Cons.	0.911						0.924						0.895		
Solution PRI	0.836						0.856						0.776		
Solution Cov.	0.791						0.790						0.844		

● Indicates the presence of the condition, ○ the absence of the condition, and an empty cell that the condition not causally relevant. E.g. configuration 1 indicates that the absence of a strong focus on offering SSP and SSC, in combination with decentralization of decision making and managerial commitment to services is sufficient for financial service success, regardless of the presence or absence of a separate service organization and service orientation of corporate culture.

as they contain a strong focus on product-related services only, either combined with a limited offering of SSC (4FS, 4NFS), or with the offering of SSC not being relevant (3FS/3NFS/2OS, 5NFS). Finally, configuration 5FS contains also more advanced, process related services, pointing to a more advanced level of servitization (Fundin et al., 2012; Oliva & Kallenberg, 2003). Configuration 6FS/6NFS/3OS doesn't contain the kind of offering as a causal condition, so no statement can be made about its positioning on the product-service continuum. It is discussed in Section 4.4.

At initial stages when the offering is limited, strong managerial commitment, decentralization and service orientation of corporate culture consistently lead to servitization success in the examined cases (1FS/1NFS/1OS). Another path to performance at this stage is the establishment of a separate service organization in combination with a strong service culture and decentralization (2FS, 2NFS). Possibly, cases belonging to these configurations follow a focused strategy, where they offer one or two highly specialized services, as indicated by the strong service culture, even though the offering is quantitatively limited. These paths show that success is possible also with a limited offering, as long as it is supported by the right configuration of organizational characteristics.

There appears to be a substitution effect between strong managerial commitment and the existence of a separate service organization at this stage. Strong management commitment to services is an important driver of servitization (Lay, Copani, & Jäger, A. & Biege, S., 2010; Martinez, Neely, Velu, Leinster-Evans, & Bisessar, 2017) and necessary for the achievement of overall success (see 4.2). Service profitability and non-financial service success individually, however, are also achieved regardless of managerial commitment, if there is a separate service organization (2FS, 2NFS). If the service business is independent of the product business, and service management has the freedom to take its own financial and strategic decisions, as indicated by the presence of decentralization in these configurations, overall managerial commitment becomes less critical for the achievement of high performance. In these instances the responsibility for the definition of the service related strategy, objectives, and investments shifts from the mother organization to the service business, meaning that the managerial commitment to services does not have to be present in the mother organization but in the service business.

A strong focus on product related services is considered related to product-oriented businesses (Mathieu, 2001a) and has previously been found to only indirectly affect performance (Eggert et al., 2014). The present results demonstrate that performance can be achieved also with offering SSP alone. One way to success is the combination with decentralization, management commitment and a service orientated culture (3FS/3NFS/2OS). Another path to achieve non-financial service success is the combination with decentralization, a separate service organization, and service orientation of corporate culture (5NFS). Hence, the previously discussed substitution effect between managerial commitment and the existence of a separate service business appears to be in place also with a product-oriented service offering, however only in relation to non-financial success.

Paths 4FS and 4NFS demonstrate the differential effects of structure of the service organization for service profitability and non-financial success with a product-oriented service offering. While these paths appear to be an exception rather than the rule (as indicated by their low unique coverage scores, CovU 0.003, see Table 5), they are of particular interest as they deviate from the mainstream narrative commonly assumed in servitization research (Luoto et al., 2017). To achieve service profitability, the combination of a clearly SSP oriented offering with an integrated (i.e. not separated) service organization, decentralization, and a service orientated culture is sufficient for some of the examined cases (4FS). The fact that non-financial success (4NFS) can be achieved in the same way, regardless of organizational structure, indicates that what makes the difference between financial and non-financial performance in this particular configuration are the costs of creating a

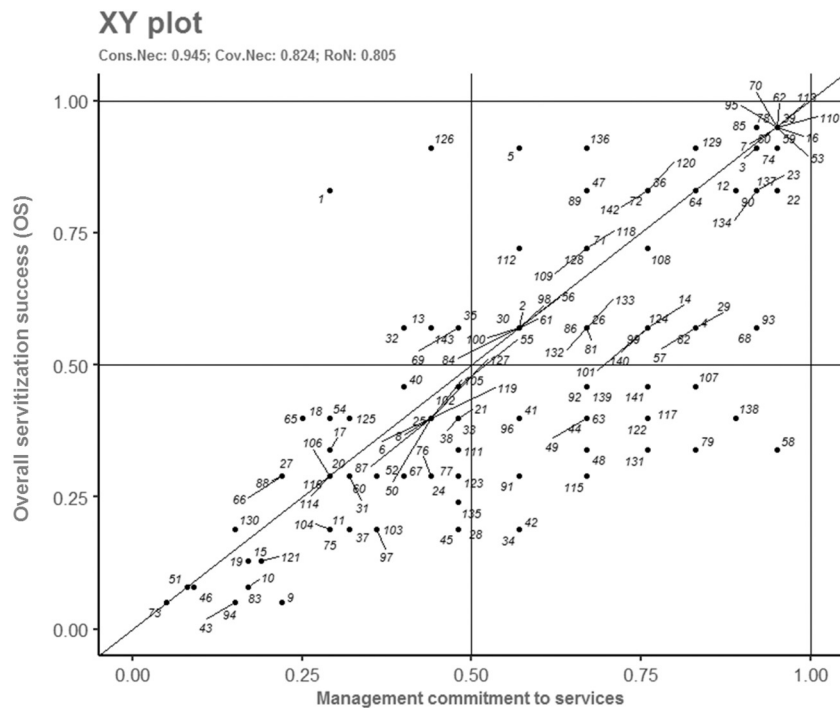


Fig. 3. Necessity relation management commitment to services and overall servitization success. Each number indicates an individual case.

separate service organization (Mathieu, 2001a) as opposed to the benefits of synergies in an integrated organization (Neu & Brown, 2008). Knowledge exchange and reciprocal spillovers between products and services have been argued to be of particular importance for servitization (Forkmann, Ramos, Henneberg, & Naudé, 2017; Visnjic & van Looy, 2013). Particularly since configuration 4FS illustrates a product-oriented service strategy, it makes sense that in order to achieve profitability with services supporting the product, the service business should be closely connected to the product business, in order to allow

for these complementarities. Conflicts between product and service business, which are often used as an argument for the creation of a separate service organization, can be prevented by the strong service culture and decision making authority of service leaders present in this configuration (Matthyssens & Vandenbempt, 2008). It could furthermore be a way to facilitate the coexistence of distinct but synergistic product and service cultures (Story et al., 2017), and to allow for greater integration of the product and service elements in the hybrid offering (Storbacka et al., 2013; Ulaga & Reinartz, 2011).

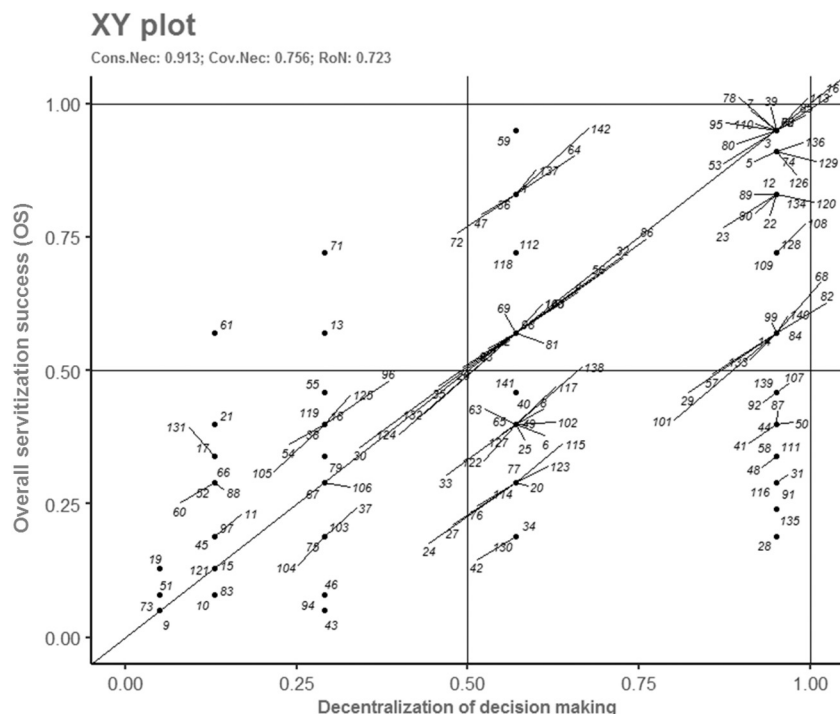


Fig. 4. Necessity relation decentralization of decision making and overall servitization success. Each number indicates an individual case.

