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Integration of the multidisciplinary contributions on Service Design for Innovation

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To those who inspired this thesis and
to those who can get inspired by it.

ABSTRACT

The expansion of the service sector in the current economic scenario brought to attention the key role of Service Innovation in society, either as a facilitator of organizational competitiveness and growth or as a driver of societal well-being. As such, boosting Service Innovation has become a strategic challenge for the global economy. In this context, Service Design, as a human-centered, holistic and iterative approach to creating new services, is proposed as a key practice to Service Innovation. However, Service Design has been employed from multiple perspectives and embedded in different disciplinary discourses, lacking an integrated comprehension of its field and approach and, consequently, hampering its potential to foster Service Innovation.

This investigation addresses as research challenges the lack of a comprehensive understanding of Service Design as an integrated multidisciplinary field and approach, which hinders the dialogue and collaboration among service designers coming from different backgrounds. Moreover, this thesis addresses the need for improving the connections of Service Design to Service Innovation, supported by multidisciplinary contributions, in order to leverage the innovative potential of Service Design.

As such, this thesis investigates how Service Design can foster Service Innovation supported by the integration of multidisciplinary contributions. To address this challenge, the research objectives are three folded: (1) Comprehend which are the core multidisciplinary perspectives and their contributions to Service Design; (2) Integrate a shared ground for the evolution of Service Design as a multidisciplinary field and approach; (3) Characterize how Service Design can foster Service Innovation at distinct levels of complexity by integrating multidisciplinary contributions.

Following a qualitative methodological approach, the objectives led to three main contributions. Study 1 comprises an expert-based literature review, resulting in the identification and systematization of core multidisciplinary perspectives and their contributions to Service Design. Study 2 describes shared and specific research foci among the core multidisciplinary perspectives on Service Design identified in the first study, by developing a qualitative research comprising focus groups with the Service Design academic community. Built on the results from the previous studies, Study 3 develops a multiple case study research

of 9 Service Design projects involving multidisciplinary teams developed by organizations, resulting in the systematization and description of how Service Design changes when fostering Service Innovation at different levels of service ecosystems, supported by the integration of multidisciplinary contributions.

The thesis contributes to advancing Service Design as a multidisciplinary field and approach, which can ground future research and practice that integrate the work of multidisciplinary teams. Besides, it contributes to improving Service Design connections to Service Innovation, by building an understanding of how to integrate multidisciplinary contributions to innovate service at different levels of service ecosystems. As such, this dissertation benefits Service and Design researchers, as well as practitioners from different fields, with a common ground which can strengthen their collaboration and theory development, therefore supporting expanding the frontiers of Service Design as a multidisciplinary field.

Keywords: Service Design; Service Innovation; Multidisciplinary research; Multidisciplinary collaboration; Service Ecosystem.

RESUMO

A expansão do setor de serviços na atual conjuntura econômica trouxe à tona o papel fundamental que a Inovação em Serviços tem na sociedade, seja como um viabilizador da competitividade e do crescimento organizacional ou como um facilitador do bem-estar social. Dessa forma, impulsionar a Inovação em Serviços tornou-se um desafio estratégico para a economia global. Dentro desse contexto, o Design de Serviços, descrito como uma abordagem iterativa, holística e centrada no ser humano, é proposto como uma prática que promove a Inovação em Serviços. No entanto, o Design de Serviços tem sido empregado sob múltiplas perspectivas e incorporado em diferentes discursos disciplinares, o que leva a falta de uma compreensão integrada do seu campo. Consequentemente, há uma redução do seu potencial em inovar em serviços.

Esta tese aborda como desafio de pesquisa a falta de uma compreensão integrada do Design de Serviços, enquanto um campo promovedor de uma abordagem multidisciplinar. Além disso, esta investigação aborda a necessidade de melhorar as conexões entre o Design de Serviços e a Inovação em Serviços, quando apoiado por contribuições multidisciplinares, a fim de alavancar o seu potencial inovador.

Portanto, esta tese investiga como o Design de Serviços pode fomentar a Inovação em Serviços, apoiado pela integração de contribuições multidisciplinares. Para abordar essa temática, são três os objetivos dessa pesquisa: (1) Compreender quais são as principais perspectivas multidisciplinares e suas contribuições para o Design de Serviços; (2) Integrar um conteúdo multidisciplinar que fomente a evolução do Design de Serviços como campo e abordagem multidisciplinar; (3) Caracterizar como o Design de Serviços, enquanto uma abordagem multidisciplinar, pode promover a Inovação em Serviços em níveis distintos de complexidade.

Seguindo uma abordagem metodológica qualitativa, os objetivos levaram a três contribuições. O estudo 1 compreende uma revisão de literatura com base na recomendação de especialistas, resultando na identificação e sistematização das perspectivas multidisciplinares centrais ao Design de Serviços. O estudo 2 descreve áreas de pesquisa compartilhadas e específicas entre as perspectivas multidisciplinares centrais do Design de Serviços previamente identificadas, com base em grupos focais junto a centros de pesquisa da comunidade acadêmica dessa área. A partir dos resultados dos estudos anteriores, o estudo 3 desenvolve uma pesquisa de casos

múltiplos de nove projetos de Design de Serviços, produzidos por equipas multidisciplinares em organizações, o que resulta na sistematização e descrição do potencial dessa abordagem em promovedor inovação em diferentes níveis de ecossistemas de serviços, com o suporte de contribuições multidisciplinares.

A tese contribui para o avanço do Design de Serviços como campo e abordagem multidisciplinar, o que pode fundamentar pesquisas e práticas futuras que integrem o trabalho de equipas multidisciplinares. Além disso, esta investigação contribui para melhorar as conexões do Design de Serviços com a Inovação em Serviços, construindo uma compreensão de como integrar contribuições multidisciplinares para inovar ecossistemas de serviços a diferentes níveis. Assim, esta dissertação beneficia pesquisadores e práticos em Serviços e em Design, com um conteúdo multidisciplinar que pode fortalecer futuras colaborações e desenvolvimento de teorias, fomentando assim a expansão das fronteiras do Design de Serviços como um campo multidisciplinar.

Palavras-chave: Design de Serviços; Inovação em Serviços; Pesquisa Multidisciplinar; Colaboração Multidisciplinar; Ecossistema de Serviços.

RIASSUNTO

L'espansione del settore dei servizi nell'attuale clima economico ha messo in luce il ruolo fondamentale che L'innovazione nei servizi svolge nella società, sia come motore di competitività e crescita organizzativa o come facilitatore del benessere sociale. Pertanto, promuovere l'innovazione dei servizi è diventata una sfida strategica per l'economia globale. In questo contesto, il Design dei Servizi, descritto come un approccio iterativo, olistico, centrato sull'uomo, viene proposta come una pratica che promuove l'innovazione del servizio stesso. Tuttavia, il Design dei Servizi è stata impiegata da più punti di vista e incorporata in diversi discorsi disciplinari, portando ad una mancanza di una comprensione integrata del suo campo. Di conseguenza, c'è una riduzione del suo potenziale di innovazione nei servizi.

Questa tesi affronta l'argomento come una sfida di ricerca la mancanza di una comprensione integrata del Design dei Servizi come campo che promuove un approccio multidisciplinare. Inoltre, questa ricerca affronta la necessità di migliorare le connessioni tra Design dei Servizi e L'innovazione nei servizi quando supportate da contributi multidisciplinari, per sfruttare il suo potenziale innovativo.

Pertanto, questa tesi indaga su come il Design dei Servizi può favorire L'innovazione nei servizi supportata dall'integrazione di contributi multidisciplinari. Per affrontare questo tema, ci sono tre obiettivi di questa ricerca: (1) Comprendere quali sono le principali prospettive multidisciplinari e i loro contributi alla Design dei Servizi ; (2) integrare contenuti multidisciplinari che promuovono l'evoluzione del Design dei Servizi come campo e approccio multidisciplinare; (3) Caratterizzare come Design dei Servizi, come approccio multidisciplinare può promuovere l'innovazione del servizio a diversi livelli di complessità.

Seguendo un approccio metodologico qualitativo, gli obiettivi hanno portato a tre contributi. Lo studio 1 comprende una revisione della letteratura basata sulla raccomandazione di esperti, che ha portato all'identificazione e alla sistematizzazione di prospettive multidisciplinari centrali per la Design dei Servizi. Lo Studio 2 descrive aree di ricerca condivise e specifiche all'interno delle prospettive multidisciplinari centrali precedentemente identificate di Design dei Servizi, basate su gruppi con centri di ricerca nella comunità accademica in quest'area. Dai risultati di studi precedenti, lo Studio 3 sviluppa una ricerca multipla di nove progetti di Design

dei Servizi realizzati da team multidisciplinari all'interno di organizzazioni, con conseguente sistematizzazione e descrizione del potenziale di questo approccio nel promuovere l'innovazione a diversi livelli di servizio. ecosistemi di servizi, supportati da contributi multidisciplinari.

La tesi contribuisce al progresso del Design dei Servizi come approccio sul campo e multidisciplinare, che può supportare la ricerca e le pratiche future che integrano il lavoro dei team multidisciplinari. Inoltre, questa ricerca contribuisce a migliorare le connessioni tra Design dei Servizi e L'innovazione nei servizi sviluppando una comprensione di come integrare i contributi multidisciplinari per innovare gli ecosistemi di servizi a diversi livelli. Pertanto, questa tesi di laurea va a beneficio di ricercatori e professionisti dei servizi e del design, con un contenuto multidisciplinare che può rafforzare le future collaborazioni e lo sviluppo della teoria, favorendo così l'espansione delle frontiere del Design dei Servizi come campo multidisciplinare.

Parole chiave: Design dei Servizi; Innovazione di servizio; Ricerca multidisciplinare; Collaborazione multidisciplinare; Ecosistema di Servizio.

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1 INTRODUCTION

The service sector accounts for over 70% of total employment and value added in the European Union (CIA World, 2017). According to the Europe 2020 indicators (Europe 2020 strategy, 2016), while the agriculture and manufacturing sectors have contracted in the last years, the service industry has expanded in number of jobs by about 14% between 2008 and 2015. In parallel, the use of service as a perspective on value creation has been growing due to theoretical developments in Service-Dominant Logic (S-D Logic) (Vargo & Lusch, 2004, 2008b, 2016). The primary proposition of this perspective is that organizations, markets and society are fundamentally concerned with the exchange of service. Service is defined as the application of competences (knowledge and skills) for the benefit of a party (Vargo & Lusch, 2008), which means a S-D Logic is useful for all economic sectors. These perspectives on value creation are reflected by the core strategies in the European 2020 policies, which position the key role of service innovation as a mean to enable new channels to market, new organizational processes and new business models (Expert Panel on Service Innovation, 2011). Boosting service innovation has become a strategic challenge to European Union.

Service innovation can be defined as the creation of new service offerings, service delivery processes and service business models (Ostrom et al., 2010). From a S-D Logic perspective, this definition has been reframed to understand service innovation as a process of integrating resources in novel ways to enable new forms of value co-creation among actors (Lusch & Nambisan, 2015).

Service innovation has a key role in organizational competitiveness and growth, such as by supporting the development of new business models, which can generate higher returns to providers and increased value to customers (Teece, 2010). Besides, service innovation can be a driver for societal well-being, by engaging organizations in improving consumers' lives, concerning the multiple demands and potentialities of their communities (Rosenbaum, 2015).

Service design has been studied as a key approach to service innovation (Ostrom et al., 2015; Patrício, Gustafsson, & Fisk, 2018; Sangiorgi, Prendiville, Jung, & Yu, 2015; Sangiorgi & Prendiville, 2017). Service design is defined as a holistic, human-centered, iterative and collaborative approach for creating new services or improving existing ones, which has been informed by a "designerly" perspective to innovation (Blomkvist, Holmlid & Segelström,

2010; Meroni & Sangiorgi, 2011; Yu & Sangiorgi, 2018). This designerly view on service design refers to the abilities of solving ill-defined problems, adopting solution-focused strategies and using non-verbal modelling media which designers employ during projects (Cross, 2007).

However, from a multidisciplinary standpoint, service design has been also approached from multiple perspectives and embedded in different disciplinary discourses (Secomandi & Snelders, 2018; Patrício et al., 2018). Initially, the term "service design" was employed in the context of service blueprinting research (Shostack, 1982) and as a step within a New Service Development (NSD) process (Scheuing & Johnson, 1989), focused on formulating service operations and service concepts. Since the 1990s, service design has grown as a Design field (Erlhoff, Mager, & Manzini, 1997; Pacenti, 1998; Mager, 2009), because of the interest of this community in designing new services, which justifies its influence from a "designerly" perspective. As such, service design has gradually embedded multidisciplinary concepts (Patrício & Fisk, 2013), such as the value proposition offered to the customer (Edvardsson, Gustafsson, Sandén, & Johnson, 2000), service interfaces that embody service offerings (Secomandi & Snelders, 2011), service operations (Hill et al., 2002), and supportive technologies that fuel service innovation (Kieliszewski *et al.*, 2012).

In this sense, service design has been studied and adopted by different disciplinary perspectives, focusing on its distinct aspects. For instance, service design has been employed to create distinctive service offerings and customer experiences, bringing together Operations and Marketing views (Zomerdijk & Voss, 2010). Similarly, service design has been discussed as an approach to design for customer-centric service, from a Service Research perspective (Andreassen et al., 2016). Besides, organizational studies have examined capabilities, practices and abilities, which facilitate the use of service design within organizations (Karpen, Gemser, & Calabretta, 2017). As designing thinking has spread out to other fields, this has also facilitated the adoption of service design by multidisciplinary perspectives (Kimbell, 2009; Meroni & Sangiorgi, 2011). Design thinking is defined as a human-centered mindset and process to innovation, based on the general phases of inspiration, ideation and implementation (Brown, 2008).

As such, service design has been evolving as a multidisciplinary field and approach to service innovation (Foglieni, Villari, & Maffei, 2018; Patrício et al., 2018; Sangiorgi & Prendiville,

2017; Secomandi & Snelders, 2018). However, the multidisciplinary aspect of service design has been taken for granted, since there is a lack of research which goes in-depth in understanding and describing this character in service design. As a consequence, service design has been researched and employed by different academic and practitioner communities (Secomandi & Snelders, 2018), resulting in the use of disparate concepts and approaches (Patrício et al., 2018). Research shows, for instance, that while some service design perspectives focus on the material and process-oriented aspects of service design (Kimbell, 2011; Secomandi & Snelders, 2011), others turn the attention to the customer experience enabled by its approach (Andreassen et al., 2016; Zomerdijk & Voss, 2010), and still others focus on how it can create new operations and technology to support the service delivery system (Glushko, 2010; Sampson, 2012). These different perspectives offer valuable contributions for specific aspects of service design. However, considering its holistic approach, there is a lack of a comprehensive understanding of the main multidisciplinary perspectives that inform service design and which contributions they bring. This fragmented comprehension hinders the dialogue and shared ground among service designers coming from different fields, risking for researchers and practitioners to build knowledge in silos (Anderl, Voelz, Rollmann, & Lee, 2009).

The lack of a shared understanding among service design perspectives has implications for service innovation, since service design is identified as a key approach to bringing new service ideas to life (Ostrom et al., 2010). Research has highlighted the need to further establish service design connections to service innovation, especially when supported by multidisciplinary teams, in order to enhance its potential to tackle complex problems (Ostrom et al., 2015; D'souza, 2016). Due to the multi-dimensional character of service innovation (Gustafsson, Kristensson, Schirr, & Witell, 2016), which may involve transformations from organizational change (Salmi & Mattelmäki, 2019) to public sector innovation (Sangiorgi, 2015), adopting multidisciplinary lenses in service design is a strategic imperative for researchers and practitioners who aim to understand and generate new forms of value co-creation in different contexts (Lusch & Nambisan, 2015). In this sense, service design needs to be better understood as an integrated field and approach, in order to leverage its potential to innovate service (Patrício et al., 2018).

With the aim of facing these challenges, the objectives of this investigation were three folded: (1) Comprehend which are core multidisciplinary perspectives and their contributions to

service design; (2) Integrate a shared ground for the evolution of service design as a multidisciplinary field and approach, and (3) Characterize how service design can foster service innovation at distinct levels of complexity by integrating multidisciplinary contributions.

As such, three studies were developed in order to achieve those objectives. Study 1 involved an expert-based literature review based on the recommendations of 13 international service design and innovation leading researchers to identify, characterize and systematize core multidisciplinary perspectives and their contributions to service design. Study 1 was published as an article in the Journal of Service Management (Joly, Teixeira, Patrício, & Sangiorgi, 2019).

Building upon the results of Study 1, Study 2 focused on integrating and building a shared ground for the evolution of service design as a multidisciplinary field and approach, by identifying and examining shared research areas among the core multidisciplinary perspectives on service design, identified in the previous study. As such, this second study developed a qualitative research (Gioia, Corley, & Hamilton, 2012) comprising focus groups (Krueger & Casey, 2015) with 6 leading service design and innovation research centers, representing the service design academic community. Study 2 was published as an article in the Service Design (ServDes18) conference proceedings (Joly, Teixeira, Patrício, & Sangiorgi, 2018).

Finally, Study 3 covered a multiple case study research (Yin, 2018) of 9 service design projects involving multidisciplinary teams developed by organizations, in order to understand how service design enables service innovation at different levels of complexity, supported by multidisciplinary contributions. Study 3 was submitted as an article for the Design Studies journal (Joly et al., n.d.).

Following these studies, this thesis has produced three sets of outcomes which support advancing service design as a multidisciplinary field and approach to service innovation. Firstly, Study 1 identifies core multidisciplinary perspectives on service design and systematizes their contributions, describing service design as an activity, composed by goals, objects, approaches and outcomes (Joly et al., 2019). Following this first study, Study 2 identifies and examines shared and specific research foci from the service design multidisciplinary academic community, indicating common spaces to converge concepts and

approaches and, consequently, supporting mutual understanding and collaboration among service design researchers and practitioners coming from different fields (Joly et al., 2018). Thirdly, Study 3 builds a multidisciplinary perspective on service design from a practice point of view (Sangiorgi, Lima, Patrício, Joly, & Favini, 2019; Sangiorgi & Prendiville, 2017), by characterizing and systematizing how service design can foster service innovation at different levels of complexity, supported by multidisciplinary contributions (Joly et al., n.d.).

Hence, this investigation provides two main contributions to the service and the design communities, by integrating the outcomes from those three studies. On the one hand, the thesis supports evolving service design as a multidisciplinary field. In this sense, this dissertation supports creating a common ground among service design researchers and practitioners from different backgrounds to better communicate and understand each other when collaborating, which boosts the involvement of multidisciplinary teams during service design and innovation projects (D'souza, 2016; Ostrom et al., 2015). On the other hand, this thesis supports advancing service design connections to service innovation (Secomandi & Snelders, 2018; Patrício et al., 2018), by systematizing the different design foci, approaches, techniques, tools and multidisciplinary contributions, which service design teams can use to collaborate and foster service innovation at distinct levels of complexity. Therefore, this dissertation also brings a valuable contribution to organizations which are interested in using service design, by describing how multidisciplinary teams can employ this approach and have a wide impact on different forms of service innovation (Gustafsson, Kristensson, et al., 2016).

As this dissertation brings together terms from multidisciplinary fields, a glossary was created comprising the definitions of the main concepts used along the chapters, supported by their related literature (see Appendix I). This glossary may be used by the reader while interpreting this thesis, to support her/his comprehension of the technical and supportive concepts addressed.

As such, this thesis is organized by the following chapters. In the "Theoretical foundations", in Chapter 2, the definitions of multidisciplinary research, service design and service innovation are presented, as well as their related research gaps concerning the evolution of service design as an integrated multidisciplinary field and approach to service innovation. The "Methodology", in Chapter 3, indicates the research questions and the overall research design, explaining how the three studies of this thesis were developed and complement each other to

attain the research objectives. In Chapters 4, 5 and 6, the Studies 1, 2 and 3 are respectively presented and discussed. The Chapter 7 presents the contributions and implications of this investigation, taking into consideration the research phases and questions defined. Finally, Chapter 8 indicates the conclusions, limitations and future research directions.

2 THEORETICAL FOUNDATIONS

This chapter starts by introducing the understanding of multidisciplinary research and multidisciplinary collaboration, as they have been studied in the design and innovation context. The following subsections review service design and service innovation studies to highlight the need to evolve service design as an integrated multidisciplinary field and approach, as well as the importance of better connecting it to service innovation.

2.1 Multidisciplinary research

In order to advance the understanding of service design as a multidisciplinary field and approach to service innovation, a multidisciplinary research perspective was adopted. This section defines what is understood by "multidisciplinarity" and how multidisciplinary collaboration has already been investigated in the design and innovation context, concluding with the research positioning of this investigation.

2.1.1 Intradisciplinary, multidisciplinary, interdisciplinary and transdisciplinary research

Theory development can range from intra-disciplinary, multidisciplinary, to interdisciplinary and, ultimately, transdisciplinary modes of research (Gustafsson et al., 2016b; Klein, 2010), as illustrated in Figure 1.

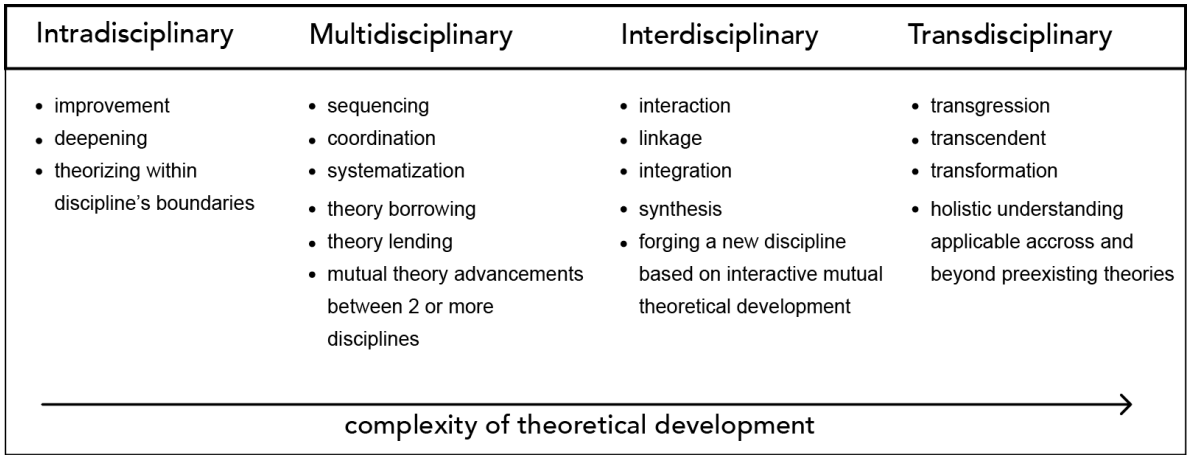


Figure 1 - Different modes of research
Source - From the authors, based on Klein (2010) and Gustafsson et al. (2016b).

Here, the concept of academic discipline is central, which concerns the organization of learning and the systematic production of knowledge regarding specific object(s) and/or phenomenon(a) (Krishnan, 2009). An academic discipline can be seen as a form of specific and rigorous scientific training that indoctrinates practitioners, according to a certain body of knowledge and institutional rules (Moran, 2010).

An intra-disciplinary approach to research theorizes within disciplines' boundaries, improving and deepening knowledge. Through a multidisciplinary approach, instead, one borrows theory from one discipline to another (theory borrowing), as well as use her/his own discipline theory to explain an observed phenomenon, advancing theory in other fields (theory lending) (Gustafsson et al., 2016b). In parallel, interdisciplinary research is developed when techniques, tools, perspectives, concepts, and/or theories are integrated from two or more disciplines to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single field (Stine & Haak, 2005). Finally, transdisciplinary research is based on building a holistic theory which arises from a common theoretical understanding of preexisting disciplines, applied across and beyond their boundaries, creating an overarching synthesis (Gibbons et al., 1994; Gustafsson et al., 2016b; Klein, 2010).

In this thesis, multidisciplinarity means juxtaposing disciplinary contributions (e.g. concepts and approaches), in order to foster wider knowledge to tackle a common issue (Klein, 2010; Gustafsson et al., 2016b). While an intra-disciplinary approach to research theorizes within the boundaries of a discipline, with a multidisciplinary approach one can borrow theory from one discipline to another, advancing knowledge in other fields (Gustafsson et al., 2016b). However, these disciplines are coordinated to remain separated, maintaining the original identity of their elements and not crossing their existing knowledge structures. A multidisciplinary approach, then, differs from interdisciplinary or transdisciplinary perspectives, where the focus is, respectively, to integrate knowledge from two or more disciplines and to build a comprehensive theory that arises from a common theoretical understanding of the preexisting disciplines (Klein, 2010).

Conducting multidisciplinary research is challenging because of the different concepts, approaches and languages used by different disciplinary fields (Ratcheva, 2009). Research standards (e.g., reporting of methodology) and communication formats (e.g., journal classification) differ among disciplinary areas (Abbott, 1988), which hinders the transference

of theory among fields. Research streams and disciplines are increasingly in competition among each other for attention by practice and academia (Stine & Haak, 2005). As such, to persist, research streams demand a clear identity and combination of resources, so that a community of researchers, educators and practitioners can form and reinforce each other to, ultimately, make a stronger impact (Cova, Ford, & Salle, 2009). Similarly, the inherently multidisciplinary field of service design (Foglieni et al., 2018; Patrício et al., 2018; Sangiorgi & Prendiville, 2017; Secomandi & Snelders, 2018) demands an understanding of its multiple perspectives and contributions, in order to avoid redundancies and leverage synergies.

As such, this dissertation adopts a multidisciplinary research approach on service design, in order to identify which are core perspectives and their contributions to this field (Study 1), their shared and complementary research foci (Study 2) and how they support service design to foster service innovation (Study 3). This is critical to bridge the different contributions brought by distinct disciplinary lenses on service design, towards a more integrated perspective on designing for service (Sangiorgi & Prendiville, 2017). Given the relatively novelty of the research on service design (Patrício, Gustafsson, et al., 2018; Secomandi & Snelders, 2018), moving too quickly and taking for granted its multidisciplinary character may result in losing sight of the various possible disciplinary contributions different perspectives could bring together to advance this field (Ostrom et al. 2015). In this sense, a multidisciplinary comprehension about service design must be firstly synthesized and consolidated to support stronger steps towards interdisciplinary and transdisciplinary research in this area (Klein, 2010; Gustafsson et al., 2016b).

2.1.2 Multidisciplinary collaboration in design

The integration of multidisciplinary contributions by service design is connected to the research topic of multidisciplinary collaboration. Multidisciplinary collaboration is recognized as an approach which explores the intersection of different specialists' points of view in order to understand and design for the complexity of phenomena (Bagaini et al., 2017; Barbero & Bicocca, 2017).

Research about multidisciplinary collaboration in the design and innovation context indicates strategies to facilitate multidisciplinary team work during innovation processes comprising, for instance, the use of design thinking (Barbero & Bicocca, 2017; D'souza & Dastmalchi, 2016),

visual tools (Kasali & Nersessian, 2015; Kelly, 2017; Niinimaki, Tanttu, & Kohtala, 2017) and T-shaped professionals (Niinimaki et al., 2017). Design thinking is highlighted as a framework able to create a common language that dissolves disciplinary barriers and guide the innovation process through its phases of inspiration, ideation and implementation (Barbero & Bicocca, 2017; D'souza & Dastmalchi, 2016).

Similarly, visual tools - e.g. sketches, prototyping, mock-ups - can work as boundary objects (Star & Griesemer, 1989), permeating a language that is easily understood by the team and that supports multidisciplinary discussion to create shared visions (Kasali & Nersessian, 2015; Kelly, 2017; Niinimaki et al., 2017). The frequent contact of teams to overcome communication issues is also highlighted as a relevant enabler of multidisciplinary collaboration, being facilitated by techniques such as brainstorming sessions and workshops (Driver, Peralta, & Moultrie, 2011). Moreover, the involvement of T-shaped professionals, defined as the workers who have expertise in a particular area of specialization and ability to make connections across fields, is also considered important to fulfil knowledge gaps between disciplines, as well as to facilitate communication and collaboration (Niinimaki et al., 2017). Additionally, the relevance of soft skills - as interpersonal communication, empathy, emotional intelligence - is discussed as a supplementary way to facilitate multidisciplinary collaboration (Glatte, Heidingsfelder, & Brodack, 2017; Rojas, English, Young, & Spencer, 2017). Besides, research also reveals challenges in multidisciplinary collaboration, which are mainly due to issues in the team dynamics, because of the different patterns of thinking, work cultures, language, tools and conflict of interests (Anderl et al., 2009).

In the specific realm of service design, research shows few publications considering the implications of multidisciplinary collaboration. Literature has discussed, for instance, the challenges that multidisciplinary stakeholders bring during service design projects due to their diverse viewpoints and backgrounds (Yang & Sung, 2016). Likewise, research has indicated the importance of service design techniques (e.g., service blueprint and customer value constellation) in enhancing multidisciplinary collaboration (Teixeira et al., 2017), as well as the use of service design as a horizontal skill which can support the work of multidisciplinary teams within organizations (Sangiorgi et al., 2019).

Still, other publications examine how service design has absorbed and adapted knowledge from other areas, such as Interaction Design (Holmlid, 2007), Operations management and

Marketing (Patricio & Fisk, 2013). In this context, possibilities to establish a common ground between Interaction Design and Service Design, based on similarities of their design objects (e.g., interactions) and of their design techniques (e.g., customer journeys) have been described (Holmlid, 2007). On the other hand, contributions brought by the fields of Operations to designing the service backstage and of Marketing to designing new value propositions have also been explored (Patricio & Fisk, 2013).

Based on this literature review, it is possible to assume that the techniques and approaches used to facilitate multidisciplinary collaboration in the design and innovation context, such as visual tools (Niinimaki et al., 2017) and the service design process (Stickdorn & Schneider, 2011), could also support service design multidisciplinary teams to integrate their contributions when collaborating. However, a critical research gap points to the lack of a more comprehensive multidisciplinary view on service design (Ostrom et al., 2015; Patrício et al., 2018; Sangiorgi & Prendiville, 2017), which could provide an integrative understanding of the landscape of multidisciplinary perspectives, instead of looking at isolated contributions areas bring to this field.

Therefore, this dissertation addresses the investigation of multidisciplinary collaboration in service design, in terms of an examination and description of core multidisciplinary perspectives and their contributions to this approach (Study 1), followed by the identification of shared research areas which those perspectives can use to bring together their knowledge when collaborating (Study 2). Finally, this research shows how multidisciplinary collaboration supports the practice of service design when fostering service innovation, by describing how service design teams can coordinate their contributions according to the level of complexity addressed by their projects (Study 3).

2.2 Service design

Early attempts to designing new services were mainly led by the disciplines of Marketing and Operations management, driven by the interest in developing and commercializing new services (Secomandi & Snelders, 2018). The term “service design” was initially employed as a specific step within a New Service Development (NSD) process (Scheuing and Johnson, 1989), focused on generating ideas and formulating service concepts (Johnson, Menor, Roth, & Chase, 2000). Still in the 80s, service blueprinting was presented as an operational tool that

guided and facilitated the specification of physical evidences, staff actions and support systems needed to deliver service across different channels (Shostack, 1982; 1984). Additionally, other efforts in describing service design were developed, such as the use of this approach to specify the infrastructure and content of service operations strategies (Fitzsimmons and Fitzsimmons, 2000), as well as to guarantee service quality (Gummesson, 1990).

Since the 1990s, service design has grown as a discipline within the Design field, because of the interest of this community in exploring and understanding the application of design capabilities to the service sector (Pacenti, 1998; Mager, 2009). Initial research in this field focused on creating key concepts in an analogy with interactive systems design (Pacenti, 1998), being further developed with theoretical models for the analysis and design of service informed by Activity Theory (Sangiorgi, 2004). As such, service design has expanded as an academic area, focused on understanding the importance of a design perspective in creating new service models and functionalities to solve people's needs (Mager, 2009), being also addressed by wider fields such as Service Science (Maglio & Spohrer, 2008) and Service Research (Andreassen et al., 2016).

Service design has gradually transformed its intrinsic design-centered disciplinary focus to also embed multidisciplinary contributions. The integration of the service blueprinting (Shostack, 1984) and customer journeys (Lemon & Verhoef, 2016) are examples, which have roots in the Service Research and Marketing fields as operational tools to envision the systems needed to deliver service. Design researchers have also explored the intersection of service design with Anthropology and Psychology, for instance, bringing together methodologies such as ethnography (Prendiville, 2015) to user research. As such, the integration of contributions from other fields has evolved service design into a multidisciplinary practice (Foglieni, Villari, & Maffei, 2018), employing the most suitable approaches, tools and knowledge from various backgrounds (Moritz, 2005)

In parallel, service design has also been studied and adopted by other disciplinary perspectives, focusing on its distinct aspects. Service design has been discussed in the context of experience-centric services, focused on crafting the customer experience to create distinctive service offerings, integrating Operations and Marketing views (Zomerdijk & Voss, 2010). Besides, the use of service design has been pointed out as an approach prompting significant changes in the organizational mindset and routines (Kurtmollaiev, Fjuk, Pedersen, Clatworthy, & Kvale,

2018). Still, the relevance of service design was highlighted as an approach to combine customers' insights and in-house professionals' ideas into designing for new services (Trischler, Kristensson, & Scott, 2018), integrating Design and Organizational studies' perspectives.

More recently, the need to develop a more integrated and multidisciplinary approach to service design has emerged, as a way to acknowledge the different disciplinary contributions involved during the service design practice. With this perspective, 'designing for service' – instead of service design - was suggested to better represent an innovation practice that is not only conducted by designers, but also concerns to what and how multidisciplinary teams can come together to support innovation (Sangiorgi & Prendiville, 2017).

As part of this conversation, service design has been also studied as a human-centered and creative approach with a transversal set of skills that can favor the convergence of multidisciplinary knowledge to support service innovation (Sangiorgi et al., 2019). Under this view, service design can adapt different disciplinary lenses to consider how people, technology and organizations interact and create value under distinct contexts and conditions.

However, these multiple research efforts have provided heterogeneous views and do not reflect a full and systematized landscape of multidisciplinary perspectives on service design. Therefore, a fundamental step towards overcoming knowledge silos (Anderl et al., 2009) and leveraging the role of service design in service innovation (Ostrom et al., 2015) is to identify, systematize and characterize multidisciplinary perspectives and their contributions to service design. Additionally, it is also important to identify and examine shared and complementary research areas among those perspectives, in order to integrate and build a shared ground for the evolution of service design as a multidisciplinary field and approach (Patrício et al., 2018; Secomandi & Snelders, 2018). These endeavors are key to support service design multidisciplinary teams to better communicate and collaborate (Ostrom et al., 2015), by providing an in-depth understanding of the multiple contributions they can integrate to designing the conditions for new service (Sangiorgi & Prendiville, 2017).

2.3 Service Innovation

Service innovation has been a key topic in Service Research, investigated through a diversity of definitions and frameworks (Gallouj & Djellal, 2010; Ostrom et al., 2010; Witell, Snyder, Gustafsson, Fombelle, & Kristensson, 2016). In order to trace a common ground between this existing literature and show the evolution of the service innovation definition, Witell et al. (2016) describe three perspectives on this phenomenon: assimilation, demarcation and synthesis.

2.3.1 Assimilation perspective

The assimilation perspective focuses on the impact of new technology as the main driver for service innovation (Toivonen & Tuominen, 2009). This perspective follows the tradition of taking concepts and definitions from product innovation to understand and define service innovation (Ko & Lu, 2010). As such, under an assimilation perspective service innovation can be understood as a new product, process or service which is significantly different from previous offerings (Witell et al., 2016). Therefore, an assimilation perspective is aligned with a Schumpeterian view of innovation, developed from the provider's point of view, which considers as innovation any outcome that is new to the world and have economic value for the firm (Schumpeter, 1934).

2.3.2 Demarcation perspective

The demarcation perspective suggests that service innovation differs in nature and character from product innovation (Chen, Tsou, & Huang, 2009; Coombs & Miles, 2000). As such, this perspective claims for new service-specific theories and concepts to analyze and comprehend service innovation (Tether, 2005). Under a demarcation perspective, service innovation can be defined "as a new service or new offer that entails some form of change for either the firm or customer" (Witell et al., 2016, p. 14). Here, the centrality of customers starts to become emergent (Lin, Chen, & Chiu, 2010). Therefore, the demarcation perspective breaks free from the Schumpeterian vision of innovation as an outcome that must be new, introduced in the market or make profit for the firm to be recognized as a service innovation.

2.3.3 Synthesis perspective

The synthesis perspective claims for an integrative view between assimilation and demarcation perspectives, suggesting that theories on service innovation should be broad enough to encompass innovation both in service and manufacturing (Gallouj & Savona, 2009). This perspective is described as a New-Schumpeterian view on service innovation (Flikkema, Jansen, & Van Der Sluis, 2007), in which theories and methods of service innovation depart from a service-logic point of view (Michel, Brown, & Gallan, 2008). This service-logic view on service innovation challenges the aforementioned traditional perspectives, claiming that "any innovation (or change) in product or process requires changes in customer thinking, participation, and capabilities to create and realize value" (Michel et al., 2008, p. 50). Through this point of view, behavioral change is needed (e.g., changes in the customer thinking, participation and capabilities), in order to create and realize value. In this sense, innovating (or, more explicitly changing) the customer's role can be seen as a mean to service innovation, because it supports new ways for people to co-create value (Grönroos & Gummerus, 2014). The case of e-commerce is an example, in which customers turned to be self-served without leaving their homes, consequently innovating the service delivery system of companies.

Therefore, under the synthesis perspective, service innovation can be defined as "a new service, product or process that implies some degree of change for the customer" (Witell et al., 2016, p. 15), which highlights the importance of the customer's point of view to the definition of service innovation. In other words, this perspective implies that organizations create value propositions as platforms for creating value with customers, and that both product and process can be part of the value proposition offered to customers as a service innovation (Skålén, Gummerus, von Koskull, & Magnusson, 2015). As such, process and outcomes may be seen as different components of service innovation, the first associated with the process of value co-creation (e.g. service) and the second with the tangible and intangible results of a production process (e.g. new virtual interface, social and economic benefit) that serve as a mean for new further value co-creation.

More recently, S-D Logic has been brought to service innovation, defining this phenomenon as the "rebundling of diverse resources that create novel resources that are beneficial (i.e., value experiencing) to some actors in a given context" (Lusch & Nambisan, 2015, p. 161). This definition focuses on the value experienced by the beneficiary rather than the output delivered

by a service provider. Therefore, it incorporates the beneficiary (e.g. customer) as an active (and required) participant in the innovation process, and emphasizes the access to the relevant bundle of resources at the location (or context) where the service exchange occurs. S-D logic supports researchers and practitioners to approach complex value co-creation processes in service innovation (Grönroos and Gummerus, 2014), such as the ones which involve service networks (Akaka, Vargo, & Lusch, 2012) and institutions (Vargo et al., 2015).

This dissertation adopted a synthesis perspective, more specifically S-D logic, to comprehend and define service innovation. As such, service innovation is understood here as new resource integration, in terms of new resources (e.g. new technology, new product) or new integration of existing resources (e.g. new customer's roles), which work as a mean for new value co-creation among actors to happen (Edvardsson & Tronvoll, 2013; Lusch & Nambisan, 2015).

Comprehending service innovation under S-D logic provides a stronger approach for improving the connections between service design and service innovation, because it unifies both changes in processes and products as part of innovation in service (Gallouj & Savona, 2009). This perspective is suitable to converge service design and service innovation studies, because service design can involve both the design of new artifacts (Kimbell, 2011) and of novel processes (Holmlid, Wetter-Edman, & Edvardsson, 2017). Besides, S-D logic enables approaching service innovation with a systemic view, considering a wider set of resources, actors and their inter-relations as possible elements which can support innovation (Helkkula, Kowalkowski, & Tronvoll, 2018). This is aligned with the holistic approach of service design, which considers the whole system of actors and their inter-connected resources during projects (Wetter-Edman et al., 2014).

2.4 Service design as a multidisciplinary approach to service innovation

Service design has been highlighted as a key approach to service innovation (Ostrom et al., 2015; Patrício et al., 2018; Sangiorgi, Prendiville, Jung, & Yu, 2015; Secomandi & Snelders, 2018; Wetter-Edman et al., 2018). This is because service design brings collaborative ways of innovation (Sanders & Stappers, 2008), based on user-centered methods and creative tools (Curedale, 2013; Morelli, 2006) that engage users' personal contexts and experiences as a basis for envisioning new or improved services (Lin, Hughes, Katica, Dining-Zuber, & Plsek, 2011; Patrício, Fisk, e Cunha, & Constantine, 2011; Wetter-Edman et al., 2014).

Research in this domain has indicated the need to further explore service design as a multidisciplinary and multi-actor practice (Sangiorgi & Prendiville, 2017), especially when addressing projects at different levels of complexity (Sangiorgi, Patrício, & Fisk, 2017). There has been, in fact, a wide range of research which investigates the role service design in service innovation, suggesting different dimensions this approach can address. Research has discussed, for instance, the use of service design to innovate touchpoints between service providers and their customers (Clatworthy, 2011). Besides, literature has described the application of service design to designing socially networked services to help elderly people in living independently (Morelli, 2015), as well as to support interconnected groups of actors in local communities to create their own services (Baek et al., 2018). More recent literature shows that service design can create the conditions for transforming the way people think and behave (Wetter-Edman et al., 2018), consequently promoting institutional change (Vink et al., 2019).

However, although involving the inherent multidisciplinary character of service design, this literature pays little attention to which and how multidisciplinary contributions have supported this approach to enable service innovation at those different levels of complexity. As such, due to the increasing importance of service design in service innovation (Ostrom et al., 2015) and the need to create solid foundations for service design research within service innovation studies (Secomandi & Snelders, 2018; Patrício et al., 2018), further investigation is still needed to better connect service design to this phenomenon, especially when supported by multidisciplinary contributions (Ostrom et al., 2015; D'souza, 2016). Besides, it is critical to understand how this happens in practice, in order to evolve service design as a multidisciplinary praxis better connected to service innovation (Ostrom et al., 2015; Patrício, Gustafsson, & Fisk, 2018; Sangiorgi, Prendiville, Jung, & Yu, 2015; Sangiorgi & Prendiville, 2017).

This dissertation contributes to evolving the understanding of service design as a multidisciplinary field and approach to service innovation, as well as to advance the literature on the intersections between those areas, by (a) characterizing how service design can foster service innovation at different levels of complexity, and (b) understanding how multidisciplinary contributions support service design in that endeavor. This is especially relevant for multidisciplinary teams (D'souza & Dastmalchi, 2016) which are interested in employing this approach to impact on service innovation across different scales, such as throughout organizations, service networks and ecosystems (Patrício et al., 2018).

3 METHODOLOGY

This investigation addressed the research gaps of the lack of a comprehensive understanding of service design as an integrated multidisciplinary field and approach (Sangiorgi & Prendiville, 2017; Patrício et al., 2018; Secomandi & Snelders, 2018), which hampers its potential to foster service innovation (Ostrom et al., 2015; Patrício et al., 2018). In order to tackle these challenges, this thesis aimed at understanding "How service design can foster service innovation supported by the integration of multidisciplinary contributions?". As such, this main research question was divided into 3 sub-research questions, as presented below:

(1) How do core multidisciplinary perspectives contribute to service design?

(2) How can we integrate multidisciplinary contributions to service design in order to build a shared ground for this field and approach?

(3) How service design fosters service innovation at different levels of complexity, supported by multidisciplinary contributions?

The goal of defining three sub-research questions was to facilitate the development of a qualitative and explorative investigation, focused on addressing the research challenges through the development of 3 interconnected studies. A qualitative research approach was selected, because of the restricted number of studies delineating the multidisciplinary character of service design in innovation contexts (Patrício et al., 2018). Qualitative research is employed "when there is little information on your topic of interest, when the variables are unknown, or when the relevant theory base is inadequate or missing" (Muratovski, 2016, p. 48). In this sense, "the purpose of qualitative research is the construction of a rich and meaningful picture of a complex and multifaceted situation" (Muratovski, 2016, p.48), which consists as an adequate research view for the purpose of this thesis of integrating a comprehensive understanding of service design as multidisciplinary field and approach to service innovation.

Besides, this investigation followed an exploratory research approach, in order to identify and characterize core multidisciplinary perspectives on service design, as well as to understand how service design can foster service innovation supported by the integration of multidisciplinary contributions. Exploratory research is used "when the subject is very new"

and “we know little or nothing about it” (Neuman, 2014, p. 38). Therefore, the thesis’ goals were aligned with an exploratory research approach, in order to “become familiar with the basic facts, setting, and concerns” and “formulate and focus questions for future research” (Neuman, 2014, p. 38).

Therefore, the research design of this thesis was coordinated into 3 studies in order to explore the multidisciplinary character of service design, by collecting data from three distinct sources: (a) service design multidisciplinary literature; (b) service design multidisciplinary academic community, and (c) service design multidisciplinary practitioners. As such, Study 1 focuses on answering the first sub-research question through an expert-based literature review, involving 13 leading researchers in service design and innovation. Study 2, instead, answers the second sub-research question, by developing focus groups (Krueger & Casey, 2015) with 6 service design and innovation research centers. Finally, Study 3 was designed as a multiple case study research (Yin, 2018) of service design projects involving multidisciplinary teams in organizations, in order to answer the third sub-research question.

Figure 2 presents a diagram which describes the research design of the thesis, by integrating these 3 studies. As Figure 2 shows, Study 1 enables the identification and characterization of core multidisciplinary perspectives and their contributions to service design, working as a theoretical basis for the subsequent studies. Study 2 describes shared and specific research foci among the identified core multidisciplinary perspectives on service design, therefore integrating results from Study 1 and supporting data analysis of Study 3, as indicated by the arrows in Figure 2. Built on the results from the previous studies, Study 3 brings an empirical perspective to the investigation, by characterizing how the integration of multidisciplinary contributions can support service design to foster service innovation. The following subsections present how these studies were developed and are connected among each other.

