Does one size fit all? New service development across different types of services.

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Does one size fit all? New service development across different types of services

Abstract

Purpose – The extant new service development (NSD) literature tends to assume that the key practices for NSD identified in one context apply for all services, and has failed to sufficiently consider differences in NSD between service types. This study explores the nature of NSD across different service types.

Design/methodology/approach – An extensive, cross-sectoral survey was conducted in seven countries. Data from 1333 NSD projects was analyzed to empirically derive a service typology and examine if and how different types of services vary in terms of NSD resources, practices, methods, and results.

Findings – Based on six service characteristics, the study identifies four service types: routine-intensive, technology-intensive, contact-intensive, and knowledge-intensive services. The study also identifies specific NSD resources, practices, methods, and results that are prevalent across the service typology. The evidence indicates that the use of advanced practices and methods differs dramatically between service types.

Practical implications – The article enables practitioners to expand their current understanding on NSD by providing insights into the variability of NSD across service types. The results suggest that either service-type-specific models or a configurable model for NSD should be developed.

Originality/value – This study provides one of the first empirically derived service typologies for NSD. The study demonstrates that NSD resources, practices, methods, and results differ across service types, thereby challenging the “one size fits all” assumption evident in current NSD research.

Keywords: new service development, service typology, service characteristics, NSD methods, project teams.

1. Introduction

The development of innovative services has become a key source of differentiation and competitive advantage (Gustafsson and Johnson, 2003; Storey and Hull, 2010) as well as an engine for future growth in today's markets (e.g., Sawhney *et al.*, 2004). However, firms are reported to struggle with new service development (NSD) (Storey and Kelly, 2001; Alam and Perry, 2002; Edvardsson *et al.*, 2013). In an attempt to determine how NSD should be conducted to reach favorable outcomes, academic research has provided a range of generic frameworks for NSD processes (see, e.g., de Jong and Vermeulen, 2003; Kindström and Kowalkowski, 2009) and success factors (see, e.g., de Brentani, 1991; Menor and Roth, 2008; Paswan *et al.*, 2009). However, these models are typically developed solely on the basis of studies in a single country or sector, particularly financial services, telecom services, or healthcare (e.g., Storey and Easingwood, 1996; Avlonitis *et al.*, 2001; Syson and Perks, 2004), or they are conceptual models that have not been tested empirically. Yet, there is an implicit assumption that these models are broadly applicable to any services, despite the absence of studies confirming this assumption by empirically exploring the nature of NSD across different service types (Kuester *et al.*, 2013; Storey *et al.*, 2016).

At the same time, service scholars agree that the range of services is too diverse to allow a meaningful analysis of the entire service sector: without a clear understanding of the differences and similarities between service types, it is difficult to apply knowledge gained from one service type to another (Ottenbacher *et al.*, 2006; Voss *et al.*, 2016). Research has shown that different types of services face unique marketing and management challenges (e.g., Clemes *et al.*, 2000; Verma, 2000). Surprisingly, differences between types of services have received scarce attention in NSD research, despite findings suggesting that certain NSD practices may be specific to particular types of services (Zomerdijk and Voss, 2011; Biemans *et al.*, 2016), and that service characteristics are important determinants for managing NSD projects (Jaw *et al.*, 2010). There is a lack of research addressing differences in NSD across different types of services (Biemans *et al.*, 2016).

To address this fundamental gap, *the purpose of this study is to explore the nature of NSD across different service types*. A broad range of NSD projects was analyzed in order to (1) empirically derive a service typology, and (2) examine if and how different types of services vary in terms of NSD features, drawing on an extensive, cross-sectoral survey conducted in seven countries with 1333 respondents. This study contributes to service and NSD literature by (1) providing an empirically derived service typology, and (2) offering a systematic and comprehensive description of the nature of NSD according to type of service. This

understanding is currently missing in NSD research. The study describes the nature of NSD across four distinct service types – technology-intensive, contact-intensive, knowledge-intensive and routine-intensive services – and thereby nuances the current understanding on NSD.

2. Literature review

2.1 An overview of service typologies

For many years, the large variety and complexity in nature and business has created the need to find useful ways of classifying things, such as species, materials, or information. Linnaeus and Darwin, for instance, created meaningful typologies that led to great scientific developments. A typology is here defined as “a system used for putting things into groups according to how they are similar” (Merriam-Webster Dictionary, 2015). Typologies are popular in social sciences since they describe complex organizational forms and outcomes in an elegant way (Doty and Glick, 1994). Typologies can be considered a special form of theory building that provides advantages for researchers and practitioners through the organization of complex networks of concepts and relationships. Snow and Ketchen (2014) emphasized that well-developed typologies are more than classification systems and identified a need for typologies in both prevalent and emerging research areas. They argued, based on Fiss (2011), that a typology can reduce complexity to manageable levels, both conceptually and methodologically.