Stage on the product-service continuum	Configurations sufficient for financial success (FS)	Configurations sufficient for non-financial success (NFS)	Configurations sufficient for overall success (OS)
Limited service offering	1FS Decentralization, management commitment to services and service orientation of corporate culture sufficient for financial, non-financial and overall success, when combined with a limited offering of SSC, regardless of offering of SSP 2FS Decentralization, separate service organization and service orientation of culture sufficient for service profitability, when combined with a limited offering of both SSP and SSC	1NFS Decentralization, management commitment to services and service orientation of corporate culture sufficient for financial, non-financial and overall success, when combined with a limited offering of SSC, regardless of offering of SSP 2NFS Decentralization, separate service organization and service orientation of culture sufficient for non-financial success, when combined with a limited offering of SSC, regardless of offering of SSP	1OS Decentralization, management commitment to services and service orientation of corporate culture sufficient for financial, non-financial and overall success, when combined with a limited offering of SSC, regardless of offering of SSP
Offering focused on product-oriented services (SSP)	3FS Decentralization, management commitment to services and service orientation of culture sufficient for financial, non-financial and overall success, when combined with an SSP-oriented offering, regardless of offering of SSC 4FS Decentralization, integrated service organization and service orientation of culture sufficient for financial success, when combined with an SSP-oriented offering and a limited SSC offering	3NFS Decentralization, management commitment to services and service orientation of culture sufficient for non-financial success, when combined with an SSP-oriented offering, regardless of offering of SSC 4NFS Decentralization and service orientation of culture sufficient for non-financial success and overall success, regardless of structure of service organization, when combined with an SSP-oriented offering and a limited SSC offering 5NFS Decentralization, a separate service organization and service orientation of culture sufficient for non-financial success, when combined with an SSP-oriented offering, regardless of offering of SSC	2OS Decentralization, management commitment to services and service orientation of culture sufficient for financial, non-financial and overall success, when combined with an SSP-oriented offering, regardless of offering of SSC
Advanced service offering (SSP and SSC)	5FS Decentralization, a separate service organization and service orientation sufficient for financial success, when combined with an advanced offering of both SSP and SSC		

Fig. 5. Configurations along the product-service continuum.

An *extended service offering* containing both SSP and SSC is often presumed to be the ultimate objective of servitization and has been linked to superior performance (e.g. Matthyssens & Vandenbempt, 2008, 2010; Ulaga & Reinartz, 2011). In order to achieve high service profitability at this stage, the active offering of SSP and SSC needs to be combined with decentralization, a separate service organization, and a strong service culture (5FS). The low unique coverage (CovU 0.004, see Table 5) of this configuration indicates that, in our sample, the maturity of servitization is still low, with only few companies actively offering more than one SSC. This is in line with Lay et al. (2010) and Dachs et al. (2014), who showed a generally low maturity of servitization in European manufacturing companies.

The present findings also demonstrate the importance of product related services even in more advanced stages of servitization (Parida et al., 2014; Salonen et al., 2017). A strong focus on offering SSC is found to be causally relevant only for achieving service profitability (5FS) and is irrelevant for superior performance in configurations 3FS/3NFS/2OS and 5NFS. At the same time, a limited offering of SSC is found to be beneficial for superior performance in configurations 1FS/1NFS/1OS, 2FS, 2NFS, 4FS and 4NFS. This supports recent research stating that manufacturers do not abandon their product business and the related services when advancing along the product-service continuum (Kowalkowski et al., 2015; Storbacka et al., 2013), but rather utilize the more advanced services to boost their core business, which still has the greatest impact on financial performance (Salonen et al., 2017). This once again emphasizes the co-existence of different business orientations and strategic foci in one organization (Kowalkowski et al., 2015).

4.4. Recipes for servitization success

Overall, three configurations that are consistently sufficient for overall servitization success are identified (configurations 1OS, 2OS and 3OS, see Table 5). All three paths contain the three necessary conditions decentralization, management commitment, and service orientation of corporate culture. However, the presence of these three conditions alone is not sufficient for overall success. To achieve service profitability and non-financial service success at the same time, they need to be combined with 1) a limited offering of SSC, regardless of structure or the offering of SSP (1OS); or 2) a product-oriented service offering, regardless of structure or the offering of SSC (2OS); or 3) a separate service organization, regardless of the offering of SSP or SSC (3OS).

Interestingly, the absence of an extensive SSC offering is causally relevant for overall servitization success in the examined cases (1OS). The absence of an extensive SSC offering might be indicative of a focused strategy, where only one highly specialized SSC is offered. It does not mean that offering SSC is negatively related to success, as it is not part of the configurations sufficient for the absence of success (see Table 6). The results indicate, however, that in the examined cases, offering two or more SSC (see calibration thresholds, Table 3) is not causally related to superior overall performance. This could be because of the higher risks and costs of offering SSC, particularly given the low maturity of servitization in the sample. SSC generally require higher levels of internal integration (Brax & Jonsson, 2009) and therefore increase the costs of internal organization and control (Benedettini et al., 2015). Their offering also requires close cooperation with the customer and high levels of external integration (Brax & Jonsson, 2009; Mathieu, 2001b), exposing the company to greater environmental risks (Benedettini et al., 2015). Consequently, due to the complexity of SSC, a limited offering appears to be more beneficial in the examined cases.

Path 2OS clearly indicates the causal relevance of a strong focus on SSP for overall servitization success, given the presence of the necessary conditions. This is true in the examined cases regardless of the offering of SSC, and therefore supports recent research that stresses the importance of product related services at all stages of servitization (Parida

et al., 2014; Salonen et al., 2017). The core product business and the related services have a great impact on performance (Salonen et al., 2017) and they are not abandoned as manufacturers advance along the product-service continuum (Kowalkowski et al., 2015; Storbacka et al., 2013).

Finally, overall success can also be achieved *regardless of the kind of service offering*, as demonstrated by configuration 3OS. The existence of a separate service organization, in combination with the necessary conditions is consistently sufficient for overall success in the examined cases (3OS). This configuration is one of the ways to combine different, sometimes competing, business models (Story et al., 2017). The existence of a strong service culture might serve as an integration mechanism, which, in combination with decentralized decision making, facilitates the performance of the separate service organization. As the kind of service offering is not causally relevant in these configurations, it can be used as a recipe for success at different stages of servitization. While this might sound easy, it comes with all the previously discussed challenges of establishing a strong service culture in a product-oriented business (Kowalkowski et al., 2015) and the risks and resistance of restructuring (Mathieu, 2001b).

4.5. Configurations and the absence of success

The intermediate enhanced solution for the absence of the outcomes is presented in Table 6. Solution consistency (Cons) is well above the established 0.8 threshold, with 0.906, 0.921 and 0.977 for absence of financial, non-financial and overall success, respectively. Also the PRI scores are high (0.780, 0.771, 0.941 respectively), indicating that the identified solutions are consistently sufficient for the absence of success. Solution coverage (CovS) is lower than for the presence of the outcomes (0.645, 0.673, and 0.596), but still indicates high empirical relevance of the results. XY-plots illustrating the distribution of the cases are given in online appendix D.

