Modular Professional Services: Conceptual Goodness and Research Themes

Full Paper

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Abstract

Professional service providers are increasingly confronted with the challenge of integrating digital components and knowledge-intensive activities to standardize complex recurring tasks while remaining agile to offer customized services that fulfill diverse customer needs. Modular service design has been proposed as a mean to enable a sound balance between these contradicting aims. However, the current literature on modularity in professional services reflects inconsistencies and tensions in the concept that have hitherto hindered the development of a common point of departure for further research. This paper seeks to summarize the current theoretical discussion on the modular design of professional services and evaluates its conceptual goodness based on five established design criteria. Our findings identify weak spots in our understanding of the modularity concept in the field of professional services and highlight five prevailing research themes that build a common ground for further research to address them correspondingly from different angles.

Keywords

Service Modularity, Service Systems Engineering, Professional Service Firms, Conceptual Goodness

Introduction

In recent decades, professional service firms (PSF) have become the lubricant of those complex service networks that underlie today's modern economies. Professional services invoke a value creation process that is characterized by intense interaction between customer and provider and rely upon knowledge-intensive activities in service provision (Muller and Doloreux 2007; Muller and Zenker 2001). Especially in a B2B context, providers of professional services take over central roles in which they accumulate, create, and disseminate knowledge among multi-actor constellations, thereby helping their customers to run and transform their businesses. Examples of professional services in a B2B context include IT-consulting, R&D services, professional legal services, financial and management consulting (Miles 2005; Nordenflycht 2010). With (digital) technology evolving to an essential mean of today's work environment (Lusch and Nambisan 2015), PSF are increasingly in the research focus of Service Systems Engineering (SSE) that is particularly concerned with the systematic development of socio-technical systems and the creation of value from the interplay between humans and technology (Maglio et al. 2009).

Driven by the general trend towards a greater diversity of customer needs in a highly competitive business environment, a growing number of PSFs are faced with the challenge of balancing the diverging aims of service standardization and individualization. Given these challenges, the target vision for many PSF has become to transform into a modular state. In particular, the integration of digital service components promises high-efficiency gains by allowing automatizing complex recurring tasks without compromising the necessary provider agility to meet individual customer demands (Nätti et al. 2015). For example, professional legal firms use software solutions to pre-structure customer requirements, thus allowing them to assess the success of legal proceedings even before personal consultations. However, modular professional services have hitherto been rather an abstract thought without adequate scientific foundation and empirical saturation.

In general, modularity can be seen as the ability of an organization to decompose a complex system (in this case – professional services) into smaller parts (modules) that can be improved and substituted independently, while maintaining the functionality of the whole (Baldwin and Clark 2000). Modules are highly interdependent and yet loosely coupled due to the use of standard interfaces, allowing them to function together as a whole (Baldwin and Clark 1997a; Sanchez and Mahoney 1996). Providers who draw on a modular service architecture can create variety in their service portfolio through mixing and matching of modules with different needs of their customers, while also achieving efficiencies of scale and scope due to commonality in the use of service modules (Tuunanen et al. 2012; Bask et al. 2010).

Despite its promising benefits, recent studies point out that research on service modularity is still in an early stage (Cabigiosu et al. 2015; Bask et al. 2010). Even though the academic community has successfully adopted the modularity concept to a few service domains, e.g., logistics and financial services (Dörbecker and Böhmann 2013), the specificities that differentiate the field of professional services from these other service domains have seldom been taken into account in the interpretation of the concept. In particular, the fact that professional services are characterized by knowledge-intensive components that cannot be specified and documented (i.e. the non-documentable expertise and experience of an IT-consultant is critical for the estimation of project cost estimates), diverges from the classic understanding of a modular service architecture (Voss and Hsuan 2009). Correspondingly, the current body of knowledge reflects several tensions and inconsistencies with respect to the understanding of what modularity is and how it can be achieved, thus hindering the development of a common point of departure for further research and indicating the need for a structured analysis.