Typologies play an important role in service research. Scholars have attempted to divide services into groups that share certain characteristics, but also to facilitate a better understanding of the characteristics that differ between service types. Towards that end, a number of service typologies have been proposed. Existing typologies mainly aim to develop distinct operations, marketing, and management implications for different types of services. In particular, early typologies focused on analyzing the challenges in terms of managing *service operations*. For example, Chase (1978) and Maister and Lovelock (1982) classified services according to the extent of customer contact and customization required in service delivery, which relates to differences in managing the variability of service processes across service types. Shostack (1987) classified service processes according to their complexity (that is, the number and intricacy of steps required to perform the service) and divergence (that is, the degree of freedom allowed or inherent in a step) and suggested that these process characteristics need to be managed.

Other typologies have discussed the *management* challenges arising for distinct operational characteristics. Schmenner’s (1986) service typology emphasized the

characteristics of the service delivery process – labor intensity as well as the degree of interaction and customization associated with the service process – with the argument that different types of services are associated with particular managerial challenges. In a similar vein, an empirical study by Verma (2000) found that management challenges differ across four service types, distinguished by the degree of customer contact and labor intensity. Ritala *et al.* (2011) discriminated types of service on the basis of (1) the intensity of knowledge sharing in the co-creation of services (low vs. high) between the provider and the customer, and (2) the nature of the problem-solving process (homogeneous, routinized vs. heterogeneous, unstructured) and suggested that each service type requires different management practices. Clemes *et al.* (2000) found that different types of service organizations – discerned on the basis of characteristics such as degree of customization, contact time, and product vs. equipment focus – face somewhat different *marketing* challenges.

The majority of service typologies are purely conceptual and only a handful of empirically derived typologies can be found. Existing empirical studies focused on service types have either developed a typology and speculated on its implications, or studied the prevalence of phenomena across a conceptual typology. For example, Silvestro *et al.* (1992) classified service organizations by using case-based data to find clusters of characteristics; this resulted in the identification of three types of service processes: professional services, service shops, and mass services. Bowen (1990) presented a typology of services based on customer perceptions of service characteristics, identifying three categories: (1) high contact, customized, personal services; (2) moderate-contact, semi-customized, non-personal services; and (3) moderate contact, standardized services. However, these studies do not empirically elaborate any implications of such typologies.

Very few typologies focus on the implications of service type on NSD. A notable exception is Avlonitis *et al.*'s (2001) study of how the innovativeness of the new service shapes the NSD process. Furthermore, Kuester *et al.* (2013) identified four service innovation types among service firms: efficient developers, innovative developers, interactive adopters, and standardized adopters. Cheng *et al.* (2012) empirically verified a service innovation typology and further explored customer involvement in the various NSD process stages. In a similar way, Gustafsson *et al.* (2012) and Witell *et al.* (2014) investigated how the practices and effects of customer involvement differ between firms developing incremental and radical service innovations. These empirical typologies demonstrate the need to gain a more nuanced view of how service characteristics influence the nature of NSD.

In sum, although a wide range of typologies for services exist; they have been developed predominantly on the basis of theoretical considerations, with the aim of facilitating the operations, management, or marketing of services. Few typologies have been empirically derived and even fewer have been created in the NSD context. Very few, if any, typologies have explicitly focused on distinguishing between service types to identify the nature of NSD prevalent across different service types.

2.2. Nature of NSD: resources, practices, methods, and results

The question of interest in this study is whether and how the nature of NSD varies across different service types. To capture a comprehensive view of the nature of NSD, a set of common descriptive NSD features – resources, practices, methods and results (cf. Papastathopoulou and Hultink, 2012; Biemans *et al.*, 2016) – needs to be considered.

NSD resources refer to the investments firms make in NSD. Aside from monetary investments, service innovation is thought to require considerable involvement of frontline employees (Åkesson *et al.*, 2016). NSD research has also emphasized the resources that reside outside the firm's boundaries, highlighting the importance of involving external partners in NSD projects (e.g., Perks and Moxey, 2011; Rusanen *et al.*, 2013). A recent review indicated that strategic issues have become more important in NSD literature within the last few years (Biemans *et al.*, 2016). According to Johne and Storey (1998), companies possessing an integrated NSD strategy tend to focus on existing strengths, fit new services to the current portfolio, and balance development work and existing resources. Therefore, the existence of an explicit NSD strategy is here considered a key resource in NSD.

NSD practices capture how firms manage the development process of new services. Such practices represent the most investigated topic in NSD (Biemans *et al.*, 2016). The use of formalized development processes is commonly considered a success factor for NSD since it is believed to improve the efficacy and effectiveness of NSD (Kuester *et al.*, 2013; Avlonitis *et al.*, 2001). Another key NSD practice relates to how customer information is gathered (Biemans *et al.*, 2016). In particular, the literature has highlighted the role of customer involvement in NSD processes as a practice that contributes to NSD success (Edvardsson *et al.*, 2012; Papastathopoulou and Hultink, 2012; Magnusson *et al.*, 2003). Another important NSD success factor discussed in the literature is the use of cross-functional teams (e.g., Zomerdijk and Voss, 2011). Lin and Hsieh (2014) argued that “it is essential that an NSD project team cooperates across organizational boundaries and various disciplines to achieve the sustainability goal of an NSD project” (p. 113). Their empirical study found that the inter-organizational context and

support for NSD processes through “a service value network” (p. 113) are more important than focusing solely on an individual project. Lin and Hsieh (2014) argued for the need to engage multiple stakeholders and coordinate their activities. Therefore, interaction with customers and external parties are key NSD practices to be examined.