The absence of success with services, even though efforts to enhance the offering have been made, is an important theme in servitization research (Brax, 2005; Gebauer et al., 2005). However, research on unsuccessful cases of servitization is sparse, and little is known about the factors that inhibit success (Lütjen, Tietze, & Schultz, 2017; Neely, 2008; Valtakoski, 2017). So far, mostly the increased costs and risks faced by servitizing companies have been used as explanations for increased failure rates among them (Benedettini et al., 2015; Benedettini et al., 2017).

By examining both the presence and the absence of servitization success, this study contributes to the understanding of unsuccessful servitization, showing that different configurations of the same factors that explain success also explain a lack of success. The absence of success, however, does not necessarily mean a failed servitization, as also cases that report neutral effects of servitization on their performance belong to the negation of the outcome sets, without necessarily being cases of failed servitization. The asymmetric nature of servitization success is further illustrated by the fact that the solutions for the presence and the absence of the outcomes differ (Frösén et al., 2016). Therefore, both aspects should be analyzed in order to obtain a complete picture of the examined phenomenon.

Organizational structure plays an important part in explaining the absence of servitization success (see Table 6). The discussion of the right organizational structure for services is an important theme in servitization research (Zhang & Banerji, 2017). Previous research has recommended the creation of a separate service organization as a way to prevent the service paradox (Gebauer et al., 2005; Gebauer et al., 2006) and found mostly positive relationships between a separate service organization and performance (Gebauer et al., 2010; Oliva et al., 2012).

In contrast, the present findings clearly indicate the conjunctural, equifinal and asymmetric nature in which the structure of the service organization displays its causal effects on performance. Specifically,

Table 6
Configurations sufficient for the presence of the outcomes

Conditions	Configurations sufficient for the absence of financial service success			Configurations sufficient for the absence of non-financial service success			Configurations sufficient for the absence of overall servitization success		
	1 fs	2 fs	3 fs	1nfs	2nfs	3nfs	1os	2os	3os
Offering focused on SSP		○	○		○	○		○	○
Offering focused on SSC			○		○	○			○
Decentralization	○		○	○		○	○		○
Existence of a separate service organization	●	●		●	●		●	●	
Management commitment to services	○	○	○	○	○	○	○	○	○
Service orientation of corporate culture	○	○	○	○	○	○	○	○	○
Cons.	0.910	0.895	0.909	0.936	0.949	0.950	0.985	0.972	0.986
PRI	0.800	0.763	0.762	0.825	0.848	0.839	0.963	0.931	0.960
Raw Cov.	0.446	0.467	0.514	0.477	0.479	0.558	0.414	0.435	0.479
Unique Cov.	0.042	0.063	0.136	0.056	0.059	0.138	0.037	0.058	0.124
Solution Cons.	0.906			0.921			0.977		
Solution PRI	0.780			0.771			0.941		
Solution Cov.	0.645			0.673			0.596		

● Indicates the presence of the condition, ○ the absence of the condition, and an empty cell that the condition not causally relevant. E.g. configuration 1 fs indicates that the existence of a separate service organization, in combination with the absence of decentralization, management commitment to services, and service orientation of corporate culture, is sufficient for the absence of financial servitization success, regardless of the kind of service offering.

this study shows that when the separate service organization is not supported structurally by the corresponding decision making authority for service managers that comes with decentralization; culturally by a strong service orientation of corporate culture; and strategically by clear goals and objectives set by committed management, this mismatch is sufficient for the absence of servitization success (1 fs/1nfs/1os).² Comparing this configuration to 3OS/6FS/6NFS, it becomes evident that, in the absence of the necessary conditions, the presence of a separate service organization becomes sufficient for the absence of success. The organizational restructuring implied by the creation of a separate service organization is not without risks (Benedettini et al., 2015; Mathieu, 2001b). In addition to the resources that need to be deployed for restructuring (Visnjic & van Looy, 2013), the presence of a separate service organization increases the costs of internal organization and control (Benedettini et al., 2015). Decentralization of decision making and integration mechanisms, like a strong common culture, would be ways to overcome the increased transaction costs (Nadler, Gerstein, & Shaw, 1992). Since these are not present in this configuration, however, it is not surprising that the examined cases exhibiting this configuration consistently fail to achieve service performance.

Similarly, also configurations 2 fs, 2nfs, and 2os stand for a mismatch between structure, strategy, and culture, so the previous argumentation applies. Furthermore, they illustrate the differential effects of the service offering on the lack of financial and overall success on the one, and non-financial success on the other hand. Specifically, not offering SSC is shown to impact on the lack of non-financial success, but not on the lack of financial and overall success.

A general lack of all examined success factors, as in configuration 3 fs/3nfs/3os is also consistently sufficient for the lack of servitization performance in the examined cases, regardless of organizational structure. This configuration could be considered indicative for companies that do not actively attempt servitization but only passively offer a few services because of customer demand or competitive pressure (Mathieu, 2001b). In that case, the offering of services is not due to strategic intent, as indicated by the lack of managerial commitment, which helps explain the lack of success in these cases (Lay et al., 2010). It could also be indicative of an intended effort to deservitize, i.e. to reduce the service offering in order to refocus on the core product

business (Kowalkowski et al., 2017). In that case, the lack of success with services is not perceived as problematic, but is rather the expected outcome of deservitization.

This configuration could also mean that these companies are in the very beginning of their servitization path. In that case, it is in line with the notion that servitization only shows its positive effects after a certain maturity has been reached with the offering (Fang & Palmatier, 2008; Lay et al., 2010; Neely, 2008). Compared to configurations 2FS and 2NFS, however, these results are more nuanced, showing that it is not the limited offering alone that is responsible for lack of performance – as indicated by the existence of successful configurations with a limited offering as well (1FS/1NFS/1OS, 2FS, 2NFS) – but the combination with a lack of service culture, decentralization, and of a strong managerial commitment to the service business.

5. Conclusions

5.1. Summary of contributions

By conducting a state-of-the art fuzzy-set QCA, three necessary conditions for overall success with services were identified. In the examined cases, overall success is not achieved without a strong service orientation of corporate culture, decentralized decision making, and strong managerial commitment to services. The identification of service orientation of corporate culture as necessary condition confirms current research, underlining the critical importance of a cultural reorientation to services for successful servitization. Adopting a configurational approach to success, three equifinal recipes for overall servitization success are identified. In the examined cases, companies that combine the presence of the three necessary conditions with a limited offering of SSC (1OS); or an extensive offering of SSP (2OS); or a separate service organization, regardless of the kind of offering (3OS), consistently achieve overall success.

The present study adds to the literature, by disentangling the complex causalities that surround both the financial and non-financial aspects of servitization success, and by focusing on conditions which have been shown to be interconnected and to impact performance in complex ways, but have not been studied from a configurational perspective. Previous research usually adopts a net-effects approach, aiming to identify one ideal way to be successful with services. In contrast, the present study paints a more nuanced, detailed and rich

² Configurations 1 fs, 1nfs and 1os; 2 fs and 2os; and 3 fs, 3nfs and 3os are each identical.

picture of the different recipes for success.

Second, this study identifies alternative paths to performance that deviate from the mainstream narrative (Luoto et al., 2017). It is shown that 1) performance can be achieved also with a limited service offering, 2) focusing on SSP alone can be a way to success, 3) a limited offering of SSC can be beneficial 4) an extensive offering of SSC, while not obstructive to success, is not causally related to overall success in the examined cases, 5) in some instances, an integrated service organization is preferable to achieve service profitability, 6) the creation of a separate service organization under the “wrong” conditions can lead to a lack of success, and 7) the question of the “right” organization for services should include aspects of vertical differentiation and integration mechanisms. By drawing on contingency theory and configuration research, the present research furthermore provides an alternative explanation to the most commonly applied resource and capabilities based approaches.