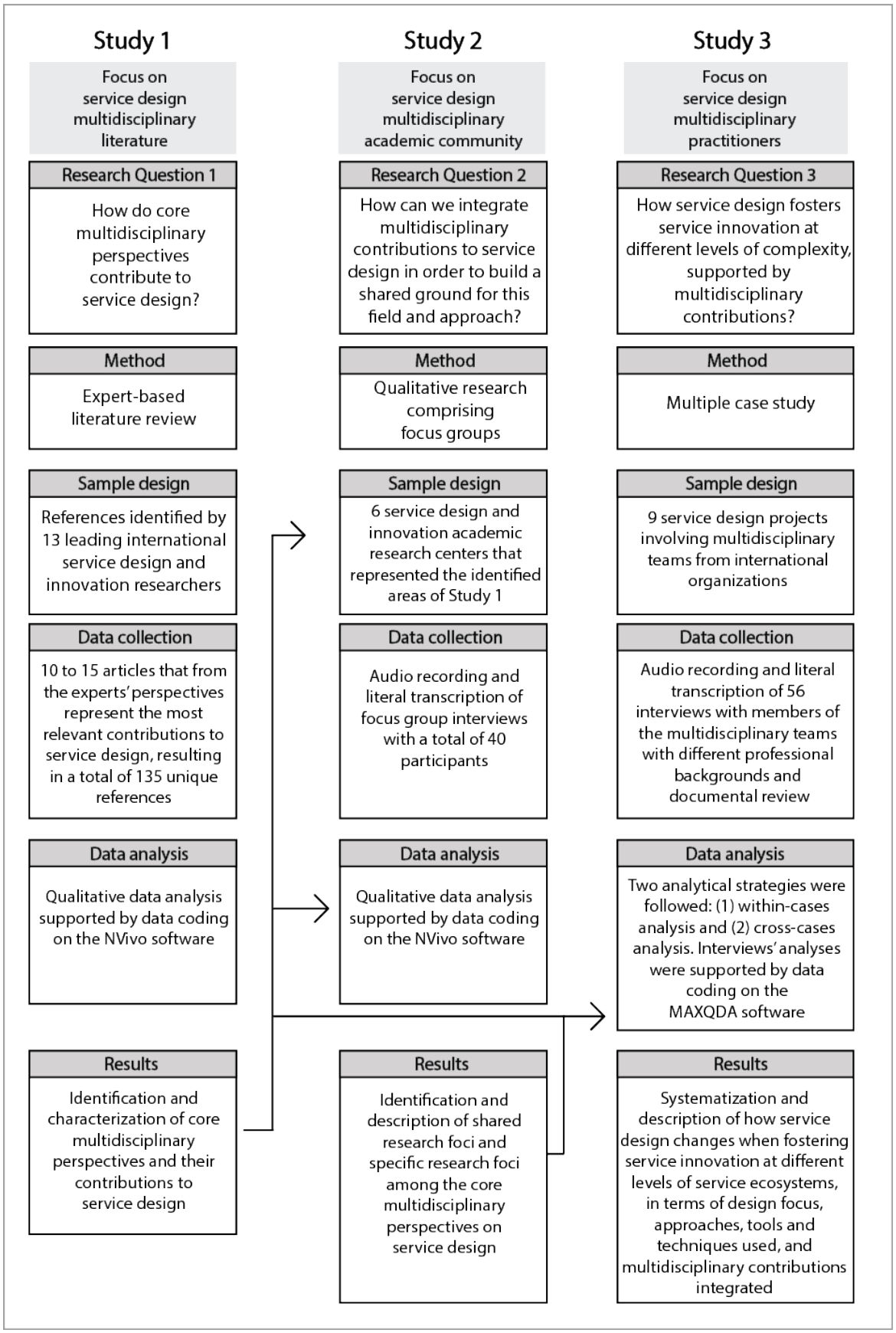


Figure 2 - Research design

3.1 Study 1 – Expert-based literature review

The first study addressed the sub-research question of "How do core multidisciplinary perspectives contribute to service design?". As such, this study focused on the first research objective of this thesis of comprehending which are core multidisciplinary perspectives and their contributions to service design. With the aim of addressing this challenge, this first study was designed as an expert-based literature review, with a sample design based on the recommendation of 13 leading researchers in service design and innovation (see Appendix II). The selection of an expert-based literature review was made for this study, because of the diffuse nature of multidisciplinary contributions in this field, especially in terms of publications outlets (i.e. journal articles, conference proceedings, books, etc.). Therefore, this approach enabled a focused examination of relevant literature on service design discussed by multidisciplinary perspectives.

Data collection was made through e-mail, collecting 10 to 15 articles indicated by these service design experts, which resulted in a total of 135 unique references. These publications were qualitatively analyzed (Gioia et al., 2012) with support of the NVivo software, by integrating the information that emerged from the data analysis and establishing connections with theory to build results. Study 1 results enabled the identification and characterization of 6 core multidisciplinary perspectives and their contributions to service design, namely from Service Research, Design, Marketing, Operations Management, Information systems and Interaction Design. The detailed explanation of the methodological approach used during the first study is presented in the subsection 4.3, in the Study 1 chapter of this thesis.

3.2 Study 2 – Qualitative research comprising focus groups

Building upon the results of Study 1, the second study focused on answering the sub-research question of "How can we integrate multidisciplinary contributions to service design in order to build a shared ground for this field and approach?". As such, Study 2 addressed the second research objective of this thesis of integrating a shared ground for the evolution of service design as a multidisciplinary field and approach. While Study 1 developed an analysis of literature to show that multidisciplinary perspectives have been approaching service design, resulting in different concepts and approaches, Study 2 advanced that study by identifying shared research areas to integrate those contributions based on the current work of the service

design research community. In order to achieve those goals, this second study was designed as a qualitative research comprising focus groups (Krueger & Casey, 2015) with a sample design based on 6 service design and innovation research centers that represented the identified areas of the Study 1 (see Appendix IV). Focus group was the method selected for Study 2, because of its approach of bringing experts together to intensively discuss about a specific topic (Krueger & Casey, 2015), therefore enabling the examination of shared research areas among the selected academic centers representing the core multidisciplinary perspectives on service design.

Data collection was made by audio recording the focus groups, with a total of 40 participants. These interviews were transcribed and qualitatively analyzed (Gioia et al., 2012) with the support of the NVivo software, by identifying categories and building results supported by the service design multidisciplinary literature collected and examined during Study 1. Study 2 results enabled the identification and description of shared and specific research foci among the 6 core perspectives on service design, therefore supporting the integration of a shared ground for service design as a multidisciplinary field and approach. The detailed explanation of the methodological approach used in the second study is presented in the subsection 5.3, in the Study 2 chapter of this thesis.

3.3 Study 3 – Multiple case study

Study 3 focused on the sub-research question of "How service design fosters service innovation at different levels of complexity, supported by multidisciplinary contributions?". As such, this study addressed the third research objective of this thesis of characterizing how service design, as a multidisciplinary approach, can foster service innovation at distinct levels of complexity. Study 3 was built upon the results from Study 1 and Study 2, complementing these prior studies by providing an empirical perspective on how service design practitioners from various backgrounds have been developing service innovation projects in distinct contexts. Literature identified and examined during Study 1 also supported data analysis in Study 3. In order to achieve the research objective, this third study was designed as a multiple case study research (Yin, 2018). A multiple case study was selected as the method for this study, in order to examine different cases in which multidisciplinary teams apply service design in service innovation projects. Case studies are recommended for research focused on understanding how certain phenomena happens in different contexts, providing rich descriptions of the research

object(s) and, therefore, sustaining theory development about their related research topic(s) (Dul & Hak, 2008).

Sample design was based on the selection of 9 service design projects involving multidisciplinary teams developed by international organizations, which presented different dimensions of service innovation addressed by service design (see the cases' profile in Appendix VI). Data collection was built on 56 semi-structured interviews (Kvale, 1996) and documental review (Flick, 2014) of artifacts related to the project (e.g., any accessible report, news, website). Data was qualitatively analyzed following two strategies: within-cases analysis to provide an in-depth description of the cases, followed by a cross-case analysis of the identified patterns that characterized how service design enables service innovation (Voss, Tsikriktsis, & Frohlich, 2002; Yin, 2018). Study 3 resulted in the systematization and description of how service design changes when fostering service innovation at different levels of service ecosystems, in terms of design focus, approaches, tools and techniques, and multidisciplinary contributions integrated. The detailed explanation of the methodological approach used during the third study is presented in the subsection 6.4, in the Study 3 chapter of this thesis.

4 STUDY 1 – IDENTIFYING AND SYSTEMATIZING MULTIDISCIPLINARY PERSPECTIVES ON SERVICE DESIGN

This chapter presents the development and the outcomes of Study 1, which covers the identification and systematization of how core multidisciplinary perspectives contribute to service design. This chapter is organized by the following subsections. In subsection 4.1 Introduction, the research challenges and research questions for this study are identified, followed by the subsection 4.2 which presents a literature review on Activity Theory, which supported data analysis in this study. These subsections are followed by the 4.3 Methodology, 4.4 Results, 4.5 Discussion and 4.6 Conclusions, specific for this study.

4.1 Introduction of Study 1

In a preliminary stage of Study 1, an initial literature review of the concepts of service design, service innovation and multidisciplinary research was undertaken, as previously presented in the Theoretical foundations chapter of this thesis. This preliminary literature review revealed the challenge of the lack of a multidisciplinary understanding of service design, followed by the need to identify which are core perspectives and the contributions they bring to this approach.

While service design is considered as a multidisciplinary field (Patrício, Gustafsson, & Fisk, 2018; Secomandi & Snelders, 2018), its contributions (such as concepts and approaches) often adopt a specific disciplinary stance, thus lacking a more holistic and integrated approach to fully support the design of new services. This lack of a shared understanding among service design perspectives has implications on service innovation, since service design has been developed as a service innovation approach (Ostrom et al., 2015; Patrício et al., 2018; Teixeira et al., 2017; Yu & Sangiorgi, 2018). As such, it is not clear how different multidisciplinary perspectives contribute to service design and, consequently, how these perspectives support service design to foster service innovation. This challenge demands that service design evolves as a multidisciplinary activity, which is able to take into account complementary aspects related to service innovation (Lusch & Nambisan, 2015).

This chapter addresses the challenge of the need for a comprehensive understanding about the main multidisciplinary perspectives and their contributions to service design, through an expert-based literature review based on the recommendation of 135 publications from 13 world-leading multidisciplinary researchers in service design and innovation (see Appendix II). As such, Study 1 brings a fundamental contribution to advance service design as a multidisciplinary activity to service innovation, through the identification, characterization and systematization of core multidisciplinary perspectives and their contributions to service design.

The next subsection presents a literature review on how service design can be viewed as an activity (Kaptelinin & Nardi, 2012; Wertsch, 1979), in order to support this investigation in terms of how service design is approached by different disciplinary communities.

4.2 Approaching multidisciplinary perspectives on service design with Activity Theory

When interpreting literature from multidisciplinary perspectives on service design, it was important to understand which was the structure and the building blocks that constituted this approach, in order to facilitate identifying a common framework that could support data analysis. As such, we resorted to Activity Theory to view service design through the lenses of an activity (Wertsch, 1979; Kaptelinin & Nardi, 2012).

Activity theory is an interdisciplinary approach to human sciences originated in the Soviet psychology (Wertsch, 1979). This theory has as unit of analysis the activity system, which is a concept that bridges the individual subject and her/his action within the societal structure (Engeström, Miettinen, & Punamäki, 1999). This system is formed by a set of elements – subject, mediating artifacts, object, outcome, rules, community, division of labor – which are interconnected in a system to explain the human activity, as illustrated in Figure 3.

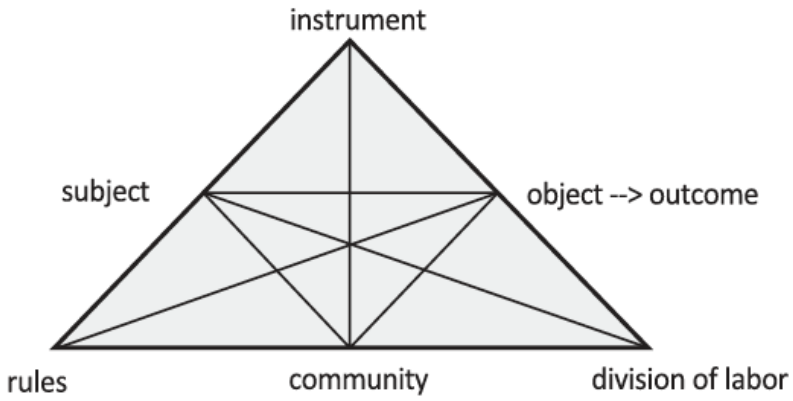


Figure 3 - Engeström's activity system model
Source - Kaptelinin, 1996, p. 34.

According to Activity Theory, an activity is composed of a sequence of steps, defined as actions that are guided by goals (Wertsch, 1979). Kaptelinin and Nardi (2012, p. 30) define a goal as "what directs the activity" being developed by a subject, who can be a person or a group of people. Objects, on the other hand, "motivate and direct activities, around them activities are coordinated, and in them activities are crystallized when the activities are complete" (Kaptelinin & Nardi, 2012, p. 29). The subject who acts over an object is part of a community of practice, which is a unit broader than the individual action (Engeström et al., 1999; Lave & Wenger, 1991). Kaptelinin and Nardi (2012) also describe approaches as the mediational means that intermediate the subject-object interaction. Finally, the outcome of the activity system is described as "a transformation of the object produced by the activity in question into an intended result, which can be utilized by other activity systems" (Kaptelinin & Nardi, 2012, p. 34).

Through an Activity Theory lens, service design can be understood as an activity composed by goals, objects, approaches and outcomes (Kaptelinin & Nardi, 2012; Wertsch, 1979). These concepts can be illustrated by considering the activity of an interaction designer, for instance, who works as a member of a service design team redesigning the user interface of a service application (e.g., Uber app). The object of her/his activity is the existing application interface, and the expected outcome is a new interface. To achieve this transformation, the interaction designer employs a variety of approaches in her/his work on the object, including methods and techniques (e.g., personas). As illustrated by this example, the identification of goals, objects, approaches and outcomes supports understanding the different forms in which service design can be approached. Therefore, Activity Theory offers a suitable framework to investigate how

multidisciplinary communities approach and develop the service design activity, also bringing to light their distinct contributions in terms of goals, objects, approaches and outcomes.

4.3 Methodology of Study 1

In order to tackle the challenge of the lack of a multidisciplinary understanding of service design, the specific aims of this study were to identify, characterize and systematize the core multidisciplinary perspectives and their contributions to service design.

Due to the dispersed nature of multidisciplinary contributions to service design in terms of publication outlets (journal articles, conference proceedings, books, etc.), a systematic literature review (Booth, Papaioannou, & Sutton, 2012) would not alone provide a comprehensive overview of the relevant scholarship. Furthermore, considering the wide variety of fields that offer contributions to service design, this study focused on the core disciplinary areas connected to service design. For this reason, the research involved two stages of expert-based literature review, as presented in the Table 1.

Table 1 - Research design and summary of findings of Study 1

	Phase 1	**Phase 2**
Method	Literature review	Literature review based on experts' suggestions
Sample design	References identified by the multidisciplinary research team, composed by the PhD candidate, her supervisors and a senior researcher from the University of Porto	References identified by 13 international leading service design researchers from 9 countries in Europe, North America, South America and Asia (covering the 6 core service design areas, at least 2 per research area)
Data collection	Selection of 40 references that represent multidisciplinary contributions to service design	10 to 15 articles that, from the experts' perspectives, represented the most relevant contributions to service design, resulting in a total of 135 references
Data analysis	Qualitative data analysis based on the articles' content	Qualitative data analysis supported by data coding on the NVivo software
Results	Identification of 6 core areas that contribute to service design: service research, design, marketing, operations management, information systems and interaction design	Characterization of the multidisciplinary perspectives and their contributions to service design, in terms of an activity (with goals, objects, approaches and outcomes)

The phases of the research process are detailed in the following subsections.

4.3.1 Phase 1

The first phase involved a literature review on service design. The selection of publications for this preliminary literature review was based on references selected by the PhD candidate, her supervisors and a senior researcher from the University of Porto. This multidisciplinary research team brought together perspectives from Design, Engineering, Marketing and Interaction Design on service design, and the goal was to explore these and other perspectives while developing this initial literature review. The sample criterion was the relevance of the publications for service design, in terms of concepts, processes and approaches (e.g. service system, design thinking, service prototyping). After this selection, the content of the references was analyzed in order to identify their associated disciplinary areas. The results of this analysis are presented in Appendix III.

As the name implies, service design builds on multidisciplinary contributions from Service Research and Design research (Patrício et al*.,* 2018; Secomandi & Snelder, 2018). Therefore, literature review covered these two research areas, revealing they provide the foundations of service design. A more in-depth examination on the Service Research stream of literature revealed other areas also contributing to service design, namely Marketing, Operations management and Information Systems. The analysis of literature coming from a Design stream also revealed a significant body of publications connecting Interaction Design to service design. Based on this first round of literature review of multidisciplinary perspectives, 6 core areas were identified as contributors to service design: Service Research and Design research, as the key research umbrellas to service design, as well as Marketing, Operations management, Information systems and Interaction Design as specific research areas connected to these two main streams of literature. The description of each area's perspective is presented in the subsection 4.4.1 of the Results section.

4.3.2 Phase 2

Building upon this identification of the 6 areas, the second stage involved a qualitative approach (Gioia et al., 2012) based on an expert-based literature review, focused on gaining an in-depth understanding of these contributions. This phase was based on the recommendations

of 13 leading international researchers in service design from research centers in 9 countries in Europe, North America, South America, and Asia, as presented in Appendix II. These experts were selected based on their leading research roles in the 6 identified areas, ensuring the selection of a minimum of two experts from each area. Each expert was invited by e-mail to participate in the study by suggesting 10 to 15 articles that, from his or her field's perspective, represented the most relevant contributions to service design. In this context, some of these articles may not explicitly address service design as such, but from the experts' perspectives they developed concepts and approaches that make valuable contributions to this field. The experts' responses resulted in a set of 135 unique references covering a rich variety of multidisciplinary contributions to service design, including 90 journal articles, 13 conference papers, 30 book chapters, and 2 publications from other sources. The total of references per area suggested by the experts are: Service Research (30), Design (37), Marketing (17), Operations management (18), Information systems (26) and Interaction design (25).

These articles were analyzed with a qualitative approach that aimed to integrate the information that emerged from the data analysis and establish connections with theory to build robust results. This involved two types of coding – initial and focused coding – using the NVivo software. Within this process, fragments of data like segments of text were first coded close to their analytical import (initial coding), and then finally condensed, integrated, and synthesized into more meaningful categories (focused coding) (Charmaz, 2014).

The results of data analysis were then structured into a conceptual model composed by 4 main categories (goals, objects, approaches and outcomes). This conceptual model was framed adopting the Activity Theory framework (Kaptelinin & Nardi, 2012; Wertsch, 1979) and, therefore, examining service design as an activity (see subsection 4.4.2.1 of Results).

4.4 Results of Study 1

This section presents the identification, systematization and characterization of the core multidisciplinary perspectives and their contributions to service design. It starts with the 6 core areas contributing to service design that were identified in the first stage of research, followed by an in-depth examination of these contributions that resulted from the expert-based literature review.

4.4.1 Phase 1: Identification of core multidisciplinary perspectives on service design

The first stage of literature review enabled the identification of 6 core areas contributing to service design: Service Research, Design, Marketing, Operations management, Information Systems and Interaction Design. The analysis of this first set of literature showed that Service Research perspective provides the focus and context to service design, bringing definitions such as the concept of service as the application of the competences of one entity for the benefit of another entity (Vargo & Lusch, 2008), as well as the service concept (Edvardsson, Gustafsson, Sandén, & Johnson, 2000) or value propositions (Frow et al., 2014) which enable value co-creation. Service Research also highlights the central role of service systems, which involve a set of inter-related structures that support and enable value co-creation among actors (Edvardsson, Skålén, & Tronvoll, 2012). A Design perspective instead provides the mindset, processes and tools that offer a holistic, iterative approach to creating new services. The literature review in the design research sphere revealed the coexistence of an exploratory inquire perspective to creating new services and a more rational problem-solving approach that is closer to engineering design (Kimbell, 2011). This Design perspective contributes to understanding and visualizing user experiences (Blomkvist & Segelström, 2014), and offers collaborative design practices and participatory design principles (Holmlid, 2007).

A Service Marketing perspective addresses the design of service concepts and multi-interface service systems focused on the customer experience, with techniques and concepts such as service blueprinting (Bitner, Ostrom, & Morgan, 2008) and service clues (Berry, Carbone, & Haeckel, 2002). An Operations management perspective focuses on designing service processes, making the connection between service in the front and back stages through models such as the process chain network (Sampson, 2012). Some service literature connected to Information Systems also addresses the technological and back-office processes that support person-to-person, person-to-machine and machine-to-machine interactions (Glushko, 2010). Finally, literature review identified an Interaction Design perspective as one of the pioneering influences on service design (Pacenti & Sangiorgi, 2010), contributing to design service interfaces for the user experience with tools such as storyboarding (Truong, Hayes, & Abowd, 2006) and experience prototyping (Buchenau & Suri, 2000). These 6 areas contributing to service design served as the basis for the subsequent research stages.

4.4.2 Phases 2: Multidisciplinary perspectives and their contributions to service design

The qualitative analysis of the 135 references recommended by the 13 experts in the second stage research enabled an understanding of service design as an activity (Wertsch, 1979; Kaptelinin & Nardi, 2012) that can incorporate multidisciplinary contributions. The following subsections present the conceptual model that resulted from data analysis through an Activity Theory lens, with the description of the goals, objects, approaches and outcomes of the core multidisciplinary perspectives and their contributions to service design identified.

4.4.2.1 Service design activity conceptual model:

The iterative process of the research Phase 2 enabled the development of a conceptual model, which was used to characterize core multidisciplinary perspectives and their contributions to service design. This conceptual model examines service design as an activity (Wertsch, 1979; Kaptelinin & Nardi, 2012). The conceptual model that resulted from examining service design through Activity Theory is presented in Figure 4, being composed by goals (designing for), objects (focus of design), approaches (designing through), and outcomes (intended or emergent changes that can be viewed as innovations).

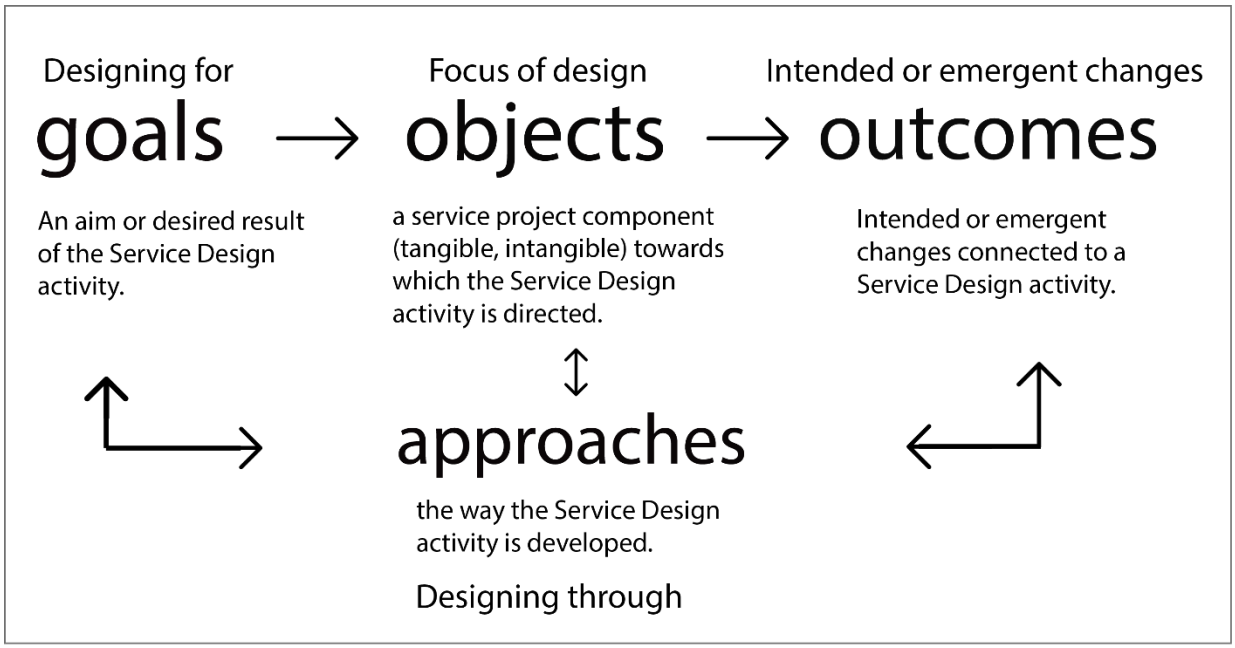


Figure 4 - Service design activity conceptual model

This conceptual model was used for a more detailed data analysis of the multidisciplinary contributions to service design. This resulted in a structure of sub-categories within goals,

objects, approaches and outcomes, which were used to characterize each perspective, as presented in Tables 2-6 in the following subsections. These Tables present indirect quotations (collected during Phase 2 of the Methodology) which illustrate distinctive aspects of how each multidisciplinary perspective contribute to service design, according to the results.

4.4.2.2 Goals:

As presented in Table 2, results indicate *designing for enhancing customer experience*, *strategic value co-creation* and *supporting service* as the main goals shared by all the areas. Likewise, *designing for improving service quality* is cited by Service Research, Marketing, Operations and Information Systems perspectives as a relevant goal for service design.

A Service Research perspective demonstrates a focus on enhancing customer experience by developing theory and conceptual frameworks that explore, for instance, "emotional responses as mediating factors between the physical and relational elements and loyalty behaviors" (Pullman & Gross, 2004, p. 551). Literature analysis shows this area also devoting attention to designing for supporting service by studying service systems and service delivery processes connected to organizations (Kaltcheva and Weitz, 2006). In this context, the role of customer experience is investigated as a means of attaining service quality and, consequently, customer satisfaction (Ding et al., 2009).

Along with Service Research, Marketing analyzed literature brings a strong focus on designing for enhancing customer experience. The literature notes, for instance, the planning of dramatic structures for service events, coupling back-stage employees with front-stage processes, which provide customized service (Zomerdijk & Voss, 2010). The results also show a focus on designing so as to support service and improve service quality, by developing, for instance, service with rigorous analysis and controls to identify problems before they happen (Bitner et al., 2008; Shostack, 1982, 1984).

Table 2 - Service design multidisciplinary goals

Goals	Definition	Service Research	Design	Marketing	Operations Management	Information Systems	Interaction Design
Designing for enhancing customer experience	Designing the contextual elements (Michel, Brown and Gallan, 2008) and the service performance (Grove & Fisk, 2001) to enable an experience.	Creating conceptual frameworks to understand customer experience (Pullman & Gross, 2004)	Applying design methods and skills to improve the customer experience (Miettinen & Koivisto, 2009)	Planning of dramatic structures for service events (Zomerdijk & Voss, 2010)	Dealing with customer variability so as to improve service operations (Frei, 2006)	Use of web-based solutions to enhance the customer experience (Davis *et al.*, 2011)	Using modelling techniques to conceptualize customer experience (Holmlid, 2007)
Designing for strategic value co-creation	Designing service concepts, value propositions and strategies to enable value co-creation (Patricio et al., 2011; Frow et al., 2014)	Creating new service offerings (Patrício et al., 2011)	Creating new kinds of value relation between diverse actors within a socio-material configuration (Kimbell, 2011)	Conceptualizing customer-centric service systems (Mahr *et al.*, 2013)	Creating operational strategies for multichannel service delivery systems (Roth & Menor, 2003)	Designing automated service systems (Glushko & Nomorosa, 2013)	Designing interactional strategies between technological solutions and their users (Lee *et al.*, 2010)
Designing for supporting service	Designing for operationalizing the value proposition (Sampson & Froehle, 2006).	Exploring service systems and service delivery processes connected to organizations (Kaltcheva and Weitz, 2006)	Designing service systems that meet users' needs (Lin, Hughes, Katica, Dining-Zuber, & Plsek, 2011)	Analyzing service delivery process and improving service quality (Bitner et al., 2008)	Planning, visualizing, and implementing service delivery processes (Sampson, 2012)	Creating service-oriented architectures to support business-to-business collaborations (Chesbrough & Spohrer, 2006)	Designing service interactions to support customer experience (Zimmerman et al., 2011)
Designing for improving service quality	Designing for guaranteeing service quality in terms of service efficiency and efficacy. (Frei, 2006)	Improving customer experience as a means of attaining service quality (Ding et al., 2009).	-	Systematically measuring and rewarding customer-centric behavior in front-line personnel (Saco & Goncalves, 2008)	Rigorously analyzing and controlling of service operations (Shostack, 1984)	Designing service monitoring systems to evaluate customer satisfaction (Glushko & Nomorosa, 2013)	-
Designing for enabling service interactions	Designing for intermediating service encounters between actors. (Zimmerman et al., 2011)	-	Designing service interfaces (Secomandi & Snelders, 2011)	-	-	-	Designing service interactions within and among organizations (Sangiorgi, 2009)
Designing for improving societal well-being	Designing for public and societal value, achieved through service that involves a large set of stakeholders. (Burns, Cottam, Vanstone, & Winhall, 2006; Manzini, 2015)	-	Supporting new service models and social innovation initiatives within communities (Jégou and Manzini, 2008)	-	-	-	-
Designing for improving service design process	Contributing to better develop the process of designing service as through researching the benefits of co-design, design tools and service representations. (Blomkvist, 2015; Sanders & Stappers, 2008; Segelström, 2010)	-	Creating and exploring the use of tools and techniques to visualize and analyze the user experience (Miettinen & Koivisto, 2009)	-	-	-	Facilitating co-design activities (Sanders & Stappers, 2008)

The Operations management literature analyzed reveals that this area offers knowledge in using design to support service by planning, visualizing, implementing, and managing the service delivery processes that enable value co-creation between employees, organizations, and customers (Lovelock & Wirtz, 2016; Sampson, 2012). The results indicate that this area contributes to managing service capacity and creating flexible processes to deal with customer variability so as to maintain or improve operational efficiency and efficacy (Frei, 2006; Sampson & Froehle, 2006). From this area's perspective, results characterize designing for enhancing customer experience, such as by planning service evidences (Shostack, 1984) of "front-stage activities that customer can see and use to assess service quality" (Lovelock & Wirtz, 2016, p. 295). The literature also reveals the Operations perspective on designing for strategic value co-creation by targeting "market and customer segments" and designing the related "service delivery systems" (Roth and Menor, 2003, p. 148).

Data analysis indicate an Information Systems interest in designing for supporting service, as by creating service-oriented architecture and web services to support business-to-business collaborations (Chesbrough & Spohrer, 2006). In addition, literature from this perspective reports the use of web-based technological solutions to enhance the customer experience during service delivery processes, as by increasing the power of choice of customers through a self-service approach (Davis et al., 2011). Similarly, data analysis presents this area as contributing to improving service quality by designing usable systems that "allow their users to achieve their goals with effectiveness, efficiency, and satisfaction within a particular context of use" (Harmelen, 2001, p. xv).

Notwithstanding, designing for enabling service interactions and improving service design process are common goals brought by Design and Interaction Design perspectives. The data analysis demonstrates that a Design perspective focuses on enabling service interactions like "better designing the service interface" through the application of "design methods and skills to improve the user experience" (Meroni & Sangiorgi, 2011, p. 9). In addition, the results describe this area as contributing to improving the service design process by exploring the use of tools and techniques to make future service situations tangible so as to facilitate the visualization and analysis of user experience (Miettinen & Koivisto, 2009; Stickdorn & Schneider, 2011).

On the other hand, results reveal an Interaction Design perspective focused on enabling service interactions, by dealing with one-to-one, many-to-many, and open-ended service relations, and with interactions within and among organizations (Sangiorgi, 2009). Results describe this area associated with improvements in the service design process, by researching and creating co-design activities, where the user gains the position of "expert of his/her experience", playing "a large role in knowledge development, idea generation and concept development" (Sanders & Stappers, 2008, p. 8).

Finally, results also show that a Design perspective is turning the focus of service design towards improving societal well-being. This is reported in the literature by the active participation of designers in local communities, contributing to supply them with "specific design knowledge [like] design skills, capabilities and sensitivities" that enable and support new socially innovative service models to appear and grow (Jégou & Manzini, 2008, p. 41). In this context, the analyzed literature defines social innovation as referring to "changes in the way individuals or communities act to solve a problem or to generate new opportunities", which are "driven more by changes in behaviour than by changes in technology or the market and they typically emerge from bottom-up rather than top-down processes" (Jégou & Manzini, 2008, p. 29).

4.4.2.3 Objects:

As shown in Table 3, results indicate *service system, service interface* and *service concept/ value proposition* as service design objects in all areas. Likewise, *service delivery process* is cited by Service Research, Design, Marketing, Operations and Information Systems perspectives as relevant objects for service design.

From a Service Research perspective, results demonstrate a focus on understanding the service interface, especially in terms of service clues (Berry & Bendapudi, 2003) and servicescape (Bitner, 1992). The interest in service systems is also reported, expanding its focus from an organizational level (Ding et al., 2009; Kaltcheva & Weitz, 2006) to also include the study of value networks (Epp & Price, 2011; Akaka et al., 2012) and service ecosystems (Edvardsson & Tronvoll, 2013; Edvardsson, Tronvoll, & Gruber, 2011).

Table 3 - Service design multidisciplinary objects

Objects	Definition	Service Research	Design	Marketing	Operations Management	Information Systems	Interaction Design
Service system	A set of inter-related structures that support and enable value co-creation among actors (Edvardsson, Skålén & Tronvoll, 2012)	Social structures in service systems are key to understand and enhance value co-creation (Edvardsson & Tronvoll, 2013)	Socio-technical systems (Secomandi & Snerlders, 2011).	Customer-oriented experience systems (Mahr, et al., 2013)	Back-office and front-office of service delivery systems (Roth & Menor, 2003)	Service system is a basic theoretical construct in service science (Maglio & Spohrer, 2008)	Service interactions cannot be separated from the overall service system (Sangiorgi, 2009)
Service interface	Service interface includes material artifacts, environments, embodied human interactions, diffuse phenomena appealing to the senses (as the tastes, smells, sounds) and all the service evidences that intermediate service encounters. (Secomandi & Snelders, 2011)	Service clues and servicescape (Bitner, 1992)	Materiality of service interface (Kimbell, 2011)	Conceptualizing brand experience as sensations, feelings, cognitions, and behavioral responses evoked by brand-related stimuli (Brakus, Schmitt, & Zarantonello, 2009)	Service evidences (Shostack, 1984)	User interfaces (Glushko, 2010)	Service interface is made up of people, products, information and environments that support the user experience (Sangiorgi, 2009)
Service concept/ value proposition	Set of potential benefits offered to customers and/or other stakeholders. (Patricio et al., 2011; Frow *et al.*, 2014).	Value propositions (Frow et al., 2014)	Service offerings that address social and economic problems (Burns et al., 2006)	New forms of value co-creation within service networks (Akaka et al., 2012)	Service concept defines the how and the what of service design (Goldstein, Johnston, Duffy, & Rao, 2002)	New service offerings supported by online tracking systems to increase operations efficiency. (Chesbrough & Spohrer, 2006)	Service as a mean for new forms of interactions between stakeholders (Zimmerman et al., 2011)
Service delivery process	Process of applying specialized competences (knowledge and skills) to enable service among actors. (Chen, Tsou, & Huang, 2009)	New forms of value co-creation throughout the service delivery process (Patrício et al., 2011)	Design of customer-journeys (Steen, Manschot, & De Koning, 2011)	Design of employees' roles as key supporters of customer experience in the service delivery system (Parish, Berry, & Lam, 2008)	Design of service operations (Sampson, 2012)	Design of information-intensive service delivery processes (Glushko, 2010)	-
Technology	All the IT artifacts/systems used to enable the service and/or the Service Design process. (Hara, Arai, & Shimomura, 2009; Min Kyung Lee, 2013).	-	-	-	Technology that supports the service delivery system (Roth & Menor, 2003)	Systems of human-ware, hardware, and software in services (Hara et al., 2009)	Crowd-sourcing social computing systems to support service (Zimmerman et al., 2011)
Service design process	Process to create new service or improve existing one. (Stickdorn & Schneider, 2011)	-	Use of co-design to support engagement of stakeholders (Steen et al., 2011)	-	-	-	Using of prototyping as external representations (Blomkvist & Segelström, 2014)

Along with Service Research, Marketing analyzed literature reports an interest in orchestrating all the "clues" that people detect as service interface during the buying process (Berry et al., 2002). Results also show a Marketing focus on service systems, by assessing value creation within the service delivery system (Kleijnen, Ruyter & Wetzels, 2007), designing for value co-creation within networks (Rosenbaum, 2006; Akaka et al., 2012) and by planning the processes of service delivery (Bitner et al., 2008; Shostack, 1982).

Data analysis demonstrates a Design' focus on the service interface, by highlighting, for instance, the importance of "service evidence and physical cues in the servicescapes to interpret both intended and unintended relational messages that communicate the service providers' perceptions about customers" (Lo, 2011, p. 05). Likewise, literature analysis shows that design brings knowledge to create service systems, service concepts and service delivery processes by suggesting tools that "easily describe and manipulate business models to create new strategic alternatives" (Osterwalder & Pigneur, 2010, p. 15).

Along with Design, results show service interface as the main focus of an Interaction Design perspective, with a special interest on designing the material aspects that enable interactions and representing other sensory aspects related to the service encounter (Kimbell, 2011; Holmlid, 2007). Another important reported focus from this area is the service system, since an Interaction Design perspective acknowledges that designing for service interactions cannot be separated from the overall user context (Sangiorgi, 2009).

An Operations perspective brings a focus on the service delivery process, by designing and managing all the activities and service evidences that support the service encounter (Shostack, 1984; Wirtz & Lovelock 2016). In this sense, this perspective is also interested in the service system, specially at the organizational level, which is constituted by back-office and front-office operations that support the service interactions between organizations and customers (Wirtz & Lovelock 2016). Although the analyzed literature does not describe operations managers creating the service interface *per se*, in terms of service evidences (Shostack, 1984), they are reported to be responsible for defining and managing the resources and operations which support value co-creation with customers (Sampson, 2012).

Data analysis shows, from an Information Systems perspective, a focus on service systems, service interface and service delivery process, such as by the application of Service Oriented

Architecture (SOA) methodologies to deploy Web Services that allow service system operations to be efficient and scalable (Glushko, 2008) and by the conceptualization of smart solutions that integrate ubiquitous computing interfaces (Kuniavsky, 2010).

Nevertheless, technology is a common object brought by Information Systems, Operations and Interaction Design perspectives. From an IT perspective, for instance, literature describes the design of a Computer Added Design (CAD) tool to describe, evaluate and improve product-service systems (Hara et al., 2009). In parallel, an Operations perspective contributes to understanding how technology can change and enhance service delivery systems (Glushko, 2010; Zomerdijk & de Vries, 2007), creating multiple possibilities of service encounters and, consequently, service delivery processes (e.g. self-service, technology enhanced person-to-person service, multichannel service) (Patrício et al., 2011). Likewise, an Interaction Design perspective places its focus on understanding interactions between technological solutions (e.g. robots, cell phone app) and their users, in order to improve the interfaces that intermediate them (Lee et al., 2010; Zimmerman et al., 2011).

Finally, results also show that Design and Interaction Design perspectives bring a focus on the meta-level of service design, having as a common object the service design process. Literature reports, for instance, a Design perspective contributing to identify the benefits of co-design "such as improving the creative process" and "creating a better fit between the service offer and customers' or users' needs" (Steen, Manschot and De Koning, 2011, p. 59). On the other hand, data analysis shows an Interaction Design perspective exploring the use of tools and techniques to make future service situations tangible (as through role play, desktop walkthrough, prototyping), in order to facilitate the visualization and analysis of user experience (Blomkvist, 2015).

4.4.2.4 Approaches:

Results indicate that service design approaches can be characterized by their *customer-centered* and *systemic approach* in all areas, as summarized in Table 4 and Table 5.

Literature analysis in Service Research introduces both customer and employee-centered foci to service design by describing, for instance, an integrated view of the organizational service delivery system, including the roles of service providers and customers (Bitner *et al.*, 2008).

Moreover, this area refers to service blueprint (Shostack, 1984) and journey maps (Zomerdijk & Voss, 2010) as techniques that contribute with a systemic process to service design. Service researchers acknowledge both New Service Development (Edvardsson & Olsson, 1996) and Design Thinking (Dorst, 2011) as two approaches to designing for service.

Human, customer and user centered foci are associated with a design perspective, by employing Design Thinking and Participatory Design approaches that "use visual methods to explore and generate ideas" (Kimbell, 2011, p. 42) and "involve users and front-line workers in the design process – capitalising on their own ideas, knowledge and expertise, and uncovering some of their latent needs and desires" (Burns et al., 2006, p. 20). In this context, literature describes Design for social innovation as an approach employed by designers to "recognize and support solutions developed autonomously by groups of people to solve their own problems in their local contexts" (Cipolla & Bartholo, 2014, p. 87).

A Marketing perspective, on the other hand, brings a strong customer-orientation to service design, defined as "the set of beliefs that puts the customer's interest first'" (Deshpande, Farley and Webster, 1993, p. 27). This is completed by an employee-centered perspective, which brings a focus on guaranteeing employees' quality of work, so they can feel stimulated to provide a better customer experience (Bitner, 1992). Data analysis shows that this area also refers to New Service Development and a systemic process, for instance, using service system as a theoretical construct to understand "configurations of people, technology, and value propositions" (Mahr et al., 2013, p. 437). Literature analysis describes Experience design as a used approach to create emotional connection with customers through careful planning of tangible and intangible service elements (Berry et al., 2002), which has gained popularity in many hospitality and retail businesses (Pullman & Gross, 2004).

Table 4 - Service design multidisciplinary approaches – centeredness

Approaches	Definition	Service Research	Design	Marketing	Operations Management	Information Systems	Interaction Design
Centeredness **Customer-centered**	A customer-centered approach seeks to analyze people in the context of consumption, understanding service through customers' perspective, in order to satisfy customer needs and wants, therefore, improving customer experience. (Stuart, 2006)	Customer as a co-creator of value (Edvardsson and Tronvoll, 2013)	Solving customer problems and satisfying customer needs with new value propositions (Osterwalder & Pigneur, 2010)	Strong customer orientation to service design (Deshpande *et al.*, 1993)	Systematically managing the flow of human resources along the service delivery system (Zomerdijk & de Vries, 2007)	Supporting interactions with customers with web-based service (Davis *et al.*, 2011)	Focus on designing and describing potential interactions modes and paths of customers (Maffei, Mager & Sangiorgi, 2005)
Employee-centered	An employee-centered approach highlights employees' participation during service, by designing their roles within the service delivery system, training and giving them the conditions (e.g. physical space; scripts) so they can better perform their work. (Bitner, 1992; Berry, Carbone and Haeckel, 2002; Sampson, 2012).	Involve users and front-line workers in the design process (Burns *et al.*, 2006)	-	An integrated view of the organizational service delivery system, including the roles of employees and customers (Bitner *et al.*, 2008).	Systematically processing customers along the service delivery system (Zomerdijk & de Vries, 2007)	Technology in itself does not create world class service organizations. Recruiting, training and retaining educated employees are also prerequisites for success. (Davis *et al.*, 2011)	-
User-centered	An user-centered approach seeks to see and analyze people in the context of usage, in order to understand users' experiences in their own terms. (Kimbell, 2011; Zimmerman et al., 2011).	-	Focus on understanding and engaging users in co-design activities (Meroni & Sangiorgi, 2011)	-	-	User-centered design emphasizes issues about the usability of the service (Glushko, 2008)	Visualization of user research (Segelström, 2009)
Human-centered	A human-centered design approach consists of the capacity and methods to investigate understand and engage with people's experiences, interactions and practices as well as their values and dreams. (Meroni & Sangiorgi, 2011)	-	Focus on understanding human beings as active agents of their contexts. (Manzini, 2002)	-	-	-	Focus on humans as resources to 'infrastructuring' design endeavors. (Bjögvinsson, Ehn, & Hillgren, 2012)

Table 5 - Service design multidisciplinary approaches – process

Approaches	Definition	Service Research	Design	Marketing	Operations Management	Information Systems	Interaction Design
Process **Systemic approach**	Approach to understand and analyze phenomena not in an isolated way, but in relation with contextual elements and their inter-relations. (Meadows, 2008)	Integrating physical environment improvements with organizational and operational changes (Ulrich, Berry, Quan, & Parish, 2010)	Understanding business organizational structures, processes, and related systems (Osterwalder & Pigneur, 2010)	Using service system as a theoretical construct to understand configurations of actors and resources (Mahr et al*.,* 2013)	Visually representing the flow of resources along service operations (Shostack, 1984)	Using service system as an abstraction to understand value co-creation (Spohrer & Kwan, 2009)	Understanding and contextualizing interactions within user systems (Sangiorgi, 2009)
Experience design	An approach to create emotional connection with customers through careful planning of tangible and intangible service elements. (Pullman and Gross, 2004, p. 551)	-	-	Creating emotional connections with customers through the careful planning of tangible and intangible service elements (Berry *et al.,* 2002)	-	Experience design approach to improve the usability of service interfaces (Constantine & Lockwood, 2001)	Designing game-like interactions to increase enjoyment and engagement with software (von Ahn & Dabbish, 2008)
Participatory design or other co-creation practices	An approach that seeks to actively involve stakeholders (e.g. employees, partners, customers, citizens, end users) in the design process to help ensure results meet their needs. (Sanders & Stappers, 2008)	-	Designer is not only a facilitator but rather a co-actor within a co-design process (Thorpe & Gamman, 2011)	Use of co-creation workshops (Mahr et al., 2013)	-	-	Design process s laid out to support users' interests, and the services designed are to be supportive of these interests as well (Bjögvinsson et al., 2012)
Design Thinking	Application of the design ability (Cross, 2007) – deal with ill-defined problems, solution-focused strategy, abductive thinking, visual ways of communication, constructivist thinking -, which may be represented in the form of an iterative method of exploration, creation, reflection and implementation. (Stickdorn & Schneider, 2011)	Developing together both the formulation of a problem and ideas for a solution, with constant iteration of analysis and synthesis, between the two notional design "spaces"—problem space and solution space (Dorst, 2006)	Frame problems and opportunities from a human-centred perspective, use visual methods to explore and generate ideas, and engage potential users and stakeholders (Kimbell, 2011)	-	-	-	Systematically applying design methodology and principles (Holmlid, 2007)
New Service Development	NSD is the overall process of developing new service offerings (Johnson et al., 2000) and is concerned with the complete set of stages from idea to launch. (Goldstein et al., 2002, p. 122)	New Service Development as an approach to create new service (Edvardsson & Olsson, 1996)	-	Understanding how customer input may be obtained in the various stages of the NSD process (Alam & Perry, 2002)	Managing NSD process or performance (Menor et al., 2002)	-	-
Design for social innovation	Everything that expert design can do to activate, sustain, and orient processes of social change towards sustainability (Manzini, 2015, p. 62)	-	Design for social innovation supports solutions developed autonomously by groups of people to solve their own problems (Cipolla & Bartholo, 2014).	-	-	-	-

Within this context, literature analysis from an Operations perspective refers to both customer and employee centered foci to service design, by presenting studies that systematically manage the flow of resources along the service delivery system, in order to guarantee that operations in the back and front stages occur as planned (Zomerdijk & de Vries, 2007). In this sense, results demonstrate this perspective contributing with systemic and procedural approaches to service design, with tools such as service blueprint, flowcharts and diagrams to visually represent the flow of resources along the service operation, facilitating decision making during service projects (Shostack, 1984; Sampson, 2012). Moreover, literature from this area also reports New Service Development (Menor, Tatikonda, & Sampson, 2002) associated with their perspective to service design.

An Information Systems perspective indicates customer, user and employee centered views on service design. Results refer to a systemic process, using a service system perspective as "the fundamental basis to understand value co-creation" (Edvardsson et al., 2011, p. 540) and an Experience design approach to improve the usability of service interfaces (Constantine & Lockwood, 2001).