Regarding *NSD methods*, extant literature has emphasized tools and methods for how to involve customers, such as customer panels, focus groups, personal interviews, surveys, free elicitation, and the lead-user method (see, e.g., Edvardsson *et al.*, 2012 for an overview). Previous research has even been able to show that different customer involvement methods provide different benefits and contribute to NSD to a different extent (Witell *et al.*, 2011). Furthermore, the NSD literature has highlighted a number of tools to support the design of service processes and business models, such as service blueprinting, service mapping, and the business model canvas (e.g., Shostack, 1987; Bitner *et al.*, 2008; Osterwalder and Pigneur, 2010; Zomerdijk and Voss, 2011).

Finally, the *results of NSD* have been addressed in a wealth of studies on NSD. According to Cooper and Kleinschmidt (1987), general dimensions of performance include financial performance in terms of profits, market impact, and opening up new opportunities for the firm. A review by Johne and Storey (1998) highlighted that the performance of NSD relates not only to the performance of the newly developed services in the market, but also to the effectiveness of NSD projects, which is measured, for example, in terms of the percentage of new services that are successful in the market (see also Voss *et al.*, 1992). According to Cooper and Edgett (1999), the success rate of new services is approximately 60 percent, and it tends to depend on the service type.

3. Methods and data

3.1 Sample and data collection

The research team designed a survey to develop a service typology and examine its relevance for explaining the nature of NSD. The survey was sent to firms representing different sectors across seven countries: Austria, Finland, Germany, Italy, Mexico, Sweden, and Switzerland. Following Edvardsson *et al.* (2013), the research team generated a list of service sectors eligible for the study and then decided on the study guidelines. In line with previous research on NSD, the key informant approach (cf. Moorman and Miner, 1997) was adopted. The key informants were typically CEOs, marketing managers, or service development managers who had been working at their current firm for an average of 11 years, representing sufficient knowledge about the firm and nature of NSD. In some firms, more than one key informant was selected as

they represented different business units. As an incentive to participate in the empirical investigation, key informants were promised an executive summary of the major findings of the study. Reminders were sent to non-respondents two to six weeks after the initial survey.

The empirical investigation of a service typology as well as NSD features was performed across the seven countries, resulting in 1333 usable survey responses. Similar to Verhoef *et al.* (2011), the response rate varied by country with Mexico having 84%, Finland 11%, Sweden 15%, and Austria with about 5%. Researchers used several communication methods to improve response rates, such as e-mail follow-ups and personal visits. Mexican researchers were particularly successful in getting a high response rate using personal visits. A test was conducted excluding the countries with the lowest response rates, but this did not influence the results of the study why all countries were retained. The sample included service sectors as well as manufacturing firms providing services. In total, 73.6 percent of the sample's firms represented service industries, with the remaining 26.4 percent representing manufacturing industries. In addition, 58.3 percent of the firms operate primarily in business-to-business markets, 29.0 percent in business-to-consumer, and 12.7 percent in business-to-government. In terms of the size of the firms, 28 percent of the 1333 responses were small firms (between 20 and 50 employees), 40 percent were medium-sized firms (between 51 and 250 employees), 20 percent were large companies (between 251 and 1000 employees), and 12 percent were major corporations (with more than 1000 employees); see Table 1. In all countries, NACE-codes were used to identify the samples with an emphasis on larger firms, i.e. firms with less than 10 employees were underrepresented in the sample. In general, cultural and social services are underrepresented in the sample. Through previous research, it is known that firms that use advanced practices for NSD will be overrepresented in the sample.

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3.2 Research instrument

The questionnaire was developed to capture managers' views and experiences on how NSD is performed in their organization (that is, their firm or business unit). Key informants were asked to list up to three newly developed services that were typical for their firm, and subsequently rate the degree to which certain service characteristics describe these services. The informants were then asked questions that characterized the development process of these services in terms

of NSD resources, practices, methods, and results. The items in the final questionnaire were generated through a literature review, discussions with managers, and reviews of scales used in previous research. The questions were pre-tested in a pilot study with a subset of service and manufacturing firms (that is, manufacturing firms providing services). In particular, the questionnaire was designed to cover service characteristics as well as features of NSD (see Appendix 1). How the different parts of the questionnaire were developed is explicated below.

In order to identify suitable characteristics for deriving the typology, existing service typologies (e.g., Maister and Lovelock, 1982; Silvestro *et al.*, 1992; Schmenner, 1986) were reviewed. This review resulted in a list of about 50 service characteristics. The list of criteria was then discussed in an expert workshop in order to decide on the characteristics to form the basis for a typology. The six chosen characteristics were: (1) labor intensity in service delivery, (2) technology intensity of services, (3) customization of services, (4) standardization of services, (5) customer interaction in service delivery, and (6) complexity of services. These six characteristics were included in the initial section of the questionnaire.