Third, empirical evidence for complex causalities surrounding the structure of the service organization is provided. While creating a separate service organization is generally considered positive for servitization performance (Gebauer et al., 2010; Oliva et al., 2012), this study illustrates that, when done under the wrong conditions it can also contribute to a lack of success. The existence of a separate service organization is either positively related to overall success or not causally relevant. For service profitability with a product-oriented offering, however, the integration of the service business is preferable (4FS). At the same time, the results also provide evidence for the risk that comes with restructuring under the wrong conditions (Benedettini et al., 2017), showing that a separate service organization can under some conditions be sufficient for the absence of performance.

The identification of decentralization of decision making authority as necessary for overall success expands this discussion, by illustrating that the distribution of power and the freedom of the service organization to set strategic goals and deploy resources are more critical than the formal structure of the service organization. It is therefore concluded that it is time to examine the structure of the service organization as a complex phenomenon, which does not only include the horizontal but also the vertical differentiation as well as control- and integration mechanisms.

Fourth, by examining the presence and the absence of servitization performance separately, as intended by configuration logic and QCA (Ragin, 2008), a more complete image of servitization success is given. It is shown that the factors commonly used to explain servitization success are principally suitable to explain a lack of success as well. However, the configurations differ, meaning that explanations for servitization success cannot serve equally to explain servitization failure. Failure is not just a mirror image of success. In order to get the whole picture of such a complex phenomenon, both presence and absence of success should be analyzed.

Fifth, this study provides clear empirical evidence for the importance of two servitization success factors that have received limited attention so far: decentralization and management commitment to services. Particularly the identification of managerial commitment to services as necessary for overall success adds to understanding the role of management for servitization (Luoto et al., 2017).

Methodologically, the present study is, to the best of the author's knowledge, the first application of the Enhanced Standard Analysis in servitization. It is an example of a complete, state-of-the-art fsQCA, which includes and reports analyses of necessity and sufficiency, for the presence and the absence of the outcome, considerations regarding membership distributions and logical contradictions, and also conceptually follows configurational and set-theoretic logic. It contributes to configuration research by demonstrating that servitization success and failure are configurational phenomena that can be understood in terms of set relations. It also provides a set-theoretical conceptualization of servitization success as the conjunction of financial and non-financial service success.

5.2. Managerial implications

The findings of this study facilitate better managerial decisions regarding servitization. The identified necessary conditions – service orientation of corporate culture, decentralized decision making authority and managerial commitment to services – can be understood as pre-conditions for success and should be present in any company wishing to achieve superior performance with services. The value of customer services and the importance of services for the business should be deeply ingrained in the company's values, while ensuring that management and employees think and behave accordingly. In traditionally product oriented companies this is not an easy task, as it implies the coexistence of often contradictory cultures. Hiring, promoting, and rewarding for service competence, getting the sales force on board and implementing value based selling, facilitating informal communication and knowledge exchange between the product and service business as well as integrating new product and new service development are ways to achieve this task.

A highly committed management can further support the establishment of a strong service culture. Setting clear service related strategies and objectives, while being ready to deploy the required financial and human resources for their implementation, is a crucial part of successful servitization. This also means having to overcome resistance to change, both from employees as well as fellow management, particularly since the benefits of offering services in a product oriented business are not always recognized by everyone. While committed management is important, it is equally important to award service managers with the freedom and authority to take decisions on the service business. Like this, the people closest to the problem and the customer will be empowered to take the best decisions for the benefit of the service business, further strengthening the service culture.

Overall, the identified configurations can be understood as different roads to servitization success that the companies in the sample have followed. Servitizing companies can benchmark themselves against these paths and thus analyze where they stand, where they want to go and which paths to avoid.

To analyze the status quo, managers of servitizing companies can identify which configuration best fits their organizational reality and adjust accordingly. For example, companies with a given product-oriented service offering can compare their own organizational characteristics with configuration 3FS/3NFS/ 2OS (see Table 5 and Fig. 5). It should be made sure that decision making authority is decentralized, management is highly committed to the service business and a strong service orientation of corporate culture is in place.

To analyze possible trajectories, managers of servitizing companies can identify which organizational factors might have to be adjusted to be ready for the next step along the servitization journey. For example, if the objective is the addition of more advanced, process-oriented services to a currently product-oriented service offering, the creation of an independent and separate service organization with a high degree of decision making authority is advisable to achieve superior service profitability (configuration 5FS).

To avoid pitfalls, managers of companies struggling with achieving higher performance with services should make sure they do not exhibit any of the configurations that are shown to lead to a lack of success (see Table 6). For example, the existence of a separate service organization under the wrong conditions can be risky. If the service organization is not supported by managerial commitment, service managers' decision making authority, and a strong service culture, a lack of performance is to be expected. Overall, servitizing companies should expect to implement changes in their structure, strategy, and culture to be successful with servitization.

5.3. Limitations and future research

Despite its contribution, the present study is not without limitations.

Objective, self-reported measures of performance are used, which tend to be positively biased. While this was considered during calibration, future research should consider using independent measures of performance, also to avoid common method bias (Hair Jr. et al., 2014). Similarly, a single respondent per company was used; future research should try and gather data from multiple sources per organization.

The identified subset relations, even though consistent based on established parameters of fit, are not perfect – as almost always the case in social sciences (Schneider, 2018). Few of the examined cases deviate from the identified subset relations, meaning that they are either members of the solution term without being members of the outcome, or they display the outcome without exhibiting the necessary conditions. From a regularity theory of causation perspective, this means that conclusive causal inferences about the identified subset and superset relations can only be drawn if complemented with thorough within-case analysis (Schneider, 2018). The case-based nature of QCA allows for the identification of individual cases. Future research should utilize this to further examine cases that deviate from the identified subset relations, in order to discover more and alternative causal mechanisms for servitization success and failure (Schneider & Rohlfing, 2013). Also cases that are typical for configurations with low coverage (4FS, 4NFS, 5FS, 5NFS) would be of interest, in order to gain further insight into how they differ from the more common configurations. Comparing path 1OS to path 2OS, there appears to be a substitution effect between a limited offering of SSC and an extensive offering of SSP. This might be indicative of a clear strategic focus, either on the product business and a wide range of related services, or on a limited, but specialized process-related service. More research and in-depth examination of typical cases in each configuration is required to draw a final conclusion on the causal role of the type of service offering for servitization success. To gain further insight on which degree of the identified necessary conditions is required for achieving a given level of servitization success, Necessary Condition Analysis could be applied in future research (Dul, 2016).

The offering of SSC is found causally relevant only for the achievement of service profitability (5FS), but is not causally related to the other examined outcomes. This finding might be due to the operationalization of non-financial success in the present study, which focuses on the impact of the service business on the product business and on retaining and gaining customers. Further research is needed in order to clarify the causal impact of offering SSC on other performance measures, like overall profit growth, quality of customer relationships, firm value or mutual value creation.

While the identified necessity relations are strong, the existence of cases that deviate from these relations warrants further investigation. The analysis for SUIN (sufficient but unnecessary part of a factor that is insufficient but necessary for an outcome, Mahoney, Kimball, & Koivu, 2009; p. 126)(see online appendix) revealed that the simultaneous presence of service orientation of corporate culture and managerial commitment also passes the threshold for the acceptance of necessary

conditions. While not explored in this study, as it was not supported by the measurement model, future research should explore the possibility of a common, higher-order construct encompassing both aspects of service orientation of corporate culture and managerial commitment as causally relevant for servitization success.