Therefore, the purpose of this research is to summarize the current discussion in the literature and evaluate the conceptual goodness of the concept based on five established design criteria from Gerring (1999): *differentiation*, *coherence*, *depth*, *theoretical utility* and *field utility*. Furthermore, we identify and frame prevailing research themes within the extent literature. We thereby address recent calls in the literature for research that enhances our understanding of what modular professional services are, consequently contributing to a clearer identity of this research stream (Cabigiosu et al. 2015; Iman 2016).

The remainder of this paper is organized as follows. After the methodology of our review process is presented in chapter 2, the concept of modularity in the context of professional services is evaluated with the help of the conceptual goodness criteria in chapter 3. On this basis, we derive current research themes in chapter 4. The paper concludes with a brief discussion of research findings, limitations, and future research implications, thereby providing guidelines to scholars on how to reduce the degree of uncertainty in the current understanding of modular professional services and improve its conceptual goodness.

Methodology

We conducted a systematic literature review based on the research guidelines by Webster and Watson (2002). A systemic review was chosen because this approach has been outlined as particularly fruitful to tackle research questions that have been previously discussed from different perspectives, but apparently, show certain contradictions (Webster 2002). As suggested by Webster and Watson (2002), the review process was initiated with a definition of the scope, aim, and audience of the review. The aim is to analyze the current body of knowledge on modularity in professional services and its related theoretical foundation. The scope of the review is existing articles that deal with modular service design in professional services in a business-to-business context. The audience of this article in the first place are researchers from the IS community. After we had defined the scope and aim of our research, we started searching the literature for relevant articles based on a systematic keyword search. For this reason, we screened the main academic search engines (Google Scholar, EBSCO, Science Direct, Elsevier, and Jstor) for the relevant articles from academic journals and conference proceedings. The following terms were used in the search: "*professional services*" and "*knowledge intensive*" in combination with one of the following additional terms "*modularity*", "*modularisation OR modularization*" and "*modular*". Without further restrictions, in this way and, twelve relevant articles were identified. Using forward and backward search, two further relevant articles were located, so that in total 14 articles build the foundation for our literature review. The search process was considered complete when no further articles could be identified in the search.

The literature was systematically reviewed based on a research framework comprising of two sets of review criteria. The first set considered the research context of relevant articles and sketched the boundaries and

implications of modularity in professional services (1). To cover the literature more holistically, we included criteria in our analysis that aimed at the identification and classification of prevalent research themes in the literature. We further considered differences in the applied research perspectives of the identified articles to gain further insights into scholars' interpretation of the modularity concept. The second set comprised criteria to investigate the theoretical foundation of modularity in professional services (2). Criteria in this set cover the roots of understanding modularity in the field of professional services, i.e. given definitions as well as their respective references that provide further information on the articles' theoretical foundation. We further studied given examples of modules and interfaces as well as limitations and acknowledgments of the articles' theoretical foundation. A systematic application of this framework was supported by using professional software for qualitative data analysis (MaxQDA) and excel tabling, which eased the process of arranging, discussing and synthesizing prior research into greater units of analysis (Brocke et al. 2009).

Conceptual Goodness of Modularity in PSF

In the following, we illuminate the theoretical foundation of modularity in PSF, by presenting the outcome of the application of the first set of review criteria. Being an abstract concept previously applied in other domains such as manufacturing or organizational science, it is important to take into account where modularity has been adopted from since it influences the applicability of the concept in different contexts.

The Theoretical Foundation of Modularity in Professional Services

In this chapter, we give a brief overview of the articles considered in this research as well as commonalities and differences in their theoretical foundation. Table 4 summarizes these findings, with the considered articles illustrated as (rows) In the course of the review process, we analyzed the research context, by studying given definitions and those definitions that were referenced from other articles. In this way, we identified similar contextual origins that could be aggregated to greater units of analysis. From this approach, we derived five different roots of modular professional services (columns).

