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Target and position article

How to be successful with servitization – Guidelines for research and management

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1. Introduction

Servitization (Vandermerwe & Rada, 1988) or service transition (Oliva & Kallenberg, 2003) is a global trend in manufacturing (Lay, Copani, Jäger, & Biege, 2010) with antecedents that go back 150 years, when the integration of manufacturing and service aimed at establishing market entry barriers by controlling the supply chain (Schmenner, 2009). Servitization encompasses offering simple, product-related services as well as complex hybrid offerings (Ulaga & Reinartz, 2011), integrated solutions (Brax & Jonsson, 2009) or product service systems (Tukker, 2004). Companies like IBM, General Electric, Xerox, Kone, ABB, and Caterpillar have served as prominent examples of servitization in manufacturing. Manufacturers offer services mainly for economic reasons. By offering maintenance and repair services or spare parts management for their installed base, they can generate additional consistent and reliable revenue (Oliva & Kallenberg, 2003). Services in fact allow for higher profit margins than products, which face strong competitive pressure due to the globalization of production and declining prices (Martin & Horne, 1992; Oliva & Kallenberg, 2003). Services generate more stable payment flows, for example through maintenance or leasing contracts, and balance fluctuations in cash flow (Fang, Palmatier, & Steenkamp, 2008; Gebauer & Friedli, 2005). The demand for services is also growing, because, on the one hand, customers want to focus on their own core competencies, thus outsourcing peripheral service activities (Gebauer, Wang, Beckenbauer, & Krempl, 2007). On the other hand, customers want to improve their own production processes, resulting in more complex customer needs and a demand for increasingly sophisticated and customized services (Baines, Lightfoot, Benedettini & Kay, 2009).

Although promising, service transition does not always yield the expected positive effect on organizational performance, and sometimes even has a negative impact. This phenomenon is referred to in the literature as the service paradox (Brax, 2005; Gebauer, Fleisch, & Friedli, 2005). Fang et al. (2008) studied the effect of service transition on firm value and show that the effect becomes positive when service revenue reaches 20–30% of the company's total revenue. If the share of service revenue is below that, offering services might have a negative impact on firm value. Overall, the share of service revenue is still low in European manufacturing businesses and the implemented service strategies are not fully developed (Dachs et al., 2014; Lay et al., 2010). The risks of servitization are also emphasized by Neely (2008), who found a disproportionately large proportion of bankrupt servitized firms in his sample of 10.028 manufacturing firms from 25 different countries.

The service paradox indicates that servitization is inevitably associated with various challenges and pitfalls, particularly since shifting the focus from products to services entails more than just adding services to the offering (Brax, 2005). But what critical preconditions must companies fulfill, in order to overcome these challenges and become successful service providers? A large number of mostly qualitative studies have attempted to answer to this question (e.g. Gebauer, Friedli, & Fleisch, 2006; Neu & Brown, 2008). These case study or expert-interview-based studies often identify a plethora of specific and rather ungeneralizable factors, while the comparatively small number of quantitative studies focuses on the influence of a few general factors on various performance indicators (e.g. Eggert, Hogreve, Ulaga, & Muenkhoff, 2011; Gebauer & Pütz, 2007). However, there is no consensus on the critical factors that impact on the success of a service transition. It is also not always clear when a service transition can really be considered successful. The fact that there are many different conceptualizations of what constitutes a service transition strategy, further hinders the applicability of findings from one context to another. The aim of our study is therefore twofold: first, to identify and structure the different perceptions of service transition and service transition strategies in the literature; and second, to identify and categorize the critical factors that affect the success of manufacturers' servitization endeavors within a comprehensive framework, formulating testable propositions. Ultimately, such a framework should consolidate our knowledge in the field, serving as a guide for future research and as support for informed management decision making.

The paper is structured as follows: the following section presents a brief overview of literature reviews on servitization, arguing that there remains need for a systematic review of the factors influencing the success of service transition. In Section 3, we introduce the systematic literature review (Tranfield, Denyer, & Smart, 2003), as the method used in this study, and provide a descriptive overview of our data set. Section 4 presents the results of our literature analysis. First, we

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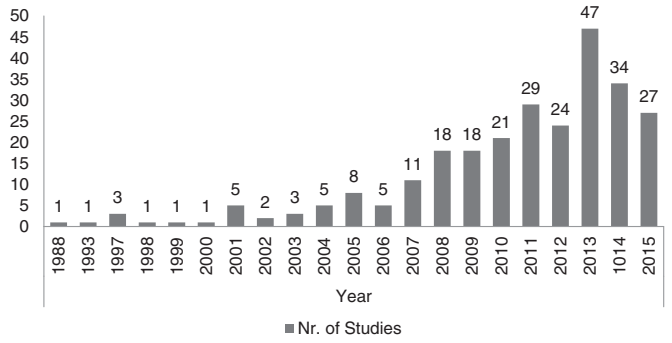

Fig. 1. Distribution of publications through time.

systematize and discuss the different perceptions of service transition and service strategies in the literature. We then demonstrate and analyze our comprehensive framework, which summarizes and categorizes the success factors of service transition that have been identified through the systematic literature review, yielding testable propositions. In Section 5, we discuss our key contributions and their implications for future research and management practice.

2. Literature reviews in the servitization field

Servitization research has its roots in the late 1980s (Vandermewe & Rada, 1988), although the output started growing rapidly in the early 2000s (see Fig. 1). Given that the field extends over 15 years of intensive research activity, the need for a systematic overview over the central themes and findings, particularly regarding servitization success factors, becomes evident.

There is a small, but important number of servitization related literature reviews (Baines, Lightfoot, Benedettini, & Kay, 2009; Bigdeli, Baines, Bustinza, & Shi, 2017; Eloranta & Turunen, 2015; Gebauer, Ren, Valtakoski, & Reynoso, 2012; Kohtamäki & Helo, 2015; Lightfoot, Baines, & Smart, 2013). Baines, Lightfoot, et al. provided the first state of the art review of the servitization literature in 2009, focusing on defining servitization and summarizing the evolution of the research field, the reasons for, and the challenges of servitization. They included 58 articles from the servitization field. Subsequently, Lightfoot et al. (2013) conducted the most exhaustive review so far. Analyzing 148 papers, they identified service marketing, service management, operations management, product service systems, and service science management and engineering as the dominant research communities involved with servitization-related issues. Adopting a broader, interdisciplinary approach in their search, they provide a comprehensive overview of the field and its main research concerns.

Eloranta and Turunen (2015) and Bigdeli et al. (2017) follow a deductive approach in their reviews. Eloranta and Turunen (2015) adopt a strategic management perspective, focusing on how competitive advantage is explained in the servitization literature. Analyzing 79 articles from the servitization and solution literature, they identify Porter's competitive forces, the resource based view, the dynamic capabilities approach, and the relational view, as having substantial explanatory power. Bigdeli et al. (2017) adopt a change management perspective, and identify the content, context and process of servitization related change, including 158 papers from the servitization field.

While some of the studies perform a systematic review (Baines, Lightfoot, et al., 2009; Bigdeli et al., 2017; Eloranta & Turunen, 2015; Lightfoot et al., 2013), others adopt a narrative approach (Gebauer et al., 2012, Kohtamäki & Helo, 2015;). Kohtamäki and Helo (2015) emphasize the importance of an environment strategy fit and specific capabilities for offering industrial services, while proposing a critical perspective on the conceptualization and measurement of service strategies. Gebauer et al. (2012) document research progress in the field, also addressing the financial consequences of services in manufacturing, and offering useful directions for future research.

No literature review so far focuses on identifying and categorizing the factors that have a critical impact on the success of the service transition. Most reviews adopt a relatively narrow scope (Lightfoot et al., 2013 being the exception), focusing exclusively on the servitization literature, excluding the closely related fields of integrated solutions and product service systems. While providing valuable insight into the research field, the main criticism of narrative reviews, which to date dominate management research (Tranfield et al., 2003), is that they are not based on those values and assumptions which determine the inclusion or exclusion of references in the review (Fink, 1998; Hart, 1998). Consequently, narrative reviews are high in researcher bias and difficult to replicate. More transparent, replicable, and rational reviews are needed, in order to synthesize and organize the empirical and conceptual knowledge in the field. This ultimately would enable an evidence-informed formulation of management recommendations and directions for future research (Lightfoot et al., 2013).

3. Methodology

In order to identify and systematize the servitization success factors, we conduct a systematic literature review, following a replicable, scientific and transparent process, in which all decisions and conclusions are documented in detail, consequently minimizing researcher bias (Cook, Mulrow, & Haynes, 1997; Tranfield et al., 2003). The systematic review process consists of 3 main stages (Tranfield et al., 2003): 1) the identification of relevant research to be included in the first literature screening, 2) the selection of studies to be included in the review, based on predefined and documented selection criteria, 3) the extraction of data, using a data extraction form in which general information and emerging themes of the studies are documented, and 4) data synthesis, in which the gathered data are interpreted, categorized and summarized. All steps and decisions have to be elaborately documented in a review protocol.

We used the research databases made available through EBSCOhost and Web of Science to identify relevant publications for our analysis (Step 1). Together, they provide access to over 50.000 scholarly books, 160.000 conference proceedings and 12.000 peer reviewed journals, including the marketing, management and service journals that are particularly relevant for our research. Based on a preliminary literature search and the in-depth study of servitization related research over the past few years, we identified a large number of subject terms under which servitization is discussed. First, we searched for the terms most widely used to describe the phenomenon: *service transition, servitization, service integration, service infusion, service paradox, product service system, hybrid offering, service addition, integrated solutions, customer solutions, solution provider, solution business,* and *value-added solutions.* However, not all related research uses this terminology, with some scholars using more descriptive language. Therefore, we included the terms: *product substituting service, product related services, transition from products to services, service strategies in product manufacturing companies* and *industrial service offering.* Finally, to ensure that relevant research is included from scholars who are not traditionally B2B-oriented, and which uses more service-related terminology, we searched for the terms *service orientation, service logic, service business, service strategy,* and *service revenue,* in combination with *manufacturing, success,* and *performance.* By applying this wide range of search terms, we ensure that relevant research from operations, industrial marketing and service research is included in our review. The literature search was conducted during the period from May to September 2015. An initial review of the titles and abstracts of the search results yielded 447 articles for further inspection.