The findings are naturally limited to the examined conditions and outcomes. Different outcomes, like service revenue, overall performance, the decision to servitize or to follow different servitization strategies, should also be studied from a configurational perspective. Present research often adopts a resource or capabilities based approach to servitization success. It would be interesting to further investigate configurations of resources and capabilities for servitization-related outcomes (Rönnerberg Sjödin, Parida, & Kohtamäki, 2016; Wilden, Gudergan, Akaka, Averdun, & Teichert, 2018). One critical aspect is the maturity of servitization in the examined cases (e.g. Brax & Visintin, 2017; Martinez et al., 2017), which in this study was captured only based on the type of offering. Future research should utilize different, more complex operationalizations or a temporal approach based on longitudinal data, to capture the dynamic and procedural nature of servitization. Also different, often overlooked conditions, like the organizational environment or characteristics of the customer should be included in future research. Following the identification of management commitment as necessary for success, further research is needed to gain insight into the importance of leadership, different leadership styles, and individual traits of leaders in servitization (Fliess & Lexutt, 2019). Particularly since service orientation of corporate culture was identified as a necessary condition, studying how individuals shape this culture and drive organizational change (Lenka, Parida, Rönnerberg Sjödin, & Wincent, 2018) would be a fruitful research topic. Also other relevant orientations, like customer orientation (Brax & Jonsson, 2009) or service-dominant orientation (Karpen, Bove, & Lukas, 2012; Karpen, Bove, Lukas, & Zyphur, 2015) would be of interest in this context. Regarding the absence of servitization success, future studies should examine how factors like costs, risks, environmental conditions and customer characteristics interplay in producing the service paradox. Finally, also different theoretical lenses, for example path dependency (Schreyögg, Sydow, & Koch, 2009) or new institutional economics (North, 2002) should be applied.

Declarations of interest

None.

Acknowledgements

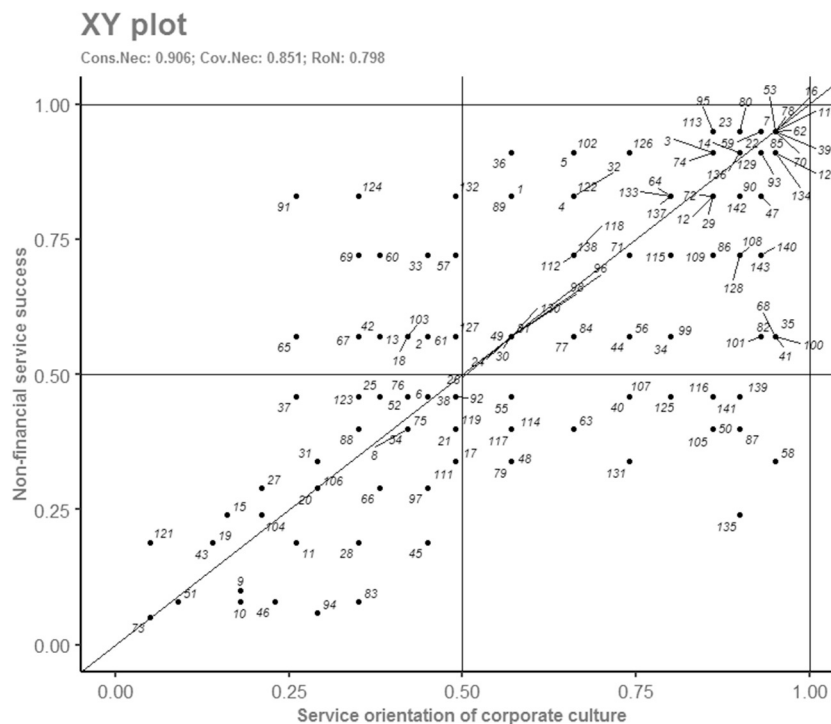
This research was supported by funding from the Gesellschaft der Freunde der Fernuniversität e.V (GdF). The funding source had no involvement in study design; in the collection, analysis and interpretation of data; in the writing of the report; or in the decision to submit the article for publication.

Appendix A. Operationalizations

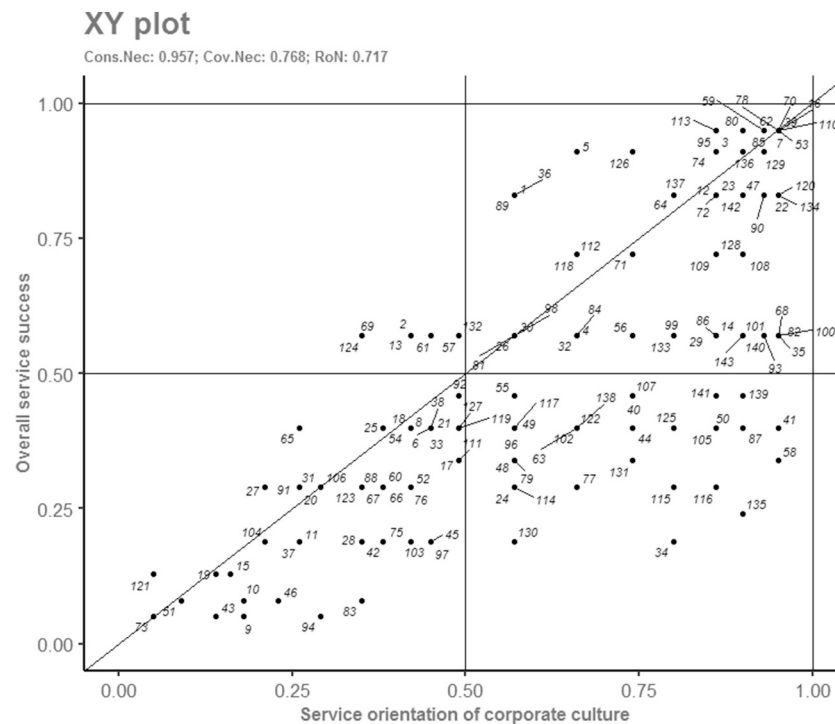
Construct	CR	Items	Loadings	Adapted from
Financial service success (FS)	0.787	The services we offer are very profitable	0.796	Oliva et al. (2012)
Non-financial Service Success (NFS)	0.836	A large fraction of our total profit is generated by our service business	0.815	Raddats et al. (2015)
		Services enable my company to sell new products to existing customers	0.711	
		Services enable my company to win business with new customers	0.780	
		Services help my company to retain existing customers	0.772	
Management Commitment to Services (MCM)	0.882	My company's services enhance the performance of our product	0.729	Oliva et al. (2012)
		We have a clearly defined service strategy	0.749	
		We have clearly defined service business objectives	0.752	
		Our top management recognizes the potential (revenue, profits, customer loyalty) of the service business	0.806	

Service Orientation of Corporate Culture (SOR)	0.908	Our management is motivated to invest time and resources in the service business	0.758	Homburg et al. (2003)
		Sufficient resources are always available to improve service processes and offerings	0.697	
		Management wholly supports employee efforts to improve service offerings	0.705	
		Customer Service is one of the core values of our corporate culture	0.740	
Offering focused on SSP (SSP)*		High-quality customer service is of similarly high importance to us as the quality of our products	0.835	Antioco et al., 2008
		We understand ourselves not only as a supplier of products but as a provider of comprehensive performance bundles for the solution of our customers' problems	0.781	
		Our employees are aware of the importance of a comprehensive and a high-quality customer service and they act accordingly	0.775	
		Our concerns of the customers are of high importance for the employees	0.702	
		Our employees have a distinctive service mentality	0.771	
		Our employees engage strongly in the solution of customers' problems	0.751	
		How actively do you offer the following services (0 = not offered, 5 offered very actively) Product documentation		
		Product transportation/delivery		
		Product installation		
		Help desk/call center/customer service hotline		
Offering focused on SSC (SSC)*		Product inspection/diagnosis		Antioco et al., 2008
		Product repair and spare parts delivery		
		Product upgrades		
		Product refurbishing		
		Product recycling and dismantling / machine brokering		
		Preventive maintenance		
		Condition monitoring		
		Process-oriented engineering (testing, optimizing and simulating)		
		How actively do you offer the following services (0 = not offered, 5 offered very actively)		
		Financing services / Leasing		
Decentralization of Decision Making (DEC)*		Management of spare parts		Antioco et al., 2008
		Process-oriented training (quality-driven including technology)		
		Business oriented training (financially driven/management training)		
		Process oriented consulting (quality-driven including technology)		
		Business oriented consulting (financially driven/management consulting)		
		Managing the customer's maintenance function		
		Research and Development services for customers		
		Fully managing customer's product-related operations (complete outsourcing and ownership of product by vendor)		
		In our company, decision making authority is distributed among different hierarchical levels (decentralized).		
Existence of a Separate Service Organization (SEP)*		Our service business is separated from the product business (Yes/No)		Eggert et al. (2014) Gebauer et al., 2010
		Our service organization runs with its own profit and loss responsibility (Yes/No)		
		Our product and service business essentially share resources with each other (REV) (Yes/No)		

Appendix B



Appendix B1.