In this context, Interaction Design literature characterizes a mostly user-centered approach, illustrated by the claim that "the main and distinctive focus of service design tools concerns the design, description and visualization of the user experience, including the potentials of different interaction modes, paths and choices (Flow Diagrams, Storyboarding, Use Cases, Customer Journey, Video Sketching, Video Prototyping, Dramaturgy, etc.)" (Maffei, Mager & Sangiorgi, 2005, p. 6). Participatory Design and co-creation are also associated approaches with Design and Interaction Design perspectives, where "users and staff become co-designers" and "users become conscious and active participants in service delivery processes" (Wetter-Edman et al., 2014, p. 15). A systemic process is highlighted by the interest in understanding and contextualizing interactions within user systems (Sangiorgi, 2009).

4.4.2.5 Outcomes:

Data analysis enabled the identification of service design outcomes which can be positioned at different levels of service ecosystems (Chandler & Vargo, 2011). Service ecosystems are defined as systems of "resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange" (Lusch & Vargo, 2014, p.

161). Service ecosystem levels are defined as contexts where new forms of value co-creation can be enabled (Chandler & Vargo, 2011; Lusch & Vargo, 2014), in which service design presents a key role in creating new resources and infrastructures that support new forms of value co-creation (Wetter-Edman et al., 2018; Kurtmollaiev et al., 2018). In this sense, service design outcomes can be categorized as being positioned at the micro, meso and macro levels of a service ecosystem (Chandler & Vargo, 2011), which is illustrated in Figure 5.

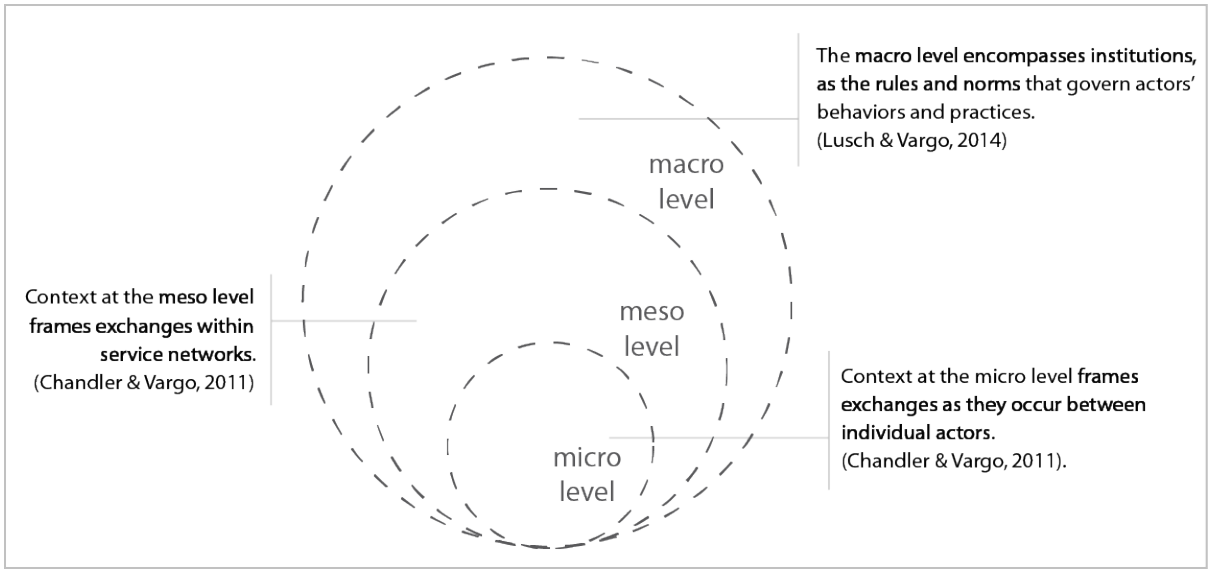


Figure 5 - Service ecosystem model
Source - From the authors, based on Lusch & Vargo (2014) and Chandler & Vargo, (2011)

The micro level is characterized by interactions between dyads of actors, such as an organization and its customers (Chandler & Vargo, 2011; Mahr et al., 2013). The meso level refers to the value co-creation context within service networks (Chandler & Vargo, 2011; Akaka, Vargo & Lusch, 2012). Finally, the macro level is characterized by the context of institutions, rules (often tacit and implicit), and common knowledge that connects actors at the micro and meso levels (Lusch & Vargo, 2014; Vargo, Wieland & Akaka, 2015).

The positioning of service design outcomes across service ecosystem levels is not rigid as service design may simultaneously impact distinct service ecosystem levels. Moreover, value co-creation is a dynamic process, which changes according to the context (Edvardsson & Tronvoll, 2013). Nevertheless, the organization of the service design outcomes across the micro, meso and macro levels of service ecosystems (Chandler & Vargo, 2011) was useful to reflect the analyzed literature main foci and facilitate the interpretation of results. In this sense, if the literature under analysis focused more on service design outcomes based on changing

dyadic interactions between users and service providers, as well as more specific organizational service processes, they were categorized at the micro level. On the other hand, if literature described service design outcomes based on many to many interactions or value propositions in the value network, then these outcomes were considered as having a meso focus. Finally, if service design outcomes were identified as connected to institutional change, then this literature was characterized as having an impact on the macro level (Lusch & Vargo, 2014). These service design outcomes are presented in Table 6**.**

At a micro level of service ecosystems, all perspectives are reported to bring knowledge that support changing the service encounter, in terms of new service clues and servicescape (Bitner, 1992), new service interfaces (Secomandi & Snelders, 2011), new brand-related stimuli (Brakus et al., 2009), new service evidences (Shostack, 1982), new user interfaces (Glushko, 2010) and new configurations of people, products and information that support the user experience (Sangiorgi, 2009). Operations management and Information Systems are the perspectives that mostly contribute to designing new service delivery processes, by reducing variability in service operations (Frei, 2006) and using technology to increase service performance (Schmenner, 2004). Moreover, both these areas and Interaction Design show a focus on supporting service design to designing new technology (Hara et al., 2009) to improve service operations (Roth & Menor, 2003) and to innovate service interactions (Zimmerman et al., 2011). A Marketing perspective also contributes to creating new service clues that integrate the service encounter (Berry et al., 2002).

At a meso level of service ecosystems, Operations management and Information Systems perspectives are reported to support service design to conceptualize new service delivery processes within supply chains (Sampson, 2012) and leverage technology to enable new interactions that support service network change (Davis et al., 2011; Von Ahn and Dabbish, 2008). Moreover, a Design perspective brings a social innovation orientation to service design (Jégou & Manzini, 2008), through the creation of service platforms that support new value co-creation interactions between actors, strengthening novel social and economic networks (Baek et al., 2015).

Table 6 - Service design multidisciplinary outcomes

		Definitions	Service Research	Design	Marketing	Operations Management	Information Systems	Interaction Design
micro level	service encounter change	Changes in the service encounter. e.g.: new interfaces (Secomandi and Snelders, 2011); new service delivery channels – e.g. mobile channel. (Kleijnen, de Ruyter and Wetzels, 2007)	New service clues and servicescape (Bitner, 1992)	New service interfaces (Secomandi and Snelders, 2011)	New brand related stimuli (Brakus *et al.,* 2009)	New service evidences (Shostack, 1982)	New user interfaces (Glushko, 2010)	New configurations of people, products and information (Sangiorgi, 2009)
	service delivery process change	New service delivery processes and operations that structure and support value co-creation (Sampson, 2012)	Designing new forms of value co-creation (Patrício *et al.*, 2011)	Designing new customer journeys (Steen *et al.*, 2011)	Designing new employees roles (Parish *et al.*, 2008)	Reducing variability in service operations (Frei, 2006)	Using technology to increase service performance (Schmenner, 2004)	Designing new service interactions (Zimmerman et al., 2011)
	technological change	New technology created, or used, to improve service delivery process, the customer experience or the service design process. e.g.: personalization of technology (Lee, 2013), use of new CAD systems to improve Service Design process. (Hara, Arai and Shimomura, 2009)	Studies of the impact of technologies on service (Gallouj and Savona, 2009)	-	Assessment of value creation in mobile service delivery (Kleijnen *et al.*, 2007)	Using technology to improve service delivery processes efficiency (Roth and Menor, 2003)	Designing web-based services to support new forms of value co-creation with users (Davis *et al.*, 2011)	Using technology to support new forms of user interactions (Zimmer-man *et al.*, 2011)
meso level	value proposition change	New service concepts and strategies that support new value propositions (Frow *et al.*, 2014), e.g.: new electricity service concept (Cipolla, Melo and Manzini, 2015).	Design of new service offerings (Patrício *et al.*, 2011)	Design of new service models based on social innovation (Jégou and Manzini, 2008)	Conceptualiz-ing new forms of value co-creation with customers (Mahr *et al.*, 2013)	Design of new service delivery systems (Roth and Menor, 2003)	Using technology to support new service models (Chesbrough and Spohrer, 2006)	Design of new interactional strategies between users and robots (Lee *et al.*, 2010)
	service network change	Changes in the service network (Akaka, Vargo and Lusch, 2012), which involve new forms to promote multi-actors' service that extend the dyad organiza-tion-customer. (Vargo and Lusch, 2008).	Conceptual-ization of new value networks (Akaka *et al.,* 2012)	Design of service platforms that strengthen novel social and economic networks (Baek *et al.*, 2015)	Innovation of complex healthy food experiences involving many stakeholders (Mahr *et al.*, 2013)	Design of new supply chains (Sampson, 2012)	Creating networked peer-to-peer collabora-tion through Internet mediated tools (IfM and IBM, 2007)	Networked individuals accomplishing work online through open-source software-de-velopment projects (von Ahn and Dabbish, 2008)
macro level	institutional change	New ways of thinking and doing (Manzini, 2009) and changes in the shared institutional logics that permeate service exchanges. (Vargo and Lusch, 2011). Changes at this level ask for the engagement of a wide set of actors, taking time to be achieved (Lusch and Vargo, 2014).	Questioning existing systems of norms and reconfiguring novel ones based on new practices and beliefs (Koske-la-Huotari *et al.*, 2016).	Envisioning new services ecosystems that support more sustainable lifestyles (Manzini, 2009)	-	-	-	-

At a macro level of service ecosystems, a Design perspective contributes to enabling institutional change, by envisioning new service ecosystems that support more sustainable lifestyles and consumption habits (e.g. distributed power generation systems, programs of urban and regional development) (Manzini, 2009), as well as new service concepts that change citizens' practices and routines (Cipolla, Melo, & Manzini, 2015; Manzini & Staszowski,

2013). On the other hand, a Service Research stream offers expertise that supports service design to understand and enable institutional change, through the questioning of existing socially constructed systems of norms, values and definitions, as well as by reconfiguring novel service ecosystems based on new practices and beliefs (Vargo et al., 2015; Koskela-Huotari et al., 2016).

4.5 Discussion of Study 1

After identifying, characterizing and systematizing the core multidisciplinary perspectives on service design in terms of goals, objects, approaches and outcomes (Kaptelinin & Nardi, 2012), this subsection provides an integrative examination of the research and managerial implications that these multiple contributions bring to service design.

4.5.1 Research implications

Study 1 builds a multidisciplinary perspective to service design sustained by the systematization of multiple contributions that Service Research, Design, Marketing, Operations, Information Systems and Interaction Design bring to this approach.

The study results show the richness of contributions that multiple perspectives can bring to service design, making service design a multidisciplinary field able to get a broad and holistic understanding of service related challenges. These multiple areas also provide complementary perspectives, which taken together support the foundations for a holistic service design approach that could not be achieved by each perspective in isolation. The systematization of these multiple perspectives enhances the dialogue and shared ground among service designers coming from different backgrounds, elucidating the connections between the various approaches and concepts of their communities of practice.

Overall, a Service Research perspective informs service designers with the conceptual frameworks to understand, analyze and design new forms of value co-creation within service systems (Edvardsson & Tronvoll, 2013). Complementary to this perspective, a Design view brings tools and methods (Miettinen & Koivisto, 2009) to understand, envision and generate new forms of value co-creation within socio-material configurations (Kimbell, 2011). For that, designers contribute to creating service interfaces (Secomandi & Snelders, 2011) and to

facilitating co-design processes (Steen et al., 2011) that concretize and sustain the interactions between actors in service systems (Wetter-Edman et al*.,* 2014).

A Marketing perspective, on the other hand, brings an extensive knowledge on understanding and designing the customer experience (Zomerdijk & Voss, 2010). This area's perspective supports service designers to conceptualize customer-centric service systems (Mahr et al., 2013), for instance, by planning the tangible and intangible service elements that increase service quality (Bitner *et al.,* 2008). An Operations view to service design supports to build the customer experience, by creating operational strategies (Roth & Menor, 2003), planning and controlling service operations (Shostack, 1984) and designing the entire service delivery system, which sustain the quality of the service encounter (Sampson, 2012). In parallel, an Information Systems view contributes to designing the technology that supports these service delivery systems to run (Glushko & Nomorosa, 2013). By bringing a technology-perspective, this area increasing the service delivery performance (Schmenner, 2004), as well as creating new user interfaces (Glushko, 2010) and designing service monitoring systems to evaluate the customer satisfaction (Glushko & Nomorosa, 2013).

Nonetheless, an Interaction Design perspective contributes to understanding and designing service interactions that support the user experience (Zimmerman et al., 2011). This area's contributions range from creating approaches that facilitate co-design activities (Sanders & Stappers, 2008), to the visualization and interpretation of user journeys within service systems (Sangiorgi, 2009).

4.5.2 Managerial implications

The identification and characterization of the goals, objects and approaches that service design multidisciplinary perspectives can deal with during service design projects demonstrate the diversity of complementary contributions this approach can bring to service innovation. Understanding these perspectives can help to articulate which kind of contribution is useful along the service innovation process (Gustafsson et al., 2016), in order to coordinate resources to create new service. For instance, if the goal is designing for supporting service with improved service operations, it may be interesting to integrate knowledge from capacity and customer variability (Frei, 2006), with an understanding of how to articulate resources along the customer journey to enhance customer experience (Truong, Hayes, & Abowd, 2006), from

Operations and Interaction Design areas, respectively. These perspectives can also be complemented by designing the technology that will support the service delivery system (Glushko, 2010), with an Information Systems point of view.

This study brings a valuable contribution to organizations which are interested in enabling diverse forms of innovation, by describing how a service design multidisciplinary approach can have a wide impact on service innovation, reflected in: new service interfaces (Secomandi & Snelder, 2011), technological innovation (Zimmerman *et al.,* 2011), new value propositions, new service networks (Patrício *et al.,* 2018b), social innovation (Baek *et al.,* 2015), public-sector innovation (Manzini & Staszowski, 2013) and institutional innovation (Koskela-Huotari et al., 2016). Likewise, Study 1 identifies approaches, such as systemic and participatory design (Kimbell, 2011), Experience design (Berry et al., 2002) and design thinking (Dorst, 2011), which can be used by teams to coordinate the integration of resources during service design projects.

This characterization and systematization supports a better understanding of service design as an innovation practice, which can incorporate multidisciplinary perspectives to enable new forms of value co-creation (Lusch & Nambisan, 2015) at different levels of service ecosystems (Chandler & Vargo, 2011). In this sense, this study clarifies which multiple contributions Service and Design researchers and practitioners can integrate to tackle complementary levels of complexity of service projects.

Finally, this chapter presents research results to support the development of a common ground that enables service designers from different backgrounds to better communicate and understand each other when collaborating (Anderl et al., 2009), which boosts the involvement of multidisciplinary teams (D'souza, 2016) during service design and innovation projects (Ostrom et al., 2015). Therefore, this comprehensive discussion contributes to paving the way to advance service design as a multidisciplinary field better connected to service innovation (Gustafsson et al., 2016b; Ostrom et al., 2015; Patrício et al*.,* 2018).

4.6 Conclusions of Study 1

Study 1 supports the understanding of service design as a multidisciplinary activity able to foster service innovation, by bringing together complementary contributions. However, in spite

of the effort to systematize multidisciplinary contributions to service design, this study has limitations. Firstly, the research process was expert-based, which means that a sample of service design experts was selected, influencing the selection of suggested literature and, consequently, the results. As the service design community grows, future research could accompany its multidisciplinary evolution and its new efforts towards supporting service innovation.

Secondly, the research process concentrated on collecting multidisciplinary contributions from the point of view of past service design literature. Therefore, further research could focus on understanding how multidisciplinarity is dealt in the service design research and practice communities, as well as how service design enables service innovation at different levels of service ecosystems. This could also be complemented by studies that investigate other areas connected to service design which were not considered in this study.

Finally, the results also indicate emerging research areas that are not yet shared by all perspectives. One of these emerging research topics that seems especially important is the connection between service design and service ecosystem. Currently, this research area is mainly supported by Design (Burns et al., 2006; Sangiorgi, 2011) and Service Research (Vargo et al., 2015; Koskela-Huotari et al., 2016). From a Design perspective, service design brings a transformational approach (Burns et al., 2006; Sangiorgi, 2011), focused on enabling society-driven innovation, by addressing social challenges and creating solutions that support more sustainable service ecosystems (Baek et al., 2015). In this sense, service design can be used not just as an approach to innovate dyadic relations between customers and service providers, but a process for radical change through the envisioning and design of new service systems (Burns et al., 2006; Manzini, 2009). More recently, a Design perspective has also been developed to support the connection between service design and institutions, claiming that changes at the micro level are critical to catalyze institutional change at the macro level of service ecosystems (Wetter-Edman et al., 2018). Therefore, in terms of social innovation outcomes it is possible to notice that the distinction between meso and macro levels of service ecosystems is getting increasingly blurred, since the efforts on fostering socially innovative service networks (Baek et al., 2015) and stimulating institutional change (Cipolla et al., 2015) are inter-related.

From a Service Research perspective, the emerging concern about service ecosystems focuses on social structures (Edvardsson & Tronvoll, 2013) and on breaking down existing institutional

arrangements, reconfiguring new service ecosystems based on novel practices and beliefs (Koskela-Huotari et al., 2016). Public policies can also consolidate institutional change and shape the macro level of service ecosystem, as highlighted by Trischler and Charles (2019), since they coordinate the collective, multi-actor and systemic phenomenon of value co-creation between actors. Therefore, understanding users and their value co-creation processes are key to public policy design, in order to identify the most suitable configuration of resources to integrate and support emergent solutions within service ecosystems (Trischler & Charles, 2019). Building on this emerging area, further research is needed to explore the connections between service design and service ecosystems, by bringing supportive knowledge from other research perspectives beyond Service Research and Design.

The next Chapter 5 presents the Study 2, which investigated shared and complementary research areas among the core multidisciplinary perspectives on service design.

5 STUDY 2 – INTEGRATING MULTIDISCIPLINARY CONTRIBUTIONS TO SERVICE DESIGN

This chapter presents the development and the results of Study 2, which integrates and builds a shared ground to support the evolution of service design as a multidisciplinary field and approach. This study developed a qualitative research (Gioia, Corley, & Hamilton, 2012) comprising focus groups (Krueger & Casey, 2015) with 6 leading service design and innovation research centers, representing the identified perspectives on service design during Study 1. By investigating representatives from the service design academic community from multidisciplinary perspectives, this study indicates shared research areas to converge concepts and approaches, which can support mutual understanding and collaboration among service design researchers and practitioners coming from different fields.

While Study 1 focused on examining the core multidisciplinary perspectives on service design through an expert-based literature review (Joly et al., 2019), which covered references already published connected to service design research, it was also important to investigate the current work of the service design academic community, which represented that identified perspectives. Thus, Study 2 concentrated on understanding which contributions have been developed by the multidisciplinary service design academic community, therefore, identifying and describing a shared ground to integrate multidisciplinary perspectives on service design.

This chapter is organized by the following subsections. In the subsection 5.1 Introduction, the research challenge and research question for this study are indicated. Subsection 5.2 presents some of the efforts of the service design academic community in bringing together multidisciplinary contributions to service design. The subsection 5.3 Methodology presents the research design, data collection and data analysis of Study 2. These subsections are followed by the 5.4 Results, 5.5 Discussion and 5.6 Conclusions, specific for this study.

5.1 Introduction of Study 2

As previously presented in Chapter 4, Study 1 characterized the core multidisciplinary perspectives on service design and their related contributions, namely from Service Research, Design, Interaction Design, Marketing, Operations management and Information Systems

(Joly et al., 2019). Service Research and Design offer the building blocks of service design (Patrício et al., 2018; Secomandi & Snelders, 2018) by, respectively, providing the focus of this approach with concepts such as the definition of service (Vargo & Lusch, 2008), and by contributing with the mindset, the processes and the tools that bring the iterative way to create new services (Kimbell, 2011). Interaction Design, instead, contributes to designing and structuring the resources that support service interactions and the user experience (Holmlid 2007), while Marketing addresses the design of service concepts and multi-interface service systems for the customer experience (Bitner et al., 2008). Besides, Operations management contributes to designing service delivery processes (Sampson 2012), while Information Systems also addresses the technology that supports person-to-person, person-to-machine and machine-to-machine interactions (Glushko, 2010).

In this sense, Study 1 showed that different multidisciplinary perspectives have been approaching service design, resulting in disparate concepts and approaches. This lack of integration hinders the dialogue and shared ground among service designers from distinct backgrounds, risking to researchers and practitioners building knowledge in silos (Anderl et al., 2009), and eventually hampering the potential of service design to foster service innovation (Ostrom et al., 2015). As such, although the core perspectives and their complementary contributions to service design have been identified and systematized during Study 1, there is still a need to integrate them, by identifying shared research areas that can work as bridges to bring them together.

Therefore, in Study 2, shared research foci among the core multidisciplinary perspectives on service design are identified and described, based on the investigation with research centers which represented their academic communities. Likewise, specific research foci among those analyzed multidisciplinary perspectives are also reported as emerged from data analysis, indicated uniquely by some of the focus groups. In this sense, Study 2 exposes shared and specific research foci to service design approached by multidisciplinary perspectives, contributing to build a shared ground to support the evolution of service design as a multidisciplinary field and approach. As value, this chapter integrates and describes common research spaces which service designers from different fields can use to support their dialogue, collaboration and theory building towards advancing service design as a multidisciplinary field and approach (Gustafsson *et al.*, 2016b).

5.2 Service design and the need for integrating its multidisciplinary contributions

Service design, as presented in the introduction chapter of this thesis, is defined as a human-centered, collaborative, and holistic approach focused on improving existing services or creating new ones (Blomkvist, Holmlid and Segelström, 2011; Meroni & Sangiorgi, 2011). Service design has been approached by multidisciplinary perspectives, namely Service Research, Design, Marketing, Operations management, Information Systems and Interaction Design (Joly et al., 2019), which indicates the need for further integration of their multiple contributions to this field and approach, in order to avoid redundancies and leverage synergies (Patrício et al., 2018; Joly et al., 2019).

Recently, there has been efforts in the service design research community to investigate the multidisciplinary contributions to this field. Service design has been discussed as a practice which integrates and adapts concepts and tools from various areas, such as from Service Marketing and design-based disciplines (e.g., Product design, Communication design, etc.) (Sangiorgi & Prendiville, 2017). Likewise, the contributions of designers to service innovation have been investigated in multidisciplinary contexts (Yu & Sangiorgi, 2018). Besides, the need to integrate multiple perspectives and methods to reinforce and expand the foundations of service design and innovation has been pointed out (Patrício et al., 2018).

Thus, there is an interest of the service design academic community in bringing together multidisciplinary perspectives and their contributions to service design. However, studies approaching specifically the integration of these multidisciplinary perspectives, such as by identifying common areas of interest among them, are still lacking. This pointed to the need to conduct Study 2, with a view to identifying shared research areas that service designers from multidisciplinary perspectives could focus on when collaborating.

In order to instrumentally support the analysis of this integration, the concept of service ecosystem (Lusch & Vargo, 2014) was employed to enable a structured view of the shared research areas among the core multidisciplinary perspectives on service design. As presented in the Results section of Study 1, service ecosystem was a useful concept to categorize the service design outcomes of the service design multidisciplinary activity (Joly et al., 2019), across its micro, meso and macro levels (Chandler & Vargo, 2011). As previously described in that first study, the micro level refers to the context of individual actors (such as people and

organizations) and their dyadic interactions, which support value co-creation in service (such as between a service provider and its customers) (Lusch & Vargo, 2014). The meso level, instead, refers to the context of service networks and their complex interactions among multiple actors (Akaka et al., 2012). Finally, the macro level consists of the context of the institutions that govern the service ecosystems (Vargo et al., 2015), as the rules and norms (Scott, 2001) that drive actors' behaviors and actions. As such, in Study 2, these service ecosystem levels are again employed to organize the contexts at which research thematics shared by the multidisciplinary service design academic community are positioned.

5.3 Methodology of Study 2

The aims of Study 2 were to integrate and describe common research areas to support a shared ground for the evolution of service design as a multidisciplinary field and approach. Therefore, this study addressed the research question of "How can we integrate multidisciplinary contributions to service design in order to build a shared ground for this field and approach?"

As such, this study was designed as a qualitative research (Gioia et al., 2012), comprising focus groups (Krueger & Casey, 2015) with participants from 6 leading international service design and innovation research centers, in order to investigate shared research areas developed by the multidisciplinary service design academic community. This methodological approach was selected in order to develop a deep and rich description (Gioia et al., 2012) of how this academic community has been addressing service design from multidisciplinary views. More specifically, the purpose of the focus groups was to understand from the academic centers which were their research interests and multidisciplinary contributions employed during service design research and practice, in order to inductively identify (Gioia et al., 2012) shared research foci which could support integrating service design as a multidisciplinary field and approach.

5.3.1 Sample design

A sample of 6 service design and innovation research centers was selected to participate in the focus groups, because of their leading role in representing the core areas that contribute to service design, previously identified during Study 1: Service Research, Design, Interaction Design, Marketing, Operations management and Information Systems.

The criterium for selecting these academic centers was that they should have international recognition in their areas, and have an active presence in the service design field, namely through publications, research projects and research-level education. This strategy was used in order to guarantee that the selected academic centers developed research with impact in their multidisciplinary areas and, therefore, that they could bring a relevant perspective on service design during the focus groups.

The leaders of the selected service design and innovation academic centers were contacted through e-mail and invited to conduct the focus groups in their research centers. As such, those research leaders who accepted in participating, were solicited to invite 6 to 10 service design and innovation senior researchers from their research networks. The intention of this request was that the selection of the focus groups' participants was done by the research center leaders, therefore, avoiding a selection bias by the research team of this study, inherent of the personal recruitment (Krueger & Casey, 2015). Besides, in order to guarantee a good sample of participants, the research center leaders were asked to invite senior researchers connected to their fields' perspectives. This sampling strategy resulted in the participation of a total of 40 researchers, characterized as having a PhD or being PhD candidates or involved in research for at least 3 years in the core multidisciplinary perspectives on service design. The list of the research centers which participated in the focus groups can be seen in Appendix IV, while the list of their participants can be seen in Appendix V. The profile of each focus group is presented in Table 7. Based on this profile, focus groups will be referred herein by their numbers and main research focus.

Table 7 - Focus groups' profile

Focus group	Number of participants	Main research focus	Country
Service design Center 1 (SD1)	9 participants	Information Systems	Germany
Service design Center 2 (SD2)	6 participants	Operations Management	Portugal
Service design Center 3 (SD3)	9 participants	Interaction Design	Sweden
Service design Center 4 (SD4)	4 participants	Design	Italy
Service design Center 5 (SD5)	8 participants	Marketing	Netherlands
Service design Center 6 (SD6)	4 participants	Service Research	Sweden

5.3.2 Data collection

In order to stimulate the participating researchers to engage in a discussion about service design multidisciplinary contributions during each focus group, a semi-structured interview protocol was created, which covered two main topics: (1) the characteristics of service design activity from multidisciplinary lenses, and (2) how the researchers saw the connections between service design and service innovation through their multidisciplinary perspectives. Besides, in order to feed this discussion, a presentation with the main results from Study 1 was shown, which included: (a) a description of the 6 core multidisciplinary perspectives on service design and the methodology followed to identify them; (b) an explanation about the service design activity model (Joly et al., 2019), used to analyze the multidisciplinary perspectives and their contributions to service design; (c) the characterization of service design multidisciplinary contributions using this model, and (d) the categorization of service design outcomes across service ecosystem levels, defined as intended or emergent changes of the service design activity (Joly et al., 2019).

The focus groups lasted about two hours each and were organized in terms of timing as: 10 minutes for individual presentations of the focus groups' facilitator and participants, and for the signing of the interviews' informed consents; 20 minutes for the presentation of the Study 1 results; 40 minutes to discuss about the characteristics of the service design activity from

their fields' perspectives; 40 minutes to discuss about how they saw the connections between service design and service innovation; 10 minutes for closing questions and comments. The duration of each focus group can be seen in Appendix V. Focus groups were audio-recorded and transcribed, in order to facilitate data analysis as detailed in the next subsection.

5.3.3 Data analysis

This study followed a qualitative analytical strategy (Gioia et al., 2012), based on data coding with support of the NVivo software. Firstly, the focus groups' transcriptions were uploaded to the data analysis software. Secondly, an in-depth reading of the uploaded texts was developed in parallel to an iterative process of data coding.

In the 1st-order analysis (Gioia et al., 2012), segments of the text were coded closely to their analytical definition. As data analysis progressed, the research team started seeking similarities and differences among the many codes, which resulted in their aggregation into more meaningful categories.

In the 2nd-order analysis (Gioia et al., 2012), supportive theory collected during Study 1 was brought to this examination, in order to identify whether the emerging categories suggested concepts that described common research areas among the analyzed multidisciplinary perspectives on service design. For instance, an actor-centered approach was identified as a shared research focus discussed by all the focus groups, being manifested under different terms (e.g., customer-centered, user-centered focus, etc.) which service designers can use when designing new services (see Table 8, in the subsection 5.4 Results of Study 2).

This process continued until more meaningful and stable categories were created, organizing information systematically for each focus group. As a result from this coding process, shared research foci and specific research foci among the analyzed perspectives on service design were identified, as presented in the Results section of this study. These identified shared and specific research areas were organized across the service ecosystem levels (Chandler & Vargo, 2011), in order to support data analysis, by facilitating the identification of patterns and, ultimately, the integration of the analyzed multidisciplinary perspectives on service design.

5.4 Results of Study 2

This subsection presents the results of Study 2, namely the shared research foci, complemented by specific research foci, among the core multidisciplinary perspectives on service design characterized in Study 1. Shared research focus is defined as a research topic which was common to all the focus groups, and represented a point of intersection which the analyzed multidisciplinary perspectives on service design could focus on to integrate their efforts when collaborating in projects or developing theory in service design. Specific research focus, instead, is the research subject brought by particular focus groups, which represented their distinct, but complementary perspectives on service design.

These shared and specific research foci were organized across the micro, meso and macro levels of service ecosystems (Chandler & Vargo, 2011), in order to systematize the presentation of results. This systematization enabled identifying which research areas service design multidisciplinary perspectives have in common, as well as which research topics still need further development in order to support a shared ground to this field.

Tables 8, 9 and 10 indicate the results from this data analysis and are presented in the following subsections. These Tables show in italic the different themes collectively discussed during each focus group. Themes positioned at the micro level (Table 8) refer to shared and specific research foci related to actors and the means which support their dyadic interactions (Lusch & Vargo, 2014). The shared and specific research foci positioned at the meso level (Table 9) are concerned with fostering service networks and their many-to-many interactions (Akaka et al., 2012). Finally, the specific research focus categorized at the macro level (Table 10) refers to service design activities developed with a view to changing institutions, which guide actors' behaviors and actions in service ecosystems (Vargo et al., 2015). Looking at the Tables 8, 9 and 10, it is possible to identify shared research foci by all the focus groups (with crosses marking all the focus groups) and specific research foci discussed by some of the focus groups (with crosses marking only some of the focus groups). As such, the "x" in the Tables signalizes which research topics were discussed by each focus group. These results are detailed as follows.

5.4.1 Service design research focus at the micro level

As shown in Table 8, results reveal that the focus groups have indicated research topics significantly more focused on the micro level of service ecosystem, than on the other levels. As such, it is at the micro level where there is more elaboration in terms of common research interests shared by the analyzed perspectives on service design.

Data analysis reveals that (a) the user and customer focus, (b) the service delivery process and (c) the service interface are shared research foci at the micro level among the multidisciplinary perspectives on service design under investigation. The next subsections describe these results in more detail.

5.4.1.1 User and customer focus:

Results show that all focus groups highlighted the importance of integrating a user and a customer focus in service design projects. SD3-Interaction Design and SD4-Design indicated that their perspectives contribute to a user-centered focus to service design, by "*providing the mindset, approaches and tools which support learning from users and their needs" (Interviewee16, SD3-Interaction Design).*

On the other hand, a customer-centered perspective was described as focusing on *learning from customers* (SD5-Marketing*)* and *understanding customers' needs and cultures* (SD6-Service Research). SD5-Marketing highlighted an interest in researching about *customer loyalty*, while SD6-Service Research reinforced that *"service design can stimulate new behaviors leading to changes in employees' and customers' roles"* (Interviewee32, SD6-Service Research). This was complemented by an operational interest when designing new customer roles, which was characterized by SD2-Operations as a way to support innovation in the service delivery processes:

Table 8 - Shared and specific research foci at the micro level

MICRO LEVEL						
	SD Center 1 (Information Systems)	**SD Center 2 (Operations management)**	**SD Center 3 (Interaction Design)**	**SD Center 4 (Design)**	**SD Center 5 (Marketing)**	**SD Center 6 (Service research)**
ACTOR-CENTERED APPROACH						
• **User focus**	X	X	X	X	X	X
○ *Providing the mindset, approaches and tools to learn about users' needs*			X	X		
○ *Interpreting and translating users' needs into ideas*			X	X	X	
○ *Employing users' experiences and capacities as resources*				X	X	X
○ *Using technology to support users*	X	X				
○ *Focusing on the usage context*	X					
○ *Focusing on users in the service delivery processes*		X				
• **Customer focus**	X	X	X	X	X	X
○ *Understanding customer needs and cultures*			X	X	X	X
○ *Designing new customer roles*	X	X	X			X
• **Employee focus**		X				X
○ *Learning from employees as sources of knowledge for innovating service*		X				X
○ *Creating new roles for employees*		X				X
• **Provider focus**	X	X				
○ *Guaranteeing the requirements of service providers*	X	X				
SERVICE DELIVERY PROCESS						
• **Designing and improving service delivery processes**	X	X	X	X	X	X
○ *Designing the means to support service delivery processes' implementation*	X	X	X	X		
○ *Using technology to enhance the efficiency of service delivery processes*	X	X				
○ *Studying what happens during service usage and after service usage*					X	X
○ *Focusing on implementation, realization, diffusion, scaling and measurement*	X	X			X	X
• **Improving service quality**	X	X			X	X
○ *Enhance efficiency and efficacy to guarantee quality standard*	X	X				
○ *Improve customer experience*					X	X
SERVICE INTERFACE						
• **Designing and guiding dyadic service interactions**	X	X	X	X	X	X
○ *Designing service interfaces*	X		X	X	X	
○ *Using technology to support interactions*	X	X	X			
○ *Developing theory which grounds the design of servicescapes and service clues*				X	X	X

> *We can use the example of IKEA, where new roles were designed for customers to innovate the service delivery process, in which they can choose to be in charge of collecting the furniture they have bought in the stores. (Interviewee2, SD2-Operations).*

However, data analysis indicated that some of the focus groups have also discussed specific research foci, namely an employee and provider focus on service design. An employee-centered focus was described as "*learning from employees as sources of knowledge*" (Interviewee4, SD2-Operations) and "*creating new roles for employees*" (Interviewee30, SD6-Service Research), integrating Operations and Service Research perspectives. A provider-centered focus, instead, was argued by SD1-Information Systems and SD2-Operations focus groups, as a way to guarantee that requirements of service providers can be also fulfilled when designing new services. As such, these focus groups reported Information Systems and Operations contributions to service design, respectively, by "*developing and integrating technology to enhance service usage*" *(Interviewee8, SD1-Information Systems*) and "*setting up processes and activities to maintain services to work efficiently"* (Interviewee3, SD2-Operations).

Therefore, results show that the analyzed multidisciplinary perspectives can be integrated through the shared research focus on an actor-centered approach. This shared research concern supports bringing together multidisciplinary contributions in order to understand and design solutions for actors, according to the different roles they can play in the service delivery system: as users, customers, employees or providers.

5.4.1.2 Service delivery process:

Service delivery process has also been reported as a shared research focus among all the focus groups, in terms of *designing and improving service delivery processes*. Service delivery processes were classified at the micro level of service ecosystems, because they were discussed by the focus groups especially in the context of supporting new service encounters and dyadic interactions between service providers and customers.

Service delivery processes were referred to by the service design and innovation researchers as "*user journeys*" (Interviewee23, SD3-Interaction Design), "*service operations*" (Interviewee2, SD2-Operations), "*back and front-stage processes which support the service encounter*"

(Interviewee33, SD5-Marketing) and "*processes which support value co-creation between customers and an organization*" (Interviewee 29, SD6-Service Research).

SD4-Design and SD3-Interaction Design focus groups discussed that designers can create the means, such as "*interfaces and user journeys*" (Interviewee25, SD4-Design) to inform the implementation of new service delivery processes. Interviewees highlighted, for instance, the importance of prototyping to design simulations of the interactions which will sustain the user journeys being designed:

> *We can use, for instance, prototyping with Lego to simulate the human-to-human interactions along the user journey. That is like collaborative prototyping to play with different scenarios, which helps us to inform the implementation of new service processes (Interviewee22, SD3-Interaction Design)*

SD1-Information Systems and SD2-Operations, instead, reported the concern of their fields' perspectives to maintain the *efficiency and efficacy of service operations*, such as by using technology to support and improve service delivery processes. In this context, SD2-Operations researchers, pointed out that "the *service delivery process is the main object of service design from an Operations point of view"* (Interviewees 2 and 4, SD2-Operations).

Moreover, SD5-Marketing and SD6-Service focus groups argued that "*service usage and customer experience*" (Interviewee33, SD5-Marketing), as well as "*how to implement, measure and scale operations"* (Interviewee 32, SD6-Service Research), are significant design aspects considered by their fields when creating new service delivery processes.

Besides, as Table 8 indicates, the shared research focus on service delivery processes has been indicated as complemented by the specific research concern on *improving service quality*, shared by Information Systems, Operations, Marketing and Service Research focus groups. While SD2-Operations and SD1-Information Systems are aligned with the need to "*take care of the efficiency and efficacy of service delivery processes to guarantee the quality standard of services*" (Interviewee3, SD2-Operations), this is supplemented by Marketing and Service Research perspectives, concerned with "*enhancing the customer experience as a way to increase the service quality*" (Interviewee34, SD5-Marketing).

5.4.1.3 Service interface:

Service interface was indicated as a shared research focus among all focus groups, by describing the service designers' concern with *designing and guiding new service dyadic interactions*. Service interface was characterized as "*the set of resources and spaces*" (Interviewee23, SD3-Interaction Design) which "*support the service encounter and the customer experience"* (Interviewee36, SD5-Marketing).

SD4-Design and SD3-Interaction Design focus groups discussed that designers not only *create new service interfaces*, but also *structure and guide people's activities* throughout them. Interviewee 23 illustrates the perspective from an Interaction Design point of view:

> *So, what we do is to expose some things and hide other things to people along their service journeys. The goal is not only enabling interactions, but also driving interactions and driving value co-creation (...) So, not only interactions between people and technology but also between people and people (Interviewee23, SD3-Interaction Design).*

As seen in Table 8, focus groups also discussed the *use of technology to support interactions* (SD1; SD2; SD3). In this context, SD1-Information Systems researchers defined service interface as being part of technology, arguing for a technological-perspective to service design: *"I think it is always technology (...) if we take service interface we can sub-classify it in technology (...) So, we would talk about a technology perspective, which describes how new technology influences innovating services." (Interviewee7, SD1-Information Systems).*

Finally, SD5-Marketing and SD6-Service focus groups discussed that their fields tend to focus on service interfaces, in terms *service clues* and *servicescapes*. Literature defines service clues as the tangible (e.g., appearance of the service desk) and intangible (e.g., receptionist behavior) aspects which influence a customer's overall perception of an experience (Berry, Wall and Carbone, 2006). Servicescape, instead, refers to the physical space where service takes place (Bitner, 1992). This perspective has been reinforced during SD4-Design focus group, which related the contributions brought by Architecture to the study of servicescapes: "*From a design point of view, the notion of servicescape is very connected to Architecture, which brings knowledge on how to design and compose spaces" (Interviewee25, SD4-Design).*

5.4.2 Service design research focus at the meso level

Results show the shared research focus on service networks at the meso level, which is still not very well developed when compared to the micro level, but already presents a common ground between the analyzed perspectives on service design, as presented in Table 9. This shared concern was discussed by the focus groups under the topic of *designing for new constellations of actors*, defined as "*fostering new connections between people, organizations and other entities within a service network*" (Interviewee32, SD6-Service Research).

As Table 9 shows, SD1-Information Systems, SD4-Design, SD5-Marketing and SD6-Service Research focus groups commonly discussed the research topic of *designing of new value propositions inside service networks*. An interviewee highlighted that, under an Information Systems perspective, service design not only contributes to "*designing the technology which will support service"*, but also to "*creating new service concepts which will engage and sustain the network of actors around the use of this technology"* (Interviewee10, SD1-Information Systems). The idea of designing new service concepts to engage actors in service networks was complemented by SD4-Design, SD5-Marketing and SD6-Service Research focus groups, which indicated the use of service design to create new value propositions and the conditions that support their realization in practice:

> *Service design is about redesigning the systems, making sure that the created value proposition is also backed-up by changes in processes, interfaces and all the infrastructure that will support the value proposition to work in practice, as so to engage actors in the service network to co-create value. (Interviewee 29, SD6-Service Research).*

A technology perspective was also argued by SD1-Information Systems and SD2-Operations focus groups, discussed as a mean to support improving and designing new service delivery processes, especially at the network level: "*I think in this context the focus is much more on being efficient, being reliable, keeping the liability of technology up, understanding what drives operations and how to sustain the connections among multiple stakeholders." (Interviewee8, SD1-Information Systems)*

Table 9 - Shared and specific research foci at the meso level

MESO LEVEL						
	SD Center 1 (Information Systems)	**SD Center 2 (Operations management)**	**SD Center 3 (Interaction Design)**	**SD Center 4 (Design)**	**SD Center 5 (Marketing)**	**SD Center 6 (Service research)**
SERVICE NETWORKS						
• **Designing for new constellations of actors**	**X**	**X**	**X**	**X**	**X**	**X**
○ *Designing new value propositions inside service networks*	**X**			**X**	**X**	**X**
○ *Using technology to support service delivery processes in networks of organizations*	**X**	**X**				
○ *Engaging actors into new service networks*			**X**	**X**		
• ***Designing for social innovation***			**X**	**X**		
○ *Using technology to support social networking services to generate social value*			**X**			
○ *Designing for new social practices involving communities to meet their social needs*				**X**		

Moreover, results show SD3-Interaction Design and SD4-Design focus groups indicated that service design offers approaches and techniques which support *engaging actors into new service networks*: "*Service designers engage people, either by using Participatory design processes or workshops, which involve stakeholders in networks and create a shared decision-making process, in order to activate actors to be part of the solutions being designed"* (Interviewee24, SD3-Interaction Design).

Results also indicated that SD4-Design and SD3-Interaction Design focus groups discussed about the specific research focus on *designing for social innovation* as a recurrent thematic in

the Design field, defined as *"designing for new social practices involving communities that meet social needs"* (Interviewee26, SD4-Design). In this context, the Interaction Design focus group discussed the key role technology plays in social innovation as a mean to create online platforms which engage networks of actors into new forms of interactions towards achieving social benefits: "*See Airbnb or Uber, for instance, they all were social innovation initiatives already running in society, in order to generate social and economic value, which were later institutionalized into new service models with the support of technology*" (Interviewee22, SD3-Interaction Design). Likewise, results show designers bringing knowledge from Anthropology (e.g., Ethnography) to service design, as a way to understand and study users and their relations within their service networks: "*Anthropology has always worked with services since they started, and it brings interesting contributions to our work, as through the use of Ethnography, to understand social innovations and their social structures"* (Interviewee26, SD4-Design). As such, although the research interest in social innovation was not shared by all the focus groups, it reveals a competency area brought by the Design field, which can contribute to advance service design research towards working with social change oriented projects.

5.4.3 Service design research focus at the macro level

Results report no shared research foci among focus groups at the macro level of service ecosystems. A specific research area common to SD4-Design and SD6-Service Research focus groups was the connection between *service design and institutions*, discussed under the topic of *designing for institutional change*, as presented in Table 10. This specific research focus was also discussed during SD3-Interaction Design focus group, by researchers interested in the link between service design and Service-Dominant logic (Interviewees 16, 18, 19, 22 and 24, SD3-Interaction Design). As such, those three focus groups indicated the interest in investigating the connections between service design and institutional change as an emerging research area in service design.

Table 10 - Emerging research area at the macro level

MACRO LEVEL						
	SD Center 1 (Information Systems)	**SD Center 2 (Operations management)**	**SD Center 3 (Interaction Design)**	**SD Center 4 (Design)**	**SD Center 5 (Marketing)**	**SD Center 6 (Service research)**
SERVICE DESIGN AND INSTITUTIONS						
• **Designing conditions for institutional change**			**X**	**X**		**X**
○ *Changing behaviors towards more sustainable practices*				**X**		
○ *Innovating public services to stimulate new behaviors*						**X**
○ *Questioning assumptions and breaking institutions*			**X**			**X**

In this context, the macro level of service ecosystems was defined as the realm which comprises "*the set of assumptions, values, beliefs, rules, that act as organizing principles for actors*" (Interviewee32, SD6-Service Research). Data analysis shows those three focus groups interested in connecting service design research to institutional change, defined as "*the creation of new norms, rules, policies*" (Interviewee19, SD3-Interaction Design). Under this perspective, service design has been reported to foster "*new behaviors, new practices, new beliefs*" (Interviewee25, SD4-Design), consequently, *"transforming the way actors work, relate and behave inside ecosystems*" (Interviewee31, SD6-Service Research).

SD4-Design described that service design can change actors' behaviors towards more sustainable practices, by "*working with local communities, engaging their local actors to understand how their production systems work*" (Interviewee26, SD4-Design), "*creating new service models that support new interactions between local consumers and local producers*" (Interviewee27, SD4-Design) and, ultimately, "*facilitating new services inside these communities*" (Interviewee25, SD4-Design), which generate social and economic benefits, as well as decrease environmental impact (e.g., by producing and consuming locally).

SD6-Service Research, on the other hand, pointed out that *changing the way public services are offered to citizens* can also stimulate changes at the macro level of service ecosystems, by

facilitating or hampering certain behaviors from actors, who ultimately modify their way of working in society (Interviewee*31,* SD6-Service Research).

Finally, service design was argued by SD3-Interaction Design and SD6-Service Research participants as contributing to *questioning assumptions*, as a way to support breaking institutions. As such, service design can support "*an inquiry process*" (Interviewee29, SD6-Service Research), "*bringing to light contradictions between institutional arrangements and users' needs*" (Interviewee19, SD3-Interaction Design) and "*building a consciousness among actors about a need for change*" (Interviewee31, SD6-Service Research). This is supported by approaches and techniques such as "*participatory design practices which integrate different actors' ideas and facilitate mutual learning*" (Interviewee16, SD3-Interaction Design) and "*prototypes which simulate how a service may be implemented and experienced in the future*" (Interviewee18, SD3-Interaction Design).