Next, we applied selection criteria to refine our choice of studies for inclusion in the detailed analysis (step 2). Only studies from the business-to-business context were selected, which examine the service transition of producing companies and –implicitly or explicitly– address

prerequisites for a successful transition. Papers that focus on structuring or taxonomizing the existing service offerings or strategies were also included. Qualitative, quantitative, and conceptual work was included, as well as contributions from scholarly books, conference proceedings and practitioner periodicals, as we are interested in diverse viewpoints and attempt to reduce the publication bias inherent to all literature reviews (Harrison, Banks, Pollack, O'Boyle, & Short, 2017). The vast majority (91%) of the included studies, however, was published in academic journals. We excluded studies that concentrate on the impact of product service systems on the environment, as they do not account for the success of services in an entrepreneurial sense. Studies that focus on the design, development and engineering of services or PSS are excluded, as they fall into the realm of innovation research, which is not our focus here. In order to keep the review transparent and replicable, cross-references are not included in the analysis. All decisions, intermediate results, and inclusion and exclusion criteria were reported in a review protocol.

The literature selection process resulted in 265 studies, published in 69 peer-reviewed journals, 7 conference proceedings, 4 books, and 14 practitioner journals, all forming the base of our analysis. The publication dates range from 1988 to 2015, with a noticeable rise in publications since the mid-2000s, and a peak in 2013 (see Fig. 1). A broad range of journals was included. Marketing, service, business research, operations management, and production management journals are represented (see Table 1 for the 10 most represented journals), indicating that the service transition, due to its impact on several organizational functions, is relevant to many different research domains. Most publications (35) appeared in Industrial Marketing Management, followed by the Journal of Service Management (23 publications) and the Journal of Business & Industrial Marketing (16 publications). 60% of the studies are qualitative, 15% purely quantitative, while 5% adopt a mixed-methods approach. 20% of the studies are conceptual, either in the sense of literature reviews or of non-empirical work.

To answer our research questions, we analyzed the full text of the 265 contributions, creating a data extraction form. (Step 3). For each contribution, we identified and documented the following: first, the kind of service strategy being studied, the authors concentrate on a specific type of service offering or strategy, identify different categories of offerings or strategies, or make no differentiation? Second, which factors are assumed to have an effect on service transition success? Third, how is service transition success conceptualized and measured? The following discussion of our results clarifies how the data were synthesized (Step 4).

4. Findings and discussion

4.1. Perceptions and conceptualizations of service offerings, service strategies, and service transition

An unclear use of terminology complicates the servitization discussion. In addition to the many research domains involved, all using different terms to describe a similar phenomenon, the terms "service strategy" and "servitization" (and its siblings) are often used interchangeably, or are defined differently in different studies (or are used without providing any definition at all).

Vandermewe and Rada introduced the term *servitization* in 1988 to describe "offering fuller market packages or bundles of customer focused combinations of goods, services, support, self-service and knowledge" (Vandermewe & Rada, 1988, p.316). Since then, numerous marketing, operations management, and service management scholars have taken up the topic, using different, sometimes synonymous and sometimes related terminology to describe the phenomenon. Service Transition (e.g. Fundin, Wittel, & Gebauer, 2012; Oliva & Kallenberg, 2003) and Service Infusion (e.g. Eggert et al., 2011; Kowalkowski, Kindström, Brashear, Brege, & Biggemann, 2012) are usually used synonymously to describe the process of a pure manufacturer becoming a service provider (Ostrom et al., 2010). Ulaga and Reinartz (2011) use the term "hybrid offering" to emphasize the importance of combining tangible products with intangible services to increase customer value (Shankar, Berry, & Dotzel, 2009). Integrated solutions play a special role in servitization research. Brax and Jonsson (2009) define integrated solutions as "a bundle of physical products, services and information, seamlessly combined to provide more value than the parts alone […]" (Brax & Jonsson, 2009, p. 136). The product service systems research also intersects with servitization research (Baines, Lightfoot, & Kay, 2009). Product service systems, or PSS, describe, similarly to hybrid offerings or integrated solutions, combinations of products and services to provide customer value, while simultaneously reducing the use of natural resources and consequently contributing to environmental sustainability (Mont, 2002). In the context of this study, we use the terms *service transition* and *servitization* interchangeably, and perceive becoming a provider of integrated solutions or of PSS as an advanced form of servitization, with providers implementing sophisticated service strategies (Helander & Möller, 2008; Matthyssens & Vandenbempt, 2010; Storbacka, 2011). Table 2 provides an overview of the most commonly used terms in the field.

We identified 3 different categories of studies in our data set (see Table 3 for a summary): 1) Studies which, while acknowledging the dynamic development of a service offering, focus on one specific type of offering, mostly integrated solutions or PSS. 2) Studies which do not differentiate between kinds of service offerings or strategies, adopting a more generalist view, perceiving the offering of any kind of service as evidence of the existence of a service transition and a service strategy. 3) Studies which do differentiate between different kinds of service offering or service strategy. These can be categorized further into studies focusing on service offerings, those focusing on transition paths and those focusing on servitization strategies.

It is generally acknowledged that there are many different types of industrial service offerings (Raddats & Kowalkowski, 2014). However, there is no agreement on how to summarize and structure these offerings, as several relevant dimensions are used to create typologies. Early studies distinguish between whether the service is offered before, during or after the product sale (Frambach, Wels-Lips, & Gündlach, 1997; Homburg & Garbe, 1999) or separate between "basic" or "elementary" traditional services, such as maintenance and repair, and "advanced" or "intricate" services, such as business consulting (Baines, Lightfoot, Smart, & Fletcher, 2013; Boyt & Harvey, 1997; Kotler, 1994). In 2001, Mathieu introduced the recipient of the service as the main differentiator, distinguishing between 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). Offering services that support the client has strategic implications, as intimate customer knowledge becomes critical for their provision (Mathieu, 2001a). The Mathieu 2001 typology is widely recognized, due to its simple but

Table 1
Top 10 Journals with servitization related publications.

Journal	Number of studies
Industrial Marketing Management	35
Journal of Service Management	23
Journal of Business & Industrial Marketing	16
Journal of Cleaner Production	14
International Journal of Operations & Production Management	9
Journal of Manufacturing Technology Management	9
Strategic Change	8
The Service Industries Journal	8
European Management Journal	6
Journal of Service Theory and Practice (prev. Managing Service Quality)	6

Table 2
Overview of terms and definitions in servitization related research.

Term	Definition	Number of studies with term in title	Examples of studies
Servitization	"The increased offering of fuller market packages or bundles of customer focused combinations of goods, services, support, self-service and knowledge in order to add value to core product offerings" Vandermewe & Rada, 1988, S. 314 "Servitization is the innovation of an organization's capabilities and processes to better create mutual value through a shift from selling product to selling PSS" Baines, Lightfoot, Benedettini & Kay, 2009, p. 555	42	Baines & Lightfoot, 2013; Dachs et al., 2014; Finne, Brax, & Holmström, 2013; Smith, Maull, & Ng, 2014; Turunen & Finne, 2014
Service Transition	"Studies in both marketing and strategy literature argue that manufacturing firms should shift to solution and/or service offerings to improve their competitive position in the era of intense global competition and increasing commoditization that characterizes many product markets […]. We refer to these strategic redirections as service transition strategies" Fang et al., 2008, p. 2	11	Kowalkowski, Windahl, Kindström, & Gebauer, 2015; Oliva & Kallenberg, 2003; Salonen, 2011
Service Infusion	"We use "service infusion in manufacturing firms" to capture the empirical phenomenon, whose common denominator is the increased importance of service in the offering and organization of manufacturing firms" (Kowalkowski, Witell, & Gustafsson, 2013, p. 18)	4	Eloranta & Turunen, 2014; Gustafsson, Brax, & Witell, 2010; Kowalkowski et al., 2012
Hybrid Offering	"Hybrid solutions are products and services combined into innovative offerings" (Shankar et al., 2009, p.95)	3	Rapaccini & Visintin, 2015;Ulaga & Reinartz, 2011
Integrated Solution	"We define an integrated solution offering as a bundle of physical products, services and information, seamlessly combined to provide more value than the parts alone, that address customer's needs in relation to a specific function or task in their business system; it is long-term oriented, integrates the provider as part of the customer's business system, and aims at optimizing the total cost for the customer" Brax & Jonsson, 2009, p. 136	19	Davies, 2004; Davies, Brady, & Hobday, 2006; Storbacka, 2011; Windahl & Lakemond, 2010
Product Service System	"A PSS should be defined as a system of products, services, supporting networks and infrastructure that is designed to be competitive, satisfy customer needs and have a lower environmental impact than traditional business models" Mont, 2002, p. 239	34	Baines et al., 2007; Reim, Parida, & Örtqvist, 2015; Tukker, 2004

fundamental nature, and is used particularly in quantitative studies, as it facilitates the meaningful and straightforward operationalization of different service offerings (Antioco, Moenaert, Lindgreen, & Wetzels, 2008; Eggert et al., 2011; Eggert, Hogreve, Ulaga, & Muenkhoff, 2014).

The distribution of property rights between provider and buyer is used to systematize different categories of PSS (Adrodegari, Alghisi, Ardolino, & Saccani, 2015; Park, Geum, & Lee, 2012; Tukker, 2004). The most widely used is the categorization from Tukker (2004), who differentiates between product-oriented services, which include those extending over the entire product life-cycle, and also advice and consultancy in relation to the most efficient use of the product; use-oriented services, which include renting, leasing and sharing models; and result-oriented services, which include outsourcing and performance-contracting models. The strength of this typology lies in its inclusion of industrial service models for which the ownership of the product remains with the provider. This has strategic implications, due to the increased involvement with the customer and the associated changes in the business model (Witell & Löfgren, 2013).