The survey to investigate features of NSD was built on research instruments used in previous research (see, e.g., Edvardsson *et al.*, 2013). Following Churchill (1979), new items to cover practices related to NSD process and organization, NSD strategy, and customer involvement were added, as these are commonly investigated NSD key drivers (Papastathopoulou and Hultink, 2012; Biemans *et al.*, 2016). In particular, the research instrument covered (1) resources, (2) practices, (3) methods, and (4) results. Regarding resources, the survey captured the length of a NSD project (months), the existence of a NSD strategy, the number of employees and external parties involved in a NSD project and the amount of resources spent on NSD (share of turnover). For practices, the focus was on customer participation, use of project team, use of a formalized NSD process, as well as interaction with customers and external parties. In terms of NSD methods, the questions covered the use of methods for capturing the voice of the customer such as interviews, focus groups, surveys, and internet panels, as well as methods for designing the service such as service blueprinting and the business model canvas (Witell *et al.*, 2011). Results were measured by the amount of profits coming from new services (Cooper, 1993), the number of developed services, and the number of services surviving on the market. In accordance with Bergkvist and Rossiter (2007), single-item measures for practices, methods, and results were used due to the concrete nature of the topics (see also Hair *et al.*, 2009). All items were measured on a 10-point Likert scale (ranging from 1 = strongly disagree to 10 = strongly agree), except for NSD strategy (non-existent or existent) and items requiring objective estimations from the key informants.

Since the study was conducted across seven countries, the research instrument was provided in a number of different languages. The authors agreed on an English version, which was then translated to fit the language requirements for each country. These versions were then discussed to ensure that the original meanings of the questions were retained. Where the meaning had become lost in translation, a debate resolved the differences and changes were implemented before the study was performed.

3.3 Analysis

The methodology described in Terho and Halinen (2012), Cannon and Perreault (1999) and Gebauer *et al.* (2010) inspired the analysis process for the identification of the service typology and its influence on the nature of NSD. Data were analyzed in two stages, starting with the identification of a service typology, followed by a comparison of NSD features across the identified service types.

The service typology was derived using latent cluster analysis on six service characteristics (Magidson and Vermunt, 2002). Classification based typologies are useful when it furthers an understanding of the phenomenon of interest (Punj and Stewart, 1983). Descriptive statistics and correlations between the service characteristics are provided in Table 2. Due to missing data, the analysis was performed on 1246 cases. The methodologies used in previous research, such as Terho and Halinen (2012) and Gebauer *et al.* (2010) were extended through latent cluster analysis, see e.g. Bouncken and Fredrich (2016) and Munzel and Kunz (2014)¹. Latent cluster analyses use a probabilistic classification approach based on latent class analysis (Magidson and Vermunt, 2002). Latent GOLD® 5.1 was utilized for the analysis, exporting the results to SPSS for further statistics. To decide on the number of clusters, the approach of Munzel and Kunz (2014) was followed. Different solutions were compared ranging from 1 to 9 clusters based on the value of the log-likelihood function LL_K , the percentage of improvement compared with the null model solution, the percentage of improvement compared with the preceding solution, the Akaike information criterion (AIC), and the Bayesian information criterion (BIC). In addition, the managerial interpretability of the suggested classifications was considered. Based on the percentage improvements of the log-likelihood function LL_K , a four or six cluster solution is suggested (largest percentage improvements, 1.7% and 2.8%; AIC 30972; and 29959 respectively). Based on the log-likelihood (LL), model improvement was evaluated using bootstrapping (sample size 500). The four cluster solution is

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¹ The authors thank an anonymous reviewer for this suggestion.

a significant improvement in relation the three cluster solution ($p < 0.01$) and the six cluster solution is a significant improvement in relation the four cluster solution ($p < 0.01$). The six-cluster solution has the best values, however, beyond the four cluster solution sizes of the smallest class becomes less than 1.5% of the sample size, reducing the managerial interpretability and relevance of those solutions (Miller and Roth, 1994). Therefore, the four cluster solution was chosen for further analysis.

In addition, the distribution of the service types across the countries was investigated – it was fairly even distributed, i.e. all service types existed in each country. The analysis was repeated with the exclusion of Mexico which produced a similar typology of services. ANOVAs with Duncan's multiple range test of significance evaluate the between-group variability against the within-group variability when computing the significance test that the means in the groups are different from each other (Cannon and Perreault, 1999; Terho and Halinen, 2012). Using this technique confirmed confidence in a typology with four interpretable clusters of service types, where each cluster was named based on the specific characteristics. Respondents' qualitative descriptions of developed services built the basis to further develop managerial interpretability of the service typology.

Subsequently, the differences in NSD resources, practices, methods, and results across the service typology were examined. ANOVAs were performed with Duncan's multiple range test of significance to identify how the service types differed on features of NSD. Further, the use of NSD strategy and its role in different service types was examined.

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4. Results

4.1 Identification of a service typology

As illustrated in Figure 1 and Table 3, the analysis resulted in four clusters based on the service characteristics. Five of the six characteristics discriminate well between the four clusters of service firms and together they form two dimensions. The first dimension concerns 'contact intensity', involving customer interaction, labor intensity and customization. The second dimension concerns 'technological complexity' and involves technology intensity and complexity. Together, these two dimensions were helpful in explaining the differences between the four types of services (significance levels can be found in Table 3).