However, SD3-Interaction Design focus group highlighted that service design can only design the pre-conditions to create new institutions, but not establish new ones by itself. This challenge asks not only for the contributions of other professionals (such as lawyers and public managers), but also the time to validate how these new arrangements will conform in the service ecosystem being improved:

> *Service design cannot per se create new institutions as, for example, new public policies that will change the way citizens work. Other professionals must be brought together, as maybe public managers, lawyers, etc. Service design, as it is now, can be part of proposing new institutions, but then it's up to the more complex system to see where and if they conform, which new routines, new practices, that will stick and slowly start to change the larger ones. (Interviewee16, SD3-Interaction Design)*

Therefore, results report that Service Research and Design are the main perspectives brought together around the emerging research area of designing the conditions for institutional change. While a Service Research perspective contributes to understanding and defining what institutions are and their effects on service ecosystems, a Design perspective brings approaches and tools to support the service design practice to ignite the pre-conditions for institutional change.

5.5 Discussion of Study 2

Study 2 identifies and describes shared research foci and specific research foci among the core multidisciplinary perspectives on service design, therefore integrating a shared ground for the evolution of service design as a multidisciplinary field. As such, Study 2 addresses the research calls for a better integration of multidisciplinary contributions to service design (Sangiorgi & Prendiville, 2017), and the need to bring together multiple perspectives on this field to expand its connections to service innovation (Patrício et al., 2018).

Study 2 complements Study 1 results by indicating common research areas among the core multidisciplinary perspectives on service design (Joly et al., 2019), namely the user and customer focus, the service delivery process, the service interface and the service network. These concepts are central intersection spaces which service design researchers and practitioners can use as basis to integrate their complementary contributions indicated in the first study. Therefore, after identifying and describing these shared research areas, this subsection discusses the contributions and implications of Study 2, presented as follows.

5.5.1 Service design shared ground at the micro level of service ecosystems

As results have presented, shared research areas among the focus groups were mainly reported at the micro level of service ecosystems, namely the actor-centered approach, the service delivery process and the service interface. This outcome indicates that the service design multidisciplinary research addressed by the analyzed academic centers is mostly focused on developing investigations connected to the organizational realm, and its related dyadic interactions between actors. As such, there is a body of concepts that are already shared among those multidisciplinary perspectives on service design, even if employed under different terms and with different design emphasis. The following subsections discuss the implications of those shared research areas, especially in terms of how they can support a shared ground among service design multidisciplinary perspectives at the micro level.

5.5.1.1 Implications of an actor-centered approach

Study 2 shows that an actor-centered approach is already crystalized among the core areas that inform service design, representing a shared concern which integrates both human and provider-centered perspectives. Wetter-Edman et al. (2014) advocate that a human-centered

approach indicates the importance of considering a larger set of actors, who are directly or indirectly involved in the service provision. This is reflected by the study results, which reveal a strong focus on a human-centered approach, defined as "the capacity and methods to investigate and understand people's experiences, interactions and practices as a main source of inspiration for redesigning or imagining new services" (Meroni & Sangiorgi, 2011, p. 203). Besides, results show that a human-centered approach is complemented by the specific research focus of a provider-centered perspective, shared by Information Systems and Operations focus groups. This topic has been extensively explored in Operations research literature, which brings knowledge about the contributions of managing service capacity and creating flexible processes to deal with customer variability, in order to maintain or improve operations' efficiency and efficacy (Frei, 2006; Sampson, 2012).

As such, Study 2 reports the shared research focus on an actor-centered approach, composed by human and provider-centered perspectives, as valuable for service design researchers to understand the different positions actors can assume inside service ecosystems. From a user-centered point of view, service designers can integrate users' needs and design for user experiences (Blomkvist & Segelström, 2014). Through a customer-centered perspective, on the other hand, service designers turn the attention to understanding customers' cultures (Edvardsson & Tronvoll, 2013), as well as to stimulating new customer roles (Bitner et al., 2008). Moreover, bringing attention to an employee-centered perspective, service designers can also work towards creating and changing employees' roles (Zomerdijk & Voss, 2010). In this realm, service design literature from Operations and Service Research perspectives contribute to understand employees' needs in the service delivery system (Bitner et al., 2008; Shostack, 1984), as well as to use employees' knowledge as source for customer experience innovation (Mahr et al., 2013).

Service design practitioners can also benefit from this shared concern by being able to distinguish and integrate multidisciplinary contributions, in order to address and design for the different roles that actors play inside service ecosystems (e.g., users, customers, employees, etc.). For instance, if the goal is to improve the service usage, the focus should be placed on the activities these users will perform. In this sense, focusing on the use cases of service could facilitate designing users' actions and service scaling (Constantine & Lockwood, 2001). Whereas, if the goal is to improve the perception of value by customers, the consumption context should be taken into account, as by understanding the customer's segment and culture,

as well as in which space the transactions will take place (Bitner & Wang, 2014). Finally, this study indicates that it is important, in terms of future research, to recognize and relate these different terms associated with an actor-centered approach, in order to facilitate mutual understanding and collaboration among service designers coming from different fields.

5.5.1.2 Implications of a shared research focus on service delivery processes

Still at the micro level, results indicated the shared research focus on service delivery processes among all the focus groups. Study 2 contributes to service design multidisciplinary research, by describing shared research topics that service design academic centers have been focused on connected to the implementation, scaling, measurement and enhancement of service operations inside organizational systems. This is complemented by the specific research interest in improving service quality discussed during SD1-Information Systems, SD2-Operations, SD5-Marketing and SD6-Service Research focus groups.

Likewise, Study 2 contributes to service design practice by clarifying the shared ground teams can take advantage of, in order to integrate their multidisciplinary perspectives when designing new service delivery processes. For instance, Operations and Interaction Design contributions can be coordinated to design new service operations (Sampson, 2012) and user journeys (Truong, Hayes, & Abowd, 2006) in parallel, in order to analyze capacity and customer variability (Frei, 2006), while guaranteeing the new services will be user-friendly (Blomkvist & Segelström, 2014). Finally, new technology can be designed as a way to improve service delivery processes' efficiency and efficacy from the user's point of view (Zimmerman et al., 2011). All these multidisciplinary contributions brought together around the shared research focus on designing novel service delivery processes boost the potential of service design to enable service innovation (Ostrom et al., 2015; Patrício et al., 2018).

5.5.1.3 Implications of the shared research focus on service interfaces

Study 1 showed that, according to literature from a Design perspective, service interface is the object of service design (Secomandi & Snelders, 2011). This was corroborated by Study 2's results, which identified service interface as a shared research focus among all the focus groups. Service interfaces can be defined as "the sociotechnical resources immediately associated with exchanges between providers and clients" (Secomandi & Snelder, 2011, p. 29), which justifies their categorization at the micro level of service ecosystems.

In this context, Study 2 contributes to service design research by acknowledging and integrating the different concepts associated with service interface (i.e. resources and spaces, service evidence, service clues, servicescape, user interface), what can facilitate and enhance communication within service design multidisciplinary teams (Ostrom et al., 2015). Likewise, this understanding can support service design teams to bridge these different concepts, as well as to better coordinate how each professional can contribute to design the distinct types of resources that compose service interfaces within service ecosystems - e.g. materials, technology, physical spaces, etc.

5.5.2 Service design shared ground at the meso level of service ecosystems

As results show, the service design academic community is also evolving service design towards addressing higher levels of complexity, by focusing on designing for new service networks and their multiple interactions as a shared research focus. In this sense, Study 2 contributes to indicating that the service design academic community is extending the use of service design beyond the creation of new dyadic relations between service providers and consumers, to also focus on designing for new service networks (Akaka et al., 2012). The shared research focus on designing for new constellations of actors is complemented by specific research knowledge especially brought by the Design field about Design for social innovation (Manzini, 2014, 2015). Design for social innovation has been defined as "everything that expert design can do to activate, sustain, and orient processes of social change" (Manzini, 2014, p. 62). From this perspective, new service models can be designed from ideas already being developed in society, in which actors get organized into novel service networks to achieve socially recognized goals (e.g., car sharing, co-housing, home nursing care) (Manzini, 2015). Therefore, this Design approach can supplement the shared research focus on designing for new constellations of actors, by contributing with expertise in how to carry out actions to engage a community of actors and support them to foster socially innovative initiatives of their own (Fassi, Meroni, & Simeone, 2013).

As such, although all the focus groups have shared the research interest in designing for new constellations of actors at the meso level of service ecosystems, further research is still needed to better develop service design research at this level. One potential research area which could support evolving service design multidisciplinary research focused at the meso level of service ecosystems is the contributions that Design for social innovation could bring to Transformative

Service Research (TSR) (Anderson et al., 2013). As results indicated, Design for social innovation is a competency area mainly developed by a Design perspective, which brings frameworks and approaches that support engaging actors in fostering socially innovative initiatives (Fassi et al., 2013; Manzini, 2015). As such, the intersection of those two research streams could be further explored, in order to advance service design multidisciplinary research to positively impact on the well-being of multiple actors in service networks.

5.5.3 Service design emerging research area at the macro level of service ecosystems

Study 2 contributes to evolving the frontiers of service design research, by reporting how scholars have been investigating and employing service design to enable institutional change, as an emerging research area for the field. SD3-Interaction Design, SD4-Design and SD6-Service Research focus groups described service design's connection to institutional change, defined by Service Research literature as the change of rules, norms, ways of thinking and practices which constitute a central process for enabling innovation in service (Vargo, Wieland, & Akaka, 2015). These results are aligned with recent research, mainly connected to Design and Service Research perspectives, which focus on understanding the connections between service design and institutions (Vink, Edvardsson, Wetter-Edman, & Tronvoll, 2019; Vink, Joly, Wetter-Edman, Tronvoll, & Edvardsson, 2019b; Wetter-Edman, Vink, & Blomkvist, 2018). This literature highlights the key role of service design in creating new resources and infrastructures that support catalyzing institutional change at the macro level of service ecosystems (Wetter-Edman et al., 2018). Likewise, design approaches are highlighted (e.g., co-design workshops, prototyping) as a way to support questioning assumptions (Vink et al., 2019b) and shaping mental models (Vink et al., 2019).

Besides, Study 2 contributes to advancing service design research connected to the macro level of service ecosystems, by indicating the need to integrate other multidisciplinary perspectives to support service design in enabling institutional change. As results identified, service design, as it is now, can only create conditions (e.g., use participatory processes; design new interfaces, new infrastructures) to possibly change key actors' mindsets, consequently, influencing in the creation of new rules and norms at the macro level of service ecosystems (Vargo et al., 2019). As such, the integration of other multidisciplinary contributions are needed to be investigated (as Law and Public Management, as cited during the SD3-Interaction Design focus group), as a way to boost the potential of service design to foster institutional change.

5.6 Conclusions of Study 2

Study 2 integrates and builds a shared ground for the evolution of service design as a multidisciplinary field and approach, by identifying and examining shared research foci among the 6 core multidisciplinary perspectives on service design (Joly et al., 2019). As such, Service Research, Design, Interaction Design, Operations management, Marketing and Information Systems research perspectives on service design were investigated, based on the analysis of focus groups with 6 leading international service design and innovation centers, which represented these fields.

This study integrates shared research foci among those core multidisciplinary perspectives, by using the service ecosystem concept (Lusch & Vargo, 2014) as a framework to systematize and clarify the evolution of service design multidisciplinary research from a focus from the micro level, to the meso level, towards the macro level of service ecosystems. As such, this investigation shows that shared research foci among core multidisciplinary perspectives are well-developed at the micro level, bringing together their contributions to service design around the research topics of an actor-centered approach, service delivery processes and service interfaces. In this context, Study 2 contributes to comprehending the different roles that actors can assume inside service ecosystems, supported by multidisciplinary contributions that address their distinct perspectives (i.e. user, customer, employee and provider foci).

Likewise, this investigation advances the understanding of the shared research focus on designing new service delivery processes, which can support service designers from different fields to better integrate their complementary contributions when innovating service operations. Besides, this study elucidates different terms and concepts associated with service interface (i.e. resources and spaces, service evidence, service clues, servicescape, user interface), which can facilitate and enhance communication within service design multidisciplinary teams.

Nevertheless, this study also had limitations, which indicate future research directions. First, this study was limited to the selection of 6 focus groups which represented each one of the core multidisciplinary perspectives on service design identified during Study 1. As such, this has influenced in the identification of shared research foci among those areas presented in Study 2. In order to expand the identification of more shared research concerns among

multidisciplinary perspectives on service design, new studies could expand the development of focus groups to more academic centers. Another possibility could be complementing Study 2 results with surveys, including questionnaires with a bigger sample of service design and innovation senior researchers from multidisciplinary areas.

Second, this investigation focused on identifying and describing research areas which were common among the focus groups, in order to integrate and build a shared ground to support the evolution of service design as a multidisciplinary field and approach. As such, although specific research areas were also considered and examined during data analysis, this study did not emphasized the differences and divergences among the focus groups in terms of their perspectives when addressing service design. Since Study 1 had already focused on characterizing the distinct and complementary contributions among the core multidisciplinary perspectives on service design (Joly et al., 2019), Study 2 placed its focus on identifying common research interests among those areas. Future research could further explore the divergences among multidisciplinary perspectives that inform service design, in order to identify which are the factors that hinder the integration of their perspectives by their academic communities. This investigation could contribute to identify the pain points which need to be overcome in order to advance service design as a multidisciplinary field.

On the other hand, the shared research focus on service networks, identified at the meso level of service ecosystems, although already connecting research interests from all the core perspectives on service design, still asks for further research. As such, at this level, future investigation could identify other research streams to support service design to achieve changes at the level of service networks, such as by integrating contributions from Design for social innovation and Transformative Service Research.

Finally, an emerging research area shared only between Service Research and Design perspectives was identified at the macro level, concerned with the use of service design to support institutional change. Therefore, this research topic still asks for further development, especially in terms of connecting other possible multidisciplinary contributions to service design to support this endeavor, such as from Law and Public Administration.

Besides, further research is needed to explore the integration of other multidisciplinary contributions to service design, as in the case of Anthropology which was briefly cited by focus

groups (SD3; SD4; SD6) as contributing to understand and design for users' and customers' needs. Additionally, focus groups with Information Systems and Operations backgrounds, respectively, identified technology and service delivery processes as crossing organizational and service network dimensions, thus asking for further research to better explore other areas which can contribute to service design when focused on these objects across the micro and meso levels. As future research, a practitioner point of view should be also explored to understand how service design integrates multidisciplinary contributions in practice and how this integration can support service innovation at different levels of service ecosystems. This challenge is tackled in the next Chapter 6, with Study 3.

6 STUDY 3 – DESIGNING FOR SERVICE INNOVATION ACROSS SERVICE ECOSYSTEM LEVELS

This chapter presents the development and results of Study 3, which investigated "How service design fosters service innovation at different levels of complexity, supported by multidisciplinary contributions?". After identifying multidisciplinary perspectives on service design during Study 1 and examining their shared research areas on Study 2, Study 3 focused on researching how multidisciplinary teams can integrate their contributions to address service innovation in practice. As such, Study 3 complements the prior studies by addressing the third research objective of this thesis, focused on characterizing service design multidisciplinary approach to service innovation.

This chapter is organized by the following subsections. The subsection 6.1 Introduction presents the research challenges addressed by this study. In the subsection 6.2, literature review revisits the concept of service innovation introduced in the Theoretical foundations chapter of this thesis, by describing the multi-level character of this phenomenon. This is followed by subsection 6.5, which presents how service design has been addressing service innovation at distinct levels of complexity. These subsections are complemented by the 6.4 Methodology, 6.5 Results, 6.6 Discussion and 6.7 Conclusions, specific for this study.

6.1 Introduction of Study 3

As identified during Study 1 and Study 2, the integration of multidisciplinary contributions by service design teams is still under-investigated (Joly et al., 2018; Joly et al., 2019), especially regarding the impact that service design has on service innovation when supported by multidisciplinary perspectives. As such, further research is still needed to better connect service design to service innovation, when integrating multidisciplinary contributions (Ostrom et al., 2015; Patrício et al., 2018).

However, innovation in service becomes more challenging as the complexity of service systems increases. As design research has witnessed, there is a continuous shift from the design of tangible products, to interactions and experiences, to also consider their related contextual

and cultural aspects (Buchanan, 1992). Similarly, service environments have broadened the focus of service design from organizational service systems to multi-actor networks (Sangiorgi et al., 2017), moving from the design of touchpoints (Clatworthy, 2011), to organizational change (Junginger & Sangiorgi, 2009; Salmi & Mattelmäki, 2019), up to community innovation (Baek et al., 2018) and policy making (Bason, 2017). More recently, research has been developed which covers the potential of service design to change institutions (Wetter-Edman et al., 2018), defined as the rules, norms, roles and beliefs that guide behaviors and practices of actors (Scott, 2001).

Multi-level approaches have already been proposed in service design, from the design of touchpoints and the customer journey, to service systems and service concepts within value constellations (Patrício et al., 2011; Patrício et al., 2018b). Still, this literature does not provide an integrative description of how service design has been addressing service innovation at higher levels of complexity (Sangiorgi et al., 2017), such as by considering institutions (Vargo et al., 2015). Therefore, there is a lack of research which systematizes how service design can help achieving changes within and beyond the organizational boundaries considering bigger entities, such as service networks (Akaka et al., 2012) and service ecosystems (Lusch & Vargo, 2014).

As previously presented in Study 1, service ecosystems encompass the micro, the meso and the macro levels, which are the dimensions where new forms of value co-creation can be supported (Chandler & Vargo, 2011). The micro level stands for the dimension of actors (as organizations and individuals) and their interactions (Lusch & Vargo, 2014). The meso refers to the level of service networks and their complex interactions (Akaka et al., 2012). Finally, the macro level is the dimension of the institutions (Scott, 2001), which frame and guide actors' behaviors and actions in the ecosystem (Vargo et al., 2015). From this perspective, service innovation (Lusch & Nambisan, 2015) can be structured at distinct service ecosystem levels – micro, meso and macro - where new value co-creation can be enabled (Chandler & Vargo, 2011; Lusch & Vargo, 2014).

This growing complexity of projects has also influenced service design to become more multidisciplinary, supported by the expanding demand for the work of multidisciplinary teams in innovation projects (D'souza, 2016), as well as the increasing interest in design thinking by professionals from other fields, such as Management (Kimbell, 2009). Recent research has

suggested that service design can move from being a disciplinary field to become a transversal approach able to favor multidisciplinary integration in organizations (Sangiorgi et al., 2019). However, these studies miss to explain how and what kind of multidisciplinary contributions are integrated during service design practice, motivating the calls for a better understanding of which are multidisciplinary contributions designers need to work with to sustain their practice (Yu & Sangiorgi, 2018), as well as which benefits multidisciplinary teams can bring to design research (D'souza & Dastmalchi, 2016).

To address these challenges, this study presents the results of a multiple case study with 9 organizations (Yin, 2018) to understand how service design fosters service innovation across service ecosystem levels, supported by multidisciplinary contributions. As outcomes, this chapter shows how service design changes across different levels of service innovation. These changes are analyzed in terms of design focus, approaches, techniques and tools, and multidisciplinary contributions integrated. As value, this study brings significant contributions to service and design research, namely: (1) Systematization of how service design fosters service innovation across service ecosystem levels; (2) Comprehension of how service design addresses projects at higher levels of complexity, and (3) Description of how multidisciplinary contributions are integrated to support service design practice across those levels. Finally, limitations and suggestions for future research are identified, especially in terms of the need to further develop specific approaches and tools to sustain the service design practice at the meso and macro levels of service ecosystems.

6.2 Service innovation across service ecosystem levels

As presented in the introduction of this thesis, service innovation can be defined as a process of integrating resources in novel ways to enable new forms of value co-creation among actors (Lusch & Nambisan, 2015). In this sense, service innovation can be viewed as a multi-dimensional phenomenon (Gustafsson et al., 2016), which means it can be connected to new forms of value co-creation at distinct contexts, such as organizations (Junginger, 2015), networks of multiple actors (Akaka et al., 2012) and institutional arrangements (Vargo et al., 2015). Therefore, service innovation can be manifested at different levels of complexity, which may involve organizational change (Salmi & Mattelmäki, 2019), social innovation (Baek et al., 2018) or public sector innovation (Sangiorgi, 2015). As such, understanding how the various manifestations of service innovation are categorized and inter-related is one of the fundamental

aspects to improve service design connections to service innovation research (Patrício et al., 2018).

To this end, service innovation can be categorized into archetypes, which aggregate and synthetize multiple theoretical perspectives into exemplar models - process-based, output-based, experiential and systemic archetypes -, in order to explain how service innovation has been investigated and defined (Helkkula et al., 2018). The systemic archetype of service innovation, defined as the perspective which considers the system of public, private and all contextual elements as influential to innovation in service, is especially interesting for connecting service design to service innovation. This is because the systemic archetype is aligned with the holistic approach employed by service design, which considers a wide range of actors and their inter-connected resources as part of the innovation process (Wetter-Edman et al., 2014). Through the systemic archetype view on service innovation, service design can apply a service ecosystem perspective (Lusch & Vargo, 2014) to service innovation processes (Edvardsson & Tronvoll, 2013). In particular from a service ecosystem view, service innovation can be understood as being enabled at the micro, meso and macro levels of service ecosystems, which are the distinct dimensions at which innovation in service can be fostered (Chandler & Vargo, 2011), as illustrated in Figure 6.

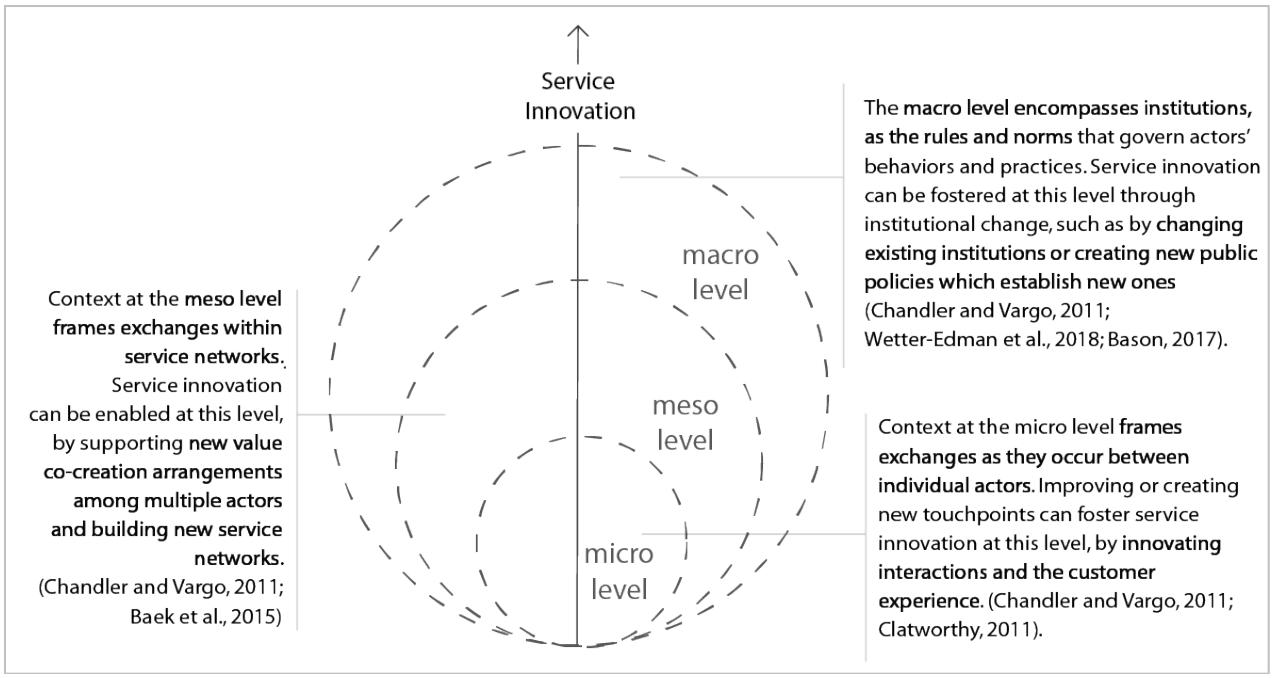


Figure 6 - Service innovation at the micro, meso and macro levels of service ecosystems
Source - From the authors, based on Lusch & Vargo (2014) and Chandler & Vargo, (2011).

The micro level is the dimension of individual actors and their interactions, as the single entities which service innovation projects are developed from and for (Lusch & Vargo, 2014). Service innovation at the micro level may involve improving dyadic interactions between actors, such as by creating new touchpoints between service providers and their customers (Clatworthy, 2011).

The meso level is the dimension of service networks (e.g., service involving a neighborhood or a city) and their many-to-many interactions (Akaka et al., 2012). At the meso level, service innovation may involve changing or creating new arrangements of actors which result in new forms of value creation among them (Patrício et al., 2018b), such as by fostering social innovation initiatives which transform interactions within networks (Baek et al., 2018).

The macro level is the dimension of institutions (Vargo et al., 2015) that guide behaviors and practices of actors within service ecosystems (Edvardsson & Tronvoll, 2013). At the macro level, service innovation involves changing institutions, such as by destabilizing the assumptions and habitual action of stakeholders, helping them to break free from existing rules (Wetter-Edman et al., 2018), or by creating new public policies to establish new norms within an ecosystem (Bason, 2017).

However, the understanding of service innovation across service ecosystem levels needs further research. Service design and service innovation projects are growing in complexity (Sangiorgi et al., 2017), when aiming to transform service networks and ecosystems (Baek et al., 2018; Wetter-Edman et al., 2018). As such, studying how service innovation can be fostered across service ecosystem levels is strategic for service design researchers and practitioners. This comprehension is needed to understand the different levels and contexts in which service innovation can be enabled, how service design should change to address these distinct levels, and which multidisciplinary contributions can be integrated to support these endeavors.

6.3 Designing for service innovation across service ecosystems levels

Building upon the analysis of multidisciplinary service design literature developed during Study 1 (Joly et al., 2019) can help understanding how service design can foster service innovation at the micro, meso and macro levels of service ecosystems (Chandler & Vargo, 2011), as shown in Table 11.

Table 11 - Service design fostering service innovation across service ecosystem levels

Micro level	Meso level	Macro level
Design of new touchpoints to improve customer experience, that creates value in the "person's relationship with the service and the service provider. (Clatworthy, 2011) **Design of service interfaces** (Secomandi & Snelder, 2011) **Understanding individuals' needs to improve their experiences** (Lo, 2011) **Design of the material and digital touchpoints** connected with the firm's service, to people and their roles, knowledge and skills and where these service encounters took place (Kimbell, 2011) **Designing new service clues** to improve customer experience (Bitner et al., 2008). **Planning of dramatic structures for service events**, coupling back-stage employees with front-stage processes, which provide customized service (Zomerdijk & Voss, 2010) **Improving service delivery processes** (Parker et al., 2013) **Organizational change**, by improving connections between stakeholders and fostering transformation of organizational processes (Junginger, 2015; Salmi & Mattelmäki, 2019)	**Designing service for value networks** (Patrício et al., 2018b) **Service design catalyzes social innovation in multi-actor networks** (Baek et al., 2018) **New social networking platforms and socially networked services, which facilitate interactions and the exchange of knowledge in networks** (Morelli, 2015) **Intervention at the community scale, building capacities and project partnerships** (Sangiorgi, 2011) **Building and maintaining trust among stakeholders networks** (Yee and White, 2015) **Designing infrastructures to foster cross-organizational service networks** (Hyvarinen et al., 2015)	**Service design informing institutional work,** by making, breaking and maintaining institutions at the macro level (Koskela-Huotari et al., 2016; Vink et al., 2019) **Service designers as "critical friends" challenging the status quo and creating alternative perspectives**. (Warwick, 2016) **Designer acting as a 'provocateur' by challenging existing assumptions and offering alternative visions** (Baskerville & Goldblatt, 2009) **Designing aesthetics experiences in which stakeholders break free from existing assumptions** (Wetter-Edman et al., 2018) **Service design involves a process of shaping new mental models** (Vink et al., 2019) **Designing new public policies** (Manzini & Staszowski, 2013; Bason, 2017; Mulligan & Bamberger, 2018)

The literature review systematized on Table 11 highlights how service design can foster service innovation at the micro level, by improving or designing new touchpoints (Clatworthy, 2011), service interfaces (Secomandi & Snelders, 2011) or service clues (Bitner et al., 2008), which enable novel interactions among actors resulting in enhanced customer experience (Lo, 2011). This is also linked to the enhancement of internal organizational processes (Junginger, 2015), which improve the connections between stakeholders and, consequently, their experiences in the service delivery system (Salmi & Mattelmäki, 2019).

At the meso level, service design can support the creation of new service offerings for value networks (Patrício et al., 2018b), can catalyze social innovation initiatives inside multi-actor networks (Baek et al., 2018) and design social networking platforms, which support new systems of interactions among stakeholders, who can engage in creating social and economic value (Morelli, 2015). Service design can also intervene at the community scale (Sangiorgi, 2011), by employing community building activities such as promoting and maintaining trust among stakeholders (Yee & White, 2015), with a view to designing infrastructures to foster cross-organizational service networks (Hyvarinen et al., 2015).

Finally, articles positioned in the third column of Table 11 describe research connecting service design to the institutional dimension (Scott, 2001) at the macro level of service ecosystems. This research links service design to institutional work (Vink et al., 2019), defined as the "purposive actions aimed at creating, maintaining and disrupting institutions" (Lawrence et al., 2011, p. 52). At the macro level, service design can support institutional work (Lawrence et al., 2011) by challenging the status quo and offering alternative scenarios for the involved stakeholders (Baskerville & Goldblatt, 2009; Warwick, 2016), as well as by designing aesthetics experiences in which stakeholders break free from existing assumptions (Wetter-Edman et al., 2018), consequently shaping new ways of thinking and doing (Vink et al., 2019). By informing the design of new public policies (Manzini & Staszowski, 2013) service design can also support the establishment of new norms within an ecosystem (Bason, 2017).

This analysis of service design multidisciplinary literature, however, misses to explain how service design is actually applied across these service ecosystem levels. Therefore, examining how service design fosters service innovation across service ecosystem levels is key to disentangle this complexity, and to help service design researchers and practitioners to know how to address service innovation projects at distinct levels. Moreover, relating this multi-level aspect of service innovation to the multidisciplinary nature of service design can further advance the understanding of service design as a multidisciplinary approach to service innovation, which is a topic that demands further investigation (Patrício et al., 2018a; Secomandi & Snelders, 2018).

6.4 Methodology of Study 3

The aims of this study were twofold. First, to characterize how service design can foster service innovation at the micro, meso and macro levels of service ecosystems. Second, to understand how multidisciplinary contributions support service design to enable service innovation across these service ecosystem levels.

To address these research questions, this study followed a Design Studies research approach (Fallman, 2008), as it analyzes the service design practice in order to improve theory in this field. Under this perspective, this investigation developed a multiple case study (Yin, 2018). Due to the limited empirical knowledge on the practice of service design for service innovation across service ecosystem levels, a multiple case study was identified as a useful method to support this exploratory and empirical investigation. Multiple case studies are recommended for research that does not have much supportive theory available, that addresses broad and complex research questions, and where the context has a significant influence on the research object (Dul & Hak, 2008).

6.4.1 Case selection

This study defined as unit of analysis (Yin, 2018) service design projects. To address the objectives of the study, a set of service design cases were selected based on three criteria. First, they all should have been developed by multidisciplinary teams. Second, they should have already been fully developed or be at an advanced stage of implementation. Finally, service design cases should provide a good coverage of the different levels of service ecosystems, as shown in Table 11.

Overall, this study selected and examined 3 cases at each service ecosystem level, totalizing 9 cases. This number of cases is justified by the interest in identifying a variety of service design projects in order to strengthen theory building (Voss et al., 2002). Following a theory-based and maximum variation sampling (Patton, 2002), the cases represent a variety of service design projects according to the selective criteria: multidisciplinary team involved and service innovation focused at the micro, meso and macro levels of service ecosystems. Besides, all selected cases involved multidisciplinary teams composed by members with at least four different disciplinary backgrounds and distinct functions in the projects. Selected cases were:

- **Cases 1-3**, which were considered as service design for service innovation projects at the micro level, as they were all focused on enabling new interactions between organizations and their customers, and improving the customer experience. These service design projects were developed by: a Portuguese technology company (Case 1), a Swedish public innovation lab (Case 2) and a technology multinational company (Case 3).

- **Cases 4-6**, which were considered as service design for innovation projects at the meso level, as they developed service concepts focused on supporting new service networks. These service design projects were developed by: a Swiss telecom organization (Case 4), a chemistry multinational (Case 5) and a Portuguese design consultancy (Case 6).

- **Cases 7-9**, which were considered as service design for innovation projects at the macro level, as they worked in the context of complex networks of stakeholders and aimed at fostering institutional work by changing institutions for ecosystem innovation. These service design projects were developed by: a Portuguese public innovation lab (Case 7), a German public organization (Case 8) and a French innovation organization (Case 9) .

The profiles of the selected cases are presented in Table 12. For a detailed characterization of the cases, please see Appendix VI.

6.4.2 Data collection

Data collection involved 56 semi-structured interviews (Kvale, 1996) with professionals inside the multidisciplinary teams of the 9 cases. Interviews were conducted face to face, through video calls or via telephone, being audio recorded and transcribed. The interview protocol covered: the academic and professional background of interviewees; the objectives and stakeholders' multidisciplinary contributions involved in the projects; how the service design process was developed; key design outcomes, and the service innovation enabled. Additionally, data collection included documental review (Flick, 2014) of artifacts related to the project (e.g. any accessible report, news, website, article or output that support illustrating and improving the understanding about the cases). These documents supported complementing and

triangulating the data gathered during the interviews. The full list of data sources is presented in Appendix VI.

Table 12 - Cases' profiles

Case number	Description	Multidisciplinary team investigated	Service ecosystem level at which service innovation has been fostered
Case 1	Project in the area of healthcare, which created a technological solution to enable new interactions between blood donors and the hospital.	Project manager; Project Director; Operations specialist; Product owner; UX Designer; Designer	Micro level
Case 2	Project in the area of healthcare that created a new touchpoint in the form of a guide to inform patients, their families and hospital staff about the Psychiatric department operations.	Designer/Project manager; Communication strategist; Psychiatrist; Chief medical officer; Former patient; Head of nurseys; Nurse	Micro level
Case 3	Project in the area of software innovation, which improved the user experience of the services provided by an interactive statistical analysis software.	User researcher; UX Designer; Front-end developers; Communication designer/ Design producer, Offering manager	Micro level
Case 4	Project in the area of telecom, which improved the data center maintenance operations' network of a technology company.	Industrial engineers; Innovation manager; Manager; IT developer; Designer	Meso level
Case 5	Project in the area of digital farming, which improved knowledge sharing and decision-making processes of crop protection within farmers' networks.	Innovation manager; Product designer; Project manager; IT developer; Industrial engineers; Agriculture engineer; Manager; Marketing and Operations Manager	Meso level
Case 6	Project which integrated the entrepreneur community of Lisbon (Portugal) in a value co-creation network.	Anthropologist; UX Designer; Psychologist; Communication strategist; Designer	Meso level
Case 7	Project of a national scale service, which transformed and integrated the service delivery of multiple public and private organizations in Portugal, needed when a citizen pass away.	Designer; Innovation manager; Psychologist; Sociologist	Macro level
Case 8	Project in the area of forest preservation, which created a new web platform for a public organization in Germany, in order to improve the dissemination of its services to a network of stakeholders.	Innovation manager; Industrial engineers; Project manager; IT engineer; Developers Forest Engineer	Meso level
Case 9	Project of innovation labs in the public sector of France, which enabled institutional change towards more participatory and transparent approaches to design and improve public policies in this country.	Designers; Popular educator; Managers; Innovation manager; Sociologists; Coach; Communication strategist	Macro level

6.4.3 Data analysis

Data analysis followed two analytical strategies. First, a within-cases analysis was performed, in order to provide an in-depth description of each case and to verify at which levels each one of the projects supported service innovation. In this stage, all cases were described following the same protocol (Yin 2018), in order to facilitate their understanding.

This stage was followed by a cross-case analysis to identify and examine patterns (Voss et al., 2002; Yin, 2018). The description of the cases was crossed-analyzed with the aim of building theory (Voss et al., 2002) and understanding how service design addressed service innovation at the micro, meso and macro levels of service ecosystems supported by multidisciplinary contributions. These analyses were sustained by several meetings and workshops with the research team, using visualizations to synthesize the main aspects of each case, as well as to support the discussion and cross-examination of findings. The visualizations created to support the within-cases analysis are presented in Appendix VII. These visualizations illustrate in diagrams how each service design project was developed, in terms of approaches, techniques and tools used, multidisciplinary teams involved and the level at which they have focused on to foster service innovation.

Additionally, a data coding process (Charmaz, 2014) with the software Maxqda 2018 supported data analysis of the transcribed interviews. Data analysis followed an iterative process of initial coding and focused coding (Charmaz, 2014). Firstly, the transcribed interviews were openly analyzed, by coding segments of text close to their analytical definition. Secondly, these various codes were iteratively condensed, based on discussions within the research team, into more meaningful categories (Charmaz, 2014). This analysis supported the identification of patterns and the establishment of conclusions, based on the supportive literature review, which grounded the development of the results of this study (Patton, 2002).

Internal validity was pursued by collecting data from a sample of professionals with different roles inside the multidisciplinary teams of the selected service design projects, in order to enable their triangulation (Yin, 2018). Interviews were triangulated between professionals from the same project and with the collected documents, aiming to ensure the validity of the research process through cross-validation of data, as well as to enrich the study by capturing different dimensions of the same phenomenon (Yin, 2018). On the other hand, external validity

was pursued by the use of thick descriptions of each case and maximum variation sampling (Patton, 2002).

6.5 Results of Study 3

This subsection reports the outcomes from the within-cases analysis and the cross-case analysis from Study 3, presented as follows.

6.5.1 Results from the within-case analysis

The within-case analysis characterized how each case was developed, in terms of design focus, approaches, techniques and tools employed, multidisciplinary contributions integrated and the service ecosystem level at which service innovation has been fostered. Table 13 indicates the results from this analysis, integrating the outcomes from discussions based on the diagrams presented in Appendix VII.

As Table 13 shows, the design focus indicates the object(s) on which the service design teams placed their attention when fostering service innovation. The approaches, techniques and tools are the means used by the service design teams to develop the projects, organized along the service design process stages (Stickdorn & Schneider, 2010). The multidisciplinary contributions represent the disciplinary knowledge integrated by the teams during each project. Finally, the service ecosystem level indicates the focus of each case, in terms of supporting service innovation at the micro, meso or macro level (Chandler & Vargo, 2011). Results indicate that while Cases 1, 2 and 3 focused on enabling service innovation at the micro level, Cases 4, 5, 6 and 8 concentrated on supporting service innovation at the meso level, whereas Cases 7 and 9 reached an impact on service innovation at the macro level of service ecosystems.

Table 13 - Results from the within-case analysis

	Design focus	Approaches, techniques and tools		Multidisciplinary contributions integrated		Service ecosystem level at which service innovation has been fostered
Case 1	Designing a new technological solution, based on an app, to facilitate new interactions between blood donors and the hospital	**Exploration:** - Shadowing of hospital staff - Analysis of hospital operations - Interviews with blood donors and hospital staff - Stakeholder map	**Creation:** - Storyboard - Customer experience modelling - Participatory design workshops - Customer value constellation **Reflexion/Implementation:** - Service blueprint	**Interaction Design** - UX Design **Design** - Design - Strategic design - Service engineering **IT** - IT Engineering - Computer sciences - Software development	**Management** - Project management - Production management - Operations management - Strategic management - Marketing	Micro level
Case 2	Designing a new touchpoint in the form of a guide to inform patients, their families and hospital staff about the Psychiatric department operations.	**Exploration** - Participatory workshops - Definition of key target groups of stakeholders - Interviews - Observation - Meetings and interviews with medical experts	**Creation** - Participatory design workshops **Reflection/Implementation** - Prototype of the guide - Surveys (validation of the guide with hospital staff and patients)	**Design** - Design - Strategic design **Management** - Project management - Operations management - Strategic management - Marketing	**Medicine** - Medicine - Nursing	Micro level
Case 3	Designing new interfaces, operations and technology functionalities to improve users experience when using the services provided by an interactive statistical analysis software.	**Exploration** - Identification of sponsor users - interviews - use of statistics to make sense of data	**Creation** - Personas - user stories **Reflection/Implementation** - Prototyping (low and high fidelity) - Validation meetings	**Interaction Design** - UX Design **Design** - Strategic design - Communication design	**Management** - Project management **IT** - IT Engineering - Software development **Social Sciences** - Psychology	Micro level
Case 4	Designing an application to improve the data center maintenance operations' network of a technology company.	**Exploration** - Interviews with users - Interviews with data center maintenance experts - Stakeholder map - Observation of service operations in loco - Analysis of data center operations; - Desk research	**Creation** - Design workshops (design of PSS concept) - User stories **Reflection/Implementation** - Prototyping	**Design** - Design - Industrial engineering **Management** - Project management - Strategic management - Marketing	- Business innovation and international management **IT** - IT Engineering - Software development **Social Sciences** - Political Sciences	Meso level

Case 5	Designing a service application to improve knowledge sharing and decision-making processes of crop protection within farmers' networks.	**Exploration** - Interviews (understand consumers' view about farmers) - Interviews with users' groups (understand users and data crop protection network's needs) - Stakeholder map - Analysis of crop protection operations	**Creation** - Creation of wireframes - App navigation architecture (design of interactions with app) - Design workshops to create a product-service system concept **Reflection/Implementation** - Prototyping (test of low and high fidelity prototypes with farmers)	**Design** - Design - Industrial engineering - Strategic design - Product design - Agricultural engineering	**Management** - Project management - Strategic management - Operations management - Marketing - Business administration - International management **IT** - IT Engineering - Software development	Meso level
Case 6	Designing a web platform to integrate the entrepreneur community of Lisbon (Portugal) - connecting startups, investors, co-work spaces, hubs, etc. - in a value co-creation network.	**Exploration** - Interviews (with representors of entrepreneur community - startups, co-work spaces, investors) - Analysis SWOT - Spider-web diagrams	**Creation** - Participatory design workshops - Branding (design of new brand to support interactions in the entrepreneur community) - Community engagement (series of activities and meetings to involve and activate the entrepreneur community during the project) **Reflection/Implementation** - Prototyping and testing (low and high fidelity prototypes of brand and wireframes)	**Interaction Design** - UX Design **Design** - Communication design - Strategic design	**Management** - Strategic management - Project management - Marketing **Social sciences** - Anthropology - Psychology - Community Psychology **IT** - Software development	Meso level
Case 7	Designing a new service which transforms and integrates the service delivery of multiple public organizations in Portugal needed when a citizen pass away (e.g. inheritance, social security, etc.), through changing public regulations and creating a new way to support citizens and their families to get access to those public services.	**Exploration** - Interviews with citizens and public servers to understand their needs in different regions of Portugal - Journey maps **Creation** - Participatory design workshop (creation of the service concept) - Creation of physical service delivery scenario - Creation of web platform to support the integration of	**Reflection/Implementation** - Service prototype with the use of role playing - Service blueprint - Policy design: implementation of new regulations to legally support the integration of the public services)	**Design** - Design - Strategic design - Public design - Industrial engineering **Management** - Business administration - Strategic management - Project management	**Social sciences** - Sociology - Psychology - Law - Political Sciences	Macro level

		service delivery from different public departments - Strategic design to create strategies to integrate the service delivery of public departments				
Case 8	Design of a new web platform for a public organization in Germany, in order to improve the dissemination of its services to a network of stakeholders (Mayors, tourism agencies, local communes, hikers, bikers, tourists).	**Exploration** - Interviews (understand the dyads of communication with the public organization) - Interviews with different stakeholders groups - Interviews with the organization's representatives - Participatory design workshop (reframing the problem from macro level to focus on increasing the public organization's awareness by stakeholders' network)	**Creation** - Design of a new website for improving the usage experience of the public organization's stakeholders - Design workshops (creation of the service concept) **Reflection/Implementation** - Prototyping of wireframes - Validation with the organization's public servers, tourism offices, Mayors and forest users - Strategic design – creating strategies for improving institutional role of the public organization to better inform stakeholders and guarantee its economical position in the market.	**Design** - Industrial engineering - Forest Engineering **Management** - Business administration - Business innovation - Strategic management - Project management - Operations management	**IT** - Computer Science - Software development - IT engineering	Meso level
Case 9	Designing innovation labs in the public French administration to enable institutional change towards more participatory and transparent approaches to design and improve public policies and services in the country.	**Exploration** - Dynamics of ice-breaking - Design workshops - Interviews with citizens **Creation** - Participatory design workshops - Community engagement and management of public servers' network. - Training - Service blueprints - Creation of user journeys - Creation of scenarios - Design of the team roles for the innovation lab of each city	**Reflection/Implementation** - Development of service prototypes - Strategic design – designing strategies to support changing the mindset of involved stakeholders, as by involving top directors of municipalities during workshop presentations. - Policy design – designing new regulations for the public sector	**Design** - Design - Strategic design - Public design **Management** - Organizational management - Project management - Strategic management	**Social sciences** - Sociology - Political sciences - Economics/Local development - Communication studies - Psychology - Community Psychology - Organizational Psychology	Macro level

6.5.2 Results from the cross-case analysis

The within-case analysis served as the basis for the subsequent cross-case analysis, which is described in this subsection and is synthesized in Table 14. This cross-case analysis revealed that service design changes depending on the level of service innovation, in terms of 1) service design focus, 2) service design approaches, techniques and tools, and 3) multidisciplinary contributions, when focusing on fostering service innovation across different service ecosystems levels. Service design focus is the object(s) on which the service design teams placed their attention to foster service innovation. Service design approaches, techniques and tools are the means used by the service design teams to develop their projects. Multidisciplinary contributions are the disciplinary knowledge integrated by the teams during the projects. The next subsections describe what distinguish how service design fosters service innovation at the micro, meso or macro level of service ecosystems.

6.5.2.1 Designing for service innovation at the micro level

At the micro level, interviewees revealed that the service design projects under study placed their focus on designing new service interfaces, dyadic interactions between customers and service providers, and customer experience. As highlighted by interviewees, these projects generated "*a technological solution which simplified the interactions of the hospital staff*" (Project manager, Case 1) or "*a guide which supported new relations between patients and nurses*" (Communication strategist, Case 2).

Tools and techniques employed at this level had a special focus on understanding (e.g., interviews and observation) and designing novel interactions (e.g., storyboards and service blueprint) between actors. The use of service blueprinting was indicated in Case 1, for instance, to support designing "*the process the user would follow and the stakeholders he would interact with along the blood donation service*" (Designer, Case1).