One major criticism of the early categorizations is that they are descriptive, neglecting the underlying strategic aims of the service transition (Gebauer, 2008; Kohtamäki & Helo, 2015; Raddats & Kowalkowski, 2014). In response to this criticism, Gebauer identified 4 types of service strategies in his 2008 study, combining clusters of external environment characteristics, including competitive intensity and price sensitivity; and strategy characteristics, including cost leadership and differentiation. The resulting types were referred to as after-sales service providers, customer support providers, outsourcing partners, and development partners (Gebauer, 2008), and while including the strategic and environmental constellations in which they are usually found, mostly describe the dominant service offering.

Table 3
Different perceptions of service transition in the literature.

Type of study	Number of studies	Examples of studies
1) Focus on specific type of offering	67	
Product-oriented services	4	Baines, Lightfoot, Peppard, et al., 2009; Gebauer & Pütz, 2009; Gebauer, Pütz, Fischer, & Fleisch, 2009; Zähringer, Niederberger, Blind, & Schletz, 2011
Advanced customer-related services	9	Baines & Lightfoot, 2013; Gebauer, 2007; Kohtamäki, Partanen, & Möller, 2013
Integrated Solutions	30	Biggemann, Kowalkowski, Maley, & Brege, 2013; Brady, Davies, & Gann, 2005; Brax & Jonsson, 2009; Davies et al., 2006; Tuli, Kohli, & Bharadwaj, 2007
PSS	20	Cook, Gottberg, Angus,& Longhurst, 2012; Durugbo, 2013; Lindahl, Sundin, & Sakao, 2014; Tukker, 2015
Operator models	4	Datta & Roy, 2011; Hornschild, Kinkel, & Lay, 2004; Kumar & Markeset, 2007; Smith, 2013
2) No differentiation	100	Dachs et al., 2014; Fang et al., 2008; Gebauer et al., 2005; Gebauer, Gustafsson, & Witell, 2011; Lay et al., 2010; Oliva, Gebauer, & Brann, 2012
3) Differentiation between offerings or strategies	98	
Offering typologies	59	Boyt & Harvey, 1997; Gebauer, 2008; Mathieu, 2001a; Tukker, 2004; Ulaga & Reinartz, 2011
Transition paths	11	Davies, 2004; Gebauer & Kowalkowski, 2012; Kowalkowski et al., 2015; Matthyssens & Vandenbempt, 2010; Oliva & Kallenberg, 2003
Servitization strategies	28	Kohtamäki & Helo, 2015; Kowalkowski et al., 2012; Raddats, 2011; Storbacka, Windahl, Nenonen, & Salonen, 2013

Although they constitute significant contributions to the research field, all service offering taxonomies share a common shortcoming, that is, they fail to capture the dynamic nature of the transition from products to services (Kowalkowski et al., 2015). This is where studies focusing on transition paths or growth trajectories come into play. In these studies, it is commonly assumed that the development from product-centric to service-centric business takes place along a continuum, which was described as the product service continuum by Oliva & Kallenberg in 2003. The starting point of the service transition is the product oriented manufacturing business. While moving through different development phases along the continuum, the importance of services in the provider's portfolio increases, and more complex service offerings replace the simple, product-oriented ones (Davies, 2004; Oliva & Kallenberg, 2003; Parida, Sjödin, Wincent & Kohtamäki, 2014). The number of intermediate phases differs between studies (Oliva & Kallenberg, 2003; Sawhney, Balasubramanian, & Krishnan, 2004; Vandermewe & Rada, 1988), but the ultimate goal of the service transition is assumed to be that of reaching the final point on the trajectory (Vandermewe & Rada, 1988). This final point can be taking over the customer's operation (Oliva & Kallenberg, 2003), becoming a solution partner (Matthyssens & Vandenbempt, 2010), a strategic partner (Matthyssens, Vandenbempt, & Weyns, 2009), or adopting a pure service orientation (Davies, 2004). It is also assumed that, in order to be successful, the provider needs to undergo intermediate development phases (Gebauer & Friedli, 2005; Ulaga & Reinartz, 2011). The kind of dominant service offering is generally used to determine the current development phase of the provider (Gebauer, Edvardsson, Gustafsson, & Witell, 2010). Alternative possible trajectories along different dimensions are identified by some studies, such as a product or process orientation (Kowalkowski, Brehmer, & Kindström, 2009), relationship or process orientation (Oliva & Kallenberg, 2003) or focus on business process or technical integration (Matthyssens & Vandenbempt, 2008).

Both alternative combinations of service offerings (Gebauer et al., 2010), as well as alternative orders, in which different service types are added to the offering, i.e. alternative transition paths (Matthyssens & Vandenbempt, 2010), are referred to as service strategies in the literature (Kohtamäki & Helo, 2015). More recent studies however, offer a more differentiated and fine-grained view. Empirical research has shown that the service transition is not always unidirectional, identifying the existence of reverse servitization paths (Finne & Holmström, 2013), divestment (Fundin et al., 2012) or standardization efforts (Kowalkowski et al., 2015). The objective of manufacturer servitization is not always to become a solution provider or to adopt a complete service orientation. Manufacturers rather focus some of their resources and activities on developing the service business, while simultaneously building up their product business (Kowalkowski et al., 2015; Storbacka et al., 2013). Also, the often assumed equation of the type of service offering with the adopted service strategy is surely flawed, as providers do not usually give up the product-oriented or after sales service business, when evolving towards more sophisticated services, thus leading to the co-existence of simple and complex service offerings (Kowalkowski et al., 2015; Raddats & Kowalkowski, 2014; Windahl & Lakemond, 2010). These studies look deeper into the servitization process and conceptualize servitization strategies as the different ways companies achieve their service-related goals, thus adopting a truly strategic viewpoint, which goes beyond describing service offerings or transition paths (Kohtamäki & Helo, 2015; Porter, 1980).

Based on the previous discussion, service transition or servitization can be defined as the process of a product-oriented company intensifying, broadening or redefining its service business. Such servitization always involves a change, either at the tactical, strategic or cultural level (Mathieu, 2001b), and is characterized by service offerings, transition paths and servitization strategies, which are interrelated but not interchangeable terms (see Fig. 2). The service offering describes the different types of service the company provides, which can be product-related or stand-alone services. The transition path describes the evolutionary steps the company has taken in the servitization process. More advanced positions along the path are related to broader or more mature service offerings. Finally, servitization strategy can be defined as the specific combination of plans and actions undertaken to achieve the company's service-related goals. These goals can be to undergo the entire transition process to become a solution provider, although intermediate stages or standardization efforts are also possible (Kowalkowski et al., 2015; Storbacka et al., 2013).

4.2. *Service transition success* factors

In order to discuss the success factors, we must first look into how success is perceived in the various studies. Only 48 of the analyzed studies (18%) specifically mention performance criteria for the service transition, of which the most (36) are quantitative studies. A mix of financial and non-financial performance criteria is applied to conceptualize and measure service transition success: overall revenue and profit levels (e.g. Eggert et al., 2011; Gebauer, 2009; Kinkel, Kirner, Armbruster, & Jäger, 2011; Visnjic & van Looy, 2013); overall revenue and profit growth rates (e.g. Eggert, Thiesbrummel, & Deutscher, 2014; Kohtamäki, Partanen, Parida, & Wincent, 2013; Pan & Nguyen, 2015); service-related revenue and profit levels (e.g. Gebauer & Pütz, 2009; Lay et al., 2010; Oliva et al., 2012); service-related revenue and profit growth rates (Eggert, Hogreve, Ulaga & Münkhoff, 2014; Parida, Rönnberg, Wincent, & Kohtamäki, 2014); share of service revenue (e.g. Bikfalvi, Lay, Maloca, & Waser, 2013; Dachs et al., 2014; Gebauer & Fleisch, 2007; Parida et al., 2014); customer satisfaction (Ceci & Masini, 2011; Homburg & Garbe, 1999; Oliva et al., 2012; Pan & Nguyen, 2015), customer retention (Gebauer, 2008), and quality of the customer relationship (Gebauer &Pütz, 2007,2009; Oliva et al., 2012) being the most popular. More elaborate financial measures, like firm value (Fang et al., 2008) or return on investment (Kohtamaki, Hakala, Partanen, Parida, & Wincent, 2015; Pan & Nguyen, 2015) are also evident, but not widely applied. Generally, a service transition is considered successful, if it has a positive direct or indirect impact on the financial or non-financial performance of the firm. However, such an impact has been measured only in quantitative studies. The qualitative studies, which make up the majority of our data set, concentrate almost exclusively on successful transitions, but usually without explicitly stating how this success is conceptualized (Fischer, Gebauer, Gregory, Ren, & Fleisch, 2010; Gaiardelli, Resta, Martinez, Pinto, & Albores, 2014; Gebauer et al., 2006; Gebauer, Bravo-Sanchez, & Fleisch, 2007; Grönroos & Helle, 2010; and Raja, Bourne, Goffin, Çakkol, & Martinez, 2013 are noteworthy exceptions). Therefore, we assume that the conditions presented in them lead to the success of the service transition, while at the same time we call for further empirical examination of the assumed relations.

The factors we identified from our analysis of qualitative, quantitative, and conceptual work as impacting on the success of the service transition can be grouped into 1) company-related factors, 2) customer-related factors, and 3) environmental factors (see Table 4), corresponding to the classic marketing perspective, according to which a company's success is determined by its strengths and weaknesses compared to those of the competition, as perceived by the customers, within a specific market environment (Porter, 1998). Given that the relationships that have been confirmed in quantitative studies are of particular interest when looking into factors affecting firm performance, Table 5 contains a summary of these effects. Fig. 3 gives an overview of the identified success factors and their interrelationships. The starting point for the service transition is to assign strategic importance to the offering of services (Oliva & Kallenberg, 2003). Therefore, the integration of services into corporate strategy is positioned at the top of the "servitization house". All other company-related changes and activities contribute to strategic integration. The columns contain the elements of organizational architecture which need to be adapted, since "structure follows strategy" (Chandler, 1962; Mintzberg,

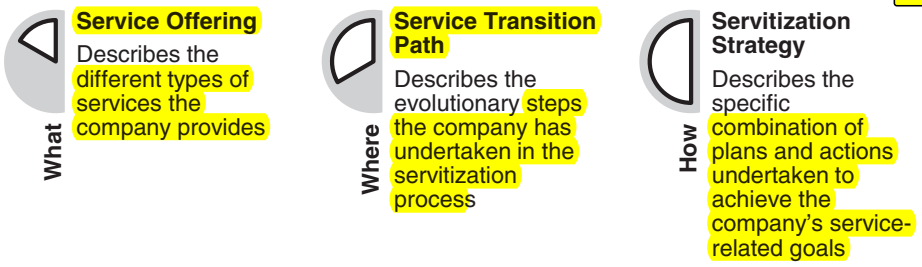

Fig. 2. The 3 key aspects of the servitization process.