Roots	Modularity in product and organization					Service mass production		Service modularity			Distinctive understanding
Definition is given by	Ulrich (1995)	Ulrich and Tung (1991)	Baldwin and Clare (1997b)	Baldwin and Clare (2000)	Sanchez and Mahoney (1996)	Sundbo (1994, 2002)	Peters and Saidin (2000)	Pekkarinen & Ulkuniemi (2008)	Voss and Hsuan (2009)	Bask et al. (2010)	Own definition was given
Bettiol et al. (2012)							X				
Brax and Toivonen (2000)		X	X			X	X				
Cabigiosu et al. (2015)			X	X	X			X	X	X	X
Giannakis et al. (2015)	X		X	X	X			X	X	X	X
Hautamäki et al. (2015)								X			
Miozzo and Grimshaw (2005)			X	X		X					
Müller (2017)				X				X		X	
Nakano (2011)	X										X
Nätti et al. (2015)	X	X			X						
Pekkarinen et al. (2009)								X	X		
Rahikka et al. (2011)					X			X			
Rajahonka and Bask (2016)										X	
Wei et al. (2010)											X
Zhou and Lin (2014)						X		X	X		

Table 1. Theoretical Foundation of Modularity in Professional Services

- The first category (*products and institutional organization*) encompasses definitions that describe the concept of modularity on a generic level. An often cited definition within this category is Baldwin and Clark (1997b, p. 86): *"A modular system is composed of units (or modules) that are designed independently but still function as an integrated whole"*. This definition, however, delivers solely an interpretation of what modularity is in general without clarifying its service-specific use and applicability (Pekkarinen and Ulkuniemi 2008).
- The second category contains definitions that transfer the general idea of modularity from manufacturing to services, which is in line with the so-called good-dominant-logic (Vargo and Lusch 2004). This stream of the literature places a particular emphasis on standardization and precise definition of interfaces and service components to achieve *mass production and customization of* services. For example, Sundbo (1994, p. 255) refers to the mass production of services as routinizing services *"that they can be repeated in the same way"*.
- The third contextual origin is the literature on *service modularity,* which is more consistent with the service-dominant-logic (Vargo and Lusch 2004). For example, Voss and Hsuan (2009) transferred the idea of a modular product architecture to services, consequently leading to a modular service architecture. The authors demonstrate their interpretation of modularity at the example of cruise ship services that are decomposed into functionalities and tangible elements. In contrast, Pekkarinen and Ulkuniemi (2008) describe a modular logistic platform that distinguishes between modularity in service, in processes, and in the organization. In both of these interpretations, the role of the customer is considered an important element of the modular service design.
- The fourth category contains definitions that were specifically given for an application in the context of professional services. For example, Cabigiousu et al. (2015) highlight the significance of knowledge-intensiveness in the provision of professional services, thus calling for further research in this particular area.

We further studied the articles with respect to remarks of the authors on the relevance, usefulness, and potential limitations of their theoretical foundation. Generally, we found that only a few articles provide insights on this issue, mostly highlighting the limitations of the modularity concept in professional services (e.g. Cabigiosu et al. 2015; Brax and Toivonen 2000). However, the use of several definitions of modular design in many articles leads to a certain degree of theoretical overlap, thus subjecting modularity in professional services to a certain degree of vagueness.

The Notion of the Conceptual Goodness

Motivated by the high level of heterogeneity and vagueness of the modularity concept in professional services, we decided to evaluate its conceptual goodness based on established criteria developed by Gerring (1999). With respect to the theoretical aim of this research, out of the original eight criteria, we excluded three criteria (familiarity, resonance, and parsimony), because they are difficult to evaluate without testing a concept in a real world context. Consequently, the following five criteria were included in the research framework: differentiation, depth, coherence, field utility, and theoretical utility.