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PLEASE INSERT FIGURE 1 HERE

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The first cluster, which can be labeled as *routine-intensive services*, features low degrees of technological complexity and contact intensity. Routine-intensive services are distinguished from other service types by the lowest mean values for all the five service characteristics forming the service typology, i.e. technological intensity, customization, customer interaction, labor intensity and complexity. Many of these services are highly standardized and marked by a high degree of repetitive processes. Services in this cluster include for example wholesale trade, real estate, transportation and logistics services, maintenance services, banking, and insurance. This cluster comprised 396 service-providing businesses.

The second cluster can be interpreted as *technology-intensive services*. This category includes services that have the highest degree of technology intensiveness and complexity combined with a relatively low degree of contact intensity. Qualitative descriptions of these services show that they frequently comprise technical services and product-related services. Examples include engineering, repair, technical support, energy management, IT services, and different types of mobile services. In total, 322 service-providing businesses in this study can be assigned to the cluster of technology-intensive services.

The third cluster can be described as *contact-intensive services*, which feature the high degrees of labor intensity and customer interaction but a low degree of technological complexity. This cluster hosts services where the personal interaction between employees and customers is a key to provide excellent service. Examples of services are customer care, retail, healthcare services, hospitality and catering, as well as call centers. This cluster is formed by 295 service-providing businesses.

The fourth cluster identified can be labeled as *knowledge-intensive services*, which display both a high degree of complexity and contact intensity. They exhibit the highest degree of customer interaction and customization, but also relatively high degree of complexity and technology intensity. Services representing this cluster include legal services, business consulting, design services, medical services, and auditing services, which are typically highly customer-centered and are provided in close collaboration with customers. A total of 233 service-providing businesses in the data set fell into this category.

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4.2 NSD practices and results across the service typology

ANOVAs with Duncan's multiple range test of significance were performed in order to identify whether "one size fits all" – that is, if features of NSD differ between technology-intensive services, contact-intensive services, knowledge-intensive services, and routine-intensive services. The results show (significance levels can be found in Table 4) that although some particular practices and methods are used to the same extent across different types of services, overall there are considerable differences in resources, practices, methods, and results between service types (see Table 4).

The evidence indicates that *NSD resource investments* are the highest in knowledge-intensive services in terms of people resources as well as investment as a share of turnover. The development of technology-intensive services features the highest prevalence of a NSD strategy (69 percent), and the longest duration of NSD processes. Routine-intensive services stand out as involving the lowest resource investments in NSD, and also having a strategy for NSD is the least common in this category.

The use of *NSD practices* fostering successful NSD outcomes is clearly the least common in routine-intensive services. Knowledge-intensive services differ from other types with regard to higher degree of interaction with customers and external partners. Together with technology-intensive services, they also feature the highest use of formalized NSD processes that is less common in contact- and routine-intensive services. Customer participation in NSD is common across different service types except for routine-intensive services.

In terms of *NSD methods*, knowledge-intensive services differ from other types in their more common use of service design tools service blueprinting and the business model canvas. The use of methods to gain customer insight – interviews, focus groups and internet panels – is equally common for all types except for routine-intensive services. Generally, in developing routine-intensive services, specific NSD methods are used to a lower extent than in the other service types.

The results show (Table 4) that the service types differ significantly in terms of *NSD results*. Knowledge-intensive service firms have the highest turnover coming from new services, followed by firms providing contact-intensive and technology-intensive services. The

results also indicate that technology and knowledge-intensive service providers develop more new services than companies representing other service types do.

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5. Discussion

The extant NSD literature has tended to assume that the key practices for NSD identified in one context apply across different types of services. Consequently, researchers have recently highlighted the need to study how service context influences the NSD process (Biemans *et al.*, 2016; Kuester *et al.*, 2013; Storey and Hull, 2010). Recently, Storey *et al.* (2016) suggested further research on how service sector characteristics influence how NSD is performed. To address this pivotal shortcoming in NSD research, this study aimed to explore how the nature of NSD differs across various types of service. For this purpose, a service typology was empirically developed, and subsequently the features of NSD in each of the four service types identified (i.e. routine-, technology-, contact-, and knowledge-intensive services) were examined. Table 5 provides an overview of NSD resources, practices, methods, and results across different types of services.

Routine-intensive services involve low degree of customer contact and technological complexity, exemplified by services in wholesale trade, transportation and logistics, basic maintenance, as well as bank and insurance. Routine-intensive services stand out as the least sophisticated context for NSD: service development does not seem to be a strategic priority in this context, and both investment on and outcomes of NSD appear to be the lowest. NSD in this context featured the lowest prevalence of NSD strategy, and the lowest use of commonly cited NSD practices, such as interaction with customers and partners, and use of project teams and formalized processes. Services falling into this category, such as bank and transportation services, are relatively standardized and product-like, and perhaps represent industries where innovativeness may not be the key source of differentiation. Interestingly, financial services are among the most commonly studied contexts in NSD research (e.g., Avlonitis *et al.*, 2001; de Jong and Vermeulen, 2003; Storey and Hull, 2010), indicating that much of extant research knowledge on NSD is drawn from studying contexts where the range of NSD practices and methods in use is actually relatively low.