1990). Resources, competencies and capabilities, which comprise the foundation of the "servitization house", need to be employed in order to facilitate the necessary changes at the organizational and strategic levels. Partners and networks support the company in its servitization endeavor, by providing and sharing service-related knowledge, resources and competencies, thus strengthening the foundation. Contingency factors, like the company's size and location, further impact on the success of the service transition, as they influence all elements of the "servitization house". The servitization endeavor needs to be aligned with customer needs and customer readiness to engage in mutual value creation. As the company is embedded in its environment, competitive factors and developments in the macro-environment also impact on the service transition.

4.2.1. *Company related servitization success factors*

Transitioning to become a service provider implies a considerable strategic change (e.g. Eggert et al., 2011; Fang et al., 2008) which, depending on the maturity of the servitization strategy, impacts on more or fewer elements of the company's business model (Gustafsson et al., 2010; Storbacka et al., 2013). Consequently, a large number of factors impacting on the success of the transition can be identified. We categorized the factors, integrating the star model for the solution business (Galbraith, 2002), the elements of organizational architecture (Nadler, Gerstein, & Shaw, 1992), and the 7S model (Peters & Waterman, 1982), as shown in Fig. 3.

4.2.2. *Integration of services into corporate strategy*

One of the main challenges of servitization lies in including a service strategy in a product-centered context, thus having to balance a service orientation and a product orientation (Salonen, 2011). Companies that overcome this challenge by integrating the service business into their strategy are evidently more successful with their servitization. Lay et al. found a positive relationship between a company's strategic commitment to services and share of service revenue, according to their 2010 study of 1.972 manufacturing companies. The strategic integration usually goes hand in hand with changes in the business model (Adrodegari et al., 2015; Witell & Löfgren, 2013), with successful businesses being found to implement more radical business model innovations, which include offering highly customized solutions (Witell & Löfgren, 2013). Similarly, the offering of relationship- or process-centered services, which require a more substantive strategic orientation towards services, leads to higher profits (Eggert et al., 2011; Eggert et al., 2014; Ulaga & Reinartz, 2011). In order to achieve a successful integration of services into the strategy, several studies emphasize the formulation and planning of a deliberate service strategy (e.g. Frambach et al., 1997; Gebauer & Fleisch, 2007; Neu, 2005; Redding, 2014). Some suggest that a rather incremental, emerging service strategy is more common (e.g. Kohtamäki & Helo, 2015; Kowalkowski, Kindström, Alejandro, Brege & Biggemann, 2012), which is in line with the strategic emergence view (Sirén, Kohtamäki, & Kuckertz, 2012). In reality, most strategies combine planned with emergent elements, forming so-called umbrella strategies (Mintzberg & Waters, 1985). In servitization, the deliberate elements appear to have a positive effect on performance. Gebauer and Fleisch (2007) showed that a systematic strategy formulation procedure, involving all parts of the company affected by the service strategy, positively impacts on service revenue. Realistic and attainable goals (Gebauer, Krempl, & Fleisch, 2008; Visnjic, van Looy, & Neely, 2013), based on exhaustive information (Gebauer et al., 2006; Neu, 2005) can further help overcome resistance to change and lead to a successful servitization. In order to control the

Table 4
Overview of groups and categories of servitization success factors.

Success factor category	Nr. Of studies mentioning the factor	Examples of studies mentioning the factor
Company related factors		
Integration of service in corporate strategy	40	Gebauer et al., 2006; Kowalkowski et al., 2012; Lay et al., 2010; Mathe & Shapiro, 1993; Neu, 2005
Adaptation of organizational architecture	101	Gebauer, 2007; Gebauer, Fischer, & Fleisch, 2010; Neu & Brown, 2008; Parida et al., 2014; Visnjic, vanLooy & Neely, 2013
Service-related resources, competencies and capabilities	68	Fang et al., 2008; Fischer et al., 2010; Gebauer, Paiola, & Edvardsson, 2012; Ulaga & Reinartz, 2011; Paiola, Saccani, Perona, & Gebauer, 2013
Company size and location	21	Baines, Lightfoot, & Smart, 2012; Dachs et al., 2014; Kowalkowski, Kindström, & Witell, 2011; Löfberg, Witell &Gustafsson, 2010
Customer related factors		
Demand for advanced offerings	8	Gebauer, 2007; Matthyssens & Vandenbempt, 2010
Willingness to pay for service	5	Besch, 2005; Matthyssens & Vandenbempt, 2010
Customer Integrativity	12	Grönroos & Helle, 2010; Matthyssens et al., 2009; Tuli et al., 2007
Trust and Commitment	6	Helander & Möller, 2008; Jacob, Kleipaß, & Pohl, 2014
Environmental factors		
Market size and complexity	14	Eggert et al., 2014; Gebauer, Paiola, & Edvardsson, 2010; Kohtamäki & Helo, 2015
Competitive intensity	5	Gebauer, 2007, 2009; Turunen & Finne, 2015
Industry characteristics	5	Fang et al., 2008; Han, Kuruzovich, & Ravichandran, 2013
Technological developments	4	Finne & Holmström, 2013; Grubic, 2014; Smith, 2013; Turunen & Finne, 2014
Legislative developments	7	Cook, Bhamra, & Lemon, 2006; Plepys, Heiskanen, & Mont, 2015; Turunen & Finne, 2014

Table 5
Quantitatively studied effects on service transition success.

Success factor	Main finding	Author(s)	Research context	n	Methodology
Company related factors					
Integrating services in corporate strategy					
Strategic commitment to services	Strategic commitment to services is one of the main determinants of service revenue	Lay et al., 2010	Diverse manufacturing companies(European Manufacturing Survey)	3.376	Econometric modeling
Service orientation of business strategy	Service orientation of corporate strategy leads to higher overall profitability	Gebauer, 2009	Manufacturing companies in German-speaking Europe (machine and equipment manufacturing, precision instruments, optical instruments, industrial equipment)	302	Structural equation modeling
Deliberate planning of service strategy	Realistic goal-setting, transparent decision making, and involving all parts of the company affected by the service strategy in the planning process, has an indirect positive impact on service revenue	Gebauer & Fleisch, 2007	Manufacturing companies in German-speaking Europe (machine and equipment, precision instruments, transportation equipment, industrial and commercial machinery and computer equipment, electronics and electrical equipment, primary metal industries, chemicals)	187	Regression
Environment-strategy fit	Fit between service strategy and competitive environment raises performance	Gebauer, 2008	Western European manufacturing companies (machine and equipment manufacturing, precision instruments, electronic and electrical equipment)	195	Cluster analysis, exploratory factor analysis
Integrating services in organizational structure					
Creation of a separate service organization	Creating a separate service organization with profit- and loss-responsibility mediates the relationship between management commitment to services and service revenue and profitability.	Oliva et al., 2012	Manufacturing companies in German-speaking Europe (machine and equipment manufacturing, precision instruments, electronic and electrical equipment, industrial and commercial machinery and computer equipment, transportation equipment, primary metal, chemicals)	216	Path analysis
Decentralized decision making	Decentralized decision making has a positive impact on service-related profit growth	Eggert et al., 2014	Mechanical engineering companies in Germany	513	Structural Equation Modeling (LGCM)
Adapting business processes					
Service development process	Integrating product and service development leads to customer satisfaction	Pan & Nguyen, 2015	Manufacturing companies in Southeast Asia	30	DEMATEL
Relevance of new service for core business and product	Relevance of new service for the core business has a positive impact on firm value	Fang et al., 2008	Diverse manufacturing companies(COMPUSTAT data base)	477	Panel data analysis
Relevance of new service for core business and product	Relevance of new service for the product has a positive impact on service revenue	Lay et al., 2010	Diverse manufacturing companies (European Manufacturing Survey)	3.376	Econometric modeling
Information- and communication technologies (ICT)	Using ICT leads to improved service offerings and consequently to added value for the customer and the provider	Belvedere, Grando, Bielli, 2013	Manufacturing companies	109	Structural Equation Modeling
Adapting Human Resource Management					
Service orientation of human resource management (HRM)	Service orientation of recruitment, training and reward systems has a positive impact on service profitability	Gebauer & Pütz, 2007	Machine and equipment manufacturing companies in German-speaking Europe	198	Exploratory factor analysis, regression
Adapting organizational culture					
Service orientation	Service orientation of organizational culture, measured as service orientation of management and employee values and behavior, raises return on sales.	Gebauer, Edvardsson, & Bjurko, 2010	Manufacturing companies in German-speaking Europe	302	Sructural equation modeling
Service orientation	Service orientation, measured as service orientation of corporate values, employee behavior, and HRM, mediates the relationship between service offering and sales and profit performance	Kohtamäki et al., 2015	Manufacturing companies in Finland	115	Structural Equation Modeling
Customer orientation	Customer orientation raises overall profitability	Gebauer et al., 2011	Manufacturing companies (pulp and paper, chemicals, mechanical equipment, electronic and optical equipment, plastics)	332	Structural equation modeling
Top management commitment to and visionary leadership of services	Top management commitment to and visionary leadership of services enhance service orientation in the company.	Antioco et al., 2008	Manufacturing companies (Heavy machinery, construction, IT & telcom, automotive, electrical, mechanical, and heavy and precision electronics)	137	PLS modeling
Service related resources, competencies and capabilities					
Resource slack	Resource slack positively moderates the impact of industrial service offering on firm value	Fang et al., 2008	Diverse manufacturing companies (COMPUSTAT data base)	477	Panel data analysis
Customer-related knowledge	Provider understanding of customer business challenges has a positive impact on service success	Raddats, Burton, & Ashman, 2015	Manufacturing companies in the UK	155	Multiple regression

(*continued on next page*)

Table 5 (*continued*)