- *Differentiation* refers to the degree to which a concept is distinguishable from others and its eligibility to capture real world phenomena (Gerring 1999). As of yet, the concept of modularity in professional services encloses a particularly large interpretation space with respect to the determination of modules and interfaces. In particular, the current lack of preciseness and clarity in the definition of modularity makes it difficult to distinguish a modular architecture from more integral (monolithic) forms. If modularity means that certain elements are more dependent than others are, any service is to some degree modular.
- *Depth* is another characteristic of conceptual goodness and refers to the capacity of a concept to bundle characteristics: *"The greater the number of properties shared by the phenomena in the extension, the greater the depth of a concept"* (Gerring 1999, p. 380). A lack of depth is reflected by the number of elements that scholars bring into relation with modular design in professional services without assigning service elements a well-defined role in a modular service architecture. In particular, this applies to organizational routines and commodified knowledge, e.g. cost estimation in software development that relies on a combination of both. The frequency in which routines and knowledge are mentioned in the literature indicates their importance for modularity in professional services. Yet, the literature fails to assign clear roles to these elements and to describe them in terms of service design.

- According to Gerring (1999), *coherence* refers to the internal consistency of instances and attributes of the concept. Several articles develop own interpretations of modules and interfaces but do not clearly state how these elements belong to each other. For example, Cabigiosu et al. (2015) refer to standard procedures as *"inner constitutive elements"* of modules while Nakano (2011) views these elements themselves as modules.
- *Field Utility* describes the quality of the correspondence between *"words and things"* of a concept (Gerring 1999, p. 382). With respect to the specific characteristics of professional services, we found that several articles struggle with the identification of the modules, i.e. what is the module, and what is it not? While digital services allow for their precise documentation, modularity in professional services fails to establish a one-to-one correspondence between observed things (e.g. knowledge-intensive tasks) and words (e.g. module and interface) due to the strong knowledge-dependency, resulting in limited field utility.
- *Theoretical Utility* refers to the placement of a concept within a wider theoretical context. In the general context of Service Systems Engineering, modularity is often highlighted as a key for the development of efficient yet individual service designs and for understanding the functionality of socio-technical systems (Böhmann et al. 2014). Modularity of professional services brings together the central building bricks of a service system, although its potential explanatory power has not yet been fully explored.

It is worth mentioning that the outlined shortcomings are not to be seen as a general criticism at the applicability of the concept of modularity to the professional service sector. Instead, we rather aim to stimulate research that further increases its conceptual goodness. Based on the identified shortcomings, we derive prevailing research themes that represent different angles from which research on modularity in professional services may be approached in future research.

Prevailing Research Themes in Modular Professional Service Design

Modular design in services is a particularly complex field of research (Bask et al. 2010) and plays a central role in the development and provision of services. This manifests in several interdependencies between the concept of modularity and other important research themes mentioned in the considered literature. The complexity and central role of modular design in services, in general, is further shown by the variety of effects that are attributed to the concept (cf. Dörbecker and Böhmann 2013). Several research themes have emerged from the central role of modular design in professional services that are to some extent different from research themes in the general service modularity literature. With the application of the second set of review criteria, we captured the variety of research themes and aggregated related themes to greater units of analysis (Webster and Watson 2002). Five themes have been synthesized from the literature as they turn out to be particularly interrelated with modular service design: *Knowledge sharing*; *Learning*; *Service Experience*; *Service innovation*; *Organization of labor and creative effort*.

However, modularity is an ambiguous concept, as that characteristics of the concept can also be viewed as benefits (Voss and Hsuan 2009; Gershenson et al. 2003), e.g., loose coupling is a benefit if the aim is to divide a system into separate parts, but from descriptive perspective it is also a characteristic to describe the structure of a system. We found that this ambivalence manifests in the literature in two different perspectives at modular design. This is also reflected by the differentiation between the operational and strategic perspective of modularity in services (Müller and Lubarski 2016). The first perspective (*strategic*) views modularity as a game changer that influences how professional service providers develop, offer, and provide their services. For example, Rahikka et al. (2011) describe modularity as a mean to enhance the customers' value perception by changing their role in the value creation process. Taking the second perspective (*operational*), other articles delimit the application space (i.e. the service portfolio of a firm) for modularity purposely by taking a point of view that certain service characteristics may not be altered in the modularization attempt. For example, Miozzo and Grimshaw (2005) identify obstacles to a firms' innovativeness, that derive from their interpretation of modular design. An overview of the identified research themes, their related *strategic (S)* and *operational (O)* perspective, is given in Table 1, containing one row for each article. Articles, in which these themes and perspectives were identified, are marked with an "X". The alignment of articles follows the same order as in **Error! Reference source not found.** in the previous section to ease comparison of findings.