Technology-intensive services feature high technological complexity but low contact intensity. Services falling into this category include for example industrial services such as engineering, repair, and IT services, as well as different types of mobile and web-based services. The development of technology-intensive services can be characterized as strategy-driven and formalized. Compared to other service types, the development processes of technology-intensive services are longer in duration and feature the highest prevalence of NSD strategy and degree of participation by customers. In the context of industrial services, NSD often involves close co-development with customers throughout the NSD process, from market sensing to sales and delivery, rather than just market research (Kindström and Kowalkowski, 2009). Together with knowledge-intensive services, technology-intensive services have a high degree of formalized NSD processes. The technological complexity prevalent in this service type carries higher risks in terms of time and cost investments, leading companies to organize their development processes according to more detailed principles. This is roughly comparable with product development in technology-intensive manufacturing companies.

Contact-intensive services feature high degree of contact and labor intensity but low level of complexity. Services representing this category include, for example, hospitality services, elderly care and healthcare, call centers, catering, as well as customer care. The results show that the development of contact-intensive services involves relatively high investments and methodical orientation, and high customer influence. Development projects in this service type feature low use of formalized NSD processes but high degree of customer participation. The use of NSD methods for gaining customer insight, such as interviews and focus groups, is common in this category. It seems that the major driver of NSD in this type of services is frequent contact with customers, which is due to the labor-intensive nature of these services (cf. Zomerdijk and Voss, 2011). Moreover, a high degree of interaction with customers helps firms to gain customer understanding and develop ideas for NSD (de Jong and Vermeulen, 2003).

The fourth service type identified is *knowledge-intensive services* that involve a high degree of contact intensity and complexity. Services in this category include, for example, business consulting, legal service, design services, and medical services. Perhaps unsurprisingly, the findings indicate that NSD is a key priority in knowledge-intensive services, as they feature the highest investment in and outcomes of NSD, and the most sophisticated NSD practices and methods. In this service context, companies report the highest use of commonly cited success factors such as formalized NSD processes, and interaction with customers and partners. These companies also feature the highest use of versatile NSD methods and tools. Service in this category can be characterized as professional in nature, relating to the

accumulation, creation, or dissemination of knowledge that satisfies clients' needs (e.g., Bettencourt *et al.*, 2002). In the NSD context, formalization contributes to knowledge codification and organizational learning (Stevens and Dimitriadis, 2005). This could explain why knowledge-focused services are more prone to using formal processes to coordinate development activities, including a wide range of formal methods such as the business model canvas, service blueprinting, and customer focus groups. The important role of interaction in NSD for this service type also finds support in the literature. Competence development in professional service firms has been found to be influenced by their close and regular interaction with customers and some other significant external actors, such as suppliers and universities (Awuah, 2007; Reihlen and Nikolova, 2010).

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6. Conclusions and implications

6.1 Theoretical contributions

This study contributes to service research in several ways. First, this study developed an empirically derived service typology. Through conducting an extensive, cross-industry survey in seven countries, four service types were identified: routine-intensive services, technology-intensive services, contact-intensive services, and knowledge-intensive services. This service typology provides a categorization of services that reflects today's service-providing industries in a comprehensive manner. Many of the existing service typologies were developed in the 1980s and 1990s with the purpose of addressing service operations. These typologies tended to focus on issues affecting service delivery, such as labor intensity and degree of customer interaction (e.g., Maister and Lovelock, 1982; Schmenner, 1986; Bowen, 1990; Verma, 2000). The typology developed in the present study addresses a broader range of service characteristics, encompassing service delivery aspects but also technology-intensiveness and complexity. Furthermore, this study differs from previous research in that it both empirically develops a typology and also studies the prevalence of the studied phenomenon – here NSD resources, practices, methods, and results – across this typology. Showing that the four service types differ in terms of the nature of NSD demonstrated that the derived service typology has both theoretical and managerial relevance.

Second, this study contributes to the knowledge gap highlighted by Biemans *et al.* (2016) by addressing the influence of service context on NSD. The study identified specific NSD resources, practices, and methods that are prevalent in certain types of services, and thereby deepens the current understanding on NSD. With one of the first attempts to develop such a typology, this study responds to recent calls for developing “NSD taxonomies” (Biemans *et al.*, 2016). Existing NSD research offers a range of generic models for NSD (e.g., de Jong and Vermeulen, 2003; Menor and Roth, 2008), but this study reveals that the relevance of NSD features is contingent on the type of the new service to be developed. Furthermore, these findings showed that the use of advanced practices and methods differs dramatically between service types, particularly between knowledge-intensive and routine-intensive services.

6.2 Managerial implications

This empirical study on the development of new services across industries and countries has clearly shown that NSD practices and methods adopted by firms differ according to the type of service. This indicates that generic NSD models suggested by most management books may not fit all NSD projects. Alam (2014) already pointed out that today’s companies still adhere to the traditional and mature models, even though such models might not meet the requirements arising from competitive and dynamic marketplaces. Thus, firms may use a specific set of NSD methods and tools for any kind of service even though they are inappropriate for several service types.