Success factor	Main finding	Author(s)	Research context	n	Methodology
Customer-related knowledge	Understanding the benefits of the offering to customers and the business model of customers is of great importance for commercial success.	Grubic, Redding, Baines, & Julien, 2011	Manufacturing companies in the UK	52	Descriptive Statitstics
Relational capital	Relational capital has a positive impact on the profitability of R&D services	Kohtamäki et al., 2013	Machine and equipment manufacturing in Finland	91	PLS modeling
Network capabilities	Network capabilities positively moderate the impact of the industrial service offering on sales growth	Kohtamäki et al., 2013	Machine and equipment manufacturing in Finland	91	Structural equation modeling
Company characteristics					
Company size	U-shaped relationship between company size and servitization activity	Dachs et al., 2014	Diverse manufacturing companies (European Manufacturing Survey)	3.693	Bivariate statistics and regression
Breadth of service offering	Breadth of service offering has a positive impact on service revenue	Lay et al., 2010	Diverse manufacturing companies (European Manufacturing Survey)	3.376	Econometric modeling
Customer related factors					
Customer satisfaction	Customer satisfaction with supplier's consulting capabilities leads to trust and loyalty	Jacob et al., 2014	IT companies in Germany	106	Structural equation modeling
Share of loyal customers	High share of loyal customers has a positive moderating effect on the relationship between service offering and service-related profit growth	Eggert et al., 2014	Mechanical engineering companies in Germany	513	Structural Equation Modeling (LGCM)
Factors related to the organizational environment					
Market complexity	Market complexity has a positive moderating effect on the relationship between service innovation and profit growth	Eggert et al., 2014	Diverse manufacturing companies (Mannheim Innovation Survey)	558	Regression
Competitive intensity	Competitive intensity is an antecedent to the development of industrial services.	Gebauer, 2007	Manufacturing companies in German-speaking Europe	212	Cluster analysis, exploratory factor analysis
Industry characteristics	Service offerings in turbulent industries with slow industry growth have a higher impact on firm value	Fang et al., 2008	Diverse manufacturing companies (COMPUSTAT data base, US chamber of commerce)	477	Panel data analysis

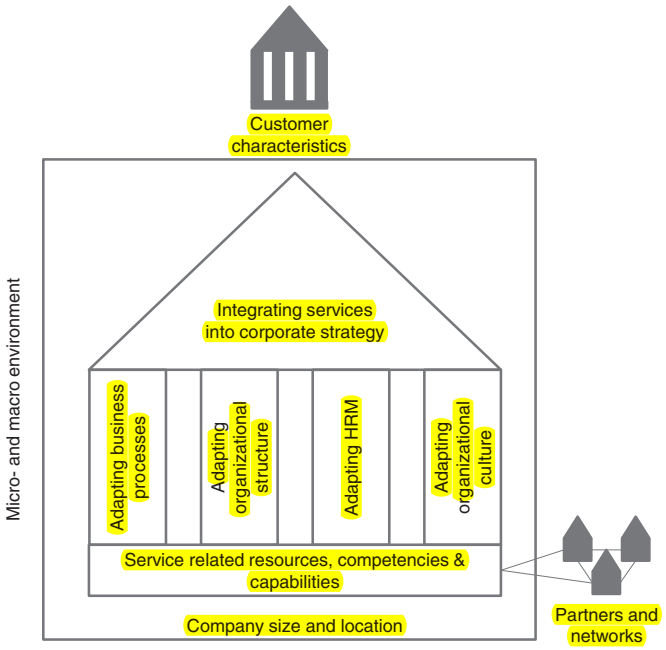

Fig. 3. The servitization house.

implementation, it is advisable to establish new, service-oriented performance criteria (Wikhamn, Ljungberg, & Styhre, 2013).

Proposition 1. Companies that integrate services into their corporate strategy are more successful with their servitization. Adopting a systematic strategy planning procedure can facilitate the integration.

Adapting the organizational architecture.

Changes in the strategy are associated with changes in the organizational architecture (Mintzberg, 1990; Nadler et al., 1992). All elements of the organizational architecture – structure, processes, people, incentives and controls, and culture – are impacted by the service transition. Implementing the necessary changes is considered critical to the success of the service transition (Gebauer et al., 2010).

One central question discussed in the literature is the appropriate *organizational structure* for services in manufacturing. Most studies conclude that a separate service organization with profit and loss responsibility should be created, so as to intensify the service business and emphasize strategic commitment (e.g. Gebauer et al., 2005; Kohtamäki & Helo, 2015). Gebauer et al. (2010) and Oliva et al. (2012) showed that an independent service organization has a positive impact on firm performance. Neu (2005) and Neu and Brown (2008) on the other hand, argue that the service organization should be integrated into the product organization, to enable synergies and knowledge spillovers. However, there is general agreement that cross-functional communication and information sharing (e.g. Antioco et al., 2008; Biggemann et al., 2013) as well as decentralized decision making (Eggert et al., 2014; Kucza & Gebauer, 2011; Neu & Brown, 2008) are important aspects of integrating services and products. Ultimately, the appropriate organizational structure depends on several factors, such as the organizational culture (Kowalkowski et al., 2011) and the servitization strategy, whereas it is mostly argued that more advanced strategies call for the establishment of a stand-alone service business unit (Oliva & Kallenberg, 2003).

Proposition 2. The appropriate organizational structure depends on the maturity of the servitization process; the more advanced, the more appropriate a separate service organization. Regardless of whether the service business is integrated or separated from the product business, cross-functional communication and information sharing contributes to servitization success.

The greatest difference between products and services, and therefore, the most crucial consequence of the service transition, is the active integration of customers into the service *process* (Brax, 2005; Martin & Horne, 1992; Raddats et al., 2015). This process involves all customer and provider activities, starting from the first contact and extending to the service delivery (Fliess & Kleinaltenkamp, 2004). The service transition therefore impacts on innovation and development processes, production processes, information processes, customer relationship processes, and sales and delivery processes. Adapting these processes accordingly can enhance servitization performance.

A customer-oriented *new service development process* is considered to be important for successful servitization (Brax & Jonsson, 2009). Integrating the customer, and involving all departments influenced by the service transition, like R&D, production and sales, can contribute to overcoming the service paradox (Gebauer et al., 2005). Particularly for product-related services, it is advisable to integrate product and service development (Pan & Nguyen, 2015). Empirical studies have found a positive relationship between the relevance of the new service for the company's core business and servitization success (Fang et al., 2008; Lay et al., 2010; Löfberg, Witell, & Gustafsson, 2010).

Proposition 3. Companies that involve the customer in the new service development process are more successful with their servitization.

Customer-oriented service development and delivery requires the integration of customer information into these processes. Customer contact employees can provide valuable insights into customer needs, which facilitate the development of new or improved service offerings (Gebauer et al., 2008). Therefore, information-gathering routines to observe customer needs, and also competitors' service-related activities, should be established (Fischer et al., 2010). Knowledge management systems enable the preservation, dissemination and utilization of the information gathered (Leoni, 2015), for example by ensuring that the customer information gathered by the front office reaches top management and R&D (Davies et al., 2006; Gebauer et al., 2008). Overall, intensive communication and information sharing between customer and provider, and between departments, facilitates knowledge spillovers and synergies, which are considered vital for the service transition (e.g. Visnjic & van Looy, 2013; Windahl & Lakemond, 2010).

Information and communication technologies (ICT) play an important part in improving existing service processes, leading to higher responsiveness and more efficient and effective decision making (Belvedere et al., 2013; Kowalkowski, Brehmer & Kindsröm, 2009). Furthermore, technological advancements that enable automated information gathering, machine-to-machine communication, and the connection of intelligent products in an Internet of Things (Ng & Wakenshaw, 2017), foster the development of new, more advanced, service offerings and innovative business models (Belvedere et al., 2013; Kowalkowski, 2008; Velamuri, Bansemir, Neyer, & Möslein, 2013). These advanced service offerings – often called smart services – can help reduce costs, increase value for the customer, and provide valuable insights for R&D, ultimately contributing to servitization success (Allmendinger & Lombreglia, 2005; Velamuri et al., 2013). Remote monitoring technologies, for example, can be used to observe the functionality and output of the installed base, reducing maintenance costs by predicting and preventing asset failure and eliminating unnecessary service calls (Velamuri et al., 2013). A minimized downtime of equipment is of high value for most customers (Phumbua & Tjahjono, 2012) while the insight gained through usage data can aid the development of even more valuable offerings (Allmendinger & Lombreglia, 2005; Baines & Lightfoot, 2013). Big Data exploitation strategies can create value from the large amount of gathered data (Opresnik & Taisch, 2015).

Proposition 4. Advanced technologies like smart products, remote monitoring and Big Data, as well as systematic information gathering, sharing and utilizing processes, facilitate the dissemination of customer

information and knowledge and thus contribute to servitization success.

Customer integration also implies a certain loss of control over production processes and of service quality for the provider (Davidsson, Edvardsson, Gustafsson, & Witell, 2009; Gebauer et al., 2005). As the involvement of customers in the production process increases, so does the uncertainty in terms of capacity management. An elaborate *service delivery process* can help in dealing with this uncertainty (Baines & Lightfoot, 2013; Kowalkowski et al., 2013). An important aspect is enabling and motivating customers in their role as co-producers (Brax, 2005), by building a strong, trusting relationship, based on open communication (Brax, 2005; Brax & Jonsson, 2009). Focusing consistently on customer relationship management and relationship marketing are important building blocks for the success of the service transition (Gebauer & Fleisch, 2007). Particularly for advanced servitization strategies, Salonen (2011) and Le Meunier and Baumann (2011) emphasize the adoption of solution selling to facilitate the interaction between customer and provider.

Proposition 5. A focus on relationship marketing, supported by customer relationship management processes and solution selling, contribute to servitization success.

People are critical for implementing the changes associated with the service transition. The recruitment and selection of personnel plays an important role (Johnstone, Wilkinson, & Dainty, 2014), as the servitization endeavor leads to an increased work load, which in turn raises personnel requirements, particularly for service staff (Beuren, Gomes, Marcelo, Cauchick, & Paulo, 2013; Gebauer et al., 2005). Taking into account the characteristics which are relevant for the service business, like flexibility, resilience, an ability to empathize and build relationships with customers, and technical adeptness, in the recruitment of new personnel, is considered to be beneficial for servitization (Baines & Lightfoot, 2013; Gebauer et al., 2012; Johnstone et al., 2014).