The illustration of findings in Table 1 shows that the considered literature places a particular focus on the interplay between modular design and knowledge-related themes such as knowledge sharing and

organizational learning. Although, eight of the 14 reviewed articles deal with interdependencies between modular service design and such knowledge sharing, few articles consider the fact that service innovation leads to the generation of new knowledge (e.g., Lusch and Nambisan 2015), and is thus also related to *learning,* which is generally a research theme that is deemphasized by the literature. The other research themes (the customers' *service experience* and *coordination of labor and creative effort*) are evenly covered by the literature. Coming to the variety of research perspectives (Table 1), most scholars approach modular design in professional services based on the assumption that the concept can have a comparable positive effect, similar to the manufacturing domain, where modular design is well established. The number of articles that deal with *knowledge sharing* and *learning* is almost evenly divided between the two perspectives. In contrast, *service experience* is the least controversial perspective. Articles covering this theme, acknowledge modular service design as a mean to alter the customers' service experience and change the customers' role in the value creation process. While the extent literature highlights the (mostly positive) influence of modularity on a firms' innovativeness and creativity, Bettiol et al. (2012) indicate that this assumption may be overly simplified and that the situation in practice is likely more complex.

Units of Analysis	Knowledge Sharing		Learning		Service Experience		Service Innovation		Coordination of Labor & Creative Effort	
Research perspectives	*S*	*O*	*S*	*O*	*S*	*O*	*S*	*O*	*S*	*O*
Bettiol et al. (2012)		X		X				X		X
Brax and Toivonen (2000)							X			
Cabigiosu et al. (2015)	X						X			X
Giannakis et al. (2015)									X	
Hautamäki et al. (2015)					X				X	
Miozzo and Grimshaw (2005)		X		X			X			
Müller (2017)					X		X		X	
Nakano (2011)	X		X		X				X	
Nätti et al. (2015)	X		X		X					
Pekkarinen et al. (2009)	X		X				X			
Rahikka et al. (2011)		X							X	
Rajahonka and Bask (2016)					X		X		X	
Wei et al. (2010)		X			X					
Zhou and Lin (2014)							X			

Table 1. Prevailing Research Themes in the Literature and their Research Perspectives

In the following, we present a discussion of findings and provide insights into the five units of analyses and their related perspectives.

Research Theme 1: *Knowledge sharing* and modular service design are closely intertwined in the inter- and intra-firm context of professional service. This symbiotic relation is one of the most recognized themes in the considered literature (e.g. Cabigiosu et al. 2015; Nätti et al. 2015; Pekkarinen et al. 2009). Scholars point out that professional service providers are highly dependent on efficient knowledge flow both within their organization and with their customers to create customized service offerings (Fosstenløkken et al. 2003; see also Miles et al. 1995). Implications that derive from modular service design on the sharing of knowledge within the organization and with the client are, for example, analyzed by Pekkarinen et al. (2009). The authors point out that modularity in professional services leads to knowledge encapsulation since modularization can cause new knowledge boundaries, e.g. between organizational units or service processes (see also Miozzo and Grimshaw 2005) (*operational perspective*). On the contrary, other scholars highlight opportunities for providers to yield a higher degree of modularity in service design by facilitating and coordinating knowledge flows (Pekkarinen et al. 2009). Nätti et al. (2015) point out ways on how this can be achieved by using appropriate tools, techniques, IT, and ICT that foster sharing of knowledge between decentralized organizational service units or between decoupled service processes (*strategic perspective*). According to Pekkarinen (2009), it is important to differentiate between different types of knowledge when considering means of its sharing. For example, they indicate that sharing knowledge about the expertise of different business units requires other means than sharing knowledge about customer needs.