Table 14 - Comparative matrix of service design cases across service ecosystem levels

	Design focus	Approaches, tools and techniques	Multidisciplinary contributions integrated by service design
Micro level	Designing new service interfaces, interactions and experiences (Cases 1, 2, 3)	**Tools or techniques** - interviews (1, 2, 3, 5, 6) - shadowing/observation (2, 4, 6) - journey maps (2, 7) - storyboards (1) - prototyping (1, 2, 3, 4, 5, 6, 8) - service blueprint (1, 5, 7, 9)	**Social sciences** - Psychology (3, 6, 7, 9) - Anthropology (6) **Interaction design** - User experience (UX) Design (1, 3, 6) **Information Technology (IT)** - IT engineering (1, 3, 4, 5, 8) - Computer sciences (1, 8) - Software development (1, 3, 4, 5, 8) **Design** - Design (1, 2, 4, 5, 6, 7, 9) - Product design (5) - Industrial engineering (4, 5, 8) - Communication design (3, 6) **Management** - Operations management (1, 2, 5, 8) - Innovation management (4, 5, 7, 8, 9) - Marketing (1, 2, 4, 5, 6)
Meso level	Designing for new service networks, by engaging groups of stakeholders in new ways to inter-relate and co-create value. (Cases 4, 5, 6, 8)	**Approaches** - participatory design workshops (1, 2, 6, 7, 9) - community engagement (6, 7, 9) **Tools or techniques** - stakeholders map (1, 4, 5, 8) - customer value constellation (1) - scenarios (9) - interviews (4, 5, 6, 7, 8, 9)	**Social sciences** - Community Psychology (6, 9) **Design** - Strategic design (1, 2, 3, 4, 5, 6, 7, 9) **Management** - Strategic management (1, 2, 4, 6) - Marketing (1, 2, 4, 6) - Innovation management (4, 5, 7, 9) - Project management (1, 2, 3, 4, 5, 6, 7, 8, 9) **Information Technology (IT)** - Software development (4, 5, 6, 7, 8) - IT engineering (8)
Macro level	Shaping new institutions, as the norms and regulations which guide the way actors work and inter-relate within service ecosystems (Cases 7, 9)	**Approaches** - strategic design approach (7, 9) - public policy design approach (7, 9) - participatory design workshops (7, 9) **Tools or techniques** - interviews with experts (2, 4 and 8) - SWOT analysis and spider-web diagrams (6)	**Social sciences** - Sociology (7, 9) - Law (7) - Political sciences (7, 9) **Design** - Policy design (7, 9) - Strategic design (7, 9) **Management** - Strategic management (4, 6, 7, 8, 9)

Data analysis showed that multidisciplinary contributions brought together at this level ranged from Psychology and Anthropology to understand user needs, to Interaction Design and IT to design interfaces and interactions. Contributions from Psychology (Cases 6 and 7) and Anthropology (Case 6) were integrated at the exploration phase of the service design process, while the participation of UX Designers (Cases 1, 3 and 6) and Software developers (Cases 1, 3, 4, 5, 8) was highlighted during implementation phases. These contributions were important to materialize "*back-office processes and web-interfaces*" (UX-Designer, Case 6) and technological solutions such as "*a smart phone application*" (Project manager, Case 1). Similarly, both Design and Management contributions were integrated to understand and design new interactions at the micro level, such as by "*designing the layout system to the software interfaces*" (Communication designer-Case 3) or "*analyzing service operations inside the organization to identify flaws*" (Operations manager, Case 1).

The analysis of the 9 cases showed that, although only Cases 1, 2 and 3 have mostly focused on the micro level, all cases have addressed this level as a fundamental context to support service innovation within service ecosystems, characterizing it as the dimension for understanding individuals and designing service interfaces to support their interactions and experiences.

6.5.2.2 Designing for service innovation at the meso level

Data analysis revealed that the meso level implies a wider context for service design, by focusing on designing for new service networks, such as an "*maintenance operations network*" (Data center manager, Case 4), a "*community of farmers*" (Supply chain manager, Case 5) or an "*entrepreneur network*" (Designer, Case 6).

In these projects, interviewees mentioned that participatory design workshops were used to involve different network actors to connect and engage them with the new services being designed. In Case 6, for instance, workshops were used to "*start engaging stakeholders in creating a network outside the digital environment, since our solution could not live only on the digital, it also had to create a community outside this space, in real life"* (Psychologist, Case 6). Similarly, tools such as stakeholder maps (Cases 1, 4, 5, 8) were employed to identify new service interactions among project stakeholders in the network. This shows the importance of involving network actors across the different phases of service design projects, in order to create and sustain

new networks around the services being designed, ultimately fostering service innovation at the meso level.

Additionally, results showed that, at the meso level, service design enables service innovation by bringing together multidisciplinary contributions which facilitate the collaborative work of different network actors, especially in the creation and reflection phases of their projects. In this context, contributions from Community psychology (Cases 6 and 9), Strategic design (Cases 1, 2, 3, 4, 5, 6, 7, 9) and Innovation management (4, 5, 7, 9) were reported to support the development of workshops, *"facilitating meetings where people could share their ideas and find solutions to collaborate*" (Innovation manager, Case 9). Cases at this level also highlight the contributions of project managers to "*organize and connect the project's phases*" (Industrial engineer, Case 4) and "*overcome possible conflicts of team dynamics*" (Project manager, Case 5). Similarly, in Cases 1, 2, 4 and 6, strategic managers created means to support network actors' long-term collaboration, resulting in more effective processes for organizations, such as by "*thinking of strategies to engage the entrepreneur community, as well as to generate project visibility in the city of Lisbon*" (Communication strategist-Case 6). At the meso level, results also showed that Design and Management moved away from operational activities to consider more strategic contributions to service design, such as by "*stimulating peer-to-peer knowledge sharing networks between farmers to avoid crops' diseases*" (Designer, Case 5). Software and IT engineers contributed to *"designing web platforms to support service interactions in the network of stakeholders*" (IT developer, Case 8).

Study results, therefore, indicate that cases with a design focus at the meso level (Cases 4, 5, 6, 8) concentrated on designing novel systems of interactions among multiple actors, constituting new service networks. This endeavor at the meso level has also involved changes at the micro level by establishing new dyadic relations between stakeholders, but surpassed this level by also considering more complex arrangements of actors and their connections in networks.

6.5.2.3 Designing for service innovation at the macro level

Cases at the macro level characterized their service design projects as focused on "*creating new public policies"* (Sociologist-Case 7) and "*changing the norms which set the way of working in public organizations*" (Innovation manager, Case 9), which can be framed as changing and creating new institutions in the service innovation literature (Vargo et al., 2015).

At this level, the approach of Policy design was specially highlighted in Cases 7 and 9, defined as the application of strategic design to create new public policies or improve existing ones (Howlett, 2014; Bason, 2017). In this context, Cases 7 and 9 described that service design introduced *experimental and collaborative approaches* (Designers, Cases 7 and 9), which induced people towards "*questioning and changing their assumptions*" (Designer, Case 7) and "*learning other ways of thinking*" (Designer, Case 9), especially by considering "*the users' point of view*" (Innovation manager, Case 7). Results show that engaging decision-makers during participatory design workshops was a way to "*back up and strengthen the service concept being designed"* (Designer, Case 7), and to "*motivate politically decision-makers to persist to the implementation of solutions"* (Manager, Case 9).

Cases classified at the macro level did not report the use of any specific service design technique or tool to foster service innovation at this level. Still, cases in general reported to have also addressed the macro level with techniques, such as interviews with experts and SWOT analysis, in order to understand the contextual space of service ecosystems. Interviews with experts were employed in Cases 2, 4 and 8 to "*discover which regulations affected stakeholders in the project and how they related with the solutions been designed*" (Communication strategist*,* Case 2*).* SWOT analysis, instead, was indicated as helpful to "*understand and compare the project's service ecosystem"* (Designer-Case 6).

Results show that multidisciplinary contributions integrated by service design to foster service innovation at the macro level especially came from institutional and macro scale perspectives, such as from Policy design or Sociology. These contributions supported service design teams throughout all phases of the projects to better comprehend and design for institutional change. As such, service design was reported to foster service innovation at the macro level, supported by a Policy design perspective by "*focusing on understanding, identifying flaws and changing regulations"* (Designer, Case 7). This was supported by the use of *"participatory and experimental design processes, such as workshops, visualizations, prototyping"* (Designer2, Case 9), which created and inspired alternative scenarios. Finally, the involvement of lawyers in the implementation phases of the project, contributed with the actual design and establishment of the "*new regulations needed to sustain the design solutions created*" (Designer, Case 7).

6.5.2.4 Strategies to integrate multidisciplinary contributions

Data analysis enabled the identification of strategies to integrate multidisciplinary contributions along the analyzed service design projects. These results, although not being part of the core of the research question in Study 3, were also considered important to address the multidisciplinarity in service design, since these integration strategies can also support service design teams in their work of fostering service innovation. As such, this subsection presents extra results which emerged from data analysis, reporting strategies to integrate multidisciplinary contributions and overcome communication problems along service design projects, as presented in Table 15.

Table 15 - Strategies to integrate multidisciplinary contributions

Strategies	Description of strategies based on data analysis
Regular meetings	Regular meetings were described by Cases 4, 5, 6 and 7 as a way to facilitate that the whole team could be aware of changes and decisions along the projects. Face-to-face meetings were especially highlighted (Case 6) was a way to exchange knowledge on specific technical aspects of the project, so professionals from other multidisciplinary backgrounds could also learn about it.
Service design as a methodological process	All cases reported the service design process as a creative approach organized into phases, which facilitated knowing which activities could be performed according to their projects' stages. As such, cases described the service design process providing methodological guidance in terms of which multidisciplinary contributions could be integrated at each projects' stage.
Use of workshops	Workshops were indicated by Cases 1, 2, 7 and 9 as an approach which facilitated the share of ideas in a no-hierarchical manner, and promoted discussions under a user-centered perspective among projects' stakeholders and multidisciplinary professionals.
Use of visualizations	All cases reported the use of visualizations, such as journey maps, service blueprinting and sketches, as a way to facilitate communication and mutual understanding within teams.
Service design mindset	Case 6 reported service design also working as a mindset that permeated a culture of experimentation, interaction and design in the organization, integrating all multidisciplinary professionals under this way of thinking.

Communication problems were mainly described by the cases' analysis, due to the different professionals' mindsets related to their multidisciplinary backgrounds. Data analysis reports that, while Management and Information Systems professionals were mostly focused on

defining requirements to be addressed along and at the implementation stage of their projects, professionals with a Design mindset preferred to maintain the design ideas open at the early phases of the service design process, in order to reframe and evolve them along with the process:

> *People from management, they had grades to show if they had achieved a goal. They had a plan, a business model, and worked step-by-step-by-step. Actually, planning was like their favorite thing, and that's what they did. And for us, the designers and engineers we were more like, first of all maybe a little more relaxed, like let's just follow the process and see what the process does with us, and does with our challenge. So these were two different mindsets to approach the project (Industrial engineer, Case 8).*

On the other hand, the cases' analysis indicates a set of strategies to overcome these communication problems and better integrate their multidisciplinary contributions. First, regular meetings (in person or virtually) were presented as one of the solutions to "*facilitate the team to participate and to be aligned along all phases of the project*" (Project manager, Case 5), which also led to the "*contaminations of knowledge inside the multidisciplinary team, where I could learn what the other person was doing and also help him. The design of the first wireframes, for example, was something that the whole team participated, which was interesting for me, who have interviewed the users and knew about the public we were aiming at achieving*" (Anthropologist, Case 6).

The service design process, as "*a creative methodology organized in phases*" (Innovation manager, Case 4), was reported by all cases to facilitate the integration of multidisciplinary contributions, by "*defining which activities could be developed at each moment*" (Industrial engineer and manager, Case 5) and "*how professionals could coordinate their activities along these stages*" (Service designer, Case 7). The use of workshops was especially indicated as a way to "*facilitate the integration of ideas from stakeholders from different backgrounds", because they "stimulated everybody to share their ideas and perspectives in a non-hierarchical way*" (Former patient, Case 2). A nurse from Case 2, for instance, reports during the workshops "*we were divided groups to discuss ideas to improve the patients' safety at the hospital. It was interesting to have a former patient with us, because she was really helpful to provide us with information from the patients' perspective*" (Nurse, Case 2). As such, the "*user-centered perspective brought by service design*" was reported by the cases to also enhance the

integration of multidisciplinary perspectives, because "*the users were put in the center of the solutions; so, it was not about 'what I think it would be better for the users' but 'what they said during the interviews what they needed in a better service*" (Innovation Manager, Case 7). This human-centered approach was also reported as a strategy to balance the power relations during workshops, where "*the focus was placed on helping the customer, so it didn't matter how much I knew more or less regarding my colleagues, everybody was learning something new about people's needs which were not being satisfied in the current service*" (Project director, Case 1).

Besides, the use of visualizations were reported as a way to boost the integration of multidisciplinary contributions. Interviewees indicate these benefits by "*sharing journey maps to show the service processes from the users' perspective*" (Psychologist, Case 7), "*using service blueprint to support communication between the design and development team*" (UX Designer, Case 1), as well as by "*using sketches, materials and presentations as objects that the whole group of multidisciplinary professionals could understand and share their opinions about*" (Communication strategist, Case 2).

Finally, specifically on Case 6, service design was reported as "*a mindset and a working culture*" (Designer, Case 6), which also supported the integration of multidisciplinary contributions:

> *Since our team is in a design agency and we work together for a long time with design thinking and now service design, we were already used to experimental aspects of the process and how to constantly interact between each other to evolve our design solutions. This design mindset is already permeated in our company and this also influences the people we hire; they must be open to work in this way" (Designer, Case 6).*

Based on these results, the next subsection presents the contributions and implications of this investigation.

6.6 Discussion of Study 3

This study systematizes and describes how service design can foster service innovation across service ecosystems levels, supported by multidisciplinary contributions. These results contribute to a deeper comprehension of service design as a multidisciplinary approach to service innovation, addressing the need for extending the foundations of service design

research within service innovation studies and sharpening its position in the design literature (Secomandi & Snelders, 2018).

First, this investigation shows that the micro, meso and macro levels at which service design can foster service innovation are inter-related and cannot be addressed in isolation, as illustrated in the framework depicted in Figure 7. The cross-case analysis shows that this interdependence is due to the fact that to create new solutions at the micro level (e.g., new touchpoints), it is necessary to understand the multiple interactions of the network of actors which they are embedded in, complemented with the understanding of laws, regulations and culture which govern these interactions.

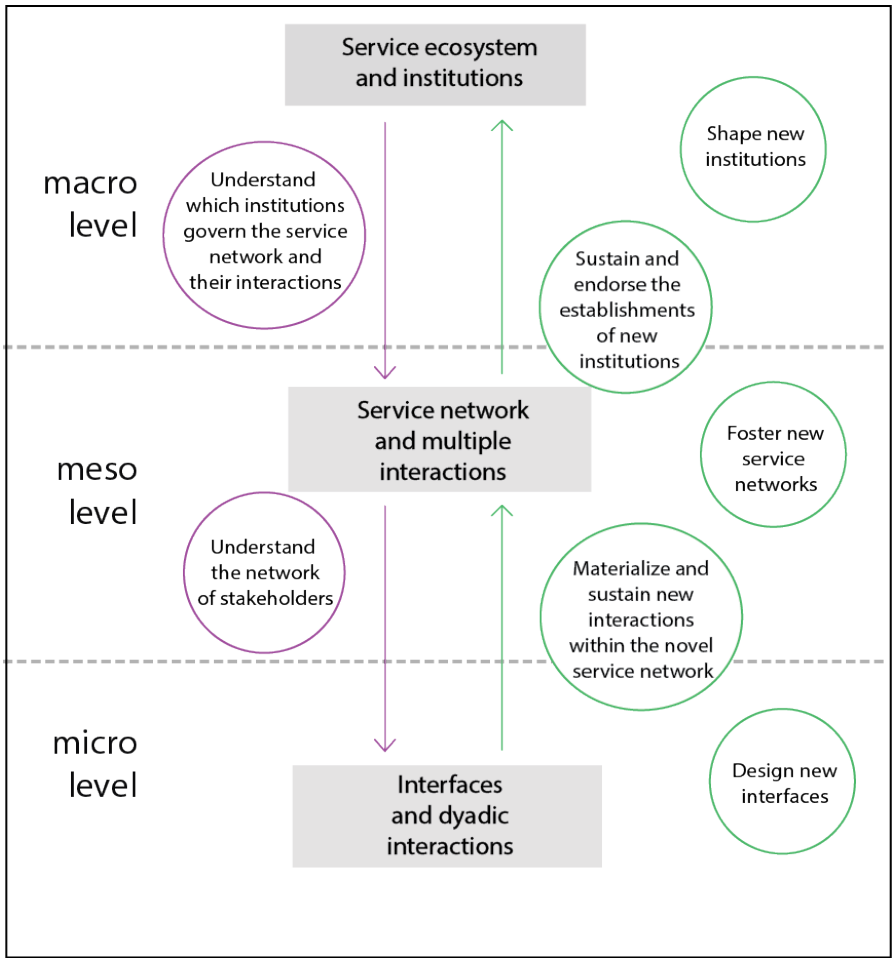


Figure 7 - Designing for service innovation across service ecosystem levels

In parallel, in order to create solutions at the meso level (e.g., new value constellations), new interfaces must be designed to materialize and sustain novel dyadic interactions within the intended service network. Consequently, to promote changes at the macro level, solutions at the micro level (e.g., new touchpoints) and at the meso level (e.g., new service networks) are

needed, to sustain and endorse the establishment of new institutions. As such, this investigation provides an integrated perspective and model to reflect on and more closely study the multi-level service design practice, advancing existing frameworks (Patrício et al., 2011; 2018b) by also considering the institutional level of service innovation. Besides, this study's results corroborate Wetter-Edman et al. (2018) research, which posits that a process of habit destabilization encouraged at the micro level can foster service innovation at the macro level, by stimulating inquiry and divergent thinking among stakeholders to change their beliefs and ways of behaving. As this Study 3 has shown, service design activities focused at the meso level are also needed to foster service innovation at the macro level, in order to foster new service networks which can defend and promote the establishment of new rules and norms.

Second, this study supports comprehending how service design can address service innovation at the meso and macro levels, providing an integrative description of service design at higher levels of complexity (Sangiorgi et al., 2017). The multiple cases study showed that the integration of service design multidisciplinary contributions is well-established when focused on enabling service innovation at the micro level, which indicates a tendency on pushing service design teams to work within organizations (as by promoting organizational change, designing new interfaces, etc.). In contrast, results indicated that when service designers work at higher levels of complexity, they need to step farther away from their comfort zones to more extensively bring contributions from other collaborative (e.g., Community psychology), strategic (e.g., Strategic management) and ecosystem-oriented (e.g., Law, Political Sciences) perspectives, in order to be able to understand and devise changes to foster new service networks (Baek et al., 2018) and institutions (Kurtmollaiev et al., 2018). As such, the more service design projects aim at fostering service innovation at the macro level, the more service design teams have to put effort in supporting conversation, policy design and agreements across very diverse partners. Whereas, the more service design teams go in detail at the micro level, they turn the attention towards operational solutions to design new interactions.

Third, this study helps to understand how multidisciplinary contributions are integrated to support service design, addressing the calls for comprehending which multidisciplinary contributions designers need to work with to sustain their practice (Yu & Sangiorgi, 2018) and which benefits multidisciplinary teams can bring to design research (D'souza & Dastmalchi, 2016). This investigation describes how Design, Management and Social Sciences in general are the fundamental transversal disciplinary areas which support service design to foster service

innovation across service ecosystem levels. As results have shown (Table 14), these areas crosscut all cases in terms of sectors, contexts and service innovation levels. However, each disciplinary area changes across the different contexts, in order to provide contributions which focus specifically on the micro, meso or macro levels. For example, Social Sciences crosscuts all levels, however, whereas projects at the micro level mention the contributions of Psychology and Anthropology, projects at the macro level highlight the contributions of Sociology, Law and Political Sciences. As such, this investigation presents that what changes in service design when fostering service innovation at distinct service ecosystem levels are the design focus and the multidisciplinary contributions integrated inside each one of those traversal disciplinary areas, as illustrated in Figure 8.

At the micro level, cases' analysis indicates a design focus on understanding users' needs, creating new interactions and supportive service delivery processes, as a way to improve the user experience, by integrating experiential and operational contributions such as from UX Design, Operations management and Anthropology. At the meso level, results present a design focus on understanding stakeholders' interests and their connections, as well as on fostering new relations among them in order to build new service networks, bringing together strategic and participatory contributions such as from Strategic design, Project management and Community psychology. Finally, at the macro level, results characterize a design focus on comprehending and informing changes to the institutional dimension of service ecosystems (Wetter-Edman et al., 2018), integrating societal and institutional contributions, such as from Policy design, Strategic management, as well as from Sociology and Law.

Therefore, this study improves the understanding of service design as a transversal approach which can foster service ecosystem innovation (Sangiorgi et al., 2019), by showing it is not only informed by Design contributions, but also by Management and Social Sciences ones. This result contributes to service design researchers and educators to know which multidisciplinary knowledge they can integrate to their praxes, in order to employ and teach service design as a multidisciplinary approach to service innovation (Sangiorgi & Prendiville, 2017).

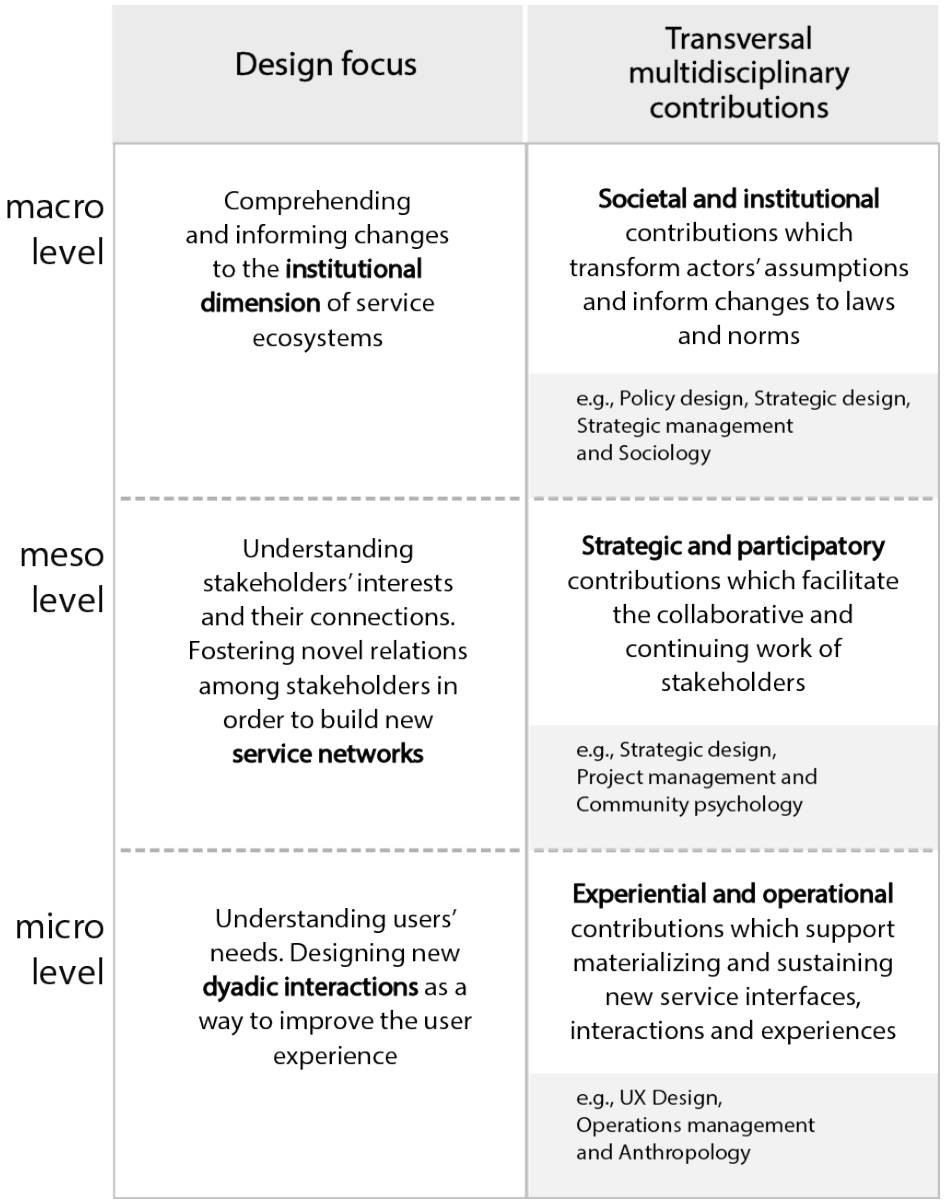


Figure 8 - Design foci and transversal multidisciplinary contributions which support service design across service ecosystem levels

Nonetheless, Study 3 contributes to complementing the literature about multidisciplinary collaboration presented in subsection 2.3.2, in the theoretical foundations chapter of this thesis. As this study shows, multidisciplinary collaboration in service design can be facilitated by the use of workshops and visualizations, which assist the integration of ideas from stakeholders coming from different fields in a non-hierarchical way. These results are aligned with literature which shows those approaches can support overcoming communication issues (Driver et al., 2011), by permeating a common language which facilitates discussion to create a shared vision (Kasali & Nersessian, 2015; Kelly, 2017; Niinimaki et al., 2017). This literature is corroborated by this investigation, which shows that a user-centered perspective also enhances

multidisciplinary collaboration by facilitating decisions based on what is best for the users. Besides, results indicate that service design is also employed as a process and a mindset which facilitate integrating multidisciplinary contributions inside organizations, as indicated by Sangiorgi et al. (2019).

Finally, by characterizing designing for service innovation at the micro, meso and macro levels of service ecosystems in different projects, this study shows an open space for further integration of other multidisciplinary contributions. For instance, service design teams could benefit from the interactive contributions from service theater (Penin & Tonkinwise, 2009) to support designing for service innovation at the micro level, while Organizational and Management studies could support fostering cross-organizational service networks (Moller & Halinen, 1999). Still, contributions from Legal Design (Hagan, 2016) could be integrated in service design projects focused on enabling service innovation at the macro level, with a view to making legal systems and services more human-centered.

6.7 Conclusions of Study 3

This investigation builds a multidisciplinary perspective on service design through an empirical study of service design practice, by characterizing how service design integrates multidisciplinary contributions to foster service innovation at different service ecosystems levels. This study is exploratory and descriptive in nature with a view to enriching limited empirical knowledge on the service design multidisciplinary practice (Sangiorgi et al., 2019). As such, this study supports practitioners by proposing a theoretical perspective on how to better reflect and operate on their service design practice (Sangiorgi & Prendiville, 2017), considering the interrelation and application of different design foci, approaches, techniques and tools, which multidisciplinary teams can use to collaborate and foster service innovation at distinct levels of complexity.

In particular, Study 3 contributes to service design researchers and practitioners to better comprehend the interconnections of service design decisions across these levels works, as well as which types of multidisciplinary contributions are integrated to sustain this practice. Therefore, by using the service ecosystem concept (Lusch & Vargo, 2014) as an integrative framework, this investigation supports evolving fundamental connections between service

design and service innovation studies (Secomandi & Snelders, 2018; Patrício et al., 2018; Ostrom et al., 2015).

Despite efforts to characterize the integration of multidisciplinary contributions to service design across different levels, this study does have limitations. Firstly, a specific set of 9 cases were analyzed, which means that a sample of service design multidisciplinary contributions was selected, influencing the results. This limitation was partially overcome by strengthening the data analysis through the selection of cases from a wide range of service sectors to avoid industry-specific findings. Further research could evolve this investigation, by focusing on a specific service relate industry in order to withdraw conclusions to support service innovation in a specific area. This could be complemented by studies that research other multidisciplinary contributions connected to service design that were not considered in this investigation. Secondly, this research presents context-specific findings restricted to the analysis of the selected 9 cases. As such, these initial findings could be tested or complemented based on a larger set of samples to be developed into more generalizable theories (Tsang, 2013).

Thirdly, the selected cases which illustrate service design applied to foster service innovation at the macro level were only identified in the public realm, therefore, representing projects engaged in creating or improving public policies. This may be a consequence of the emergent tendency of applying service design to create and improve public policies (Burns et al. 2006; La 27e Région, 2015; Bason, 2017). One interesting aspect, in terms of future research, could be investigating how service design can be developed and applied to foster institutional innovation outside the public sector domain as, for instance, in technological service ecosystems led by global companies (e.g., Amazon, Facebook, etc.).

Finally, the results also indicate emerging research areas for the service design field. One of these emerging research topics that seems notably important refers to the need for service design specialized techniques to foster service innovation at higher levels of complexity. As this study has revealed, there is a gap in service design research in terms of approaches to support service design practice at the meso level and, especially, at the macro level of service ecosystems. As such, further research is needed to sustain service design focused on enabling service innovation at those levels, through the development of tools and techniques that support the work of service designers when designing for service networks and institutions, respectively.

7 CONTRIBUTIONS

This thesis addressed as research challenges the lack of an integrative understanding of service design as a multidisciplinary field and approach (Sangiorgi & Prendiville, 2017; Patrício et al., 2018; Secomandi & Snelders, 2018), which hampers its potential to foster service innovation (Ostrom et al., 2015; Patrício et al., 2018). On the one hand, the lack of a comprehensive understanding of which are and how multidisciplinary perspectives contribute to service design hinders the mutual understanding and collaboration among service designers coming from different fields, thereby creating the risk for researchers and practitioners to build knowledge in silos (Anderl *et al.*, 2009). On the other hand, the lack of a shared comprehension among different service design perspectives has implications for service innovation, as service design has a key role in bringing new services to life (Ostrom et al., 2010). As such, research has highlighted the need to further establish the connections between service design and service innovation studies (Patrício et al., 2018), especially when supported by multidisciplinary teams (Ostrom et al., 2015), in order to unite research efforts to advance and strengthen service design as a multidisciplinary field and approach to service innovation.

In order to address these challenges, this investigation developed three interconnected studies. Study 1 comprised an expert-based literature review of multidisciplinary publications suggested by service design and innovation experts, addressing the first research objective of this thesis of comprehending which are the core multidisciplinary perspectives and their contributions to service design (Joly et al., 2019). Building upon the results from Study 1, Study 2 involved a qualitative research (Gioia et al., 2012) comprising focus groups with 6 service design and innovation academic centers, addressing the second research objective of integrating a shared ground for the evolution of service design as a multidisciplinary field and approach (Joly et al., 2018). Study 3 developed a multiple case study (Yin, 2018) of 9 service design projects developed by multidisciplinary teams in organizations, addressing the third research objective of characterizing how service design can foster service innovation at distinct levels of complexity by integrating multidisciplinary contributions (Joly et al., n.d.). As such, Study 3 complemented the prior studies with an empirical investigation of service design practice, involving projects at different levels of complexity within multidisciplinary contexts.

As a result from these three studies, this thesis has produced as outcomes, respectively: (1) the identification of core multidisciplinary perspectives on service design and the systematization

of how they contribute to this field, in terms of goals, objects, approaches and outcomes (Joly et al., 2019); (2) the description of shared research foci, complemented by specific research foci, among the core multidisciplinary perspectives on service design, organized across the micro, meso and macro levels of service ecosystems (Joly et al., 2018), and (3) the systematization and description of how service design changes when fostering service innovation at the different levels of service ecosystems, in terms of design focus, approaches, tools and techniques, and multidisciplinary contributions (Joly et al., n.d.). Figure 9 presents a diagram of these studies' outcomes and the main thesis' contributions they compose.

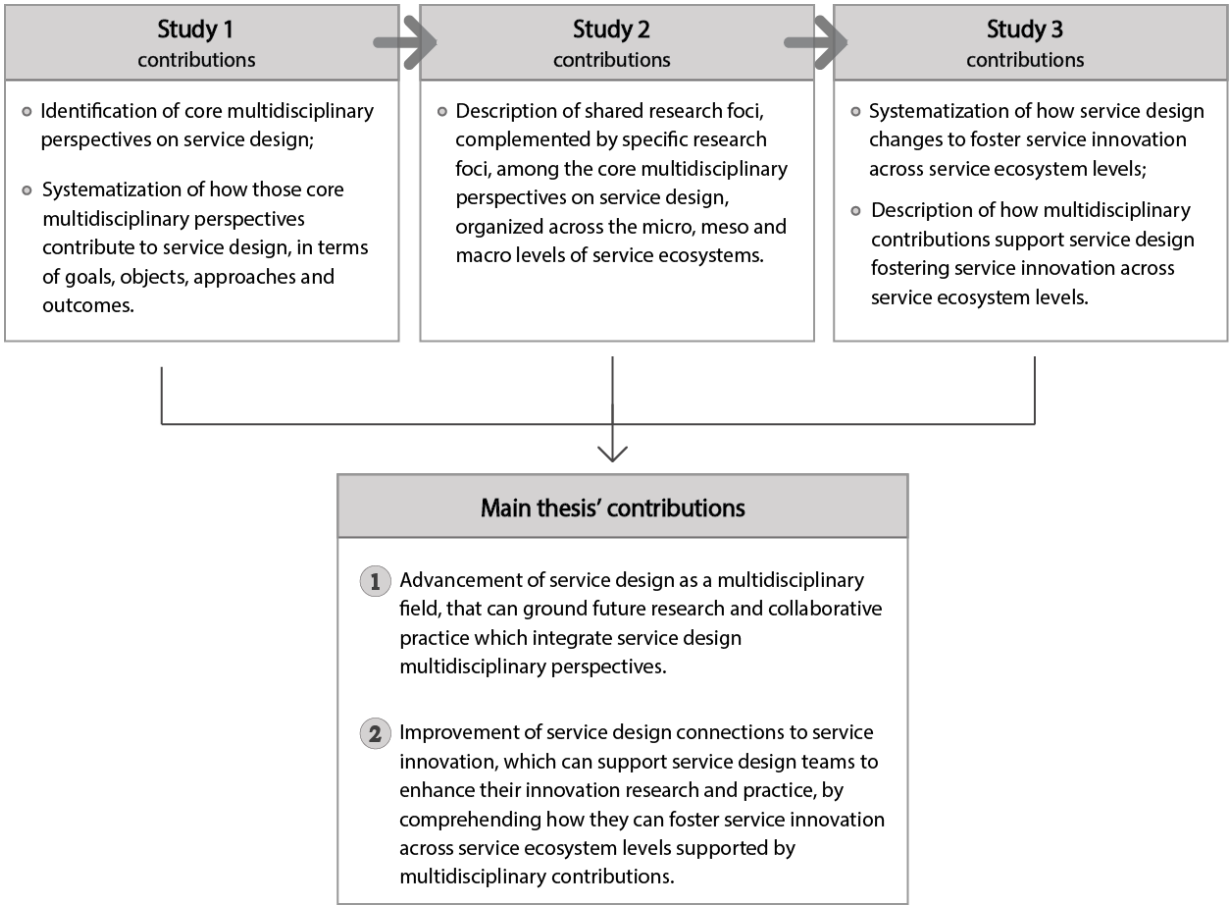


Figure 9 - Thesis' contributions

Overall, as Figure 9 shows, this thesis offers two main contributions to the service and the design communities, namely: (1) the advancement of service design as a multidisciplinary field, which can ground future research and practice that integrate service design multidisciplinary perspectives, and (2) the improvement of service design connections to service innovation, which can support multidisciplinary teams to foster service innovation at

different levels of complexity. The following subsections discuss the implications these contributions in more detail.

7.1 Advancement of service design as a multidisciplinary field

The first main thesis' contribution is supported by Study 1 (Joly et al., 2019), Study 2 (Joly et al., 2018) and Study 3 (Joly et al., n.d.) results, responding to the call for an integrative multidisciplinary understanding of service design (Secomandi & Snelders, 2018; Patrício et al., 2018), through the characterization and integration of multidisciplinary perspectives and their contributions to this field.

Study 1 builds a comprehensive understanding of the main multidisciplinary perspectives that inform service design and which contributions they bring, answering to the first research question of "How do core multidisciplinary perspectives contribute to service design?". As such, this study systematizes Service Research and Design as the foundational perspectives to service design, supported by the also influential perspectives of Marketing, Operations management, Information Systems, and Interaction Design (Joly et al., 2019).

Based on the Study 1 results, this thesis shows the richness of contributions that those perspectives can bring to service design, making it a multidisciplinary field able to gain a broad and holistic understanding of service-related challenges (Joly et al., 2019). The systematization of those multiple perspectives elucidates the connections between the various approaches and concepts of their communities, thus supporting the dialogue and mutual understanding among service designers coming from different fields.

Study 2 supplements the outcomes from the first study by describing shared research foci, complemented by specific research foci, addressed by the multidisciplinary service design academic community, across different levels of service ecosystems (Joly et al., 2018). In this context, Study 2 reveals that shared research foci among core multidisciplinary perspectives on service design are well-developed at the micro level of service ecosystems, bringing together their contributions to service design around the research topics of an actor-centered approach, service delivery processes and service interfaces. Moreover, this study shows that the service design academic community has been extending the use of service design beyond the creation of new dyadic relations between service providers and consumers, to also focus on

designing for novel service networks as a shared concern (Joly et al., 2018). Besides, the service design emerging research area of designing for institutional change was especially identified at the macro level, which asks for further investigation in order to incorporate other fields' contributions (Joly et al., 2018).

As such, Study 2 answers to the second research question of this thesis of "How can we integrate multidisciplinary contributions to service design in order to build a shared ground for this field and approach?". By identifying shared research areas among core multidisciplinary perspectives on service design, this study indicates bridges to integrate multidisciplinary contributions in this field, as well as research topics which still need further development in order to support a shared ground for service design multidisciplinary perspectives. Thus, by bringing together Study 1 and Study 2 results, this thesis contributes to indicating complementary and shared research spaces among multidisciplinary perspectives on service design, which can be used as starting points by service designers from different backgrounds to initiate conversations and collaborations, as well as to further develop multidisciplinary theory in this field (Gustafsson et al., 2016b).

Study 3 complements results from Study 1 and Study 2, answering to the third research question of this thesis of "How service design fosters service innovation at different levels of complexity, supported by multidisciplinary contributions?". Study 3 especially contributes to advancing service design as a multidisciplinary field and approach by characterizing that, in practice, service design teams integrate a variety of multidisciplinary contributions, according to the level of complexity of their projects (Joly et al., n.d.). In this context, this study describes that the service design practice works by integrating contributions mainly from Design, Management and Social Sciences in general (Joly et al., n.d.).

As Study 3 has shown, service design can be employed as a dynamic framework which combines approaches, techniques and tools from multiple areas according to the service design activity being developed. This investigation indicates that the service design process supports this integration by providing a mindset and a methodological framework that guides which activities can be developed according to the stage of the service design project (Joly et al., n.d.).

Additionally, as Study 3 has presented, service design approaches, such as the use of workshops and visualizations, can sustain the integration of multidisciplinary contributions by

facilitating communication and the creation of a shared vision which fosters collaboration between involved stakeholders. This is aligned with the literature review on multidisciplinary collaboration presented in the theoretical foundations chapter of this thesis, which shows that the use of approaches and techniques, such as a design thinking process (Barbero & Bicocca, 2017; D'souza & Dastmalchi, 2016) and visualizations (Kasali & Nersessian, 2015; Kelly, 2017; Niinimaki, Tanttu, & Kohtala, 2017), work as strategies to integrate multidisciplinary contributions in the design and innovation context. As such, this third study reinforces the understanding that service design operates as a transversal approach which assists integrating multidisciplinary contributions (Sangiorgi et al., 2019).

Hence, by bringing the results from these three studies together, this thesis shows a landscape of multidisciplinary areas whose contributions can be integrated by service design, as illustrated in Figure 10. This figure presents a snapshot of the multidisciplinary areas indicated, either in the expert-based literature review (Study 1), or the focus groups (Study 2) or the multiple case study (Study 3), as bringing contributions which were actually integrated in service design projects. As these 3 studies followed a qualitative approach based on data coding (Gioia et al., 2012), those areas were identified under the category of multidisciplinary contributions emerged from data analysis. As such, Figure 10 illustrates the landscape of multidisciplinary areas contributing to service design as a result from the investigation evolution developed along this thesis.

The thesis started with an expert-based literature review, identifying the main 6 areas which research and publish about service design: Service Research, Design, Marketing, Operations Management, Information Systems and Interaction Design (Joly et al., 2019). Then, focus groups were developed with service design and innovation academic centers, and other areas emerged as contributing to this field, such as Architecture and Anthropology (Joly et al., 2018). Finally, the multiple case study enabled identifying still other multidisciplinary contributions integrated in the service design practice, such as from Psychology, User experience design, Computer Sciences, Policy design, Strategic management, Law and Sociology (Joly et al., n.d.).

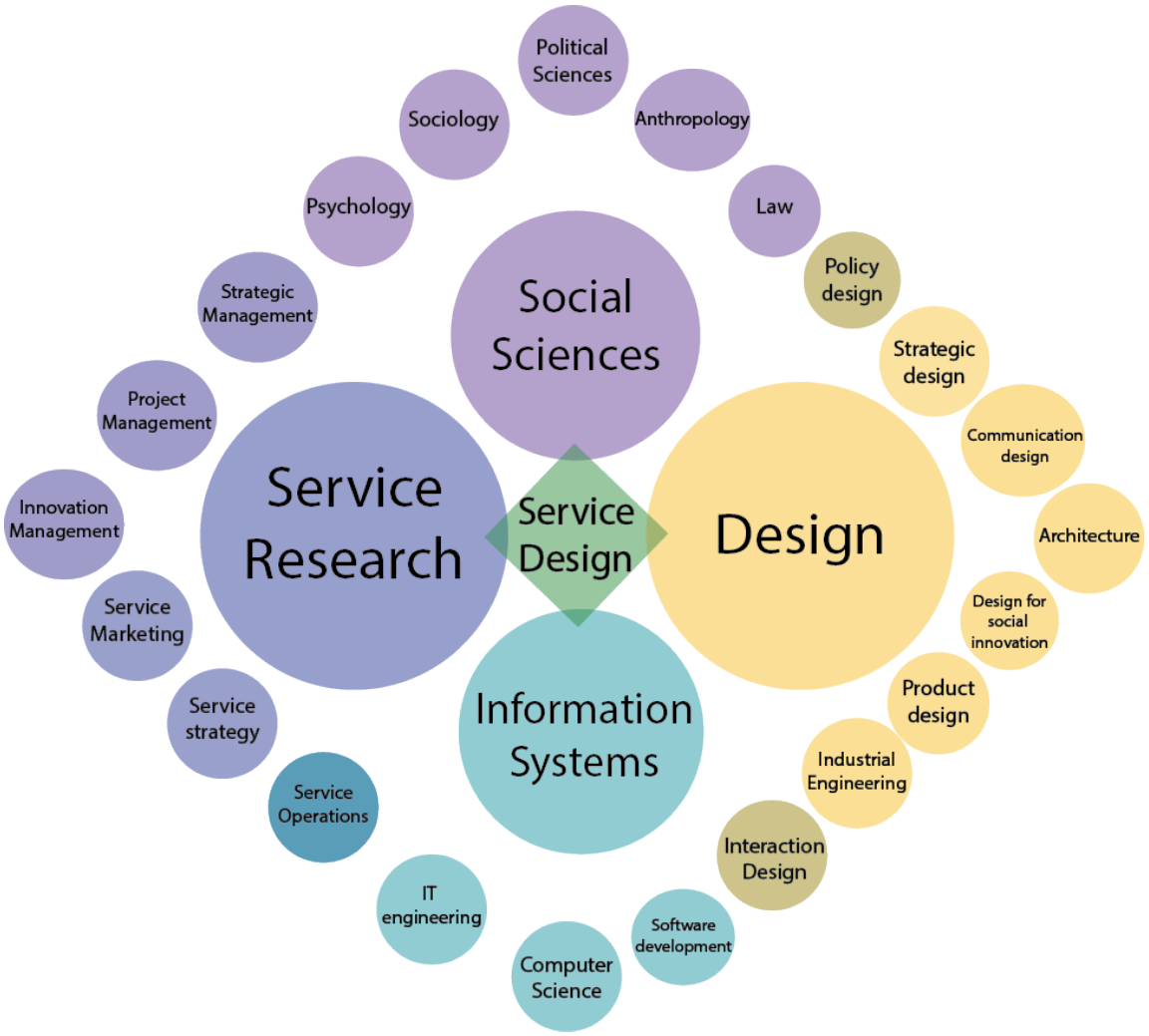


Figure 10 - Landscape of multidisciplinary areas which contribute to service design

Therefore, as Figure 10 shows, Service Research and Design are the main multidisciplinary perspectives which inform and integrate the service design field (Joly et al., 2019). Social Sciences is the broad field which integrates multiple areas that also bring significant contributions to understand and engage actors in service design projects, as well as to design for institutional change (Joly et al., n.d.). Finally, the technological component is brought by Information Systems, which was indicated in both Studies 1 and 3 as a fundamental aspect to support the design of new service delivery systems (Joly et al., 2019; n.d.).

By examining and integrating those multiple contributions, this thesis offers a fundamental theoretical piece to the service and the design communities, which can be used as a starting point to foment more multidisciplinary academic programs in service design (POLIMI, 2018). The in-depth examination of bibliography provided by this thesis can support creating a discipline about 'service design multidisciplinary research', or improving academic programs

by integrating concepts, approaches, tools and theories from multiple perspectives on service design. In this context, this thesis can support academic programs to create their own service design lines of research, following and emphasizing their particular disciplinary perspectives and contributions to this approach, as well as the levels of service innovation which they mostly address. This could result in an even stronger and faster development of service design as a multidisciplinary academic field.

All in all, by integrating multidisciplinary perspectives on service design, this investigation supports researchers and practitioners from multiple fields to better situate and position their service design work. Thus, this thesis creates a robust ground which advances service design as a multidisciplinary field, thereby encouraging and enhancing the use of its approach by professionals from different areas.

7.2 Improvement of service design connections to service innovation

The second thesis' main contribution is primarily based on Study 3, responding to the call for evolving fundamental connections between service design and service innovation studies, supported by multidisciplinary contributions (Ostrom et al., 2015; Patrício et al., 2018).

Study 3 contributes to advancing the understanding of service design as a multidisciplinary approach to service innovation, by systematizing how this practice changes, in terms of design focus, techniques, tools and multidisciplinary contributions integrated, when fostering innovation at the micro, meso and macro levels of service ecosystems (Joly et al., n.d.). As such, this third study contributes to sharpening service design contributions to service innovation research (Patrício et al., 2018), by characterizing service innovation as a multi-dimensional phenomenon (Gustafsson et al., 2016), which can manifest at different levels of service ecosystems (Chandler & Vargo, 2011). By describing service innovation under a service ecosystem view (Lusch & Vargo, 2014), this investigation facilitates and enhances the connections of service design to this phenomenon, since this systemic perspective on service innovation is aligned with the holistic approach employed by service design (Wetter-Edman et al., 2014).

Overall, this thesis shows how the service ecosystem concept (Lusch & Vargo, 2014) can work as an abstraction which supports integrating service design multidisciplinary contributions to

service innovation. While Study 1 has identified and systematized that service design multidisciplinary outcomes can be positioned at the micro, meso and macro levels of service ecosystems (Joly et al., 2019), Study 2 has examined the different service ecosystem levels which service design scholars have been focused on when developing their research (Joly et al., 2018). Study 3 advances this comprehension by describing that not only Design, but also Management and Social Sciences in general work as transversal disciplinary areas, which support service design to foster service innovation across service ecosystem levels (Joly et al., n.d.).