The strategic and organizational changes that come with servitization also include changes in the hierarchy and in the roles and positions of management and employees (Mathieu, 2001b). This can lead to insecurity and resistance, particularly when employees feel that their responsibilities and positions are under scrutiny, or that their authority is being questioned (Antioco et al., 2008; Mathieu, 2001b). Transparent communication of the objectives of the service transition, integration of the affected departments, such as sales, production, and R&D, into the decision making processes, and elaborate change management procedures, can reduce insecurities and make the transition easier for the involved people (Gebauer & Fleisch, 2007). Educating and training the personnel in service orientation further contributes to an easier implementation of servitization (Johnstone et al., 2014).

Adjusting the incentive and reward system also fosters the implementation of the service transition process (Neu, 2005). Rewarding service delivery competence and service orientation, measured by service-related performance criteria, motivates employees to contribute to the implementation of the service transition (Gebauer et al., 2010; Kowalkowski, Kindström, & Brehmer, 2011; Paiola, Gebauer, & Edvardsson, 2012). Particularly cross- as well as inter-functional cooperation and teamwork should be incentivized, since cooperation of different functions and business units is considered critical for solution sales (Tuli et al., 2007; Ulaga & Loveland, 2014) as well as for new service development (Kindström, 2010).

Sales people are particularly affected by the transition to services, as they face the challenge of selling immaterial value propositions instead of tangible products (LeMeunier & Baumann, 2011; Ulaga & Loveland, 2014). In addition, the relatively low order value of service contracts, in comparison to the often large volumes generated by equipment sales, renders service selling unattractive to some sales people (Anderson, & Narus, J. A.& Narayandas, D., 2009). Educating and training sales personnel in service orientation and service selling can help to overcome these obstacles (Paiola et al., 2013), while sales control systems that focus on behavior and the quality of the sales process rather than the outcome further contribute to the service orientation of the salesforce (Ulaga & Loveland, 2014).

Proposition 6. Companies that focus on service-related skills and competencies when recruiting personnel are more successful with their service transition.

Proposition 7. Companies that support their employees in the transition, by establishing service-related training, incentives and reward systems, are more successful with their servitization.

It is generally recognized that the service transition involves a *cultural reorientation*, from a transaction-centered production culture to a relationship-oriented service culture (e.g. Brax, 2005; Salonen, 2011). The importance of a customer orientation (e.g. Brady et al., 2005; Neu & Brown, 2008) and a service orientation (e.g. Brax, 2005; Paiola et al., 2012) and their combination (e.g. Johnstone, Dainty, & Wilkinson, 2008; Salonen, 2011) for the service business, are stressed in the literature. The impact of managerial and employee service orientation on the success of the service transition, is one of the few relationships that have been tested empirically and confirmed. Oliva et al. (2012) and Gebauer et al. (2011) found a direct relationship between a service orientation of management values and behavior, on the performance of the service business. However, it appears that the effect depends on the kind of service offering, a service orientation being more important for process-oriented or stand-alone services than for traditional product-oriented services (Antioco et al., 2008; Gebauer et al., 2010).

Proposition 8. A service-oriented corporate culture has a positive impact on servitization success. A service orientation of corporate culture is more important for advanced servitization strategies.

4.2.3. Service-related resources, competencies and capabilities

According to the resource based view, resources, skills and competencies form the basis of a company's competitive advantage (Peteraf, 1993). *Resources* are considered critical for the success of a service transition, partly because significant investments are necessary in order to build up the service business (e.g. Benedettini, Neely, & Swink, 2015; Cook et al., 2006). Fang et al. (2008) showed that resource slack positively moderates the effect of the service offering on firm value.

Proposition 9. Companies that have sufficient resources available to build up the service business, are more successful with their service transition.

Service-related competencies are important at the individual level, as pointed out in Proposition 6. Below, we concentrate on competencies and capabilities at the organizational level, where they are necessary to support the implementation of changes in the strategy and organizational architecture, and are of particular importance for supporting the service design and delivery processes.

When integrating the service business with the product business, companies deploy and combine their product-related and service-related *skills and competencies* in unique ways, in order to achieve a competitive advantage (Bjurklo, Edvardsson, & Gebauer, 2009). Expert technical knowledge about products and processes (Raja et al., 2013) is combined with integration and problem-solving abilities (Matthyssens & Vandenbempt, 2010) and customer-related knowledge (Kowalkowski et al., 2011). Due to the integration of the customer in the service process, *customer-related knowledge and competencies* are of particular importance for service transition. In-depth knowledge about customers' business processes and business models, needs and problems, and the context and process in which the product is used, is widely considered critical for service transition success (e.g. Davies, 2004; Grönross & Helle, 2010; Smith, Edvardsson & Gebauer, 2014; Ulaga & Loveland, 2014). Customer and service orientations are therefore skills that need to be developed, in order to achieve the necessary customer and service

orientation of corporate culture (e.g. Johnstone et al., 2008; Salonen, 2011). Organizational learning, information management, and knowledge transfer facilitate the combination and integration of more technical, production-related skills and competencies with service-specific customer and process related abilities (Cook, Gottberg, Angus, & Longhurst, 2012; LeMeunier & Baumann, 2011). While these skills and competencies are important for all servitization strategies, the importance of customer-related knowledge and integration skills increases, as the strategies become more advanced, involving the offering of sophisticated customer-focused services (e.g. Davies, 2004; Matthyssens et al., 2009). As the transition advances, cooperation with the customer intensifies (Matthyssens et al., 2009). In this context, a trustful relationship with the customer (Gebauer et al., 2010; Grönroos & Helle, 2010) and the existence of "relational capital" (Kohtamäki et al., 2013; Kohtamäki & Helo, 2015) can contribute to the success of the service transition.

Proposition 10. The unique combination of product-related know-how with customer- and service-related skills and competencies contribute to successful service transition. The more advanced the servitization strategy, the more important the service-related skills and competencies become.

Capabilities, defined as a "firm's capacity to deploy resources for a desired end result" (Helfat & Lieberman, 2002, p. 725) are also discussed in the servitization literature (e.g. Brady et al., 2005; Ulaga & Reinartz, 2011). Here, system integration capabilities (Ceci & Prencipe, 2008; Davies, 2004; Davies, Brady, Prencipe, & Hobday, 2011; Helander & Möller, 2008; Kowalkowski et al., 2013), consulting capabilities (Davies et al., 2006), and networking and relational capabilities (Eloranta & Turunen, 2015; Gebauer, Paiola, & Saccani, 2013; Kohtamäki et al., 2013; Kohtamäki et al., 2013) are considered most relevant for servitization success. Not all competencies and capabilities have to be present at the focal company, however. Cooperating with *partners* and building *networks* can offset a lack of capabilities (Davies et al., 2006; Matthyssens & Vandenbempt, 2008; Spring & Araujo, 2013).

Proposition 11. Establishing partnerships with companies that have service-related capabilities contributes to servitization success.

Due to its change-oriented nature, the *dynamic capabilities* concept is of particular interest in service transition research (e.g. Fischer et al., 2010; Kindström, Kowalkowski, & Sandberg, 2013; Paiola et al., 2012). All three levels of dynamic capabilities, as proposed by Teece (2007), are relevant: sensing service opportunities internally and externally; seizing the service opportunities through co-evolving with the customer and managing service delivery; and reconfiguring capabilities towards service orientation or service logic, by redesigning processes or the entire business model (Kindström et al., 2013; Paiola et al., 2012). Fischer et al. (2010) argue that various configurations of dynamic capabilities are of importance for different servitization strategies and at different phases of the transition path.

Proposition 12. The appropriate configuration of capabilities at each phase of the transition path, and for the adopted strategy, contributes to servitization success.

Company Size & Location.

Other company characteristics of strategic importance, such as size, market share, position in the supply chain, and location can also play a role in servitization success, but have received limited attention so far. Dachs et al. (2014) found a U-shaped relationship between company size and servitization activity, indicating that both small and large companies can have servitization advantages. Companies with a larger market share and a broader service offering are expected to be more successful with their servitization (Fang et al., 2008; Gebauer & Pütz, 2007; Kowalkowski et al., 2011; Lay et al., 2010; Visnjic & van Looy, 2013). Some studies stress the importance of the geographic proximity of the company facilities to the customer (Baines et al., 2012; Baines & Lightfoot, 2013). Finally, Löfberg et al. (2010) found a relationship between the company's position in the supply chain and the category of service offering.

4.2.4. The role of the customer for successful servitization

The success of a manufacturer's service expansion also depends on the characteristics of its customers. Even though customer characteristics can be critical (Tuli et al., 2007), they have not received much attention in the literature. For manufacturers to offer services successfully, there has to be a sufficient market for these services. *Customer demand* for bundled offerings is therefore the basic precondition for any servitization (Kowalkowski et al., 2011). This is not always the case, as some customers do not want to outsource their service activities in fear of losing competitive advantage. Others might not be willing to increase their commitment to the provider by allowing access to critical information or business processes (Matthyssens & Vandenbempt, 2010). Matthyssens and Vandenbempt (2010) recommend establishing a sophisticated segmentation approach, to ensure that the new service offering is targeted at customers with the appropriate needs and willingness to intensify the cooperation.

Manufacturers offering services often face the challenge of customers expecting certain services for free (Anderson et al., 2009). *Customer willingness to pay* for services is therefore a precondition for manufacturers being able to generate additional revenue through services (Eggert et al., 2014). The pricing of the services is considered important (Gustafsson et al., 2010), with unbundled pricing (Gebauer, 2007; Paiola et al., 2012), value based pricing (Keränen & Jalkala, 2013; Storbacka, 2011) and solution-specific pricing models (Sharma & Iyer, 2011) being recommended.