Research Theme 2: *Learning* plays a pivotal role in the development of modular design in professional services, as shown by the number of articles covering this theme. Since service innovation usually requires new knowledge to be accumulated or existing knowledge transferred to a new context, interrelations also exist between learning and sharing of knowledge (Cabigiosu et al. 2015), as seen by the similar markings in Table 2. The reviewed articles point out that modularity influences how professional services providers accumulate knowledge. In this context, an *operational perspective* points out to the constraints that emerge from the decoupling of organizational units, thus presenting obstacles for cross-company learning. Moreover, Miozzo and Grimshaw (2005) even highlight a potential negative impact of modularity on a firms' capability to learn in the sector of IT outsourcing. On the contrast, Nätti et al. (2015) point out that modular design can lead to modular organization forms that support the learning in the context of professional services (*strategic perspective*).

Research Theme 3: It is interesting to mention that *Service Experience* was identified to be the least controversial theme, with the literature solely reflecting a *strategic perspective*. Scholars emphasize that modularity creates opportunities for PSF to improve the value perception of their customers (Rahikka et al. 2011), which requires understanding the customer as an active part of the service process. For instance, Nätti et al. (2015, p. 18) find that modularity can make a service more visible to the customer, hence enabling the customer to better acknowledge their own role in the value creation process. Hautamäki et al., (2015) further present opportunities for providers to use modularity as a mean to replicate value-in-use across different users, thereby standardizing the customers' co-creation role during service provision. In line with this, Bettiol et al. (2012) describe how providers of communication and design services use standard procedures to guide the customers' role, e.g. by creating similar interaction patterns in the analysis of needs and in the presentation of alternative solutions.

Research Theme 4: *Service innovation* is one of the main reasons for the growing interest in the application of the concept of modularity in a professional services context. This motivation basically draws on the idea that modularity enables development of new service offerings by combining existing service modules in a new way without the need for the implementation of greater changes in the modules (Brax and Toivonen 2000), thus implying the *strategic perspective*. Some articles have also taken a contrary view, which points out the innovativeness of a firm as a possible constraint to the adoption of a modular design in professional services (*operational perspective*). For example, Miozzo and Grimshaw (2005) challenge the generalizability of the claim that modularity improves the innovativeness of a firm. Their findings show that standardization of modular service design can create obstacles to the development of new professional services. Bettiol et al. (2012) are also critical about the influence of modularity on innovation and identify limitations to the concept in the context of professional services.

Research Theme 5: Professional services draw highly on the use of specialized knowledge but often also demand a considerable degree of creativity in service provision (Hertog 2000), thus requiring *coordination of labor & creative effort*. In particular, professional services that are specialized in creative outputs require flexibility in service provision, e.g., music producers for the creation of advertisement sound files (Nakano 2011). According to Bettiol et al. (2012), this creates tensions with the idea of standardization, which is deeply rooted in the service modularity literature. For this reason, they suggest the use of other means to achieve customization and efficiency in professional services, such as using standardized working methods for the cognitive alignment of human resources. From their view, creativity represents a natural constraint to the use of modular service design (*operational perspective*). This raises the question whether the modular design and the use of working methods can be reconciled somehow beyond the traditional interpretation of a modular service architecture. Nätti et al., (2015) take a contrary position. They argue that modularity can be seen as a mean to achieve flexibility and cost-efficiency without influencing negatively firms' potential to be creative. Nakano (2011) points out that modular service design and creativity must not necessarily contradict each other. Moreover, modularity can be viewed as a mean to coordinate and manage creative effort in an efficient manner (*strategic perspective*).

In summary, our findings demonstrate the central role of modular design in professional services and the variety of research themes on which the concept depends. We have further outlined perspectives (*strategic* and *operational*) five major themes in the research on modular design in professional services and explain the role of these themes in the literature. While articles that take a strategic perspective tend to focus more on the influence of modular design at related research themes, articles that view related themes as

operational are more concerned about possible limitations that could present obstacles to a successful adoption of the concept in the context of professional services.