One interesting tendency, especially identified in Study 2 and Study 3, is that service design is well-developed when fostering service innovation at the micro level, focused on designing new interfaces, interactions and experiences. However, the application of service design at the macro level is still an emergent practice. In this context, Study 3 contributes to illustrate how service design teams have been fostering institutional innovation, through changing and improving public regulations (Joly et al., n.d.). As a matter of fact, literature on service design connected to institutional change, even if still emergent, is already much more advanced in terms of concepts and frameworks, when compared to what was found in the service design practice analyzed in Study 3.

The literature connecting service design to institutional change, analyzed in that study, describes the role service design practice can have in creating processes that support divergent thinking, habit destabilization and, consequently, the change of actors' beliefs and behaviors (Wetter-Edman et al., 2018). This stream of literature has been notably interested in investigating the use of design approaches (e.g., co-design workshops, prototyping), as a way to support questioning stakeholders' assumptions (Vink et al., 2019b) and shaping mental models (Vink et al., 2019), by building an awareness among actors about the need to change existing regulations.

Cases analyzed at the macro level in Study 3 show that service design has not fully apprehended the conceptual frameworks developed in the literature associated with this practice. These cases have not indicated a specific service design systematic approach aimed at promoting institutional innovation. They have focused, instead, on service design activities, approaches and tools which could support teams to envision, build and implement new public regulations. Therefore, although Study 3 only illustrates service design projects in the public sector realm,

it was already noticed the need to develop and test service design approaches and tools especially focused on promoting institutional change, in order to strengthen the service design multidisciplinary practice at this level.

Nonetheless, this thesis shows that the service ecosystem concept (Lusch & Vargo, 2014) can work as a theoretical framework which is flexible to coordinate and integrate the multidisciplinary contributions that support service design to foster service innovation across its levels. Study 3 contributes to comprehending that the micro, meso and macro levels at which service design can foster service innovation are inter-related and cannot be addressed in isolation (Joly et al., n.d.). As such, this investigation contributes to service design researchers and practitioners to comprehending how the movement of service design activities across these levels works, as well as which types of multidisciplinary contributions are needed to sustain this practice (Joly et al., n.d.).

The integrated understanding of service design as a multidisciplinary field and approach built by this thesis, therefore, answers to the main research question of "How service design can foster service innovation supported by the integration of multidisciplinary contributions?", as illustrated in Figure 11.

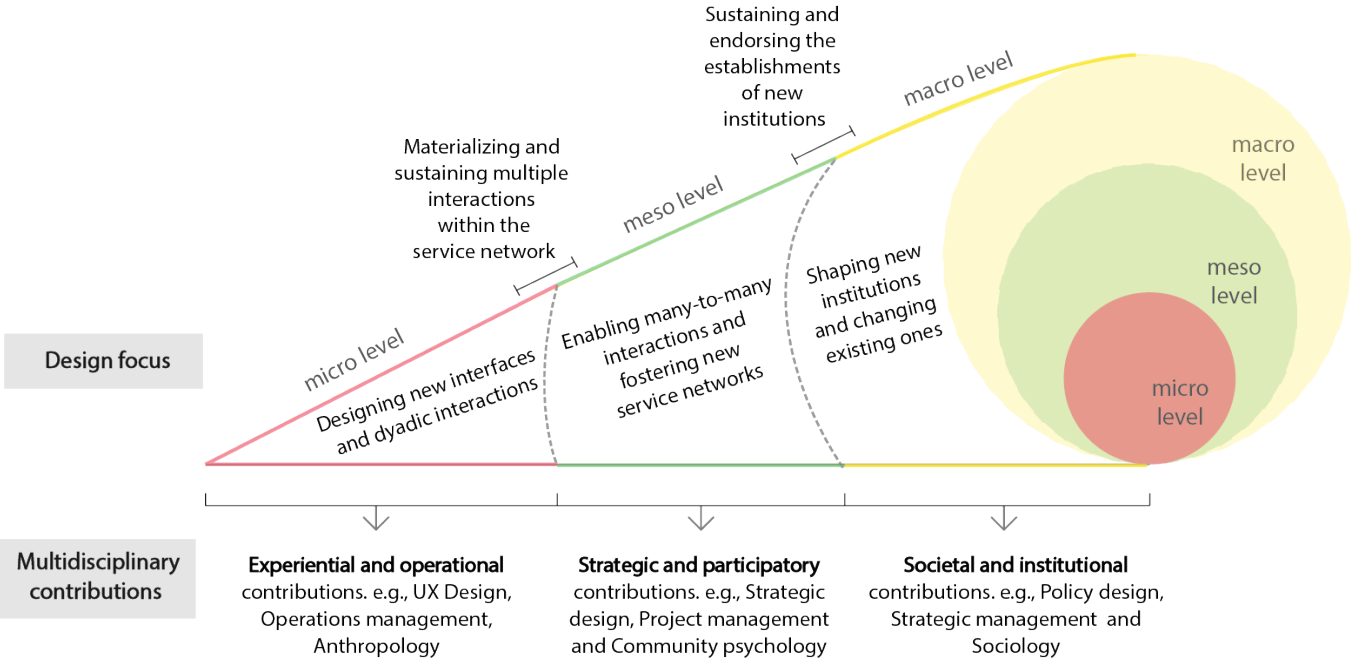


Figure 11 - How service design can foster service innovation supported by the integration of multidisciplinary contributions

As Figure 11 shows, service design can foster service innovation by, on the one hand, alternating the design focus according to the service ecosystem level the project is addressing. On the other hand, service design teams can foster service innovation by integrating distinct types of multidisciplinary contributions according to the design focus defined by the project (Joly et al., n.d.). Therefore, at the micro level, service design has a focus on designing new interfaces and dyadic interactions, supported by operations and experiential contributions. At the meso level, the focus is placed on enabling many-to-many interactions, by employing strategic and participatory multidisciplinary competences to engage stakeholders and converge their interests. Finally, at the macro level, the focus is turn to shaping institutions or changing existing ones, by bringing together societal and institutional contributions in order to innovate regulations and transform actors' behaviors. Additionally, as shown in Figure 11, connecting activities are also needed to support service design projects moving up and moving down - zooming-in and zooming-out (Mager, 2009) – to sustain the service design practice, when changing the service innovation focus to higher or lower levels of complexity. In order to foster service innovation at the meso level, new interfaces need to be designed, with a view to materializing and sustaining novel service networks. Whereas, to sustain and endorse the establishments of new institutions, a novel service network must be arranged around the service concept being designed, in order to guarantee long-term collaboration and the implementation of the intended solutions. Inversely, understanding and designing new dyadic interactions between actors, at the micro level, can also support fostering new service networks. While, understanding and integrating a service network around a new service concept, such as by developing participatory design workshops, can also sustain and inform the establishment of new institutions (Joly et al., n.d.).

As such, Study 3 builds a theoretical perspective and model on how to better reflect and operate on the service design practice, improving the connections of the multi-level character of service design (Patrício et al., 2011) to the multi-dimensional phenomenon of service innovation (Gustafsson et al., 2016). This comprehension, reflected on Figure 11, advances existing service design frameworks, namely by also considering the institutional level of service innovation (Patrício et al., 2011; 2018b), and by characterizing how the meso level works as a connecting space which supports service design activities at the micro level to foster institutional change at the macro level (Wetter-Edman et al., 2018). Moreover, Study 3 complements the literature presented in the theoretical foundations chapter of this thesis, by

showing that not only T-shaped professionals (Niinimaki et al., 2017) are needed to support collaboration in service design, but also service design activities (Joly et al., 2019) which connect and escalate service innovation across service ecosystem levels. This systematization offers a relevant contribution to organizations interested in using service design, by indicating which sets of multidisciplinary competences and activities they need to integrate in their teams in order to address service innovation at different levels of complexity.

In summary, this thesis contributes to an enhanced comprehension of service design as an innovation approach, by delineating it as a multidisciplinary and multi-level practice which can foster service innovation across different levels of service ecosystems (Joly et al., 2019; Joly et al., 2018; Joly et al., n.d.). More explicitly, it is a multidisciplinary approach because it can integrate contributions from Service and Design related areas, in order to compose a holistic and dynamic practice able to address the distinct objects of service-related challenges (e.g., service interface, service delivery processes, supportive technology, etc.). It is a multi-level approach, because it involves activities focused on enabling transformations at the micro, meso and/or macro levels of service ecosystems, as the different contexts in which value co-creation can be supported. Finally, this thesis shows that service design can approach service innovation as a multi-dimensional phenomenon, since this comprehension supports systematizing the integration of service design approaches, tools, techniques and multidisciplinary contributions, according to the levels of service ecosystems in which transformations are aimed by projects. For instance, if the goal is to improve the customer experience, operational and experiential contributions (e.g., UX Design, Anthropology) can be brought together to understand users, as well as to envision and design new touchpoints and interactions. Whereas, if the goal is to form a new entrepreneurial community, strategic and participatory contributions can be integrated (e.g., Strategic design, Participatory design), in order to foster novel relations among stakeholders to build a new service network. Nonetheless, this investigation also contributes to evolving service design to higher levels of complexity, by presenting how the integration of multidisciplinary contributions supports this approach to foster transformations, which can range from service encounter changes, passing through new service networks, until shaping new institutions (Joly et al., 2019). As such, by using the service ecosystem concept (Lusch & Vargo, 2014) as an integrative framework, this thesis supports evolving fundamental connections between service design and service innovation studies (Ostrom et al., 2015; Patrício et al. 2018).

8 CONCLUSIONS

This thesis addresses the need for an integrative understanding of service design as a multidisciplinary field and approach to service innovation (Ostrom et al., 2015; Patrício et al., 2018; Secomandi & Snelders, 2018). As such, it aimed at comprehending and integrating multidisciplinary perspectives and their contributions to service design, as well as characterizing how service design can foster service innovation supported by those multidisciplinary contributions.

Following a qualitative methodological approach, this thesis develops important contributions for multidisciplinary research and practice in service design. The first study (Joly et al., 2019) identifies core multidisciplinary perspectives and their contributions to service design, systematizing service design as an activity composed by goals, objects, approach and outcomes. The second study (Joly et al., 2018) describes shared, specific and emergent research areas to service design, by examining academic research centers which represented the core multidisciplinary perspectives on service design identified in the first study. Built on the results from Studies 1 and 2, the third study (Joly et al., n.d.) characterizes how service design changes to foster service innovation across service ecosystem levels supported by multidisciplinary contributions.

Overall, these three studies compose two substantial contributions to the service and the design communities: (a) the advancement of service design as a multidisciplinary field, that can ground future research and collaborative practice that integrates multidisciplinary perspectives on service design, and (b) the improvement of service design connections to service innovation, which can support service design multidisciplinary teams to enhance their innovation research and practice in this field, by comprehending how they can foster service innovation across service ecosystem levels.

In spite of the efforts to advance service design as a multidisciplinary field and approach to service innovation, this investigation also has some limitations, which indicate directions for future research. Firstly, the research process of Study 1 was expert-based, which means that a sample of service design experts was selected, influencing the choice of the suggested literature that grounded the characterization of service design as a multidisciplinary activity (Joly et al., 2019). This limitation was partially overcome with Study 2, by strengthening the analysis of

the literature review with focus groups involving 40 researchers from 6 service design perspectives, developed in 5 different countries (Joly et al., 2018). Besides, the research process of Studies 1 and 2 concentrated mostly on collecting multidisciplinary contributions from the point of view of service design scholars. This limitation was supplemented with Study 3, which also described which multidisciplinary contributions can be integrated in the practice of service design (Joly et al., n.d.).

Secondly, Study 3 collected a specific set of 9 cases, which influenced in the sample of multidisciplinary contributions being analyzed in this thesis, during the examination of the service design practice (Joly et al., n.d.). Likewise, this third study presented context-specific findings restricted to the analysis of those selected 9 cases. These limitations were partially reduced by strengthening the data analysis through the selection of cases from a wide range of service sectors, to avoid industry-specific findings. Further research could complement this investigation's results by using a larger sample, such as by employing surveys, in order to develop more generalizable theories (Tsang, 2013). Additionally, Study 3 had the limitation of involving service design projects at the macro level only from the public sector. As a direction for future research, new case studies could be developed in order to explore how service design can foster institutional innovation outside the public sector domain as, for instance, in service ecosystems led by global organizations. Besides, the Study 3 results could be evolved to a methodological framework with a view to integrate service design multidisciplinary contributions to service innovation, such as by developing a design science research investigation (Hevner, March, Park, & Ram, 2004) with organizations which involve service design multidisciplinary teams.

As the service design community grows towards becoming more multidisciplinary, future research could provide an updated literature review, in order to outline which new areas are approaching and contributing to service design. Moreover, the effects of the integration of multidisciplinary contributions could be investigated in the service design education context, in order to verify which new skills students can learn and apply within service design multidisciplinary projects. Similarly, other methodological approaches could be employed to provide quantitative evidence of the multidisciplinary nature of service design. For instance, a text-mining approach (Ordenes, Theodoulidis, Burton, Gruber, & Zaki, 2014) could be used to expose which terms and concepts have been borrowed and lent among multidisciplinary perspectives on service design, in order to build a multidisciplinary lexicon or find other

crossing research topics for this field. Crossing the results from those potential studies with this thesis would be helpful to strengthen the multidisciplinary foundation of service design.

Similarly important, this thesis indicates that the service design academic community is extending the use of service design beyond the creation of new dyadic relations between service providers and consumers, to also focus on designing for new service networks and for institutional change (Joly et al., 2019; 2018). In this context, an emerging research topic which seems especially relevant is the link between service design, as a multidisciplinary approach, to service innovation at the macro level of service ecosystems.

Study 1 has shown that the connections between service design and institutional change are mainly supported by Design and Service Research perspectives (Joly et al., 2019). A Design perspective brings a transformational approach (Burns et al., 2006; Sangiorgi, 2011) to service design, focused on enabling society-driven innovation, by addressing social challenges and creating solutions that support more sustainable service ecosystems (Baek et al., 2015). Whereas, Service Research shows an emerging concern about understanding social structures (Edvardsson & Tronvoll, 2013) and on breaking down existing institutional arrangements, in order to reconfigure new service ecosystems based on novel practices and beliefs (Wetter-Edman et al., 2018; Vink et al., 2019).

Study 2 has supplemented those outcomes by showing that service design academics advocate that service design can only create the conditions (e.g., by challenging stakeholders' assumptions, designing new infrastructures) to possibly change key stakeholders' mindsets, influencing in the creation of new rules and norms at the macro level of service ecosystems (Joly et al., 2018). Study 3 has added to this discussion that, in practice, the integration of service design multidisciplinary contributions is well-established when focused on enabling service innovation at the micro level of service ecosystems, such as by designing new interfaces (Secomandi & Snelder, 2011) or by promoting organizational change (Junginger, 2015). However, as Study 3 has shown, when service designers work at the macro level of service ecosystems, they need to bring contributions from ecosystem-oriented (e.g., Law, Political Sciences, etc.) multidisciplinary perspectives, which are still not fully integrated by service design (Joly et al., n.d.).

As such, this thesis indicates that advancing the integration of multidisciplinary contributions to foster service innovation at the macro level of service ecosystems is a critical emerging research area to service design. This research space, although already partially addressed by existing literature, such as in terms of understanding and designing complex systems (Ostrom et al., 2015; Sangiorgi et al., 2017) and exploring service design connections to institutional change (Wetter-Edman et al., 2018; Vink et al., 2019), is notably recognized by this thesis as a research domain which can support the evolution of the service design field towards tackling projects at higher levels of complexity. Future research could evolve the comprehension of how and which new multidisciplinary contributions service designers could integrate, in order to address innovation at the macro level, as well as which concepts, theories, approaches and tools could be developed, in order to support service designers in this endeavor.

This is also connected to the integrated perspective provided by this thesis which reflects on the multi-level service design practice (Joly et al., n.d.). By describing how the integration of specific types of multidisciplinary contributions can support service design to foster service innovation across the service ecosystem levels, this thesis contributes to advancing existing multi-level service design frameworks (Patrício et al., 2011; 2018b). Future research could still advance this theoretical perspective on service design, by describing which are the principles, approaches and tools that can support multidisciplinary teams to better navigate and coordinate their design decisions across these different levels of service innovation. For instance, which approaches and tools could be developed to integrate service design activities across service ecosystems levels, such as when designing new public policies, is an interesting topic to be further explored. Moreover, future studies could investigate which are new competences service designers need to develop, in order to address and coordinate their design decisions in projects involving different levels of complexity (e.g., designing for new interactions, service networks and, new regulations).

Nonetheless, service design is characterized by this thesis as a multi-level and multidisciplinary approach able to foster service innovation at different levels of service ecosystems. As such, it is also important to explore and further discuss that, when service design teams integrate multidisciplinary contributions to address service innovation at higher levels of complexity, they are also touching other existing design areas, such as System design, Policy design and Social design. Therefore, new studies in service design could promote a dialogue with those

and other relevant areas, in order to understand their complementarities and divergences, with a view to enrich the service design field, as well as to better define its limitations.

Still, it is important to highlight that connections between service design and service ecosystem innovation were indicated in the results from Study 1 (Joly et al., 2019), being further explored in Study 3, in terms of how multidisciplinary contributions can support service design to foster service innovation across service ecosystem levels (Joly et al., n.d.). As such, this thesis did not address the possible link between service design and Service Science, defined as an interdisciplinary field focused on studying service systems as complex constellations of value co-creating resources (Vargo, Maglio et al. 2008). Future studies could further explore the contributions service design can bring to Service Science, as a multidisciplinary and multi-level approach to service ecosystem innovation, therefore increasing the importance and possible use of this approach among service scientists.

All in all, we hope this thesis supports researchers, academics and practitioners from diverse areas to have a more integrated perspective on service design as a multidisciplinary field and approach to service innovation. Finally, we wish those professionals take advantage of this investigation to better situate their work, intensifying the use and development of this approach and, therefore, expanding the frontiers of service design as a multidisciplinary field.

REFERENCES

Abbott, A. (1988). *The system of professions: An essay on the division of expert labor*. Chicago, USA: University of Chicago press.

Alam, I., & Perry, C. (2002). A customer-oriented new service development process. *Journal of Services Marketing*, *16*(6), 515–534.

Akaka, M. A., Vargo, S. L., & Lusch, R. F. (2012). An Exploration of Networks in Value Cocreation: A Service-Ecosystems View. In S. L. Vargo & R. F. Lusch (Eds.), *Special Issue – Toward a Better Understanding of the Role of Value in Markets and Marketing (Review of Marketing Research, Volume 9)* (pp. 13–50). Emerald Group Publishing Limited.

AMA, A. M. A. (2013). *Definition of Marketing*. Retrieved June 21, 2019, from https://www.ama.org/the-definition-of-marketing/

Anderl, R., Voelz, D., Rollmann, T., & Lee, K. (2009). A contribution to engineering data sharing in discipline spanning global environments. *CoDesign-International Journal of CoCreation in Design and the Arts*, *5*(3), 159–174.

Anderson, Laurel, Amy L. Ostrom, Canan Corus, Raymond P. Fisk, Andrew S. Gallan, Mario Giraldo, Martin Mende, Mark Mulder, Steven W. Rayburn, Mark S. Rosenbaum, Kunio Shirahada, and Jerome D. Williams (2013). Transformative Service Research: An Agenda for the Future. *Journal of Business Research*, *66*(8), 1203-1210.

Andreassen, T. W., Kristensson, P., Lervik-Olsen, L., Parasuraman, A., McColl-Kennedy, J. R., Edvardsson, B., & Colurcio, M. (2016). Linking service design to value creation and service research. *Journal of Service Management*, *27*(1), 21–29.

Antons, D., & Breidbach, C. F. (2018). Big Data, Big Insights? Advancing Service Innovation and Design With Machine Learning. *Journal of Service Research*, *21*(1), 17–39.

Baek, J. S., Meroni, A., & Manzini, E. (2015). A socio-technical approach to design for community resilience: A framework for analysis and design goal forming. *Design Studies*, *40*(2015), 60–84.

Baek, J. S., Kim, S., Pahk, Y., & Manzini, E. (2018). A sociotechnical framework for the design of collaborative services. *Design Studies*, *55*(SI), 54–78.

Bagaini, A., Balmas, Z., Koryakina, A., Mangiatordi, A., Pesce, B. J., Reccia, C., … Paris, S. (2017). Multidisciplinary approach for a new vision of urban requalification. Multi-scale strategies of social innovation, economic improvement and environmental sustainability practices. *Design Journal*, *20*(1), 4778–4780.

Barbero, S., & Bicocca, M. (2017). Systemic Design approach in policy-making for sustainable territorial development. *Design Journal*, *20*(1), 3496–3506.

Baskerville, D., & Goldblatt, H. (2009). Learning to be a critical friend: From professional indifference through challenge to unguarded conversations. *Cambridge Journal of Education*, *39*(2), 205–221.

Bason, C. (2017). *Leading Public Design: How manager engage with design to transform public governance*. Copenhagen Business School.

Berry, L. L., Carbone, L. P., & Haeckel, S. H. (2002). Managing the total customer experience. *MIT Sloan Management Review*, *43*(3), 85–89.

Berry, L. L., & Bendapudi, N. (2003). Clueing in Customers. *Harvard Business Review*, (February 2003), 100–106.

Bitner, M. J. (1992). Servicescapes: the impact of physical surroundings on customers and employees. *The Journal of Marketing*, *56*(April 1992), 57–71.

Bitner, M. J., Ostrom, A. L., & Morgan, F. N. (2008). Service Blueprinting: a practical

technique for service innovation. *California Management Review*, *50*(3), 66–95.
Bitner, M. J., & Wang, H. S. (2014). Service encounters in service marketing research. In R. T. Rust & M.-H. Huang (Eds.), *Handbook of Service Marketing Research* (pp. 221–243). Cheltenham, UK: Edward Elgar Publishing Limited.
Bjögvinsson, E., Ehn, P., & Hillgren, P.-A. (2012). Design Things and Design Thinking: Contemporary Participatory Design Challenges. *Design Issues*, *28*(3), 20–34.
Blomkvist, J., & Holmlid, S. (2011). Existing Prototyping Perspectives: Considerations for Service Design. In *NorDes 2011* (pp. 1–10). Helsinki, Finland: Aalto University.
Blomkvist, J., Holmlid, S., & Segelström, F. (2010). Service Design Research: Yesterday, Today and Tomorrow. In M. Stickdorn & J. Schneider (Eds.), *This Is Service Design Thinking* (pp. 308–315). Amsterdam: BIS Publishers.
Blomkvist, J., & Segelström, F. (2014). Benefits of External Representations in Service Design: A Distributed Cognition Perspective. *The Design Journal*, *17*(3), 331–346.
Blomkvist, J. (2015). Ways of seeing service: surrogates for a design material. In *Nordes 2015* (pp. 1–4). Stockholm.
Bond, L. (2001). *Community Psychology definition*. Retrieved June 21, 2019,from https://compact.org/resource-posts/community-psychology/
Booth, A., Papaioannou, D., & Sutton, A. (2012). *Systematic approaches to a Successful Literature Review*. London: Sage Publications Ltd.
Botterweck, M. (2005). *Status quo*. Retrieved June 21, 2019, from https://en.wikipedia.org/wiki/Status_quo
Brakus, J. J., Schmitt, B. H., & Zarantonello, L. (2009). Brand Experience: What Is It? How is It Measured? Does It Affect Loyalty. *Journal of Marketing*, *73*(May 2009), 52–68.
Brown, T. (2008). Design Thinking. *Harvard Business Review*, *86*(6), 84–94.
Buchanan, R. (1992). Wicked problems in design thinking. *Design Issues*, *8*(2), 5–21.
Buchenau, M., & Suri, J. F. (2000). Experience prototyping. In *Proceedings of the conference on Designing interactive systems processes practices methods and techniques* (pp. 424–433). ACM Press.
Burns, C., Cottam, H., Vanstone, C., & Winhall, J. (2006). *RED PAPER 02, Transformation Design*. London: Design Council.
Chandler, J. D., & Vargo, S. L. (2011). Contextualization and value-in-context: How context frames exchange. *Marketing Theory*, *11*(1), 35–49.
Charmaz, K. (2014). *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis* (2nd ed.). London: Sage Publications Ltd.
Chen, J. S., Tsou, H. T., & Huang, A. Y. H. (2009). Service delivery innovation antecedents and impact on firm performance. *Journal of Service Research*, *12*(1), 36–55.
Chesbrough, H., & Spohrer, J. (2006). A research manifesto for services science. *Communications of the ACM*, *49*(7), 35–40.
CIA World. (2017). *GDP - Composition, by sector of origin*. Retrieved May 20, 2019, from https://www.cia.gov/library/publications/the-world-factbook/fields/214.html
Cipolla, C., & Bartholo, R. (2014). Empathy or Inclusion: A Dialogical Approach to Socially Responsible Design. *International Journal of Design*, *8*(2), 87–100.
Cipolla, C., Melo, P. O., & Manzini, E. (2015). Collaborative Services in Informal Settlements: Social Innovation in a Pacified Favela in Rio de Janeiro. In A. Nicholls, J. Simon, & M. Gabriel (Eds.), *New Frontiers in Social Innovation Research* (pp. 58–64). London: Palgrave Macmillan.
Clatworthy, S. (2011). Service innovation through touch-points: Development of an innovation toolkit for the first stages of new service development. *International Journal of Design*, *5*(2), 15–28.
Colander, D. C. (2016). *Social Science: An Introduction to the Study of Society* (16th ed.).

London, UK: Routledge.
Coombs, R., & Miles, I. (2000). Innovation, measurement and services: the new problematique. In J. S. Metcalfe & I. Miles (Eds.), *Innovation systems in the service economy* (pp. 85–103). US: Springer.
Cooper, A., Reimann, R., & Cronin, D. (2012). *About face 3: the essentials of interaction design*. Wiley.
Constantine, L. (2004). Beyond user-centered design and user experience: Designing for user performance. *Cutter IT Journal*, *17*(2), 16–25.
Constantine, L., & Lockwood, L. (2001). Structure and style in use cases for user interface design. In M van Harmelen (Ed.), *Object Modeling and User Interface Design* (pp. 245–280). Boston: Addison-Wesley.
Costa, N., Patrício, L., Morelli, N., & Magee, C. L. (2018). Bringing Service Design to manufacturing companies: Integrating PSS and Service Design approaches. *Design Studies*, *55*(SI), 112–145.
Cova, B., Ford, D., & Salle, R. (2009). Academic brands and their impact on scientific endeavour: The case of business market research and researchers. *Industrial Marketing Management*, *38*(6), 570–576.
Cross, N. (2007). *Designerly Ways of Knowing*. Berlin: Birkhäuser.
Curedale, R. A. (2013). *Service Design 250 Essential Methods*. Topanga, CA: Design Community College.
Davis, M. M., Spohrer, J. C., & Maglio, P. P. (2011). Guest editorial: How technology is changing the design and delivery of services. *Operations Management Research*, *4*(1), 1–5.
D'souza, N. (2016). Investigating design thinking of a complex multidisciplinary design, team in a new media context: Introduction. *Design Studies*, *46*, 1–5.
D'souza, N., & Dastmalchi, M. R. (2016). Creativity on the move: Exploring little-c (p) and big-C (p) creative events within a multidisciplinary design team process. *Design Studies*, *46*, 6–37.
Deshpande, R., Farley, J. U., & Webster, F. E. (1993). Corporate Culture, Customer Orientation, and Innovativeness in Japanese Firms: A Quadrad Analysis. *Journal of Marketing*, *57*(1), 23-37.
Ding, D. X., Hu, P. J.-H., Verma, R., & Wardell, D. G. (2009). The Impact of Service System Design and Flow Experience on Customer Satisfaction in Online Financial Services. *Journal of Service Research*, *13*(1), 96–110.
Dorst, K. (2006). Design problems and design paradoxes. *Design Issues*, *22*(3), 4–17.
Dorst, K. (2011). The core of 'design thinking' and its application. *Design Studies*, *32*(6), 521–532.
Driver, A., Peralta, C., & Moultrie, J. (2011). Exploring How Industrial Designers Can Contribute to Scientific Research. *International Journal of Design*, *5*(1), 17–28.
Drucker, P. F. (2007). *Management: Tasks, Responsibilities, Practices*. New York, USA: Truman Talley Books.
Dul, J., & Hak, T. (2008). *Case Study Methodology in Business Research*. London: Elsevier.
Edvardsson, B., & Tronvoll, B. (2013). A New Conceptualization of Service Innovation Grounded in S-D Logic and Service Systems. *International Journal of Quality & Service Sciences*, *5*(1), 19–31.
Edvardsson, B., Gustafsson, A., Sandén, B., & Johnson, M. D. (2000). *New service development and innovation in the new economy*. Lund: Studenlitteratur.
Edvardsson, Bo, Ng, G., Min, C. Z., Firth, R., & Yi, D. (2011). Does service-dominant design result in a better service system? *Journal of Service Management*, *22*(4), 540–556.

Edvardsson, Bo, & Olsson, J. (1996). Key concepts for new service development. *Service Industries Journal*, *16*(2), 140–164.
Edvardsson, Bo, Skålén, P., & Tronvoll, B. (2012). Service Systems as a Foundation for Resource Integration and Value Co-creation. In S. L. Vargo & R. F. Lusch (Eds.), *Special Issue – Toward a Better Understanding of the Role of Value in Markets and Marketing* (Volume 9, pp. 79–126). Emerald Group Publishing Limited.
Edvardsson, Bo, Tronvoll, B., & Gruber, T. (2011). Expanding understanding of service exchange and value co-creation: a social construction approach. *Journal of the Academy of Marketing Science*, *39*(2), 327–339.
Engeström, Y., Miettinen, R., & Punamäki, R.-L. (1999). *Perspectives on activity theory*. Cambridge University Press.
Epp, A. M., & Price, L. L. (2011). Designing solutions around customer network identity goals. *Journal of Marketing*, *75*(2), 36–54.
Erl, T. (2016). *Service-Oriented Architecture: Analysis and Design for Services and Microservices* (2nd ed.). Boston, USA: Prentice Hall.
Erlhoff, M., Mager, B., & Manzini, E. (Eds.). (1997). *Dienstleistung braucht Design*. Berlin: Luchterhand Verlag.
Europe 2020 strategy. (2016). *Europe 2020 indicators - employment*. Retrieved July 3, 2017, from http://ec.europa.eu/eurostat/statistics-explained/index.php/Europe_2020_indicators_-_employment
Expert Panel on Service Innovation. (2011). *Meeting the challenge of Europe 2020: the transformative power of service innovation*. Retrieved from http://www.osim.ro/centre/bazna2011/Raport Grup Experti Servicii.pdf
Fallman, D. (2008). The interaction design research triangle of design practice, design studies, and design exploration. *Design Issues*, *24*(3), 4–18.
Fassi, D., Meroni, A., & Simeone, G. (2013). Design for Social Innovation as a form of Design Activism: An action format. In *Social Frontiers: The next edge of social innovation research conference proceedings* (pp. 14–15). London, UK: Glasgow Caledonian University.
Fernald, L. D. (2008). *Psychology: Six perspectives*. Thousand Oaks, CA: Sage Publications.
Fitzsimmons, J., & Fitzsimmons, M. (2011). *New service development: Creating memorable experiences*. Thousand Oaks, California: Sage.
Flick, U. (2014). *An introduction to Qualitative Research*. London: Sage.
Flikkema, M., Jansen, P., & Van Der Sluis, L. (2007). Identifying Neo-Schumpeterian Innovation in Service Firms: A Conceptual Essay with a Novel Classification. *Economics of Innovation & New Technology*, *16*(7), 541–558.
Form, W., & Faris, R. E. L. (2019). *Sociology*. Retrieved June 22, 2019, from https://www.britannica.com/topic/sociology
Fornell, C. (1992). A National Customer Satisfaction Barometer: The Swedish Experience. *Journal of Marketing*, *56*(1), 6–21.
Frei, F. (2006). Breaking the trade-off between efficiency and service. *Harvard Business Review*, *84*(11), 93–101.
Frow, P., McColl-Kennedy, J. R., Hilton, T., Davidson, A., Payne, A., & Brozovic, D. (2014). Value propositions: A service ecosystems perspective. *Marketing Theory*, *14*(3), 327–351.
Foglieni, F., Villari, B., & Maffei, S. (2018). *Designing Better Services: A Strategic Approach from Design to Evaluation*. Springer.
Gallouj, F., & Djellal, F. (Eds.). (2010). *The Handbook of Innovation and Services: A Multi-disciplinary Perspective*. Cheltenham, UK: Edward Elgar Publishing Limited.
Gallouj, F., & Savona, M. (2009). Innovation in services: a review of the debate and a

research agenda. *Journal of Evolutionary Economics*, *19*(2), 149–172.
Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., & Trow, M. (1994). *The new production of knowledge: The dynamics of science and research in contemporary societies*. Thousand Oaks: Sage Publications.
Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2012). Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology. *Organizational Research Methods*, *16*(1), 15–31.
Glatte, H., Heidingsfelder, M., & Brodack, F. (2017). Strategies for synergies. Working in interdisciplinary teams. *Design Journal*, *20*(1), 4721–4725.
Glushko, R. J. (2008). Designing a service science discipline with discipline. *IBM Systems Journal*, *47*(1), 15–27.
Glushko, R. J. (2010). Seven contexts for service system design. In P. P. Maglio, C. A. Kieliszewski, & J. C. Spohrer (Eds.), *Handbook of service science* (pp. 219–249). Springer.
Glushko, R. J., & Nomorosa, K. J. (2013). Substituting Information for Interaction A Framework for Personalization in Service Encounters and Service Systems. *Journal of Service Research*, *16*(1), 21–38.
Goldstein, S. M., Johnston, R., Duffy, J. A., & Rao, J. (2002). The service concept: the missing link in service design research? *Journal of Operations Management*, *20*(2), 121–134.
Grönroos, C., & Gummerus, J. (2014). The service revolution and its marketing implications: service logic vs service-dominant logic. *Managing Service Quality*, *24*(3), 206–229.
Grove, S. J., & Fisk, R. P. (2001). Service Theater: An Analytical Framework for Services Marketing. In C. Lovelock (Ed.), *Services Marketing* (pp. 83–92). Upper Saddle River: Prentice Hall.
Gummesson, E. (1990). Service Design. *The Total Quality Magazine*, *2*(2), 97–101.
Gustafsson, A., Högström, C., Radnor, Z., Friman, M., Heinonen, K., Jaakkola, E., & Mele, C. (2016b). Developing service research – paving the way to transdisciplinary research. *Journal of Service Management*, *27*(1), 9–20.
Gustafsson, A., Kristensson, P., Schirr, G. R., & Witell, L. (2016). *Service innovation* (Kindle edi). New York: Business Expert Press.
Gustafsson, A., Professor Roderick J. Brodie, P., Gustafsson, A., Högström, C., Radnor, Z., Friman, M., … Mele, C. (2016). Developing service research--paving the way to transdisciplinary research. *Journal of Service Management*, *27*(1), 9–20.
Hagan, M. (2016). The User Experience of the Internet as a Legal Help Service: Defining Standards for the Next Generation of User-Friendly Online Legal Services. *Virginia Journal of Law and Technology*, *20*(394), 72p.
Hara, T., Arai, T., & Shimomura, Y. (2009). A CAD system for service innovation: integrated representation of function, service activity, and product behaviour. *Journal of Engineering Design*, *20*(4), 367–388.
Harmelen, Mark van (Ed.). (2001). *Object Modeling and User Interface Design*. Boston: Addison-Wesley.
Helkkula, A., Kowalkowski, C., & Tronvoll, B. (2018). Archetypes of Service Innovation: Implications for Value Cocreation. *Journal of Service Research*, *21*(3), 284–301.
Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design science in information systems research. *MIS Quarterly*, *28*(1), 75–105.
Hill, A. V, Collier, D. A., Froehle, C. M., Goodale, J. C., Metters, R. D., & Verma, R. (2002). Research opportunities in service process design. *Journal of Operations Management*, *20*(2), 189–202.
Hillgren, P.-A., Seravalli, A., & Emilson, A. (2011). Prototyping and infrastructuring in

design for social innovation. *CoDesign*, *7*(3/4), 169–183.
Holmlid, S. (2007). Interaction design and service design: Expanding a comparison of design disciplines. In *NorDes 2007*. Stockholm.
Holmlid, S. (2009). Participative, co-operative, emancipatory: From participatory design to service design. In *First Nordic Conference on service design and service innovation* (pp. 1–14).
Holmlid, S., & Evenson, S. (2008). Bringing service design to service sciences, management and engineering. In B. Hefley & W. Murphy (Eds.), *Service Science, Management and Engineering Education for the 21st Century* (pp. 341–345). Springer.
Holmlid, S., Wetter-Edman, K., & Edvardsson, B. (2017). Breaking free from NSD: Design and service beyond new service development. In Daniela Sangiorgi & A. Prendiville (Eds.), *Designing for service: key issues and new directions* (Kindle edi, pp. 2670–2903). London: Bloomsbury.
Howlett, M. (2014). Policy Design: What, Who, How and Why? In C. Halpern, P. Lascoumes, & P. Le Galès (Eds.), *L'instrumentation de l'action publique. Controverses, résistance, effets* (pp. 281–315). Paris, France: Les Presses de Sciences Po.
Hyvarinen, J., Lee, J.-J., & Mattelmaki, T. (2015). Fragile Liaisons: Challenges in Cross-organizational Service Networks and the Role of Design. *Design Journal*, *18*(2, SI), 249–268.
IfM, & IBM. (2007). Succeeding through service innovation: a discussion paper. *University of Cambridge Institute for Manufacturing, Cambridge, UK*.
Johnson, S. P., Menor, L. J., Roth, A. V, & Chase, R. B. (2000). A critical evaluation of the new service development process. *New Service Development-Creating Memorable Experience*, 1–32.
Jégou, F., & Manzini, E. (2008). *Collaborative services: social Innovation and design for sustainability*. Milan: Edizioni Poli.design.
Jessup, L. M., & Valacich, J. S. (2008). *Information Systems Today* (3rd ed.). London, UK: Pearson Publishing.
Joly, M. P., Teixeira, J. G., Patrício, L., & Sangiorgi, D. (2019). Leveraging service design as a multidisciplinary approach to service innovation. *Journal of Service Management*.
Joly, M. P., Patrício, L., & Sangiorgi, D. (n.d.). Designing for service innovation across service ecosystem levels: a multidisciplinary perspective. *Design Studies*. (submitted version)
Joly, M. P., Teixeira, J. G., Patrício, L., & Sangiorgi, D. (2018). Service Designers, unite! Identifying shared concerns among multidisciplinary perspectives on Service Design. In *ServDes2018-Service Design Proof of Concept* (pp. 1144–1161). Milan: Politecnico di Milano.
Junginger, S. (2015). Organizational Design Legacies and Service Design. *Design Journal*, *18*(2), 209–226.
Junginger, S., & Sangiorgi, D. (2009). Service design and organizational change: Bridging the gap between rigour and relevance. In *3rd IASDR Conference on Design Research* (pp. 1–10). Seoul, Korea.
Kaasinen, E. (2003). User needs for location-aware mobile services. *Personal and Ubiquitous Computing*, *7*(1), 70–79.
Kaltcheva, Velitchka D. Weitz, B. A. (2006). When Should a Retailer Create an Exciting Store Environment. *Journal of Marketing*, *70*(1), 107–118.
Kaptelinin, V., & Nardi, B. (2012). *Activity Theory in HCI: Fundamentals and Reflections*. San Rafael: Morgan & Claypool.
Karpen, I. O., Gemser, G., & Calabretta, G. (2017). A multilevel consideration of service design conditions Towards a portfolio of organisational capabilities, interactive practices

and individual abilities. *Journal of Service Theory and Practice*, *27*(2), 384–407.
Kasali, A., & Nersessian, N. J. (2015). Architects in interdisciplinary contexts: Representational practices in healthcare design. *Design Studies*, *41*(B), 205–223.
Kelly, R. (2017). Ikebana: A Collaborative Design Pedagogy. *Design Journal*, *20*(1), 1093–1105.
Kieliszewski, C. A., Maglio, P. P., & Cefkin, M. (2012). On Modeling Value Constellations to Understand Complex Service System Interactions. *European Management Journal*, *30*(5), 438–450.
Kimbell, L. (2009). The turn to service design. In G. Julier & L. Moor (Eds.), *Design and Creativity: Policy, Management and Practice* (pp. 157–173). Oxford, UK: Berg.
Kimbell, L. (2011). Designing for service as one way of designing services. *International Journal of Design*, *5*(2), 41–52.
Kleijnen, M., de Ruyter, K., & Wetzels, M. (2007). An assessment of value creation in mobile service delivery and the moderating role of time consciousness. *Journal of Retailing*, *83*(1), 33–46.
Klein, J. T. (2010). A taxomy of interdisciplinarity. In R. Frodeman, J. T. Klein, & C. Mitcham (Eds.), *The Oxford Handbook of Interdisciplinarity* (pp. 15–30). UK: Oxford University Press.
Ko, H.-T., & Lu, H.-P. (2010). Measuring innovation competencies for integrated services in the communications industry. *Journal of Service Management*, *21*(2), 162–190.
Krishnan, A. (2009). *What Are Academic Disciplines? Some Observations on the Disciplinarity vs. Interdisciplinarity Debate*. Southampton, UK. Retrieved from http://eprints.ncrm.ac.uk/783/1/what_are_academic_disciplines.pdf
Krueger, R. A., & Casey, M. A. (2015). *Focus Groups - A Practical Guide for Applied Research*. US: Sage Publications Inc.
Kuniavsky, M. (2010). *Smart Things: Ubiquitous Computing User Experience Design: Ubiquitous Computing User Experience Design*. Burlington: Morgan Kaufmann.
Kurtmollaiev, S., Fjuk, A., Pedersen, P. E., Clatworthy, S., & Kvale, K. (2018). Organizational Transformation Through Service Design: The Institutional Logics Perspective. *Journal of Service Research*, *21*(1), 59–74.
Kvale, S. (1996). *Interviews. An Introduction to Qualitative Research Interviewing*. London: Sage.
La 27e région, & Scherer, P. (2015). *Chantiers ouverte au public*. Paris: La Documentation Française.
Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
Lee, M. K., Kiesler, S., Forlizzi, J., Srinivasa, S., & Rybski, P. (2010). Gracefully mitigating breakdowns in robotic services. In *Human-Robot Interaction (HRI), 2010 5th ACM IEEE International Conference* (pp. 203–210).
Lee, M. K. (2013). *Designing Personalization in Technology-Based Services*. Carnegie Mellon University.
Legal Information Institute. (2019). *Jurisprudence*. Retrieved June 21, 2019, from https://www.law.cornell.edu/wex/jurisprudence
Lawrence, T., Suddaby, R., & Leca, B. (2011). Institutional Work: Refocusing Institutional Studies of Organization. *Journal of Management Inquiry*, *20*(1), 52–58.
Lemon, K. N., & Verhoef, P. C. (2016). Understanding Customer Experience throughout the Customer Journey. *Journal of Marketing*, 80(6), 69–96.
Lin, M., Hughes, B., Katica, M., Dining-Zuber, C., & Plsek, P. (2011). Service design and change of systems: Human-centered approaches to implementing and spreading service design. *International Journal of Design*, *5*(2), 73–86.

Lin, R.J., Chen, R.-H., & Chiu, K. K.-S. (2010). Customer relationship management and innovation capability: an empirical study. *Industrial Management & Data Systems*, *110*(1–2), 111–133.
Lo, K. P. Y. (2011). Designing service evidence for positive relational messages. *International Journal of Design*, *5*(2), 5–13.
Lovelock, Christopher, & Wirtz, J. (2016). *Services Marketing, 8e*. Pearson Education India.
Lusch, R. F., & Vargo, S. L. (2014). *Service-dominant logic: Premises, perspectives, possibilities*. Cambridge: Cambridge University Press.
Lusch, R. F., & Nambisan, S. (2015). Service innovation: A service-dominant logic perspective. *Mis Quarterly*, *39*(1), 155–175.
Maffei, S., Mager, B., & Sangiorgi, D. (2005). Innovation through Service Design. From research and theory to a network of practice. A users' driven perspective. In *Joining Forces* (pp. 1–9). Helsinki, Finland: University of Art and Design.
Mager, B. (2009). Service design as an emerging field. In S. Miettinen & M. Koivisto (Eds.), *Designing services with innovative methods* (pp. 28–43). Helsinki: TAIK.
Maglio, P. P., & Spohrer, J. (2008). Fundamentals of service science. *Journal of the Academy of Marketing Science*, *36*(1), 18–20.
Mahr, D., Kalogeras, N., & Odekerken-Schröder, G. (2013). A service science approach for improving healthy food experiences. *Journal of Service Management*, *24*(4), 435–471.
Manzini, E. (2014). Making Things Happen: Social Innovation and Design. *Design Issues*, *30*(1), 57–66.
Manzini, E. (2015). *Design, when everyone designs*. Cambridge: MIT Press.
Manzini, E., & Staszowski, E. (Eds.). (2013). *Public and collaborative: exploring the intersection of design, social innovation and public policy*. New York: DESIS Network.
Meadows, D. (2008). *Thinking in Systems: A Primer*. Hartford, USA: Chelsea Green Publishing.
Menor, L. J., Tatikonda, M. V, & Sampson, S. E. (2002). New service development: areas for exploitation and exploration. *Journal of Operations Management*, *20*(2), 135–157.
Meroni, A. (2008). Strategic design: where are we now? Reflection around the foundations of a recent discipline. *Strategic Design Research Journal*, *1*(1), 31–38.
Meroni, A., & Sangiorgi, D. (Eds.). (2011). *Design for services*. Aldershot, UK: Gower Publishing.
Meyer, C., & Schwager, A. (2007). Understanding customer experience. *Harvard Business Review*, *85*(2), 116.
Michel, S., Brown, S. W., & Gallan, A. S. (2008). Service-Logic Innovations: How to Innovate Customers, not Products. *California Management Review*, *50*(3), 54–66.
Miettinen, S., & Koivisto, M. (Eds.). (2009). Designing services with innovative methods (pp. 10–25). Helsinki: TAIK.
Moller, K. K., & Halinen, A. (1999). Business relationships and networks: Managerial challenge of network era. *Industrial Marketing Management*, *28*(5), 413–427.
Moran, J. (2010). *Interdisciplinarity*. London, UK: Routledge.
Morelli, N. (2006). Developing new product service systems (PSS): methodologies and operational tools. *Journal of Cleaner Production*, *14*(17), 1495–1501.
Morelli, N. (2015). Challenges in Designing and Scaling up Community Services. *Design Journal*, *18*(2, SI), 269–290.
Moritz, S. (2005). *Service design: practical access to an evolving field*. Cologne, Germany: Köln International School of Design.
Mulligan, D. K., & Bamberger, K. A. (2018). Saving Governance-By-Design. *CALIFORNIA LAW REVIEW*, *106*(3), 697–784.
Muratovski, G. (2016). *Research for designers: a guide to methods and practice*. London:

Sage Publications Ltd.
Nag, R., Hambrick, D. C., & Chen, M.-J. (2007). What is strategic management, really? Inductive derivation of a consensus definition of the field. *Strategic Management Journal*, *28*(9), 935–955.
Neuman, L. W. (2014). *Social research methods: Qualitative and quantitative approaches* (7th ed.). Harlow: Pearson Education Limited.
Niinimaki, K., Tanttu, M., & Kohtala, C. (2017). Outside the ``Comfort Zone{''}. Designing the Unknown in a Multidisciplinary Setting. *Design Journal*, *20*(1), 4434–4443.
Norman, D. A. (2005). Human-centered design considered harmful. *Interactions*, *12*(4), 14–19.
Normann, R., & Ramirez, R. (1993). Designing interactive strategy. *Harvard Business Review*, *71*(4), 65–77.
Ordenes, F. V., Theodoulidis, B., Burton, J., Gruber, T., & Zaki, M. (2014). Analyzing Customer Experience Feedback Using Text Mining: A Linguistics-Based Approach. *Journal of Service Research*, *17*(3), 278–295.
O'reilly, K. (2005). *Ethnographic methods*. London: Routledge.
Osterwalder, A., & Pigneur, Y. (2010). *Business Model Generation*. Wiley.
Ostrom, A. L., Bitner, M. J., Brown, S. W., Burkhard, K. A., Goul, M., Smith-Daniels, V., … Rabinovich, E. (2010). Moving forward and making a difference: research priorities for the science of service. *Journal of Service Research*, *13*(1), 4–36.
Ostrom, A. L., Parasuraman, A., Bowen, D. E., Patrício, L., Voss, C. A., & Lemon, K. (2015). Service Research Priorities in a Rapidly Changing Context. *Journal of Service Research*, *18*(2), 127–159.
Pacenti, E. (1998). *Il Progetto dell'interazione nei servizi. Un contributo al tema della progettazione dei servizi*. Disegno Industriale, Politecnico di Milano.
Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: a multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, *64*(1), 12.
Parish, J. T., Berry, L. L., & Lam, S. Y. (2008). The effect of the servicescape on service workers. *Journal of Service Research*, *10*(3), 220–238.
Patrício, L., & Fisk, R. P. (2013). Creating New Services. In R. P. F. R. Russel-Bennett & L. Harris (Eds.), *Serving Customers Globally* (pp. 187–207). Brisbane: Tilde University Press.
Patrício, L., Fisk, R. P., e Cunha, J., & Constantine, L. (2011). Multilevel Service Design: From Customer Value Constellation to Service Experience Blueprinting. *Journal of Service Research*, *14*(2), 180–200.
Patrício, L., Gustafsson, A., & Fisk, R. (2018). Upframing Service Design and Innovation for Research Impact. *Journal of Service Research*, *21*(1), 3–16.
Patrício, L., Pinho, N. F., Teixeira, J. G., & Fisk, R. P. (2018b). Service Design for Value Networks: Enabling Value Cocreation Interactions in Healthcare. *Service Science*, *10*(1), 76–97.
Patton, M. Q. (2002). *Qualitative Research & Evaluation Methods (3rd ed.)*. Thou- sand Oaks, CA: Sage.
Payne, A. F., Storbacka, K., & Frow, P. (2008). Managing the co-creation of value. *Journal of the Academy of Marketing Science*, *36*(1), 83–96.
Penin, L. and Tonkinwise, C. (2009), *The Politics and Theatre of Service Design*. Parsons The New School for Design.
Preece, J., Rogers, Y., & Sharp, H. (2002). *Interaction design: beyond human-computer interaction*. NY: John Wiley & Son.
Prendiville, A. (2015). A Design Anthropology of Place in Service Design: A Methodological Reflection. *Design Journal*, *18*(2, SI), 193–208.