Finally, for the servitization to be successful, customers need to be able and willing to *integrate themselves* into the provider's service process (Matthyssens & Vandenbempt, 2010). This involves the willingness to adjust and align activities, processes, resources, and competencies with those of the provider (Grönroos & Helle, 2010; Helander & Möller, 2008; Matthyssens et al., 2009). If there is such willingness, the customer also requires the corresponding knowledge and understanding of the provider's business processes (Carlborg & Kindström, 2014; Grönroos & Helle, 2010; Tuli et al., 2007). Similarly, the customer needs to be willing to share critical information about his business processes with the provider (Tuli et al., 2007), in order to enable the mutual adjustment of processes, co-evolution and mutual value creation, which is considered essential particularly for more enhanced servitization strategies (Helander & Möller, 2008; Tuli et al., 2007). If the customer is not willing to adapt, the transition path stagnates, which can have a negative influence on servitization-related firm performance (Matthyssens et al., 2009). Such a close relationship is easier to achieve with loyal customers, with whom trust and commitment has already been established (Grönroos & Helle, 2010; Helander & Möller, 2008; Jacob et al., 2014).

Proposition 13. Customer willingness and ability to integrate positively impacts on the success of the provider's service transition.

Proposition 14. Customer trust and commitment positively impacts on the success of the provider's service transition.

4.2.5. The role of the organizational environment in successful servitization

In line with contingency theory, the organizational environment is also postulated as having an impact on manufacturers' servitization endeavors (Gebauer et al., 2010; Mintzberg, 1979). Research examining the effect of the environment on service transition however, remains scarce. Few relevant factors have been identified, the size and complexity of the market being one of them (Eggert et al., 2014; Gebauer et al., 2010; Kohtamäki & Helo, 2015). In their quantitative study, Eggert et al. (2014) found that market complexity positively moderates

the effect of service innovation on revenue growth in manufacturing companies. Gebauer (2007, 2009) showed that competitive intensity is an antecedent for the development of service offerings in manufacturing companies, but did not comment on the performance of the services offered. Fang et al. (2008) included industry characteristics as moderators in their model and found that the positive impact of the service offering on firm value is stronger in turbulent industries with slow industry growth. Turunen and Finne (2014) emphasized the importance of technological and legal developments. Technological innovations like big data or remote monitoring can enable the development of new service offerings, influencing the transition path and ultimately the servitization strategy (Finne & Holmström, 2013; Grubic, 2014). Changes in legislation can be beneficial for the establishment of service-oriented business models, such as in the case of public policy support for product service systems (Cook et al., 2006; Plepys et al., 2015), but they can also be restrictive (Turunen & Finne, 2014).

Proposition 15. The competitive environment has an impact on service transition success.

Proposition 16. Technological and legal developments have an impact on service transition success.

While we present the different factors separately, it should be stressed that they are interrelated and do not occur in isolation. Rather, the occurrence of one factor can have various effects on several of the other factors. The fit between strategy, structure and environment is critical for a company's success (Mintzberg, 1979), a view also often adopted in servitization research (e.g. Gebauer et al., 2010; Gebauer & Pütz, 2009). Resources and capabilities (Ulaga & Reinartz, 2011), personnel, technologies and corporate culture (Gebauer et al., 2010; Pan & Nguyen, 2015), and organizational structure (Gebauer & Pütz, 2009) must be aligned with the type of dominant service offering, which in turn needs to fit the servitization strategy and consequently the corporate strategy (Kowalkowski et al., 2011). The company-related factors must be appropriate for the specific characteristics of the organizational environment (Gebauer, 2008). Finally, the adopted servitization strategy needs to be aligned with the expectations and competencies of customers (Matthyssens & Vandenbempt, 2008).

Proposition 17. It is not the presence or absence of individual factors, but the right configurations of them, that is most critical for successful service transition.

5. Conclusions

5.1. Contribution and future research avenues

The analysis revealed three groups of factors impacting on the success of the service transition. These are company-related factors, which are the most widely studied in both qualitative and quantitative work, and customer-related factors, as well as those related to the organizational environment, where research is scarce and mostly qualitative. Table 4 indicates how often the specific factors are mentioned in the studies in our database, while Table 5 summarizes the effects that have been confirmed in quantitative studies so far. Based on insight from qualitative, quantitative and conceptual work, we formulated 17 propositions regarding the effect of various different factors on servitization success. Because one objective of this study was the identification of research gaps, the propositions are simultaneously a call for the empirical examination of the proposed relationships, either separately or in combination. This concurs with the general demand for more quantitative research in the field (Raddats & Kowalkowski, 2014). As the importance of several factors depends on the maturity of the servitization strategy (Storbacka et al., 2013), future research should account for these differences, as well as for the differentiation between service offerings, transition paths and servitization strategies. In Table 6 we summarize the research areas and corresponding propositions in the order of their priority for research, and formulate research questions to stimulate future research.

The research areas are those presented in Fig. 3. While all areas provide grounds for further research, two areas are of particularly high priority, as they remain widely under-researched (see Tables 4 and 5): 1) the role of the customer and the network in servitization. It is widely recognized that the customer and other network partners play an important part in servitization. However, most current research still focuses on the supplier perspective (Luoto, Brax, & Kohtamäki, 2017). Future research should more widely adopt a dyadic or even a network approach (Forkmann, Ramos, Henneberg, & Naudé, 2017; Story, Raddats, Burton, Zolkiewski, & Baines, 2017), to shed further light on how customers and other network actors are impacted by servitization and how they can contribute to servitization success or failure. 2) The role of the organizational environment in servitization has been largely overlooked in previous research (Kowalkowski, Gebauer, & Oliva, 2017). Future research should examine the impact of different environmental configurations on the decision to servitize, the type of service offerings, the trajectory of transition paths, the choice of servitization strategy, and servitization success or failure.

Another theme that emerged is the potential offered by technological advancements. Even though offerings like remote monitoring and diagnostics are already fairly common in industry (Allmendinger & Lombreglia, 2005), recent technological developments, like industry 4.0, advanced manufacturing technologies, machine-to-machine communication, and the Internet of Things provide yet more opportunities for innovative service business models (Kamp & Parry, 2017; Ng & Wakenshaw, 2017). Future research should focus on the emerging access- and performance-based service models and on the challenges associated with them, particularly regarding the pricing of these offerings (Kannan & Hongshuang, 2017). Wearable technologies like sociometric badges (see for example Kim, McFee, Olguin, Waber, & Pentland, 2012; Montanari, Nawaz, Mascolo, & Sailer, 2017) could be utilized in future research to provide insight into communication patterns with customers or in multi-disciplinary service development or sales teams. The impact of technology-induced business model innovations on the relationships between different network actors and on firm boundaries is another area for future research.

The holistic framework in Fig. 3 shows similarities with various conceptualizations of business models (e.g. Chesbrough & Rosenblom, 2002; Osterwalder & Pigneur, 2010). Some servitization research already adopts a business model perspective, conceptualizing the service transition as business model innovation (e.g. Barquet, de Oliveira, Amigo, Cunha, & Rozenfeld, 2013; Kindström, 2010; Wittel & Löfgren, 2013, Forkmann et al., 2017). As the challenges and preconditions of the static offering of industrial services are largely covered by the business-to-business marketing literature (e.g. Anderson et al. 2009; Havaldar, 2006; Kleinaltenkamp, Plinke, Wilkinson, & Geiger, 2015; Lilien & Grewal, 2012; Morris, Pitt, & Honeycutt, 2001), the truly unique and worthwhile aspects of the service transition lie in its dynamic nature, i.e. the organizational change process, and the co-existence of service and product orientation in the same business. The business model approach and particularly the aspects of business model innovation are able to capture this dynamism, whereby we call for a wider adoption of this approach in service transition research.

Additionally, we identified the resource based view, contingency theory and the dynamic capabilities approach as the dominant underlying theories in servitization research. Much research, however, remains strongly evidence based, so that there is a need for more research with a strong theoretical foundation (Kowalkowski et al., 2017). The path dependence approach (e.g. Schreyögg, Sydow, & Koch, 2009) could be suitable for explaining differing transition paths, as well as the adoption of pay-per-use or performance-based contracts. Property rights theory (e.g. Hart & Moore, 1990) might offer a new perspective on the different categories of service offerings, as well as their adoption

Table 6
Summary of guidelines for research.

Research area	Formulated proposition(s)	Possible research question(s) for future research
Customer characteristics	Customer *willingness and ability to integrate* positively impacts on the success of the provider's service transition. (P13) Customer trust and commitment positively impacts on the success of the provider's service transition. (P14)	How are customers impacted by their supplier's servitization, what adaptations and changes occur for the customers? How can customers be motivated and enabled to share information, open up processes, and co-evolve with the supplier? Is customer trust and commitment a necessary condition for servitization success?
Organizational environment	The competitive environment has an impact on service transition success. (P15) Technological and legal developments have an impact on service transition success. (P16)	Which elements of the organizational environment have an impact on 1) the decision to servitize, 2) the service offering, 3) transition path, 4) servitization strategy, and 5) servitization success? What role does a favorable or unfavorable organizational environment play in servitization success and failure, as opposed to managerial decisions? Is high competition really the main driver of servitization? Which other factors lead to servitization?
Partners and networks	Establishing partnerships with companies that have service-related capabilities contributes to servitization success. (P11)	How are partners and networks impacted by a focal firm's servitization? How can one motivate and engage partners to cooperate for servitization? How are the traditional boundaries of the firm affected by increased networking in servitization and what impact does that have on actors in the network?
Utilizing ICT	Advanced technologies like smart products, remote monitoring and Big Data, as well as systematic information gathering, sharing and utilizing processes, facilitate the dissemination of customer information and knowledge and thus contribute to servitization success. (P4)	Which unique capabilities are required for the successful development and deployment of smart services? How are the boundaries between organizations affected by the stronger interconnectedness facilitated by the IoT? How is the customer-supplier relationship impacted by the offering of smart services, and how does this differ from other "advanced" services? Which new business models have emerged due to technological advancements like industry 4.0, IoT, and BigData, and how do they differ from existing access-based service models? How can wearable technologies be utilized to complement and enhance smart service offerings? How can wearable technologies be used in servitization research to deepen our understanding of communication patterns with customers and in cross-functional service teams? Does technological advancement always offer opportunities for servitization, or are there also developments, like product modularization and mass customization, that might impede servitization? Are technologically enhanced services, like remote monitoring, really "advanced" services, or will they become basic support services as the technology becomes common over time?
Fit	It is not the presence or absence of individual factors, but the right configurations of them, that is most critical for successful service transition. (P17)	Which combinations of organizational factors lead to servitization success 1) in different industries, 2) in different competitive environments, 3) at different stages of servitization?
Service related resources, competencies and capabilities	Companies that have sufficient resources available to build up the service business, are more successful with their service transition. (P9) The unique combination of product-related know-how with customer- and service-related skills and competencies contribute to successful service transition. The more advanced the servitization strategy, the more important the service-related skills and competencies become. (P10) The appropriate configuration of capabilities at each phase of the transition path, and for the adopted strategy, contributes to servitization success. (P12)	Can companies with limited resources be successful with servitization? Under which conditions? How can they compensate for a lack of resources? Which combinations of competencies and capabilities can lead to servitization success? How do competencies and capabilities differ between different industries, SME and MNO, or successful and unsuccessful companies?
Adapting HRM	Companies that focus on service-related skills and competencies when recruiting personnel are more successful with their service transition. (P6) Companies that support their employees in the transition, by establishing service-related training and incentives and reward systems, are more successful with their servitization. (P7)	What is the role of the employees in servitization? How does it differ according to their role and position (service personnel, sales force, service management)? How do employees impede or facilitate the servitization process and success? How should incentive and reward systems be designed to ensure employees' cooperation in the implementation of servitization? What is the role of teams, like top-management teams, service-development teams, or implementation teams, in servitization? How can teams be utilized as change agents for servitization-induced organizational transformation? How does organizational leadership, particularly disruptive leadership, impact the servitization-induced business transformation?
Adapting business processes	Companies that involve the customer in the new service development process are more successful with their servitization. (P3) A focus on relationship marketing, supported by customer	How can customers be motivated to participate in new service development? What are the opportunities for open innovation in the servitization field? How can one integrate new product and service development for value-