Conclusion and Research Topics

In this paper, we have presented a systematic review of the literature on modularity in professional services, where customer's demands for individualization conflicts with the provider's aim to standardize their internal processes. Our review shows that modularity in professional services is a distinct challenge and different from modularity in other services in several ways. The fact that PSFs increasingly rely on the use of information systems to access internal and external knowledge raises the importance to extend the current understanding of the general concept of modularity in services, to better account for the specificity of the knowledge-intensive professional service domain.

Our findings show that the underlying theoretical foundation has emerged from four different research streams: *modularity in product and organization, service mass production, service modularity* and *distinctive understanding*. This confirms the prior assumption that there exists a certain degree of heterogeneity in scholar's use of definitions and interpretation of the concept (Müller and Lubarski 2016). Although there is a growing interest in the practical application of the modular design in the domain of professional services, the conceptual understanding of modularity has not yet been transferred to meet specific characteristics. Motivated by this academic void, we applied the criteria of Gerring (1999) to evaluate the conceptual goodness of modularity in professional services, thereby calling for further refinement within five different research themes (Figure 1). Due to the ambiguous nature of modularity, each of these themes can be studied from two different angles – operational perspective and strategic perspective. For example, with respect to the customer's service experience, modularity may be used to alter the role of the customer during service provision on purpose by empowering him with self-service options (strategic angle). Alternatively, modularity may also be used to solely improve internal provision efficiency while maintaining the same customer involvement, perhaps to mask the true level of modularity (operational angle). While the strategic angle widens the application space for modular design (Figure 1, arrows pointing outwards), an operational angle creates a constraint that is limiting the application space accordingly (Figure 1, arrows pointing inwards).
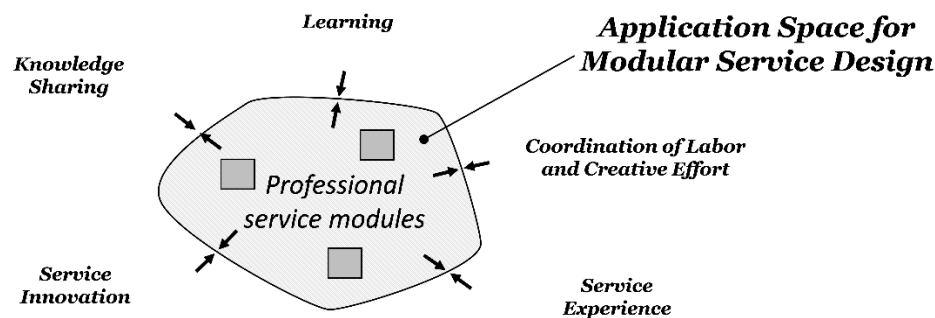

Figure 1: Future Research Opportunities

It is important to mention that our research is not without limitations. Firstly, when searching the literature for relevant articles we have not differentiated between those articles that deal with knowledge-intensive business services and those that focus on the broader research field of professional services, thereby assuming that several striking characteristics are shared between the two domains. A more differentiated analysis of industry-specific demands could, for example, compare the role of *knowledge* in modular design in different industries and thereby contribute to increasing depth and differentiation of the concept of modularity. Second, the number of relevant articles is relatively small compared to literature reviews conducted in research fields that are more established and mature. Lastly, our understanding of the concept of modularity is based solely on the theoretical literature without incorporating the perspective of the practitioners. Empirical research could focus on the role of routines, procedures, and service elements that seem to be too intertwined and complex to cover them from a sole process perspective or organizational view. A reconciliation of such elements would eventually lead to a higher *coherence* and *field utility* of the concept modularity in professional services and could improve its conceptual goodness. In this regard, information systems (IS) could be a potential mean to disentangle some of the tensions between modularity

and specific characteristics that reviewed articles point out to differentiate modularity in professional services from modularity in other domains (e.g. Cabigiosu et al. 2015; Bettiol et al. 2013). Finally, the role of IT remains widely unexplored in the literature and thus requires further research attention.

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