This observation has important managerial implications. Managers must be critical towards general “truths” for NSD best practice, and evaluate the suitability of particular NSD approaches for different types of service. When managing NSD, the models, methods, and tools used should be selected depending on the needs and challenges linked to the service type to be developed. At the same time, managers should not assume that their current practice is the best one, but they should learn about the NSD resources, practices, and methods for other service types to benchmark and renew their current approaches. For example, it seems as if routine-intensive services are lagging behind in adopting common NSD methods and tools, and contact-intensive services should focus on developing the delivery system and processes with a focus on individualization and customization. Finally, firms should be flexible in their adaptation of NSD practices and methods especially when expanding to new types of services. This could be accomplished by either adopting different service type-specific models, or a configurable model to be used when various types of services are developed.

6.3 Limitations and further research

This study has certain limitations. One is the possible bias due to the translation of the questionnaire into different languages. Although English was used as the common language, the translation back and forth between languages could have introduced uncertainties in the meaning of the theoretical constructs, although it also helped adjust the terminology to fit the vocabulary used in different cultural settings. Second, questions and concepts used can be interpreted in somewhat different ways in different countries and by different key informants. Since the position of NSD manager is not a profession or a formal position in all firms, the manager responsible for NSD in a firm could be a marketing manager, a service manager, R&D manager, operations manager, or the CEO. Third, only one manager in each firm responded to the survey; some of them might have consulted others, while others may not have.

By challenging the idea that one size fits all and arguing that practices and methods vary depending on the type of the service developed, this study has highlighted the need for further research. One such path would be to explore the usefulness of configurable process models, as found in both the literature on product development and software engineering. Researchers need to develop models for NSD (resources, practices, and methods) grounded in the logic of service that can be adjusted for different service types. Furthermore, research comparing contrasting pairs of similar services – a success and a failure, for example – would also add to the understanding of what factors and conditions in NSD practices drive outcomes for different service types. Such studies have been carried out in the new product development field (see, e.g., Rothwell *et al.*, 1974; Griffin and Page, 1996).

Future research on NSD should use a wider range of research methods than those applied so far. In particular, researchers could benefit from using simulation techniques, ethnographic methods, and participant observations, preferably using a longitudinal perspective.

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Figure 1: An empirically derived service typology

Table 1: Descriptives of the sample.

	Austria	Finland	Germany	Italy	Mexico	Sweden	Switzerland
No of firms	72	187	186	211	224	251	202
Share of B2C/B2B/ B2G*	33/58/9	25/57/18	28/62/10	27/63/10	32/63/45	16/63/21	47/43/10
Manufacturing/ service	29/71	12/88	32/68	35/65	18/82	30/70	30/70
Average no. of employees	817	2125	3667	213	460	1423	628
Labor intensity	6.57	7.05	6.71	6.72	7.69	6.63	6.6
Technology intensity	5.66	6.71	6.76	6.93	7.46	6.54	6.03
Customization	7.87	7.14	6.95	7.17	8.22	7.63	7.97
Standardization	5.67	6.56	6.51	5.74	7.45	6.2	6.23
Customer interaction	7.18	8.12	6.59	6.95	8.89	7.22	7.42
Complexity	6.84	6.71	7.28	6.82	7.38	7.17	6.91

*B2C=business-to-consumer; B2B=business-to-business; B2G=business-to-government

Table 2: Correlation of the characteristics for a service typology.

Characteristics	Mean	Stdv.	1.	2.	3.	4.	5.	6.
1. Labor intensity	6.89	2.41	1	-0.006	.22**	.066*	.30**	.16**
2. Technology intensity	6.71	2.37		1	.10**	.17**	.09**	.34**
3. Customization	7.55	2.11			1	-0.043	.39**	.30**
4. Standardization	6.42	2.21				1	.11**	0.004
5. Customer interaction	7.53	2.16					1	.28**
6. Complexity	7.05	2.05						1

Table 3: Descriptives of the typology of services.

Type of service	Routine-intensive services	Technology-intensive services	Contact-intensive services	Knowledge-intensive services
Description	Services with a low degree of customer interaction, customization, complexity, and technology intensity	Technology-based services featuring high complexity but low customer interaction and labor intensity.	Customized services that are labor-intensive with high customer interaction in service delivery.	Customized services that involve a high level of customer interaction and complexity.
Number of cases	396	322	295	233
Labor intensity	5.99 ^a	6.01 ^a	8.29 ^c	7.79 ^b
Technology intensity	5.36 ^a	8.28 ^d	6.52 ^b	6.97 ^c
Customization	5.99 ^a	7.24 ^b	8.68 ^c	9.21 ^d
Standardization	6.31 ^a	6.34 ^a	6.22 ^a	6.92 ^b
Customer interaction	6.07 ^a	6.78 ^b	8.33 ^c	10.00 ^d
Complexity	5.25 ^a	8.19 ^d	7.47 ^b	7.91 ^c
Examples	Wholesale trade, real estate, transportation and logistics services, banking and insurance, maintenance services	Engineering, maintenance, repair, technical support, energy management, mobile and web-based services	Training, retail, healthcare services, catering, hospitality services, call centers, customer care	Design services, medical services, legal services, business consulting, auditing services

(a, b, c, and d indicate that there is no difference between all with a, but that a are different from b, based on Duncan's multiple range test of difference, $p < 0.05$.)