Pullman, M. E., & Gross, M. A. (2004). Ability of experience design elements to elicit emotions and loyalty behaviors. *Decision Sciences*, *35*(3), 551–578.
Rabin, J., Hildreth, W. B., & Miller, G. J. (Eds.). (2006). *Handbook of Public Administration* (3rd ed.). London, UK: Routledge.
Ratcheva, V. (2009). Integrating diverse knowledge through boundary spanning processes – The case of multidisciplinary project teams. *International Journal of Project Management*, *27*(3), 206–215.
Rojas, F., English, S., Young, R., & Spencer, N. (2017). A design-relevant mindfulness device. *Design Journal*, *20*(1), 767–780.
Rosenbaum, M. S. (2015). Transformative service research: focus on well-being. *The Service Industries Journal*, *35*(7–8), 363–367.
Roth, A. V, & Menor, L. J. (2003). Insights into service operations management: a research agenda. *Production and Operations Management*, *12*(2), 145–164.
Saco, R. M., & Goncalves, A. P. (2008). Service design: An appraisal. *Design Management Review*, *19*(1), 10–19.
Salmi, A., & Mattelmäki, T. (2019). From within and in-between – co-designing organizational change. *CoDesign*, *0*(0), 1–18.
Sampson, S. E. (2012). Visualizing Service Operations. *Journal of Service Research*, *15*(2), 182–198.
Sampson, S., & Froehle, C. (2006). Foundations and implications of a proposed unified services theory. *Production and Operations Management*, *15*(2), 329–343.
Sanders, E., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *CoDesign-International Journal of Cocreation in Design and the Arts*, *4*(1), 5–18.
Sandhusen, R. (2008). *Marketing*. New York, USA: B.E.S. Publishing.
Sangiorgi, D. (2004). *Il Design dei servizi come Design dei Sistemi di Attività. La Teoria dell'Attività applicata alla progettazione dei servizi*. Disegno Industriale, Politecnico di Milano.
Sangiorgi, D. (2009). Building up a framework for Service Design research. In *8th European Academy of Design Conference* (pp. 415–420). Aberdeen, Scotland.
Sangiorgi, D. (2011). Transformative services and transformation design. *International Journal of Design*, *5*(2), 29–40.
Sangiorgi, D. (2015). Designing for public sector innovation in the UK: design strategies for paradigm shifts. *Foresight*, *17*(4), 332–348.
Sangiorgi, D., Prendiville, A., Jung, J., & Yu, E. (2015). *Design for Service Innovation & Development. Final report.* Lancaster.
Sangiorgi, D., Lima, F., Patrício, L., Joly, M. P., & Favini, C. (2019). A Human-Centred, Multidisciplinary, and Transformative Approach to Service Science: A Service Design Perspective. In *Handbook of Service Science, Volume II, Service Science: Research and Innovations in the Service Economy* (pp. 147–181). Springer.
Sangiorgi, D., Patrício, L., & Fisk, R. P. (2017). Designing for interdependence, participation and emergence in complex service systems. In Daniela Sangiorgi & A. Prendiville (Eds.), *Designing for service: key issues and new directions* (Kindle edi, pp. 1228–1503). London: Bloomsbury.
Sangiorgi, D., & Prendiville, A. (Eds.). (2017). *Designing for service: key issues and new directions* (Kindle edi). Bloomsbury.
Scheuing, E. E., & Johnson, E. M. (1989). A Proposed Model for New Service Development. *The Journal of Services Marketing*, *3*(2), 25–34.
Schmenner, R. (2004). Service businesses and productivity. *Decision Sciences*, *35*(3), 333–347.
Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. New

York: Basic books.
Schumpeter, J. A. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle* (Vol. 55). Transaction publishers.
Scott, W. R. (2001). *Institutions and Organizations* (2nd ed.). Thousand Oaks, CA: SAGE Publications.
Secomandi, F., & Snelders, D. (2011). The object of service design. *Design Issues*, *27*(3), 20–34.
Secomandi, F., & Snelders, D. (2018). Design processes in service innovation. *Design Studies*, *55*(SI), 1–4.
Segelström, F. (2010). *Visualisations in Service Design*. Linköping University, Linköping, Sweden.
Shostack, G. L. (1982). How to Design a Service. *European Journal of Marketing*, *16*(1), 49–63.
Shostack, G. L. (1984). Designing Services that deliver. *Harvard Business Review*, *62*(1), 133–139.
Skålén, P., Gummerus, J., von Koskull, C., & Magnusson, P. R. (2015). Exploring value propositions and service innovation: a service-dominant logic study. *Journal of the Academy of Marketing Science*, *43*(2), 137–158.
Snyder, H., Witell, L., Gustafsson, A., Fombelle, P., & Kristensson, P. (2016). Identifying categories of service innovation: a review and synthesis of the literature. *Journal of Business Research*, *69*(7), 2401–2408.
Spohrer, J., & Kwan, S. K. (2009). Service science,management, engineering, and design (SSMED): an emerging discipline -- outline and references. *International Journal of Information Systems in the Service Sector*, *1*(3), 1–31.
Star, S. L., & Griesemer, J. R. (1989). Institutional Ecology, "Translations" and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-1939. *Social Studies of Science*, *19*, 387–420.
Steen, M., Manschot, M. A. J., & De Koning, N. (2011). Benefits of co-design in service design projects. *International Journal of Design*, *5*(2), 53–60.
Stevenson, W. J. (2015). *Operations Management* (12th ed.). New York, USA: McGraw-Hill.
Stickdorn, M., & Schneider, J. (Eds.). (2011). *This is service design thinking: basics, tools, cases*. Amsterdam: BIS Publishers.
Stine, D., & Haak, L. (Eds.). (2005). *Facilitating interdisciplinary research*. Washington, DC: National Academies Press.
Stuart, F. I. (2006). Designing and executing memorable service experiences: Lights, camera, experiment, integrate, action! *Business Horizons*, *49*(2), 149–159.
Teece, D. J. (2010). Business Models, Business Strategy and Innovation. *Long Range Planning*, *43*(2), 172–194.
Teixeira, J., Patricio, L., Huang, K.-H., Fisk, R. P., Nobrega, L., & Constantine, L. (2017). The MINDS Method: Integrating Management and Interaction Design Perspectives for Service Design. *Journal of Service Research*, *20*(3), 240–258.
Tether, B. S. (2005). Do services innovate (differently)? Insights from the European innobarometer survey. *Industry & Innovation*, *12*(2), 153–184.
Thorpe, A., & Gamman, L. (2011). Design with society: why socially responsive design is good enough. *CODESIGN-International Journal of Cocreation in Design and the Arts*, *7*(3–4, SI), 217–230.
Toivonen, M., & Tuominen, T. (2009). Emergence of innovations in services. *The Service Industries Journal*, *29*(7), 887–902.
Trischler, J., Kristensson, P., & Scott, D. (2018). Team diversity and its management in a co-

design team. *Journal of Service Management*, *29*(1), 120–145.
Trischler, J., & Charles, M. (2019). The Application of a Service Ecosystems Lens to Public Policy Analysis and Design: Exploring the Frontiers. *Journal of Public Policy & Marketing*, *38*(1), 19–35.
Truong, K. N., Hayes, G. R., & Abowd, G. D. (2006). Storyboarding: an empirical determination of best practices and effective guidelines. In J. M. Carroll, S. Bødker, & J. Coughlin (Eds.), *Proceedings of the 6th conference on Designing Interactive systems* (pp. 12–21). New York, USA.
Tsang, E. W. K. (2013). Case study methodology: causal explanation, contextualization, and theorizing. *Journal of International Management*, *19*(2), 195–202.
Ulrich, R. S., Berry, L. L., Quan, X., & Parish, J. T. (2010). A Conceptual Framework for the Domain of Evidence-Based Design. *Health Environments Research and Design Journal*, *4*(1), 95–114.
Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, *68*(1), 1–17.
Vargo, S. L., & Lusch, R. F. (2008). Why "service"? *Journal of the Academy of Marketing Science*, *36*(1), 25–38.
Vargo, S. L., & Lusch, R. F. (2008b). Service-dominant logic: continuing the evolution. *Journal of the Academy of Marketing Science*, *36*(1), 1–10.
Vargo, S. L., Maglio, P. P. & Akaka, M. A. (2008). On value and value co-creation: A service systems and service logic perspective, *European Management Journal*, *26*(3), 145–152.
Vargo, S. L., & Lusch, R. F. (2016). Service-dominant logic 2025. *International Journal of Research in Marketing*, 34(1), 46-67.
Vargo, S. L., Wieland, H., & Akaka, M. A. (2015). Innovation through institutionalization: A service ecosystems perspective. *Industrial Marketing Management*, *44*(January 2015), 63–72.
Vink, J., Edvardsson, B., Wetter-Edman, K., & Tronvoll, B. (2019). Reshaping mental models – enabling innovation through service design. *Journal of Service Management*, *30*(1), 75–104.
Vink, J., Joly, M. P., Wetter-Edman, K., Tronvoll, B., & Edvardsson, B. (2019b). Changing the Rules of the Game in Healthcare Through Service Design. In *Service Design and Service Thinking in Healthcare and Hospital Management* (pp. 19–37). Springer.
von Ahn, L., & Dabbish, L. (2008). Designing games with a purpose. *Communications of the ACM*, *51*(8), 58–67.
Voss, C., Tsikriktsis, N., & Frohlich, M. (2002). Case research in operations management. *International Journal of Operations & Production Management*, *22*(2), 195–219.
Warwick, L. (2016). The role of Design as a critical friend to the Voluntary Community Sector. In *ServDes. 2016 Fifth Service Design and Innovation conference* (pp. 339–351). Linköping, Sweden: Linköping University Electronic Press.
Wertsch, J. V. (Ed.). (1979). *The concept of activity in Soviet Psychology*. New York: Sharpe.
Wetter-Edman, K., Sangiorgi, D., Edvardsson, B., Holmlid, S., Grönroos, C., & Mattelmäki, T. (2014). Design for Value Co-Creation: Exploring Synergies Between Design for Service and Service Logic. *Service Science*, *6*(2), 106–121.
Wetter-Edman, K., Vink, J., & Blomkvist, J. (2018). Staging aesthetic disruption through design methods for service innovation. *Design Studies*, *55*(March 2018), 5–26.
Whole, W., & Meiren, T. (Eds.). (2002). *Service research today and tomorrow. Spotlight on international activities*. Stuttgart: IRB. Retrieved from https://wiki.iao.fraunhofer.de/images/studien/service-research-today-and-tomorrow.pdf
Witell, L., Snyder, H., Gustafsson, A., Fombelle, P., & Kristensson, P. (2016). Defining

service innovation: A review and synthesis. *Journal of Business Research*, *69*(8), 2863–2872.
World Design Organization. (2015). *Definition of Industrial Design*. Retrieved from https://wdo.org/about/definition/
Yang, C. F., & Sung, T. J. (2016). Service Design for Innovation through Participatory Action Research. *International Journal of Design*, *10*(1), 21–36.
Yee, J. S. R., & White, H. (2015). The Goldilocks Conundrum: The `Just Right' Conditions for Design to Achieve Impact in Public and Third Sector Projects. *International Journal of Design*, *10*(1), 7–19.
Yin, R. K. (2018). *Case Study Research and Applications: Design and Methods* (Sixth edit). Thousand Oaks, USA: Sage Publications Inc.
Yu, E., & Sangiorgi, D. (2018). Service Design as an Approach to Implement the Value Cocreation Perspective in New Service Development. *Journal of Service Research*, *21*(1), 40–58.
Yu, E., & Sangiorgi, D. (2018). Exploring the transformative impacts of service design: The role of designer-client relationships in the service development process. *Design Studies*, *55*(SI), 79–111.
Zeithaml, V. A. (2002). Service excellence in electronic channels. *Managing Service Quality: An International Journal*, *12*(3), 135–139.
Zimmerman, J., Tomasic, A., Garrod, C., Yoo, D., Hiruncharoenvate, C., Aziz, R., & Steinfeld, A. (2011). Field trial of tiramisu: crowd-sourcing bus arrival times to spur co-design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 1677–1686).
Zomerdijk, L. G., & Voss, C. A. (2010). Service design for experience-centric services. *Journal of Service Research*, *13*(1), 67–82.
Zomerdijk, L. G, & de Vries, J. (2007). Structuring front office and back office work in service delivery systems - An empirical study of three design decisions. *International Journal of Operations & Production Management*, *27*(1), 108–131.
Zurlo, F. (1999). *Un modello di lettura per il Design Strategico: La relazione tra designe strategia nell'impresa contemporanea*. Politecnico di Milano.
Zurlo, F. (2004). Della relazione fra strategia e design: note critiche. In P. Bertola & E. Manzini (Eds.), *Design multiverso* (pp. 89–98). Milano: Edizioni Polidesign.

APPENDIX I – GLOSSARY

This glossary comprises the definition of concepts and terms used along the chapters of this thesis, presented in alphabetical order.

Term(s)	Definition
Actors	Actors are individuals or organizations which participate and contribute during resource integration and value co-creation (Vargo & Lusch, 2016).
Anthropology	Field which studies human beings and their ancestors through time and space, and in relation to physical character, environmental and social relations, and culture (O'reilly, 2005).
B2C interactions/ B2B interactions	B2C interactions refer to interactions between Businesses and Consumers, while B2B interactions consist of interactions between Businesses (Sandhusen, 2008).
Back-office	Back-office refers to the space where services are facilitated inside the organization, for example, the food production chain inside the restaurant not visible to the customer (Miettinen, 2009).
Boundary object	Boundary object is any object able to support and allow communication between people from different backgrounds and/or cultures, because it contains a minimal common language for both sides to establish a shared understanding. Several objects can play this role: a map, documents, field annotations, graphic representations, etc. (Star & Griesemer, 1989).
CAD tool	CAD or Computer-aided design tool is a type of software to create precision drawings or technical illustrations (Hara, Arai, & Shimomura, 2009).
Co-design	Co-design is a participatory approach used in service design, which refers to "the creativity of designers and people not trained in design working together in the design development process" (Sanders & Stappers, 2008, p.6). Literature suggests that co-design improves idea generation, supports decision-making, facilitates a better understanding of user needs, increases user benefit and enhances novelty (Steen et al., 2011; Trischler et al., 2017).
Community psychology	Community psychology is a branch of Psychology concerned with person environment interactions and the ways society affects individual and community functioning. Community psychology focuses on social issues, social institutions, and other settings that influence individuals, groups, and organizations. (Bond, 2001).
Customer/ user	Customer is an umbrella term to describe the targets of value-creating processes. The reader may replace or complement "customer" with "user" when someone is using the offering. As such, "customer" may also be interpreted as "patient" (in health care); "client" (in law or consulting); "consumer"; "member" (of an association, e.g., a trade union); "citizen" (if the supplier is a governmental agency); "pupil" or "parent" (in school), "student," or "visitor". (Gustafsson et al., 2016)

Customer/user journey	The customer or user journey refers to a series of touchpoints, involving all activities and events related to the delivery of the service from the customer/user perspective (Patrício et al., 2011).
Customer value constellation	Customer value constellation (CVC) is a model which enables designing the service concept. The CVC represents the set of service offerings and respective interrelationships that enable customers to cocreate their value constellation experience for a given customer activity. For instance, the bank's mortgage loan, the real estate broker service, and the decoration service are each part of the CVC that supports the house purchase activity (Patrício et al., 2011, p. 185).
Customer variability	Customer variability (or customer-introduced variability) means the changes induced by the customers' preferences inside a service delivery system. As such, "the customer arrives, makes a request, plays a part in the process requiring some level of capability and effort, and assesses the experience according to personal preferences" (Frei, 2006, p. 3-4).
Customer/service/user experience	Customer or service or user experience can be viewed as internal and subjective responses to any contact with a company (Meyer & Schwager, 2007).
Design	Design is a field which studies strategic problem-solving processes that drive innovation, builds business success, and leads to a better quality of life through innovative products, systems, services, and experiences (World Design Organization, 2015). It comprises both reflexive inquire (Schön, 1983) and rational problem-solving approaches which devise courses of action aimed at changing existing situations into preferred ones (Simon, 1996).
Design thinking	Application of the design ability (Cross, 2007) – deal with/solve ill-defined problems, solution-focused strategy, abductive thinking, visual, graphic, spatial ways of communication, constructivist thinking - , which can be represented in the form of an iterative method including the phases of inspiration, ideation and implementation (Brown, 2008).
Designerly perspective	A designerly perspective comprises a design-centered view which includes the abilities of resolving ill-defined problems, adopting solution-focused strategies and using non-verbal modelling media (Cross, 2007).
Ethnography	Ethnography is the systematic study of people and cultures focused on understanding the social life of humans, which is born inside the Anthropology field. It is designed to explore cultural phenomena where the researcher observes society from the point of view of the subject of the study (O'reilly, 2005).
Experience prototyping	Experience prototyping is any kind of representation, in any medium, that is designed to understand, explore or communicate what it might be like to engage with the product, space or system being designed (Buchenau & Suri, 200).
Experience-centric services	Experience-centric services are services in which firms craft the customer experience proactively to create distinctive product and service offerings, such as a visit in the thematic park Walt Disney World (Zomerdijk & Voss, 2010).
Experiential service innovation archetype	The experiential archetype of service innovation refers to the individual service innovation experience and how the customer makes sense of it. As such, the experiential archetype is informed by a phenomenological

	understanding of experience as individual and subjective (Helkkula, Kowalkowski & Tronvoll, 2018).
Front-office	The time and place in which customers come in contact with the service, for example, a website, a person serving you at the restaurant, etc. (Morelli, 2002).
Human-centered approach/ perspective	Human-centered approach/perspective is defined as "the capacity and methods to investigate and understand people's experiences, interactions and practices as a main source of inspiration for redesigning or imagining new services" (Meroni and Sangiorgi, 2011, p. 203).
Information Systems	Information Systems is the field which studies systems with a specific reference to information and the complementary networks of hardware and software that people and organizations use to collect, filter, process, create and distribute data (Jessup & Valacich, 2008).
Innovation management	Innovation management is the study and systematic approach which promote innovations inside organizations, by supporting them to grasp an opportunity and use it to create and introduce new ideas, processes, or products industriously (Tidd & Bessant, 2009).
Institutional change	Institutional change refers to modifications in laws, norms, values and moral codes that define appropriate behavior among actors and guide social action in different situations (Koskela-Huotari et al., 2016).
Institutional work	Institutional work is defined as the "purposive actions aimed at creating, maintaining and disrupting institutions" (Lawrence et al., 2011, p. 52).
Institutions	Institutions are the rules, norms, roles and beliefs that guide behaviors and practices of actors (Scott, 2001).
Interaction Design	Interaction Design is the field which studies the practice of designing interactive digital products, environments, systems, and services (Cooper, Reimann, & Cronin, 2012).
Law	Law means Jurisprudence in this thesis. Jurisprudence is the theoretical study of law, which consists of a system of rules that are created and enforced through social or governmental institutions to regulate behavior (Legal Information Institute, 2019).
Legal Design	Legal Design is the application of human-centered design to the world of law, to make legal systems and services more human-centered, usable, and satisfying (Hagan, 2016).
Management	Management is the field focused on understanding all the aspects related to the administration of an organization, whether it is a business, a not-for-profit organization, or government body (Drucker, 2007).
Marketing	Marketing is the field which comprises the activities, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large (AMA, 2013).
Maximum variation sampling	Maximum variation sampling is a data collection strategy which aims at capturing and describing the central themes that cut across a great deal of variation. This strategy follows the logic that any common patterns that emerge from great variation are of particular interest and value in capturing the core experiences and central, shared dimensions of a setting or phenomenon (Patton, 2002).

Operations management	Operations management is an area of management concerned with designing and controlling the process of production and redesigning business operations in the production of goods or services (Stevenson, 2015).
Output-based service innovation archetype	The output-based archetype of service innovation places its focus on the outputs of the service innovation process, such as the number of new service offerings. Following this perspective, service innovation can be measured, for instance, in terms of success rate, profitability, or sales impact (Helkkula et al., 2018).
Participatory Design/ participatory processes/ participatory principles	An approach that seeks to actively involve stakeholders (e.g. employees, partners, customers, citizens, end users) in the design process to help ensuring that results meet their needs (Sanders and Stappers, 2008).
Policy design	Policy design involves the effort to systematically develop efficient and effective policies, by adopting a set of actions that are likely to succeed in attaining desired goals or aims within specific policy contexts (Howlett, 2014).
Process-based service innovation archetype	The process-based archetype of service innovation appears mainly in new service development (NSD) research, which views service as a process. This perspective emphasizes the architectural elements or phases of the service experience as well as their order, which tends to be linear and sequential (Helkkula et al., 2018).
Psychology	Psychology is the field which studies human behavior and mind, including conscious and unconscious phenomena, as well as feeling and thought. As such, it aims to understand individuals and groups by establishing general principles and researching specific cases (Fernald, 2008).
Public Administration	Public administration if the field which studies the implementation of government policy and prepares civil servants for working in the public service. It has as fundamental goal to advance management and policies so that government can function (Rabin, Hildreth, & Miller, 2006).
Public design	Public design is about applying design approaches to innovation in public sector contexts. It relates to a kind of design that is socially, politically or environmentally engaged to create solutions for the public sector (Bason, 2017).
Resource	Resources are anything with the potential to create value for the involved actors or beneficiaries. Resources are *becoming*, which means that resources have potential value, but value is created only when integrated and operated on (or used) (Wetter-Edman et al., 2014, p. 9).
Resource integration	Resource integration is a continuous process, which comprises a series of activities performed by an actor for the benefit of another party (Payne, Storbacka, & Frow, 2008).
Scenario	Scenarios are stories about people and their activities in particular situations and environments (contexts). They can be textual, illustrated (e.g. picture books or comic strips), acted (e.g. dramatized usage situation) or even filmed (e.g. videos) descriptions of usage situations. They describe current or envisioned work practices or tasks of the users and thus help different stakeholders (including the users themselves) understand the tasks in their contexts, evaluate the practices and suggest changes to these practices in parallel to designing new tools. Scenario

	generating aims to predict how people could act in particular situations (Miettinen & Koivisto, 2009).
Service (eco)system innovation	Service ecosystem innovation means as a process that unfolds through changes in the institutional arrangements that govern resource integration practices in service ecosystems (Koskela-Huotari et al., 2016).
Service blueprint	A service blueprint is an operational planning tool which allows a company to explore all the issues inherent in creating or managing a service. As such, it supports specifying the physical evidence, staff actions, and support infrastructure needed to deliver a service across its different channels (Shostack, 1984).
Service capacity	Service capacity is the volume (such as of customers, data, etc.) that a service can handle while maintaining standards of quality and performance (Sampson & Froehle, 2006).
Service clues	Any element which customers can feel, see or taste which influences his/her experience in a service (Berry, Wall, & Carbone, 2006).
Service concept	The service concept defines the benefits a service offers customers (Edvardsson, Gustafsson, Sandén, & Johnson, 2000).
Service delivery process/ service operation	Process of applying specialized competences (knowledge and skills) to enable service among actors (Chen, Tsou and Huang, 2009).
Service delivery system	Service delivery system is the system which concerns with where, when, and how service is co-created with the customer (Lovelock & Wirtz, 2016).
Service design process	Process of creating new services or improving existing ones, which can be represented in the form of an iterative method including the phases of exploration, creation, reflection and implementation (Stickdorn & Schneider, 2011).
Service ecosystem	Service ecosystem is defined as a system of "resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange" (Lusch & Vargo, 2014, p. 161).
Service encounter	Service encounter involves any moment of interaction between the customer and the service provider, including the interactions involving provision of the core service offering itself (Bitner & Wang, 2014).
Service evidence	Service evidence comprises everything the consumer can comprehend with his five senses during a service (Shostack, 1977).
Service innovation process	Service innovation process consists of the procedures an organization must carry out in order to create, implement and diffuse a service offering. Service innovation process is more iterative and less structured than product-development processes for goods, involving the general phases of (a) find a focus, (b) understand the customers and (c) build a solution (Gustafsson, Kristensson, Schirr, & Witell, 2016).
Service interactions	Service interactions are actions in which actors relate and affect each other during a service, intermediated by interfaces (Secomandi and Snelders, 2011).
Service interface	Service interface includes material artifacts, environments, embodied human interactions, diffuse phenomena appealing to the senses (as the

	tastes, smells, sounds) and all the service evidences that intermediate service encounters. (Secomandi and Snelders, 2011).
Service network	Arrangement of multiple actors, beyond organizational boundaries, that interact to co-create value (Akaka et al., 2012).
Service offering	Service offering is the benefits that the service is expected to offer to the customer (Patrício et al., 2011).
Service quality	Service quality is the ability of the organization to meet or exceed customer expectations (Parasuraman, Zeithaml, & Berry, 1988).
Service Research	Service Research is a multidisciplinary field which investigates service and all its related topics (e.g., service economy, service innovation), comprising sub-disciplines such as service marketing and service operations management (Whole & Meiren, 2002).
Service system	Service system is the entity within which value creation takes place (Wetter-Edman, 2014, p. 11). Service system comprises a set of inter-related structures that support and enable value co-creation among actors (Edvardsson, Skålén and Tronvoll, 2012).
Service theater	Service theatre is a conceptual framework which uses theatre as a metaphor to describe and analyze service performances. Employees serving customers may be thought of as actors and customers as the audience that experiences the performance (Grove & Fisk, 2001).
Service-Dominant logic (S-D logic)	S-D logic is a theoretical perspective focused on investigating service as co-creation of value and all its related aspects (Lusch & Vargo, 2014).
Service-oriented architecture (SOA)	Service-oriented architecture (SOA) is a type of software design which decomposes a more complex service into blocks of services (Erl, 2016).
Service	Service is defined as the application of competences (knowledge and skills) for the benefit of a party (Vargo & Lusch, 2008b).
Servicescape	Servicescape refers to the physical space and non-human elements of the environment in which service encounters occur (Bitner, 1992).
Social Sciences	Social sciences is an interdisciplinary field concerned with investigation about society and the relationships among individuals within a society (Colander, 2016). Anthropology, Sociology, Psychology, Management, Jurisprudence and Political Science, although separated in this thesis to facilitate the examination of multidisciplinary contributions to service design, are part of the Social Sciences field.
Sociology	Sociology is a social science field that studies human societies, their interactions, and the processes that preserve and change them. It does this by examining the dynamics of constituent parts of societies, such as institutions, communities, populations, and gender, racial, or age groups (Form & Faris, 2019).
Status quo	Status quo is a Latin phrase meaning the existing state of affairs, particularly with regard to social or political issues (Botterweck, 2005).
Storyboarding	Storyboards is a prototyping technique which illustrates a visual storyline of a service or product use in its context(s) for users and clients. As such, storyboards are sequences of images, which demonstrate the relationship between individual displays and actions within a system (Miettinen, 2009).

Strategic design	Strategic design is defined as an approach with the main goal of interpreting ongoing situations, where problems are open and ill-defined, where knowledge is something that emerges step by step, through experimental processes and continuous interactions with other players (Zurlo, 1999, 2004). Strategic design confers to social systems rules, beliefs, values and tools to deal with the external environment, thus being able to evolve, as well as to maintain and develop one's own identity (Meroni, 2008).
Strategic management	Strategic management is a branch of management which involves the formulation and implementation of the major goals and initiatives taken by an organization's top management on behalf of owners, based on consideration of resources and an assessment of the internal and external environments in which the organization operates (Nag, Hambrick, & Chen, 2007).
Systemic service innovation archetypes	The systemic archetype is informed by a holistic belief that the whole is more than the sum of the parts and that something is lost when focusing on separate parts. Under this view, both private-facing resources (possessed or controlled by the individual or customer) and public-facing resources (possessed or controlled by society) become vital elements in service innovation along with the creation or recreation of norms and rules of the system and the broader social context—that is, changes in institutions and institutional arrangements (Helkkula et al., 2018).
Theory-based sampling	Theoretical sampling is a process of data collection for generating theory, whereby the analyst jointly collects codes and analyses data and decides what data to collect next and where to find them, in order to develop a theory as it emerges (Patton, 2002).
Touchpoints	Touchpoints are the points of contact between a service provider and customers (Clatworthy, 2011).
User-friendly	User-friendly describes an object that is easy to use. It is "friendly" to the user, meaning it is not difficult to learn or understand (Preece, Rogers, & Sharp, 2002).
Value proposition	Set of potential benefits offered to customers and/or other stakeholders (Frow et al., 2014).
Value	Value is not about knowledge and skills, but about using knowledge and skills in a specific context by a specific actor with the intention to create benefits. Resources enable and facilitate value creation and most often a constellation and integration of resources forms the basis for value creation. Value is created through actors' resource integration, when the customer and other actors integrate and operate on or apply the resources of the service company with other resources in their own context, including the social context. (Wetter-Edman et al., 2014, p. 9).
Value co-creation	Value co-creation entails the activities that create mutual value and mutually beneficial relations between actors, such as companies and their customers (Lusch & Vargo, 2014, p. 168).
Value constellation	Value constellation represents the network of actors and their relationships that jointly create an offering (Normann & Ramirez, 1993).

APPENDIX II – TABLE WITH EXPERTS IN SERVICE DESIGN AND INNOVATION

This table shows the experts in service design and innovation from multidisciplinary areas, who participated during Phase 2 of Study 1.

Research group	Expert	Field
Köln International School of Design	Prof. Birgit Mager	Design
National University of Singapore, School of Design and Environment	Prof. Dr. Jung-Joo Lee	Design
Universidade Federal do Rio de Janeiro - UFRJ/Coppe	Prof. Dr. Carla Cipolla	Design
W. P. Carey School of Business, Arizona State University	Dr. Mary Jo Bitner, Professor Emeritus	Service Research
Karlstad University, CTF Service Research Center, and Inland Norway University of Applied Science	Prof. Dr. Bo Edvardsson and Prof. Dr. Bård Tronvoll	Service Research
Maastricht University	Prof. Dr. Martin Wetzels	Marketing
Texas State University	Prof. Dr. Raymond P. Fisk	Marketing
Human-Computer Interaction Institute, Carnegie Mellon University	Prof. Dr. John Zimmerman	Interaction Design
Linköping University	Prof. Dr. Stefan Holmlid	Interaction Design
Warwick University, Warwick Business School	Prof. Dr. Chris Voss	Operations Management
Catholic University of Portugal, Católica Porto Business School	Prof. Dr. Rui Sousa	Operations Management
IBM Director, Cognitive Opentech Group	Dr. Jim Spohrer	Information Systems
University of Porto	Prof. Dr. João Falcão e Cunha	Information Systems

APPENDIX III – RESULTS OF PHASE 1 OF STUDY 1

The selected references from Phase 1 are presented in the Table below. The identification of the main associated areas was made based on the analysis of the publications' content.

Publication	Main area(s)
1. Bitner, M.J., Ostrom, A.L. and Morgan, F.N. (2008), "Service Blueprinting: a practical technique for service innovation", *California Management Review*, Vol. 50 No. 3, pp. 66–95.	Service Research, Marketing
2. Beyer, H. and Holtzblatt, K. (1997), *Contextual Design: Defining Customer-Centered Systems*, Morgan Kaufmann Publishers, San Franscisco.	Marketing
3. Blomberg, J. and Darrah, C. (2015), "Towards an Anthropology of Services", *The Design Journal*, Vol. 18 No. 2, pp. 171–192.	Design
4. Blomkvist, J. and Segelström, F. (2014), "Benefits of External Representations in Service Design: A Distributed Cognition Perspective", *The Design Journal*, Taylor & Francis, Vol. 17 No. 3, pp. 331–346.	Design, Interaction Design
5. Brown, T. (2008), "Design Thinking", *Harvard Business Review*, Vol. 86 No. 6, pp. 84–94.	Design
6. Buchenau, M. and Suri, J.F. (2000), "Experience prototyping", *Proceedings of the Conference on Designing Interactive Systems Processes Practices Methods and Techniques*, ACM Press, pp. 424–433.	Interaction Design
7. Burns, C., Cottam, H., Vanstone, C. and Winhall, J. (2006), *RED PAPER 02, Transformation Design*, Design Council, London.	Design
8. Carbone, L.P. and Haeckel, S.H. (1994), "Engineering Customer Experiences", *Marketing Management*, Vol. 3 No. 3, pp. 8–19.	Marketing
9. Dubberly, H. and Evenson, S. (2008), "On Modeling: The Analysis-systhesis Bridge Model", *Interactions*, ACM, New York, USA, Vol. 15 No. 2, pp. 57–61.	Interaction Design
10. Edvardsson, B., Gustafsson, A., Sandén, B. and Johnson, M.D. (2000), *New Service Development and Innovation in the New Economy*, Studenlitteratur, Lund.	Service Research, Marketing
11. Fallman, D. (2008), "The interaction design research triangle of design practice, design studies, and design exploration", *Design Issues*, MIT Press, Vol. 24 No. 3, pp. 4–18.	Interaction Design, Design
12. Forlizzi, J., Zimmerman, J. and Evenson, S. (2008), "Crafting a place for interaction design research in HCI", *Design Issues*, Vol. 24 No. 3, pp. 19–29.	Interaction Design

13. Frow, P., McColl-Kennedy, J.R., Hilton, T., Davidson, A., Payne, A. and Brozovic, D. (2014), "Value propositions: A service ecosystems perspective", *Marketing Theory*, Vol. 14 No. 3, pp. 327–351.	Marketing
14. Glushko, R.J. (2010), "Seven contexts for service system design", in Maglio, P.P., Kieliszewski, C.A. and Spohrer, J.C. (Eds.), *Handbook of Service Science*, Springer, pp. 219–249.	Information Systems
15. Holmlid, S. (2009), "From interaction to service", in Miettinen, S. and Koivisto, M. (Eds.), *Designing Services with Innovative Methods*, TAIK, Helsinki, pp. 78–97.	Interaction Design
16. Holmlid, S. and Evenson, S. (2008), "Bringing service design to service sciences, management and engineering", in Hefley, B. and Murphy, W. (Eds.), *Service Science, Management and Engineering Education for the 21st Century*, Springer, pp. 341–345.	Design
17. Junginger, S. (2015), "Organizational Design Legacies and Service Design", *The Design Journal*, Vol. 18 No. 2, pp. 209–226.	Design
18. Kieliszewski, C.A., Maglio, P.P. and Cefkin, M. (2012), "On Modeling Value Constellations to Understand Complex Service System Interactions", *European Management Journal*, Vol. 30 No. 5, pp. 438–450.	Information Systems
19. Kimbell, L. (2011), "Designing for service as one way of designing services", *International Journal of Design*, Vol. 5 No. 2, pp. 41–52.	Design
20. Lusch, R.F. and Nambisan, S. (2015), "Service innovation: A service-dominant logic perspective", *Mis Quarterly*, Vol. 39 No. 1, pp. 155–175.	Service Research
21. Maglio, P.P., Vargo, S.L., Caswell, N. and Spohrer, J. (2009), "The service system is the basic abstraction of service science", *Information Systems and E-Business Management*, Vol. 7 No. 4, pp. 395–406.	Information Systems
22. Mahr, D., Kalogeras, N. and Odekerken-Schröder, G. (2013), "A service science approach for improving healthy food experiences", *Journal of Service Management*, Vol. 24 No. 4, pp. 435–471.	Service Research, Marketing
23. Menor, L.J., Tatikonda, M. V and Sampson, S.E. (2002), "New service development: areas for exploitation and exploration", *Journal of Operations Management*, Vol. 20 No. 2, pp. 135–157.	Service research, Operations Management
24. Meroni, A. and Sangiorgi, D. (Eds.). (2011), *Design for Services*, Gower Publishing, Aldershot, UK.	Design
25. Morelli, N. (2006), "Developing new product service systems (PSS): methodologies and operational tools", *Journal of Cleaner Production*, Vol. 14 No. 17, pp. 1495–1501.	Design
26. Ostrom, A.L., Parasuraman, A., Bowen, D.E., Patrício, L., Voss, C.A. and Lemon, K. (2015), "Service Research Priorities in a Rapidly Changing Context", *Journal of Service Research*, Vol. 18 No. 2, pp. 127–159.	Service Research

27. Pacenti, E. and Sangiorgi, D. (2010), "Service Design Research Pioneers", *Design Research Journal*, Vol. 1, pp. 26–33.	Design
28. Patrício, L., Fisk, R.P., e Cunha, J. and Constantine, L. (2011), "Multilevel Service Design: From Customer Value Constellation to Service Experience Blueprinting", *Journal of Service Research*, Vol. 14 No. 2, pp. 180–200.	Service Research
29. Sampson, S.E. (2012), "Visualizing Service Operations", *Journal of Service Research*, Vol. 15 No. 2, pp. 182–198.	Operations Management
30. Sangiorgi, D. (2011), "Transformative services and transformation design", *International Journal of Design*, Vol. 5 No. 2, pp. 29–40.	Design
31. Sangiorgi, D., Prendiville, A., Jung, J. and Yu, E. (2015), *Design for Service Innovation & Development. Final Report.*, Lancaster.	Design
32. Secomandi, F. and Snelders, D. (2011), "The object of service design", *Design Issues*, MIT Press, Vol. 27 No. 3, pp. 20–34.	Design
33. Shostack, G.L. (1982), "How to Design a Service", *European Journal of Marketing*, Vol. 16 No. 1, pp. 49–63.	Operations Management, Service research
34. Shostack, G.L. (1984), "Designing Services that deliver", *Harvard Business Review*, Vol. 62 No. 1, pp. 133–139.	Operations Management, Service research
35. Stickdorn, M. and Schneider, J. (Eds.). (2011), *This is Service Design Thinking: Basics, Tools, Cases*, BIS Publishers, Amsterdam.	Design
36. Tax, S.S., McCutcheon, D. and Wilkinson, I.F. (2013), "The Service Delivery Network (SDN): A Customer-Centric Perspective of the Customer Journey", *Journal of Service Research*, Vol. 16 No. 4, pp. 454–470.	Marketing, Service Research
37. Truong, K.N., Hayes, G.R. and Abowd, G.D. (2006), "Storyboarding: an empirical determination of best practices and effective guidelines", in Carroll, J.M., Bødker, S. and Coughlin, J. (Eds.), *Proceedings of the 6th Conference on Designing Interactive Systems*, New York, USA, pp. 12–21.	Interaction Design
38. Vargo, S.L. and Lusch, R.F. (2008), "Service-dominant logic: continuing the evolution", *Journal of the Academy of Marketing Science*, Vol. 36 No. 1, pp. 1–10.	Service Research, Marketing
39. Wetter-Edman, K., Sangiorgi, D., Edvardsson, B., Holmlid, S., Grönroos, C. and Mattelmäki, T. (2014), "Design for Value Co-Creation: Exploring Synergies Between Design for Service and Service Logic", *Service Science*, Vol. 6 No. 2, pp. 106–121.	Service Research, Design
40. Zomerdijk, L.G. and Voss, C.A. (2010), "Service design for experience-centric services", *Journal of Service Research*, Vol. 13 No. 1, pp. 67–82.	Marketing, Service Research, Operations Management

APPENDIX IV – TABLE WITH SERVICE DESIGN RESEARCH CENTERS OF THE FOCUS GROUPS

This table shows the service design and innovation research centers which participated in the focus groups of Study 2.

Research center	Responsible researcher(s)	Main field
Politecnico di Milano	Dr. Anna Meroni	Design
Maastricht University	Dr. Martin Wetzels	Marketing, Service Research
Linkoping University	Dr. Stefan Holmlid	Interaction Design, Information Systems
Catholic University of Porto	Dr. Rui Sousa	Operations Management
Karlsruhe Institute of Technology	Dr. Gerhard Satzger	Information Systems
Karlstad University	Dr. Bo Edvardsson and Dr. Bård Tronvoll	Service Research, Marketing

APPENDIX V – TABLE WITH THE LIST OF FOCUS GROUPS' PARTICIPANTS AND TIME DURATIONS

This table shows the profile of service design and innovation experts who participated in the focus groups during Study 2 and the time duration of each focus group.

Focus group	Duration	Participants' multidisciplinary backgrounds	Status
Service design Center 1 (SD1)	1h 58min	Interviewee7 – Information Systems, Software development	PhD, senior researcher
		Interviewee8 – Information Systems, Operations management	PhD, senior researcher
		Interviewee9 – Information Systems	PhD, senior researcher
		Interviewee10 – Information Systems, Software development	PhD candidate
		Interviewee11 – Information Systems	PhD, Professor
		Interviewee12 – Information Systems, Computer Science	PhD, Professor
		Interviewee13 – Information Systems	PhD, senior researcher
		Interviewee14 – Information Systems	PhD, senior researcher
		Interviewee15 – Information Systems	PhD, senior researcher
Service design Center 2 (SD2)	1h 46min	Interviewee1 – Operations management, Strategic management	PhD, Professor
		Interviewee2 – Operations management	PhD, Professor
		Interviewee3 – Operations management	PhD, Professor
		Interviewee4 – Operations management, Marketing	PhD, Professor
		Interviewee5 – Operations management	PhD, Professor
		Interviewee6 – Operations management	Senior researcher
Service design Center 3 (SD3)	2h 15min	Interviewee16 – Interaction Design, Design	PhD, Professor
		Interviewee17 – Interaction Design, Design Management, Service Design	PhD, Professor
		Interviewee18 – Interaction Design, Design	PhD, Professor
		Interviewee19 – Design, Service Research	PhD, Professor
		Interviewee20 – Interaction Design, Cognitive Science	PhD, Professor
		Interviewee21 – Design	PhD, Professor
		Interviewee22 – Interaction Design, Design	PhD, Professor
		Interviewee23 – Interaction Design	PhD, Professor
		Interviewee24 – Design	PhD, Professor
Service design Center 4 (SD4)	1h 43min	Interviewee25 – Design, Architecture	PhD, Professor
		Interviewee26 - Design	PhD, Professor
		Interviewee27- Design	PhD, Professor
		Interviewee28 - Design	PhD, Professor
Service design Center 5 (SD5)	1h 45min	Interviewee33 – Marketing, Management	PhD, Professor
		Interviewee34 - Marketing	PhD, Professor
		Interviewee35 – Marketing, Policy design	PhD, Professor

		Interviewee36 - Marketing	PhD, Professor
		Interviewee37 - Marketing	PhD, Professor
		Interviewee38 – Marketing, Management	PhD, Professor
		Interviewee39 - Marketing	PhD candidate
		Interviewee40 – Marketing, Operations management	PhD, Professor
Service design Center 6 (SD6)	1h 10min	Interviewee29 - Service Research, Service innovation	PhD, senior researcher
		Interviewee30 - Service Research, Service innovation	PhD, senior researcher
		Interviewee31 – Service Research, Psychology	PhD, Professor
		Interviewee32 – Service Research, Marketing	PhD, Professor

APPENDIX VI – CASES' PROFILES AND DATA SOURCES OF STUDY 3

This table shows the profiles and data sources of the case studies from Study 3.