Appendix B2.

Appendix C. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.indmarman.2019.06.004>.

References

- Ambroise, L., Prim-Allaz, I., & Teyssier, C. (2018). Financial performance of servitized manufacturing firms: A configuration issue between servitization strategies and customer-oriented organizational design. *Industrial Marketing Management*, 71, 54–68.
- Ambroise, L., Prim-Allaz, I., Teyssier, C., & Peillon, S. (2018). The environment-strategy-structure fit and performance of industrial servitized SMEs. *Journal of Service Management*, 29(2), 301–328.
- Antiochi, M., Moenaert, R. K., Lindgreen, A., & Wetzels, M. G. M. (2008). Organizational antecedents to and consequences of service business orientations in manufacturing companies. *Journal of the Academy of Marketing Science*, 36(3), 337–358.
- Baines, T., Lightfoot, H. W., Benedettini, O., & Kay, J. M. (2009). The servitization of manufacturing: A review of literature and reflection on future challenges. *Journal of Manufacturing Technology Management*, 20(5), 547–567.
- Baines, T., Ziaee Bigdeli, A., Bustanza, O. F., Shi, V. G., Baldwin, J., & Ridgway, K. (2017). Servitization: Revisiting the state-of-the-art and research priorities. *International Journal of Operations & Production Management*, 37(2), 256–278.
- Benedettini, O., Neely, A., & Swink, M. (2015). Why do servitized firms fail? A risk-based explanation. *International Journal of Operations & Production Management*, 35(6), 946–979.
- Benedettini, O., Swink, M., & Neely, A. (2017). Examining the influence of service additions on manufacturing firms' bankruptcy likelihood. *Industrial Marketing Management*, 60, 112–125.
- Böhm, E., Eggert, A., & Thiesbrummel, C. (2017). Service transition: A viable option for manufacturing companies with deteriorating financial performance? *Industrial Marketing Management*, 60(1), 101–111.
- Brax, S. A. (2005). A manufacturer becoming service provider: Challenges and a paradox. *Managing Service Quality*, 15(2), 142–155.
- Brax, S. A., & Jonsson, K. (2009). Developing integrated solution offerings for remote diagnostics. *International Journal of Operations & Production Management*, 29(5), 539–560.
- Brax, S. A., & Visintin, F. (2017). Meta-model of servitization: The integrative profiling approach. *Industrial Marketing Management*, 60, 17–32.
- Ceci, F., & Masini, A. (2011). Balancing specialized and generic capabilities in the provision of integrated solutions. *Industrial and Corporate Change*, 20(1), 91–131.
- Chandler, A. D. (1962). *Strategy and Structure: Chapters in the History of the American Industrial Enterprise*. Cambridge, MA: MIT Press.
- Core Team, R. (2016). R: A language and environment for statistical computing. R foundation for statistical computing Vienna: Austria. URL <https://www.R-project.org/>.
- Dachs, B., Biege, S., Borowiecki, M., Lay, G., Jäger, A., & Scharinger, D. (2014). Servitisation of European manufacturing: Evidence from a large scale database. *The Service Industries Journal*, 34(1), 5–23.
- Daft, R. L. (2016). *Organization theory and design*. Boston: Cengage Learning.
- Deng, F., & Smyth, H. (2013). Contingency-based approach to firm performance in construction: Critical review of empirical research. *Journal of Construction Engineering and Management*, 139(10), 4013004.
- Dess, G., Newport, S., & Rasheed, A. M. A. (1993). Configuration research in strategic management: Key issues and suggestions. *Journal of Management*, 19(4), 775–795.
- Donaldson, L. (2001). *The contingency theory of organizations*. Thousand Oaks, CA: Sage.
- Dul, J. (2016). Identifying single necessary conditions with NCA and fsQCA. *Journal of Business Research*, 69(4), 1516–1523.
- Dusa, A. (2007). User manual for the QCA(GUI) package in R. *Journal of Business Research*, 60(5), 576–586.
- Eggert, A., Hogreve, J., Ulaga, W., & Muenkhoff, E. (2011). Industrial services, product innovations, and firm profitability: A multiple-group latent growth curve analysis. *Industrial Marketing Management*, 40(5), 661–670.
- Eggert, A., Hogreve, J., Ulaga, W., & Muenkhoff, E. (2014). Revenue and profit implications of industrial service strategies. *Journal of Service Research*, 17(1), 23–39.
- Fang, E., Palmatier, R. W., & Steenkamp, J. B. E. M. (2008). Effect of service transition strategies on firm value. *Journal of Marketing*, 72(5), 1–14.
- Finne, M., Brax, S., & Holmström, J. (2013). Reversed servitization paths: A case analysis of two manufacturers. *Service Business: An International Journal*, 7(4), 513–537.
- Fiss, P. C. (2007). A set-theoretic approach to organizational configurations. *The Academy of Management Review*, 32(4), 1180–1198.
- Fiss, P. C. (2011). Building better causal theories: A fuzzy set approach to typologies in organization research. *Academy of Management Journal*, 54(2), 393–420.
- Fliess, S., & Lexutt, E. (2019). How to be successful with servitization – Guidelines for research and management. *Industrial Marketing Management*, 78, 58–75.
- Forkmann, S., Henneberg, S. C., Witell, L., & Kindström, D. (2017). Driver configurations for successful service infusion. *Journal of Service Research*, 20(3), 275–291.
- Forkmann, S., Ramos, C., Henneberg, S. C., & Naudé, P. (2017). Understanding the service infusion process as a business model reconfiguration. *Industrial Marketing Management*, 60(1), 151–166.
- Frösén, J., Luoma, J., Jaakkola, M., Tikkanen, H., & Aspara, J. (2016). What counts versus what can be counted: The complex interplay of market orientation and marketing performance measurement. *Journal of Marketing*, 80(3), 60–78.
- Fundin, A., Wittell, L., & Gebauer, H. (2012). Service transition: Finding the right position on the goods-to-services continuum. *International Journal of Modelling in Operations Management*, 2(1), 69–88.
- Gebauer, H. (2007). An investigation of antecedents for the development of customer support services in manufacturing companies. *Journal of Business-to-Business Marketing*, 14(3), 59–96.
- Gebauer, H. (2008). Identifying service strategies in product manufacturing companies by