(*continued on next page*)

Table 6 (*continued*)

Research area	Formulated proposition(s)	Possible research question(s) for future research
	relationship management processes and solution selling, contribute to servitization success. (P5)	added solutions? What is the impact of tools like CRM, knowledge management, etc. on servitization success? How can change management approaches and organizational learning be utilized to facilitate servitization implementation?
Integrating services into corporate strategy	Companies that integrate services into their corporate strategy are more successful with their servitization. Adopting a systematic strategy planning procedure can facilitate the integration. (P1)	How prevalent are planned strategies, opposed to emergent strategies, in servitization? What kinds of umbrella strategies exist in servitization? Which elements of the strategies are deliberate, and which are emergent? How can product and service strategies be combined successfully?
Adapting organizational structure	The appropriate organizational structure depends on the maturity of the servitization process; the more advanced, the more appropriate a separate service organization. Regardless of whether the service business is integrated or separated from the product business, cross-functional communication and information sharing contributes to servitization success. (P2)	What is the impact of decentralization, formal and informal integration mechanisms, and leadership styles on servitization success? Under which conditions is the creation of a separate service unit necessary?
Adapting organizational culture	A service-oriented corporate culture has a positive impact on servitization success. A service orientation of corporate culture is more important for advanced servitization strategies. (P8)	Is a service orientation of corporate culture/service logic or solutions business logic a necessary condition for servitization success, or are there situations in which it is not important? How can a service and manufacturing orientation of corporate culture be combined uniquely to create a servitization culture?

by customers. This is particularly relevant, as access-based services and rental models, which are becoming more prevalent due to the advent of digitalization and the IoT, disrupt the traditional distribution of property rights in the economy (Kannan & Hongshuang, 2017).

There is a noticeable focus on the mechanical engineering industry. Future studies should focus on other manufacturing industries, in order to identify similarities and differences in the adopted servitization strategies and their success factors. Finally, most research focuses on cases of success (Gebauer, Bitner, & Brown, 2013), so that looking into the causes of servitization failure, as well as deservitization, would generate important insights to complement the findings of this current contribution (Kowalkowski et al., 2017).

5.2. *Managerial implications*

From this study, five main implications arise regarding the management of the servitization process (see Table 7 for an overview). First, a systematic strategy-planning procedure should be implemented, in order to *integrate services into corporate strategy*. Merely adding services to the portfolio is not enough for servitization success, and the often emerging service strategies can be difficult to integrate into the main strategic orientation of the firm. Refocusing a traditionally product-oriented business on services entails a cultural change, with customer centricity and a service orientation becoming increasingly critical for success. These values should be engrained in management and employees alike. Strong managerial support for services, and a belief in the potential of the service business is a good starting point for a strategic and cultural orientation towards services. A service orientation of human resource management helps to strengthen the service culture at the employee level. Particularly service personnel and the sales force have to be on board for a successful servitization. Offering service-related training and adjusting the reward system to exceptional service and performance is important. When recruiting new personnel, service-related skills and competencies like flexibility, resilience, and an ability to empathize and build relationships with customers should be considered, in addition to purely technical skills.

Second, depending on the strategic importance accorded to services, more or less radical *restructuring of the organization* might be necessary. This can range from the creation of a service unit with its own profit and loss responsibility, to the reorientation of the entire business

Table 7
Summary of guidelines for management.

Guidelines for managing the servitization process successfully	
1. Integrate services into corporate strategy	Plan service strategy systematically. (P1) Foster a strong service culture by demonstrating a strong belief in the potential of services. (P8) Strengthen the service culture by recruiting, training and rewarding for service orientation. (P6) (P7)
2. Consider organizational restructuring	Involve service personnel in decision making. (P2) Evaluate if a separate service organization should be established.(P2)
3. Design service development and service delivery processes	Integrate customer information in new service development. (P3) Utilize ICT to boost your service offering. (P4) Strengthen the relationships with your customers by focusing on relationship marketing and CRM. (P5) Emphasize your customer orientation by adopting a solution selling approach for your sales force.(P5) Ensure that your customers value your service offering and are willing to cooperate with you closely. (P13) (P14)
4. Build or acquire service specific resources, competencies and capabilities	Make sure that you have sufficient financial and human resources available to support the transformation. (P9) Leverage your unique product-related know-how, knowledge of customer needs and consulting and system integration capabilities to build a competitive advantage. (P10) (P12) Foster partnerships with customers, suppliers and/or competitors to build a service network. (P11)
5. Monitor environment for servitization opportunities and threats	Maintain organizational flexibility to quickly react to changes in the environment (P15) (P16)

model as a service or solution provider. Particularly for advanced service offerings, such as usage- or performance-based contracts, changes in the organizational structure become necessary. The strategic orientation towards services should be reflected in the involvement of service personnel in decision making. Change management processes and transparent communication help to alleviate resistance.

Third, along with the structure, *service development and service delivery processes should be designed and established.* More advanced service offerings also require more sophisticated processes. For service development, it is necessary to integrate the customer early on in the process, to ensure that the new services meet customer needs. ICT-based information gathering and sharing processes facilitate the necessary dissemination of knowledge between customers, frontline employees, and R&D. The aforementioned decentralization in decision making also contributes to this aim. Technological advancements, like digitalization, industry 4.0, and the Internet of Things offer significant potential for the development of innovative service offerings, like Smart services, pay-per-usage and/or pay-for-results models. Successful service delivery calls for a focus on relationship marketing, supported by customer relationship management processes and a solution-selling approach of the sales force. Customer integration is essential for the entire service process. Particularly for advanced service offerings, which require a close and trustful relationship with the customer, the willingness and ability of the customer to share information and to adapt his own activities and processes, needs to be ensured.

Fourth, building the service business requires specific *resources, competencies and capabilities*. As investments and an increased workload are part of servitization, having sufficient financial and human resources available contributes to success. The combination of product-related know-how, in-depth knowledge of customer needs and processes, and consulting and system integration capabilities is a source of competitive advantage, particularly for advanced service offerings. If these skills and capabilities are not readily available in the firm, strategic partnerships with customers, suppliers, and/or competitors can offset this shortcoming.

Finally, the *characteristics and ongoing developments of the organizational environment* should be closely monitored. Changes in the competitive intensity, the complexity of customer needs, legislation, and technologies can entail both threats and opportunities for servitization. Being aware of current developments and maintaining organizational flexibility to react in time, can be critical for servitization success.

5.3. Limitations

Both the large number of publications included in this study, as well as the fact that work from the solutions and PSS field was as included, ensure that this study constitutes the most comprehensive systematic literature review on servitization so far. It is also the only one that focuses explicitly on the identification and collation of factors that are critical for servitization success. We discuss the ambiguous use of terminology in servitization research and disentangle the terms service transition, service offering, transition paths and servitization strategies. The importance of measurable performance criteria for servitization success is also emphasized. We provide a holistic framework, containing all the servitization success factors currently discussed in the literature, while considering the differing importance of the various factors, depending on the maturity of the servitization strategy in our discussion. Particularly the identification of customer- and environment-related factors as playing an important role in servitization success, constitutes a significant contribution to servitization research, as these factors are widely under-researched. Despite its contribution, however, we also identify a number of limitations to our study.

One limitation stems from the publication bias inherent in every literature review (Harrison et al., 2017). Although a wide range of sources was included in our review, future reviews could also include so-called grey literature, i.e. unpublished research and working papers, in order to further minimize publication bias. A citation and co-citation analysis would generate further valuable insights into the structure of the research field (Zhang & Banerji, 2017). Also, our study is limited to work published in English. Research in other languages may yield interesting and different results, which, due to language barriers, were not accessible for this review.

Another limitation derives from the shortcomings of success factor research (see March & Sutton, 1997 and Kieser & Nicolai, 2005 for a detailed critique on success factor research). Critics claim that studies focusing on the identification of variables explaining variations in organizational performance often fail to capture the true causal relationship between performance variables and success factors (March & Sutton, 1997). In servitization research as well, most interpretations of service transition success are based on assumptions of simple causality, as implied by the dominant use of regression analysis and structural equation modeling (see Table 5). However, as the question of organizational performance is most likely surrounded by causal complexity, there is a need for further research that accounts for causal complexity, thus adopting a configurational approach (Böhm, Eggert, & Thiesbrummel, 2017).

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