Table 4: Descriptives of NSD resources, practices, methods and results over the typology of services.

	Types of service	Routine-intensive services	Technology-intensive services	Contact-intensive services	Knowledge-intensive services
Resources	Length of a NSD project (months)	7 months	9 months	7 months	6 months
	Share of firms with a NSD strategy	51%	69%	65%	65%
	No. of employees in a NSD project ^{ns}	5.43	6.11	6.20	6.77
	No. of external parties in a NSD project ^{ns}	2.37	2.51	2.60	3.05
	Resources on NSD (share of turnover) *	3.70 ^a	4.18 ^b	4.39 ^b	5.31 ^c
Practices	Participation of customers*	4.71 ^a	5.88 ^b	5.75 ^b	5.54 ^b
	Use of project team*	5.99 ^a	6.24 ^b	6.24 ^{a, b}	6.61 ^b
	Use of formalized NSD process*	4.76 ^a	5.73 ^b	5.11 ^a	5.78 ^b
	Interaction with customers*	5.68 ^a	6.5 ^b	6.29 ^b	7.16 ^c
	Interaction with external parties*	5.03 ^a	5.94 ^b	5.58 ^b	6.49 ^c
Methods	Interviews*	5.83 ^a	6.36 ^b	6.52 ^b	6.40 ^b
	Focus groups*	3.86 ^a	4.59 ^b	4.58 ^b	4.58 ^b
	Surveys ^{ns}	5.09	5.35	5.62	5.59
	Internet panels*	2.78 ^a	3.38 ^b	3.44 ^b	3.50 ^b
	Service blueprinting*	3.45 ^a	4.24 ^b	4.18 ^b	4.82 ^c
	Business model canvas*	3.98 ^a	4.63 ^b	4.34 ^{a, b}	4.98 ^c
Results	Turnover from new services (<3 years)*	10.65 ^a	13.40 ^b	16.25 ^c	22.09 ^d
	No of services developed (each year) ^{ns}	1.8	3.32	2.06	2.58
	No of services surviving (each year) ^{ns}	1.24	1.60	1.27	1.69

* $p < 0.05$ (a, b and c indicate that there is no difference between all with a, but that a are different from b and c, based on Duncan's multiple range test of difference, $p < 0.05$).

Table 5: An overview for NSD across the typology of services.

NSD features	Routine-intensive services	Technology-intensive services	Contact-intensive services	Knowledge-intensive services
Resources	Lowest investments in NSD and lowest prevalence of an NSD strategy with an internal focus on NSD.	Highest prevalence of NSD strategy and relatively high investments in NSD.	Relatively high investments in NSD projects.	Highest investments on NSD. Highest number of internal and external parties involved in NSD projects.
Practices	The lowest degree of interaction with customers or external parties, and customer participation. Low use of formalized processes.	High use of formalized processes. High degree of customer participation in NSD. Moderate degree of interaction with customers and external parties.	Low use of formalized processes, but high degree of customer participation. Moderate degree of interaction with external parties.	Highest degree of interaction with customers and external parties. Highest use of formalized NSD process.
Methods	Lowest use of NSD methods.	Relatively high use of versatile NSD methods.	Relatively high use of NSD methods except for business model canvas.	Highest use of versatile NSD methods, in particular service blueprinting and the business model canvas.
Results	Lowest turnover from new services.	Rather low turnover from new services.	Second highest turnover from new services.	Highest turnover from new services.

Appendix 1: Questions and measures used.

Constructs	Questions (scale)
Service characteristics	Please characterize the services listed above [newly developed services that in your opinion are typical for your company] (very low to very high) - Degree of labor intensity in service delivery - Degree of technology intensity of services - Degree of customization of services - Degree of standardization of services - Degree of customer interaction in service delivery - Degree of complexity of services
Length of a NSD project	How many months does it usually take from the start to the end of a typical new service development project in your company? - Less than 1 month - 1–3 months - 4–6 months - 7–9 months - 10–12 months - 13–18 months - More than 18 months
NSD strategy	Does your company have an explicit strategy for new service development? (Yes – No)
No. of employees / external parties in a NSD project	In a typical new service development project, on average how many persons are involved? - Employees - External parties
Resources on NSD	Please estimate the expenditures for new service development as a percentage of your company's total annual turnover with services.
Participation of customers	To what degree do customers participate in the development team in new service development projects? (In no projects – In all projects)
Use of project team	The responsibility for the development of a new service is delegated to a project team.
Use of formalized NSD process	Our company uses formalized processes for all new service development projects.
Interaction with customers / external partners	To what extent do the following statements describe how the new service development project was conducted? (Strongly disagree – Strongly agree) - We interacted with customers beyond the common practice in our industry. - We interacted with business partners beyond the common practice of market research in our industry.
Methods	To what degree are the following methods used in new service development projects? (In no projects – In all projects) - Interviews - Focus groups - Surveys - Internet panels - Service blueprinting - Business model canvas
Turnover from new services	Please estimate the percentage of your services turnover achieved as a result of new services (i.e., not older than three years)?
No. of services developed	How many new service development projects has the company conducted during the last three years?
No. of services surviving	How many of them survived the first year after launch?