- exploring environment-strategy configurations. *Industrial Marketing Management*, 37(3), 278–291.
- Gebauer, H., Edvardsson, B., Gustafsson, A., & Witell, L. (2010). Match or mismatch: Strategy-structure configurations in the service business of manufacturing companies. *Journal of Service Research*, 13(2), 198–215.
- Gebauer, H., & Edvardsson, B. & Bjurko, M. (2010). The impact of service orientation in corporate culture on business performance in manufacturing companies. *Journal of Service Management*, 21(2), 237–259.
- Gebauer, H., & Fleisch, E. (2007). An investigation of the relationship between behavioral processes, motivation, investments in the service business and service revenue. *Industrial Marketing Management*, 36(3), 337–348.
- Gebauer, H., Fleisch, E., & Friedli, T. (2005). Overcoming the service paradox in manufacturing companies. *European Management Journal*, 23(1), 14–26.
- Gebauer, H., Friedli, T., & Fleisch, E. (2006). Success factors for achieving high service revenues in manufacturing companies. *Benchmarking: An International Journal*, 13(3), 374–386.
- Gebauer, H., & Pütz, F. (2007). The impact of service offerings on service-related performance outcomes. *International Journal of Services, Technology and Management*, 8(2), 123.
- Gebauer, H., & Pütz, F. (2009). Organisational structures for the service business in product-oriented companies. *International Journal of Services, Technology and Management*, 11(1), 64.
- Gilbert, D. U., & Heinecke, P. (2014). Success factors of regional strategies for multinational corporations: Exploring the appropriate degree of regional management autonomy and regional product/service adaptation. *Management International Review*, 54(5), 615–651.
- Greckhamer, T., Misangyi, V. F., & Fiss, P. C. (2013). *Chapter 3 the two QCAs: From a small-N to a large-N set theoretic approach, configurational theory and methods in organizational research (2013)*. Bingley: Emerald.
- Grönroos, C. & Helle, P. (2010). Adopting a service logic in manufacturing. *Journal of Service Management*, 21(5), 564–590.
- Hair, J. F., Jr., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis* (7th ed.). Essex: Pearson new international edition.
- Harms, R., Kraus, S., & Schwarz, E. (2009). The suitability of the configuration approach in entrepreneurship research. *Entrepreneurship and Regional Development*, 21(1), 25–49.
- Homburg, C., Fassnacht, M., & Guenther, C. (2003). The role of soft factors in implementing a service-oriented strategy in industrial marketing companies. *Journal of Business-to-Business Marketing*, 10(2), 23–51.
- Jaworski, B., & Kohli, A. (1993). Market orientation: Antecedents and consequences. *Journal of Marketing*, 57(3), 53–70. <https://doi.org/10.2307/1251854>.
- Kan, A. K. S., Adegbite, E., El Omari, S., & Abdellatif, M. (2016). On the use of qualitative comparative analysis in management. *Journal of Business Research*, 69(4), 1458–1463.
- Karpen, I. O., Bove, L. L., & Lukas, B. A. (2012). Linking service-dominant logic and strategic business practice: A conceptual model of a service-dominant orientation. *Journal of Service Research*, 15(1), 21–38.
- Karpen, I. O., Bove, L. L., Lukas, B. A., & Zypur, M. J. (2015). Service-dominant orientation: Measurement and impact on performance outcomes. *Journal of Retailing*, 91(1), 89–108.
- Ketchen, D., Thomas, J., & Snow, C. (1993). Organizational configurations and performance: A comparison of theoretical approaches. *The Academy of Management Journal*, 36(6), 1278–1313.
- Kieser, A., & Nicolai, A. (2005). Success factor research: Overcoming the trade-off between rigor and relevance? *Journal of Management Inquiry*, 14(3), 275–279.
- Kohtamäki, M., Hakala, H., Partanen, J., Parida, V., & Wincent, J. (2015). The performance impact of industrial services and service orientation on manufacturing companies. *Journal of Service Theory and Practice*, 25(4), 463–485.
- Kohtamäki, M., & Helo, P. (2015). Industrial services: The solution provider's stairway to heaven or highway to hell? *Benchmarking*, 22(2), 170–185.
- Kohtamäki, M., Partanen, J., Parida, V., & Wincent, J. (2013). Non-linear relationship between industrial service offering and sales growth: The moderating role of network capabilities. *Industrial Marketing Management*, 42(8), 1374–1385.
- Kotter, J. P. (1995). Leading change: Why transformation efforts fail. *Harvard Business Review*, 61(3), 1–20.
- Kotter, J. P., & Heskett, J. (1992). *Corporate culture and performance*. New York: Free Press.
- Kowalkowski, C., Gebauer, H., Kamp, B., & Parry, G. (2017). Servitization and deservitization: Overview, concepts, and definitions. *Industrial Marketing Management*, 60, 4–10.
- Kowalkowski, C., Windahl, C., Kindström, D., & Gebauer, H. (2015). What service transition? Rethinking established assumptions about manufacturers' service-led growth strategies. *Industrial Marketing Management*, 45(1), 59–69.
- Lay, G., Copani, G., & Jäger, A. & Biege, S. (2010). The relevance of service in European manufacturing industries. *Journal of Service Management*, 21(5), 715–726.
- Lenka, S., Parida, V., Rönnerberg Sjödin, D., & Wincent, J. (2018). Exploring the micro-foundations of servitization: How individual actions overcome organizational resistance. *Journal of Business Research*, 88, 328–336.
- Longenecker, J., & Pringle, C. (1978). The illusion of contingency theory as a general theory. *The Academy of Management Review*, 3(3), 679–683.
- Luoto, S., Brax, S. A., & Kohtamäki, M. (2017). Critical meta-analysis of Servitization research: Constructing a model-narrative to reveal paradigmatic assumptions. *Industrial Marketing Management*, 60(1), 89–100.
- Lütjen, H., Tietze, F., & Schultz, C. (2017). Service transitions of product-centric firms: An explorative study of service transition stages and barriers in Germany's energy market. *International Journal of Production Economics*, 192, 106–119.
- Mahoney, J., & Goertz, G. (2006). A tale of two cultures: Contrasting quantitative and qualitative research. *Political Analysis*, 14(03), 227–249.
- Mahoney, J., Kimball, E., & Koivu, K. L. (2009). The logic of historical explanation in the historical sciences. *Comparative Political Studies*, 16(3), 450–470.
- March, J. G., & Sutton, R. I. (1997). Organizational performance as a dependent variable. *Organization Science*, 8(6), 698–706.
- Martinez, V., Neely, A., Velu, C., Leinster-Evans, S., & Bisessar, D. (2017). Exploring the journey to services. *International Journal of Production Economics*, 192, 66–80.
- Mathieu, V. (2001a). Product services: From a service supporting the product to a service supporting the client. *Journal of Business & Industrial Marketing*, 16(1), 39–61.
- Mathieu, V. (2001b). Service strategies within the manufacturing sector: Benefits, costs and partnership. *International Journal of Service Industry Management*, 12(5), 451.
- Matthyssens, P., & Vandenbempt, K. (2008). Moving from basic offerings to value-added solutions: Strategies, barriers and alignment. *Industrial Marketing Management*, 37(3), 316–328.
- Matthyssens, P., & Vandenbempt, K. (2010). Service addition as business market strategy: Identification of transition trajectories. *Journal of Service Management*, 21(5), 693–714.
- Medzihorsky, J., Oana, I. E., Quaranta, M., & Schneider, C. Q. (2016). *Set methods: Functions for set-theoretic multi-method research and advanced QCA*. (R package, version 2.2).
- Meyer, A., Tsui, A., & Hinings, C. (1993). Configurational approaches to organizational analysis. *The Academy of Management Journal*, 36(6), 1175–1195.
- Mintzberg, H. (1990). The Design School: Reconsidering the Basic Premises of Strategic Management. *Strategic Management Journal*, 11(3), 171–195.
- Miller, D. (1987). The genesis of configuration. *The Academy of Management Review*, 12(4), 686–701.
- Nadler, D. A., Gerstein, M. C., & Shaw, R. B. (1992). *Organizational architecture*. Jossey-Bass.
- Neely, A. (2008). Exploring the financial consequences of the servitization of manufacturing. *Operations Management Research*, 1(2), 103–118.
- Neely, A. (2013). Servitization in Germany: An international comparison. *Cambridge service Alliance* University of Cambridge (November 2013).
- Neu, W. A. (2005). Forming successful business-to-business services in goods-dominant firms. *Journal of Service Research*, 8(1), 3–17.
- Neu, W. A., & Brown, S. W. (2008). Manufacturers forming successful complex business services: Designing an organization to fit the market. *International Journal of Service Industry Management*, 19(2), 232–251.
- North, D. C. (2002). *Institutions, institutional change and economic performance*. 2002. Cambridge: CUP.
- Oliva, R., Gebauer, H., & Brann, J. M. (2012). Separate or integrate? Assessing the impact of separation between product and service business on service performance in product manufacturing firms. *Journal of Business-to-Business Marketing*, 19(4), 309–334.
- Oliva, R., & Kallenberg, R. (2003). Managing the transition from products to services. *International Journal of Service Industry Management*, 14(2), 160–172.
- Ordanini, A., Parasuraman, A., & Rubera, G. (2014). When the recipe is more important than the ingredients. *Journal of Service Research*, 17(2), 134–149.
- Paiola, M., Gebauer, H., & Edvardsson, B. (2012). Service business development in small-to medium-sized equipment manufacturers. *Journal of Business-to-Business Marketing*, 19(1), 33–66.
- Pan, J.-N., Nguyen, & Ngoc, H. T. (2015). Achieving customer satisfaction through product-service systems. *European Journal of Operational Research*, 247(1), 179–190.
- Parida, V., Rönnerberg, S. D., Wincent, J., & Kohtamäki, M. (2014). *Mastering the transition to product-service provision: Insights into business models, learning activities, and capabilities*. Research Technology Management 44–52 May–June.
- Rabetino, R., Harmsen, W., Kohtamäki, M., & Sihvonen, J. (2018). Structuring servitization related research. *International Journal of Operations & Production Management*, 38(2), 350–371.
- Rabetino, R., Kohtamäki, M., & Gebauer, H. (2017). Strategy map of servitization. *International Journal of Production Economics*, 192, 144–156.
- Raddats, C., Burton, J., & Ashman, R. (2015). Resource configurations for services success in manufacturing companies. *Journal of Service Management*, 26(1), 97–116.
- Raddats, C., & Kowalkowski, C. (2014). A reconceptualization of manufacturers' service strategies. *Journal of Business-to-Business Marketing*, 21(1), 19–34.
- Ragin, C. C. (2008). *Redesigning social inquiry – Fuzzy sets and beyond*. Chicago and London: University of Chicago Press.
- Rönnerberg Sjödin, D., Parida, V., & Kohtamäki, M. (2016). Capability configurations for advanced service offerings in manufacturing firms: Using fuzzy set qualitative comparative analysis. *Journal of Business Research*, 69(11), 5330–5335.
- Salonen, A. (2011). Service transition strategies of industrial manufacturers. *Industrial Marketing Management*, 40(5), 683–690.
- Salonen, A., & Jaakkola, E. (2015). Firm boundary decisions in solution business: Examining internal vs. external resource integration. *Industrial Marketing Management*, 51, 171–183.
- Salonen, A., Saglam, O., & Hacklin, F. (2017). Servitization as reinforcement, not transformation. *Journal of Service Management*, 28(4), 662–686.
- Schneider, C. Q. (2018). Realists and idealists in QCA. *Political Analysis*, 26(02), 246–254.
- Schneider, C. Q., & Wagemann, C. (2010). Standards of good practice in qualitative comparative analysis (QCA) and fuzzy-sets. *Comparative Sociology*, 9(3), 397–418.
- Schneider, C. Q., & Wagemann, C. (2012). *Set-theoretic methods for the social sciences – A guide to qualitative comparative analysis*. Cambridge University Press.
- Schneider, M. R., & Eggert, A. (2014). Embracing complex causality with the QCA method: An invitation. *Journal of Business and Management*, 7(1), 312–328.
- Schneider, Q. C., & Rohlfing, I. (2013). Combining QCA and process tracing in set-theoretic multi-method research. *Sociological Methods & Research*, 42(4), 559–597.
- Schreyögg, G., Sydow, J., & Koch, J. (2009). Organizational path dependence: Opening the black box. *Academy of Management Review*, 34(4), 689–709.