Case number	Sector	Project area	Location	Service innovation focus	Number of interviews	Interviewees' roles and multidisciplinary contributions	Recording time	Main documental data
Case 1	Consortium involving private organizations, public University and public hospital	Digital transformation in healthcare	Portugal	Micro level Hospital-Blood donors Blood donation service innovation	6 interviewees	1. Project manager (IT Engineering; Production management; Project management; Marketing)	1h 10min	1. Technical report from the project; 2. Service blueprint; 3. Project workshops presentations.
						2. Project Director (Computer sciences; Strategic management)	1h 05min	
						3. Operations specialist (Operations management/Software development)	42min	
						4. Product owner (Computer sciences)	44min	
						5. UX Designer (Interaction design)	35min	
						6. Designer (Service engineering and Management; Strategic design)	1h	
Case 2	Public innovation lab	Improvement of processes in Healthcare	Sweden	Micro level Hospital-Patients Improvements of processes and patient-	7 interviewees	7. Designer/Project manager (Business administration/ Design/ Project management/ Strategic design)	1h 24min	1. Workshops presentations; 2. Guide for the patients; 3. Photos from ideation and
						8. Communication strategist (Strategic management/Marketing/ Operations management)	1h 12min	
						9. Psychiatrist	40min	

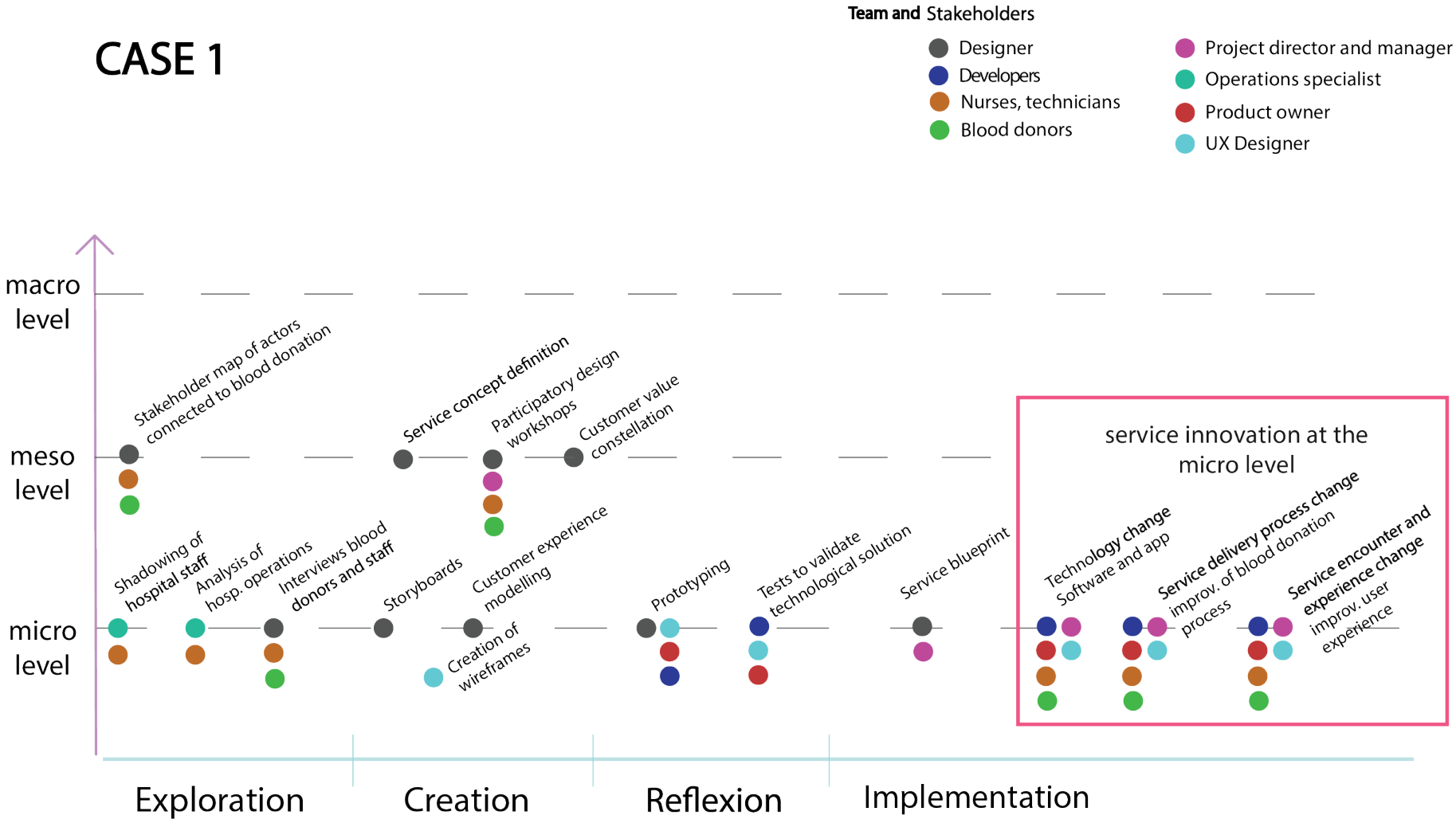
				staff relations in psychiatric department of a hospital		(Medicine)		creative workshops.
						10. Chief medical officer (Medicine)	1h 10min	
						11. Former patient (Architecture)	55min	
						12. Head of nurseys Nursey (Nursing)	44min	
						13. Nursey (Nursing)	54min	
Case 3	Technology multinational	Software innovation	Germany	Micro level Organization-Customers Software innovation	4 interviewees	14. User researcher (Psychology)	49min	1. Website of the new offering that is available in the market; 2. News regarding the new experience that the company is designing; 3. Report which explains the innovation approach practiced.
						15. UX Designer (Interaction design)	48min	
						16. Front-end developer (IT Engineering; Software development)	43min	
						17. Communication designer/ Design producer (Communication design/ Project management/ Strategic design)	57min	
Case 4	Telecom company	Data centers maintenance of Telecom industry	Switzerland	Meso level Service network New form of sharing information for data centers maintenance	6 interviewees	18. Industrial engineer (Industrial engineering/ Project management; Strategic management; Marketing)	1h 02min	1. Report describing the whole innovation process until the final prototype that informed the project; 2. Application interfaces;
						19. Innovation manager (Business innovation and international management/ Project management)	54min	
						20. Innovation manager (Political Sciences and History; Business innovation)	1h 01min	

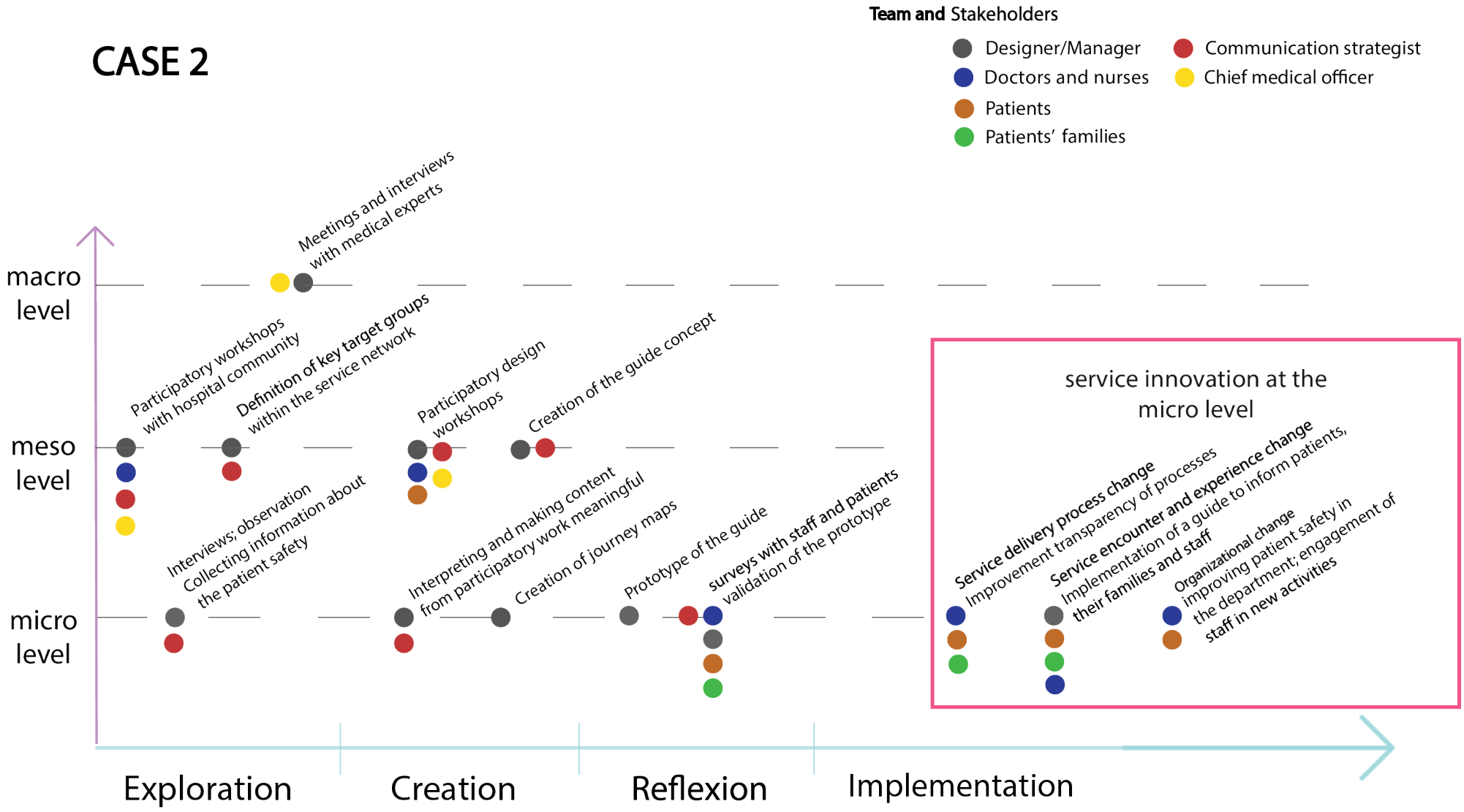
						21. IT developer (Industrial engineering/IT engineering/ Software development)	1h 22min	3. Website describing the solution.
						22. Leader of data center department (Industrial engineering/Business administration)	55min	
						23. Designer (Arts and Design management/ IT engineering; Strategic design)	56min	
Case 5	Chemistry multinational industry company	Digital farming	Germany	Meso level Service network Web-app that supports farmers creating a network and analyzing their own crops	9 interviewees	24. Innovation manager (Industrial Engineering and Management; Strategic design)	51min	1. Reports describing the whole innovation process until the prototypes that informed the project; 2. Website describing the application created; 3. Workshop presentation of the innovation process followed by the company.
						25. Product developer (Industrial engineering and product development)	24min	
						26. Project manager (Operations management/ International Management; Project management)	1h 06min	
						27. IT developer (IT engineering/ Software development)	57min	
						28. Industrial engineer and manager (Industrial engineer and management)	40min	
						29. Industrial engineer and manager (Industrial engineer and management)	53min	
						30. Agriculture engineer/product owner (Agricultural engineering)	53min	
						31. Digital farming portfolio manager	46min	

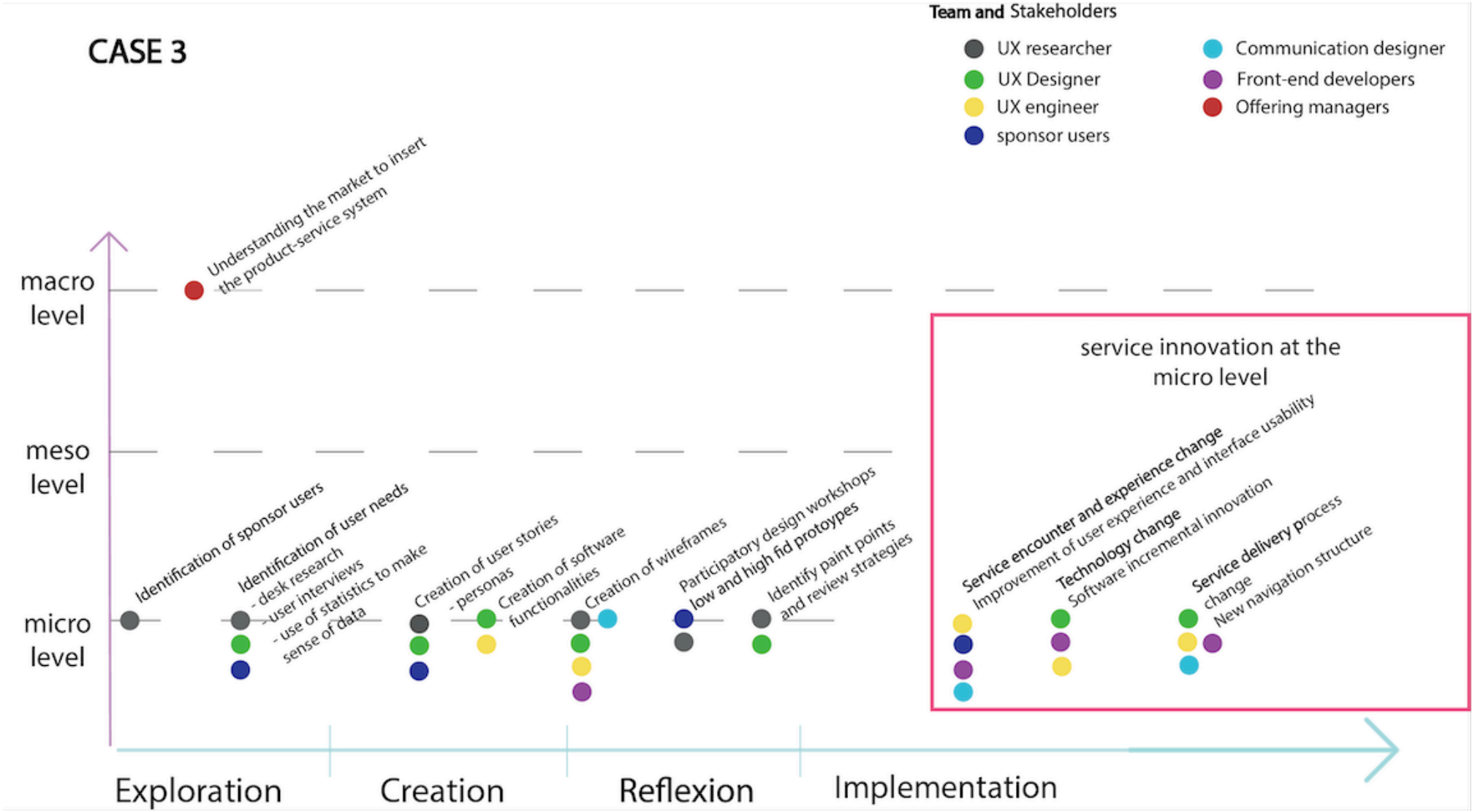
						(General engineering/Business administration)		
						32 Supply chain acquisition (Industrial engineering/ Marketing/Operations management)	1h 09min	
Case 6	Design consultancy	Web, brand and community management project	Portugal	Meso level Service network New platform to connect entrepreneurial network of Lisbon	5 interviewees	33. Anthropologist (Anthropology)	1h 15min	1. Company website describing the project 2. News reporting the project 3. Videos of the project
						34. UX Designer (Interaction design)	56min	
						35. Psychologist (Psychology; Community Psychology)	1h 12min	
						36. Communication strategist (Strategic management/Marketing)	46min	
						37. Designer (Communication design; Project management; Strategic design)	1h	
Case 7	Public innovation lab	Obituary services	Portugal	Macro level Public sector national service ecosystem Creation of new obituary service for an entire country	4 interviewees	38. Designer (Design/ Strategic design/ Public design)	1h 30min	1. Presentation of the project in the OECD 2017 conference (Paris); 2. User journeys produced during the project.
						39. Innovation manager (Industrial engineering/Business administration/ Strategic management/ Project management)	1h 07min	
						40. Psychologist (Psychology)	1h 40min	
						41. Sociologist (Sociology/ Jurisprudence/ Political sciences)	1h 03min	
Case 8	Public national department	Forest preservation	Germany	Meso/Macro level Service network/New practices at the national level Design of new service to create a new role	6 interviewees	42. Innovation manager (Business administration/ Business innovation/ Strategic management)	1h 05min	1. Report describing the whole innovation process until the final prototype that informed the project;
						43. Industrial engineer (Industrial Engineering/ Computer sciences/ Software development)	1h 12min	
						44. Project manager (Business administration/ Business innovation/ Project management)	1h 02min	

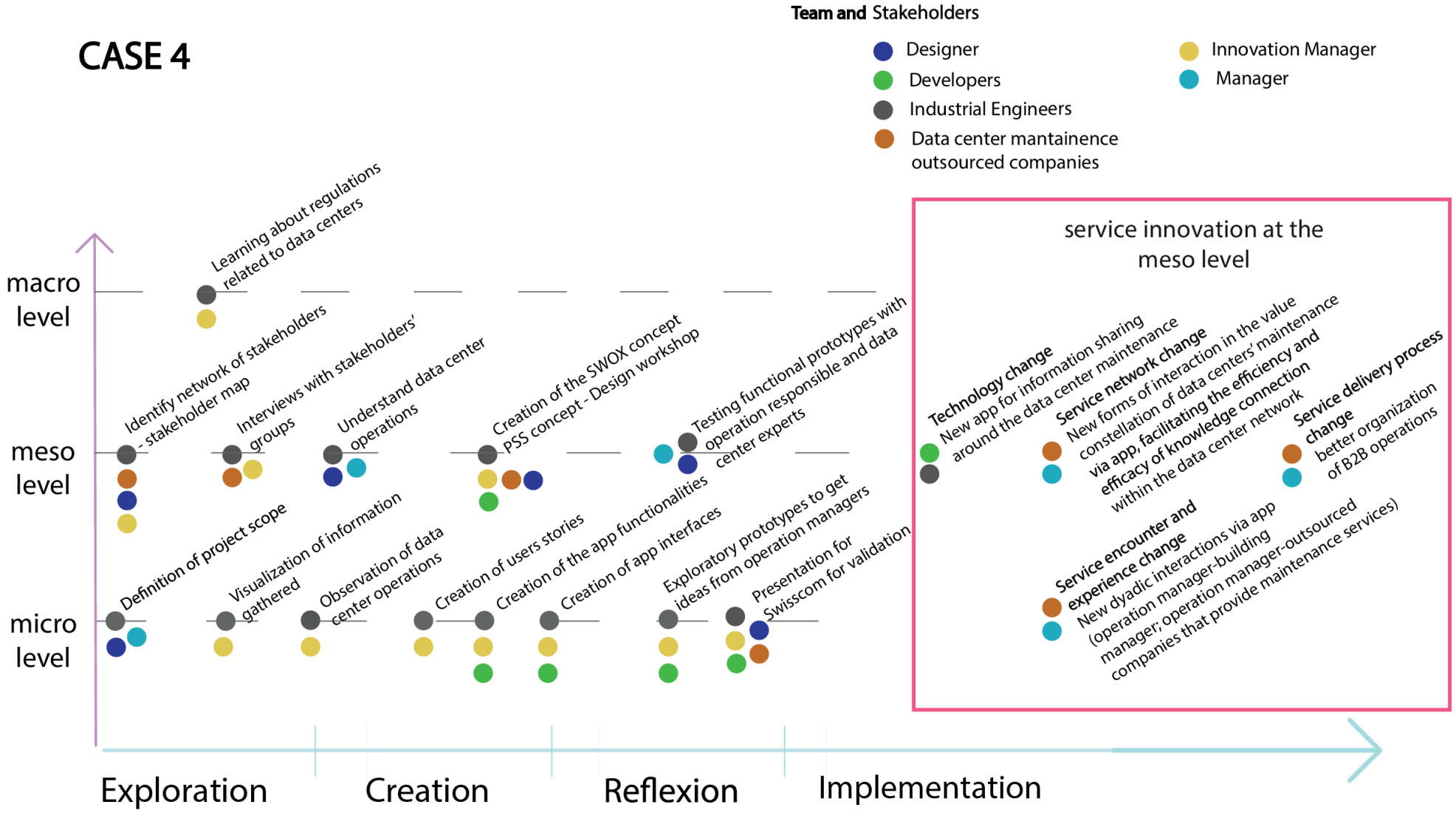
				and its awareness for a national public organization		45. IT developer (IT engineering)	1h 20min	2. Prototype of the solution created.
						46. Industrial engineer (Industrial Engineering/ Operations management)	45min	
						47. Forest Engineer (Forest Engineering)	40min	
Case 9	Public innovation lab	Local and regional development	France	Macro level Public sector national service ecosystem Changing the culture and the way of developing public policies at the national level	9 interviewees	48. Designer1 (Design/ Strategic design/ Public design)	1h 1min	1. Website and blog explaining the project; 2. Posters and manuals produced as outputs of the project.
						49. Popular educator (Pedagogy)	1h 21min	
						50. Manager (Political sciences/ Strategic Management)	1h 20min	
						51. Innovation manager (Economics/Local development/Political sciences/ Project management)	54min	
						52. Designer2 (Design/ Strategic design/ Public design)	59min	
						53. Program and project managers (Political sciences/ Organizational management)	1h 02min	
						54. Coach (Community Psychology; Organizational Psychology)	1h 09min	
						55. Communication strategist (Communication studies)	56min	
						56. Political Scientist (Political sciences/Sociology)	1h 04min	

APPENDIX VII – VISUALIZATIONS CREATED TO SUPPORT THE WITHIN-CASE ANALYSIS IN STUDY 3

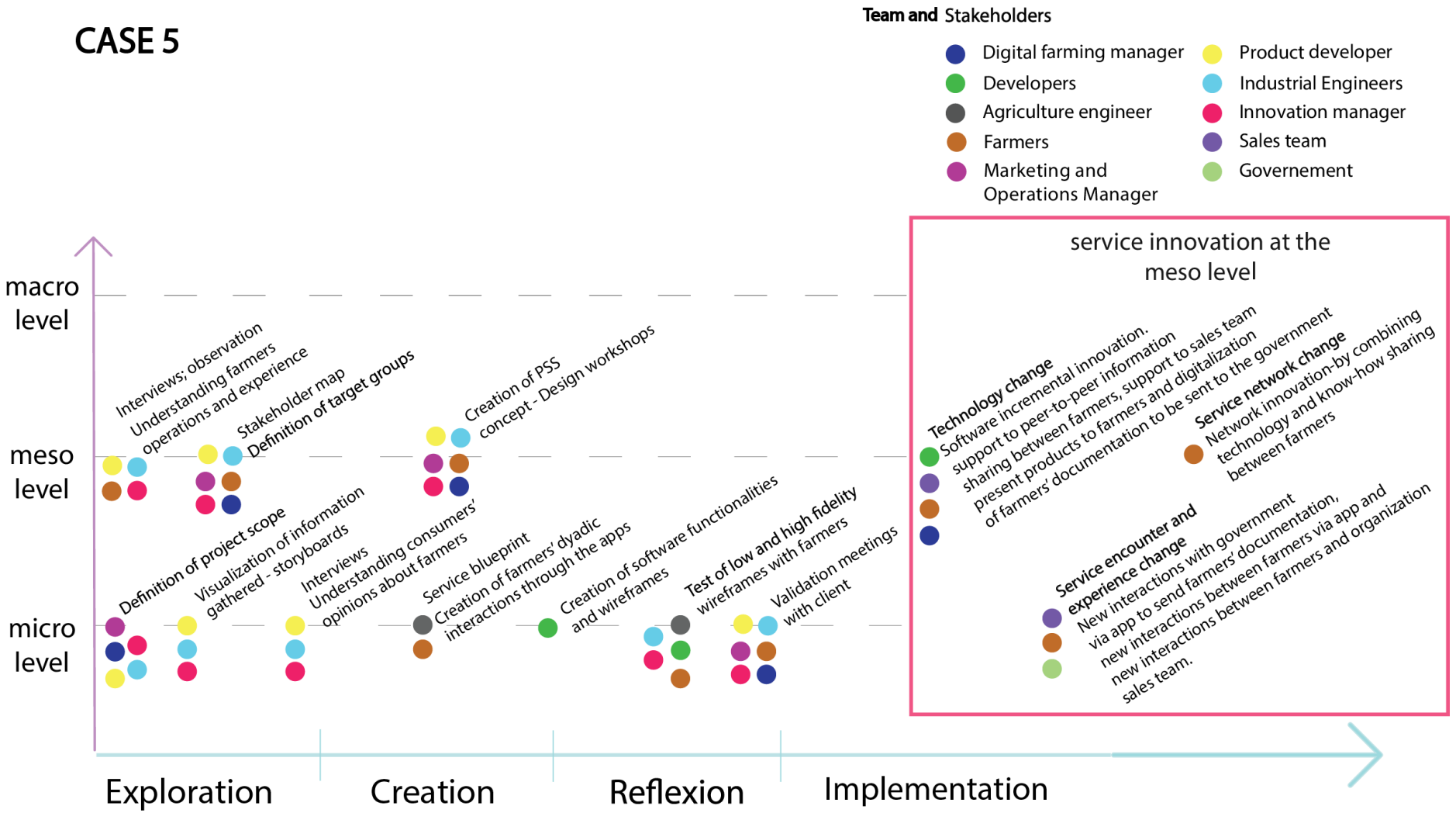


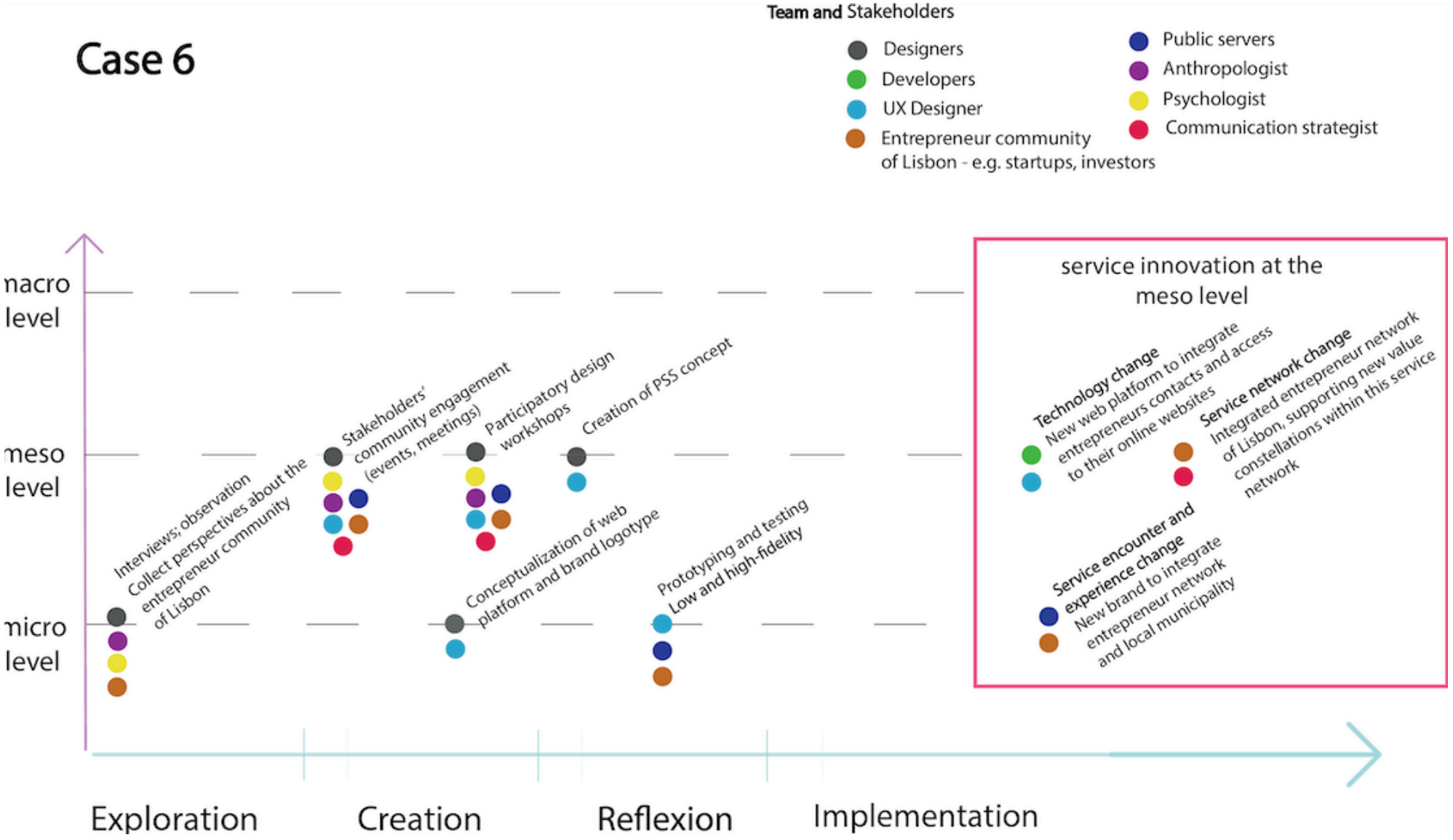

CASE 2
Team and Stakeholders
Designer/Manager
Communication strategist
Doctors and nurses
Chief medical officer
Patients
Patients' families
macro level
meso level
micro level
Meetings and interviews with medical experts
Participatory workshops with hospital community
Definition of key target groups within the service network
Participatory design workshops
Creation of the guide concept
Interviews; observation
Collecting information about the patient safety
Interpreting and making content from participatory work meaningful
Creation of journey maps
Prototype of the guide
surveys with staff and patients
validation of the prototype
service innovation at the micro level
Service delivery process change
Improvement transparency of processes
Service encounter and experience change
Implementation of a guide to inform patients, their families and staff
Organizational change
improving patient safety in the department; engagement of staff in new activities
Exploration
Creation
Reflexion
Implementation

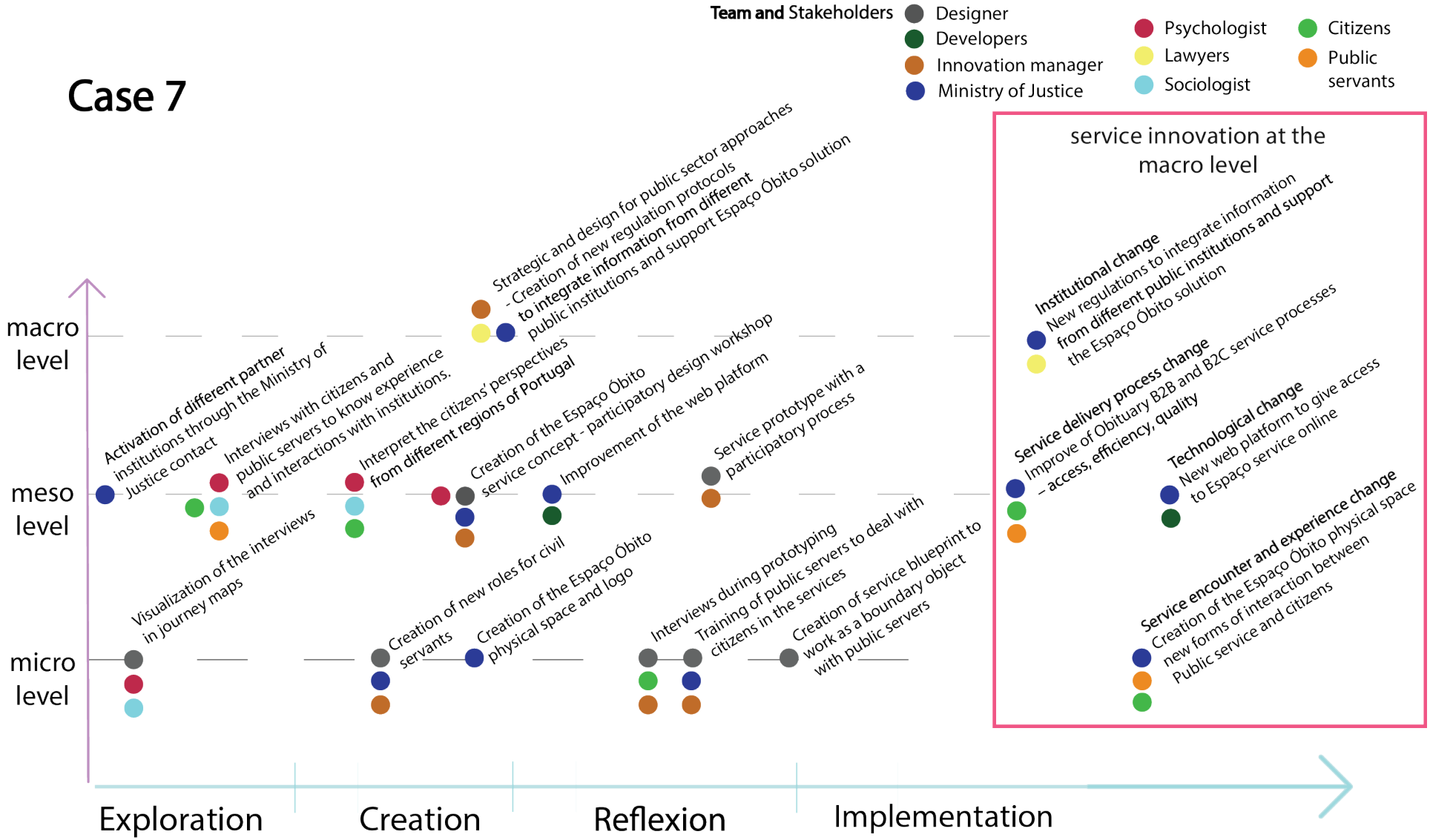

CASE 3
Team and Stakeholders
UX researcher
UX Designer
UX engineer
sponsor users
Communication designer
Front-end developers
Offering managers
macro level
meso level
micro level
Understanding the market to insert the product-service system
Identification of sponsor users
Identification of user needs
- desk research
- user interviews
- use of statistics to make sense of data
Creation of user stories
- personas
Creation of software functionalities
Creation of wireframes
Participatory design workshops
low and high fid protoypes
Identify paint points and review strategies
service innovation at the micro level
Service encounter and experience change
Improvement of user experience and interface usability
Technology change
Software incremental innovation
Service delivery process change
New navigation structure
Exploration
Creation
Reflexion
Implementation


CASE 4
Team and Stakeholders
Designer
Developers
Industrial Engineers
Data center mantainence outsourced companies
Innovation Manager
Manager
macro level
meso level
micro level
Learning about regulations related to data centers
Identify network of stakeholders - stakeholder map
Interviews with stakeholders' groups
Understand data center operations
Creation of the SWOX concept PSS concept - Design workshop
Testing functional prototypes with operation responsible and data center experts
Definition of project scope
Visualization of information gathered
Observation of data center operations
Creation of users stories
Creation of the app functionalities
Creation of app interfaces
Exploratory prototypes to get ideas from operation managers
Presentation for Swisscom for validation
service innovation at the meso level
Technology change
New app for information sharing around the data center maintenance
Service network change
New forms of interaction in the value constellation of data centers' maintenance via app, facilitating the efficiency and efficacy of knowledge connection within the data center network
Service delivery process change
better organization of B2B operations
Service encounter and experience change
New dyadic interactions via app (operation manager-building manager; operation manager-outsourced companies that provide maintenance services)
Exploration
Creation
Reflexion
Implementation

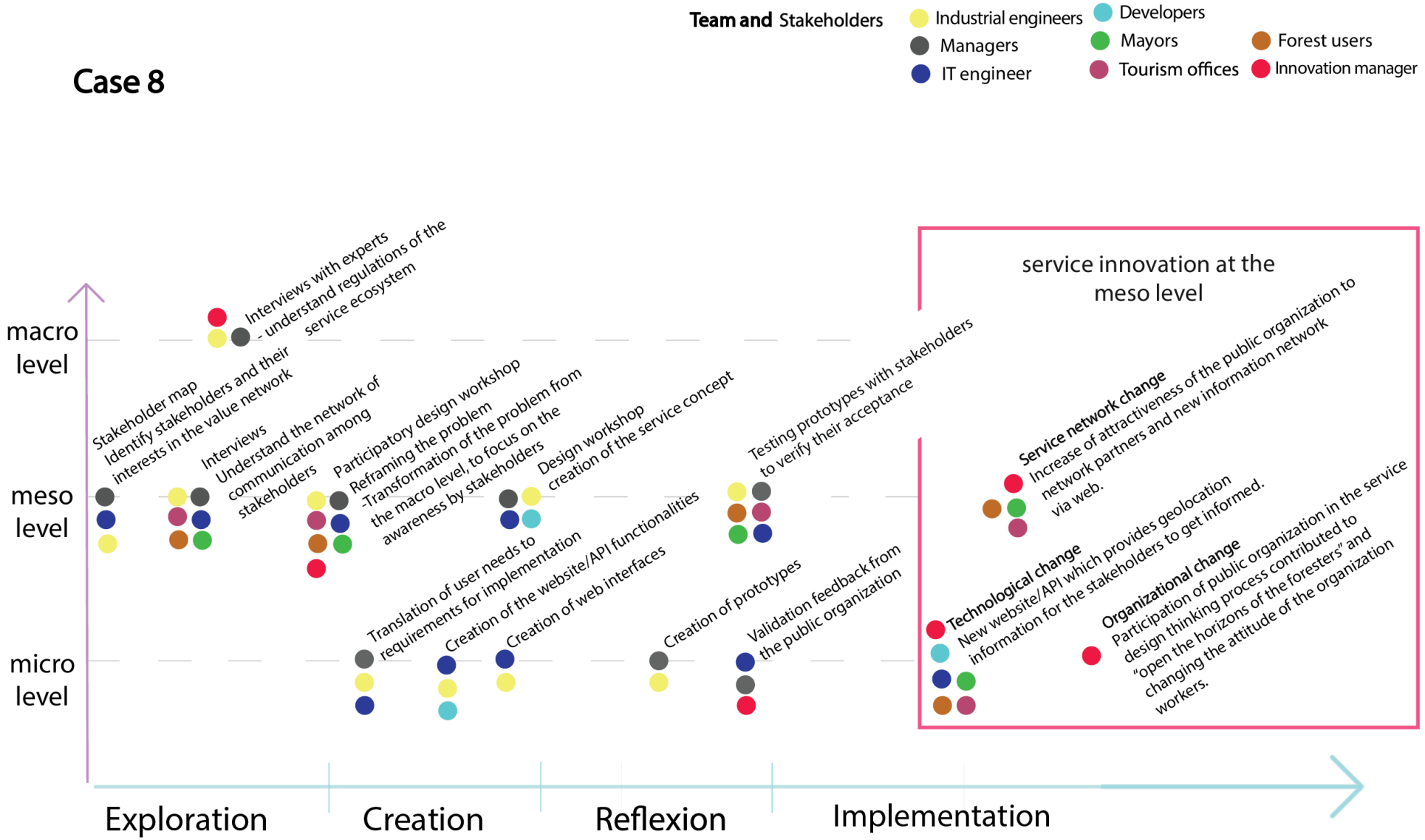
CASE 5

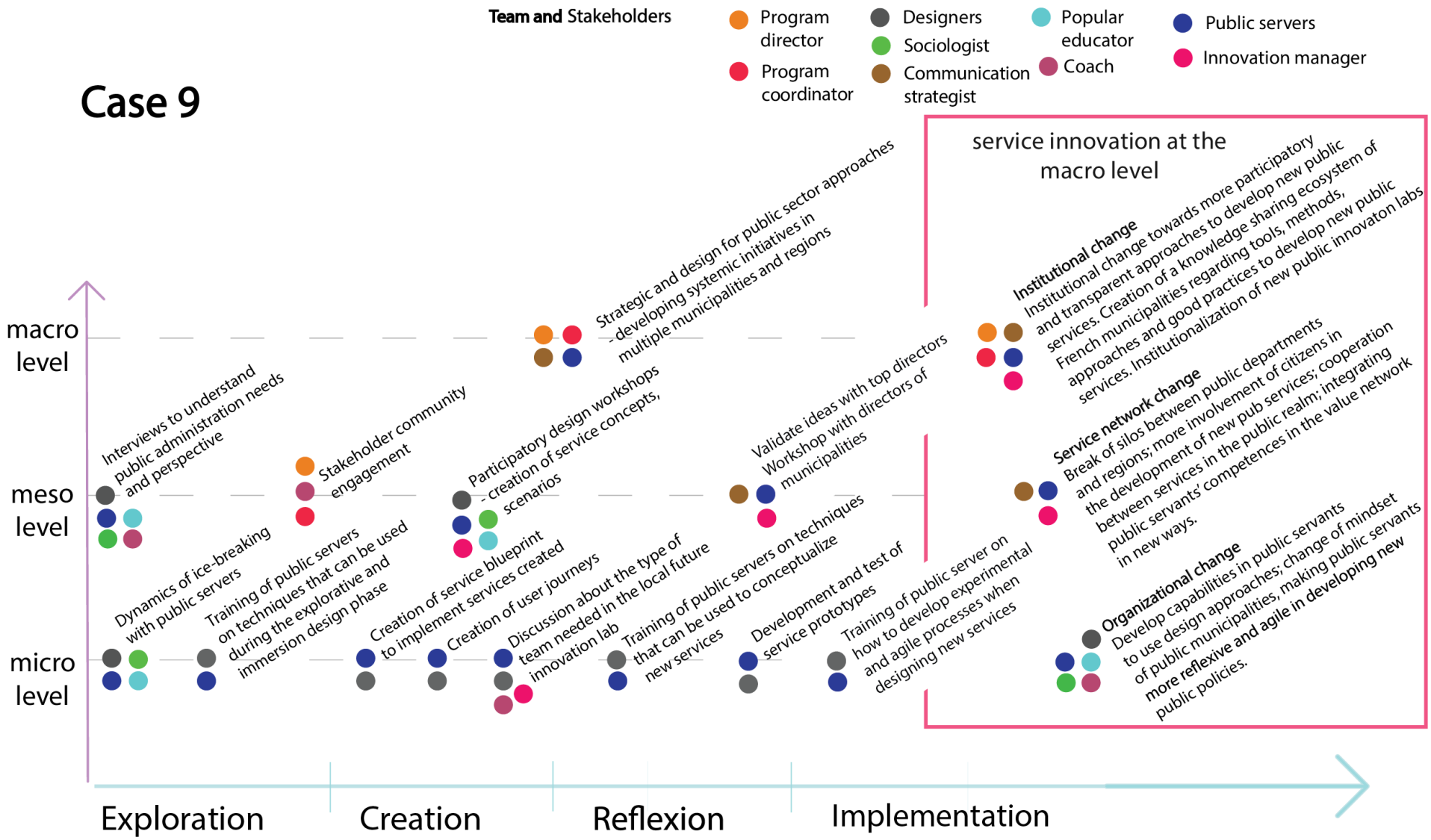

Team and Stakeholders
Digital farming manager
Developers
Agriculture engineer
Farmers
Marketing and Operations Manager
Product developer
Industrial Engineers
Innovation manager
Sales team
Governement
macro level
meso level
micro level
Interviews; observation
Understanding farmers operations and experience
Stakeholder map
Definition of target groups
Creation of PSS concept - Design workshops
Definition of project scope
Visualization of information gathered - storyboards
Interviews
Understanding consumers' opinions about farmers
Service blueprint
Creation of farmers' dyadic interactions through the apps
Creation of software functionalities and wireframes
Test of low and high fidelity wireframes with farmers
Validation meetings with client
service innovation at the meso level
Technology change
Software incremental innovation.
support to peer-to-peer information sharing between farmers, support to sales team present products to farmers and digitalization of farmers' documentation to be sent to the government
Service network change
Network innovation-by combining technology and know-how sharing between farmers
Service encounter and experience change
New interactions with government via app to send farmers' documentation,
new interactions between farmers via app and
new interactions between farmers and organization
sales team.
Exploration
Creation
Reflexion
Implementation


Case 6
Team and Stakeholders
Designers
Developers
UX Designer
Entrepreneur community of Lisbon - e.g. startups, investors
Public servers
Anthropologist
Psychologist
Communication strategist
macro level
meso level
micro level
Interviews; observation
Collect perspectives about the entrepreneur community of Lisbon
Stakeholders' community engagement (events, meetings)
Participatory design workshops
Creation of PSS concept
Conceptualization of web platform and brand logotype
Prototyping and testing
Low and high-fidelity
service innovation at the meso level
Technology change
New web platform to integrate entrepreneurs contacts and access to their online websites
Service network change
Integrated entrepreneur network of Lisbon, supporting new value constellations within this service network
Service encounter and experience change
New brand to integrate entrepreneur network and local municipality
Exploration
Creation
Reflexion
Implementation


Case 7
Team and Stakeholders
Designer
Developers
Innovation manager
Ministry of Justice
Psychologist
Lawyers
Sociologist
Citizens
Public servants
macro level
meso level
micro level
Exploration
Creation
Reflexion
Implementation
Activation of different partner institutions through the Ministry of Justice contact
Interviews with citizens and public servers to know experience and interactions with institutions.
Visualization of the interviews in journey maps
Interpret the citizens' perspectives from different regions of Portugal
Strategic and design for public sector approaches - Creation of new regulation protocols to integrate information from different public institutions and support Espaço Óbito solution
Creation of the Espaço Óbito service concept - participatory design workshop
Creation of new roles for civil servants
Creation of the Espaço Óbito physical space and logo
Improvement of the web platform
Service prototype with a participatory process
Interviews during prototyping
Training of public servers to deal with citizens in the services
Creation of service blueprint to work as a boundary object with public servers
service innovation at the macro level
Institutional change
New regulations to integrate information from different public institutions and support the Espaço Óbito solution
Service delivery process change
Improve of Obituary B2B and B2C service processes – access, efficiency, quality
Technological change
New web platform to give access to Espaço service online
Service encounter and experience change
Creation of the Espaço Óbito physical space new forms of interaction between Public service and citizens

Case 8


Team and Stakeholders
Industrial engineers
Developers
Managers
Mayors
Forest users
IT engineer
Tourism offices
Innovation manager
macro level
meso level
micro level
Interviews with experts - understand regulations of the service ecosystem
Stakeholder map Identify stakeholders and their interests in the value network
Interviews Understand the network of communication among stakeholders
Participatory design workshop Reframing the problem -Transformation of the problem from the macro level, to focus on the awareness by stakeholders
Design workshop creation of the service concept
Translation of user needs to requirements for implementation
Creation of the website/API functionalities
Creation of web interfaces
Creation of prototypes
Validation feedback from the public organization
Testing prototypes with stakeholders to verify their acceptance
service innovation at the meso level
Service network change
Increase of attractiveness of the public organization to network partners and new information network
Technological change
New website/API which provides geolocation information for the stakeholders to get informed.
Organizational change
Participation of public organization in the service design thinking process contributed to "open the horizons of the foresters" and changing the attitude of the organization workers.
Exploration
Creation
Reflexion
Implementation


Case 9
Team and Stakeholders
Program director
Program coordinator
Designers
Sociologist
Communication strategist
Popular educator
Coach
Public servers
Innovation manager
service innovation at the macro level
macro level
meso level
micro level
Exploration
Creation
Reflexion
Implementation
Interviews to understand public administration needs and perspective
Dynamics of ice-breaking with public servers
Stakeholder community engagement
Training of public servers on techniques that can be used during the explorative and immersion design phase
Strategic and design for public sector approaches - developing systemic initiatives in multiple municipalities and regions
Participatory design workshops - creation of service concepts, scenarios
Creation of service blueprint to implement services created
Creation of user journeys
Discussion about the type of team needed in the local future innovation lab
Validate ideas with top directors Workshop with directors of municipalities
Training of public servers on techniques that can be used to conceptualize new services
Development and test of service prototypes
Training of public server on how to develop experimental and agile processes when designing new services
Institutional change
Institutional change towards more participatory and transparent approaches to develop new public services. Creation of a knowledge sharing ecosystem of French municipalities regarding tools, methods, approaches and good practices to develop new public services. Institutionalization of new public innovaton labs
Service network change
Break of silos between public departments and regions; more involvement of citizens in the development of new pub services; cooperation between services in the public realm; integrating public servants' competences in the value network in new ways.
Organizational change
Develop capabilities in public servants to use design approaches; change of mindset of public municipalities, making public servants more reflexive and agile in developing new public policies.