- Sirmon, D. G., & Hitt, M. A. (2009). Contingencies within dynamic managerial capabilities: Interdependent effects of resource investment and deployment on firm performance. *Strategic Management Journal*, 30(13), 1375–1394.
- Storbacka, K., Windahl, C., Nenonen, S., & Salonen, A. (2013). Solution business models: Transformation along four continua. *Industrial Marketing Management*, 42(5), 705–716.
- Storey, C., & Hull, F. M. (2010). Service development success: A contingent approach by knowledge strategy. *Journal of Service Management*, 21(2), 140–161.
- Story, V. M., Raddats, C., Burton, J., Zolkiewski, J., & Baines, T. (2017). Capabilities for advanced services: A multi-actor perspective. *Industrial Marketing Management*, 60(1), 54–68.
- Thomann, E., & Maggetti, M. (2017). Designing research with qualitative comparative analysis (QCA). *Sociological Methods & Research*, 66, 004912411772970.
- Tóth, Z., Henneberg, S. C., & Naudé, P. (2017). Addressing the ‘qualitative’ in fuzzy set qualitative comparative analysis: The generic membership evaluation template. *Industrial Marketing Management*, 63, 192–204.
- Tukker, A. (2004). Eight types of product–service system: Eight ways to sustainability? Experiences from SusProNet. *Business Strategy and the Environment*, 13(4), 246–260.
- Uлага, W., & Reinartz, W. J. (2011). Hybrid offerings: How manufacturing firms combine goods and services successfully. *Journal of Marketing*, 75(6), 5–23.
- Valtakoski, A. (2017). Explaining servitization failure and deservitization: A knowledge-based perspective. *Industrial Marketing Management*, 60, 138–150.
- Vandermerwe, S., & Rada, J. (1988). Servitization of business: Adding value by adding services. *European Management Journal*, 6(4), 314–324.
- Venkatraman, N. (1989). Strategic orientation of business enterprises: The construct, dimensionality, and measurement. *Management Science*, 35, 942–962.
- Visnjic, K. I., & van Looy, B. (2013). Servitization: Disentangling the impact of service business model innovation on manufacturing firm performance. *Journal of Operations Management*, 31(4), 169–180.
- Vorhies, D., & Morgan, N. (2003). A configuration theory assessment of marketing organization fit with business strategy and its relationship with marketing performance. *Journal of Marketing*, 67(1), 100–115.
- Wageman, C., Buche, J., & Siewert, M. B. (2016). QCA and business research: Work in Progress or consolidated agenda? *Journal of Business Research*, 69(7), 2532–2540.
- Wang, W., Lai, K.-H., & Shou, Y. (2018). The impact of servitization on firm performance: A meta-analysis. *International Journal of Operations & Production Management*, 38(7), 1562–1588.
- Wilden, R., Gudergan, S., Akaka, M. A., Averdung, A., & Teichert, T. (2018). *The role of cocreation and dynamic capabilities in service provision and performance: A configurational study*. Industrial Marketing Management.
- Woodside, A. G. (2015). Constructing business-to-business marketing models that overcome the limitations in variable-based and case-based research paradigms. *Journal of Business-to-Business Marketing*, 22(1–2), 95–110.
- Zaefarian, G., Naudé, P., & Henneberg, S. C. (2010). Configuration theory assessment of business relationship strategies: Conceptual model and hypothesis development. *Journal of Customer Behaviour*, 9(3), 299–316.
- Zaefarian, G., Thiesbrummel, C., Henneberg, S. C., & Naudé, P. (2017). Different recipes for success in business relationships. *Industrial Marketing Management*, 63, 69–81.
- Zhang, W., & Banerji, S. (2017). Challenges of servitization: A systematic literature review. *Industrial Marketing Management*, 65, 217–227.