2

BLENDING BOUNDARIES

A thorough exploration of systems-oriented design and service design integration

Mari Suoheimo, Michalina Fidos, Marja Kuronen and Sheng-Hung Lee

1   Introduction

Service designers face different levels of complexities, including simple, complex and wicked problems when designing services. It is often difficult to separate one level from another when designing services. For example, purchasing a plane ticket online, which may be a simple problem on its own, quickly becomes complicated, if not complex, when we consider the systems behind the process of buying a plane ticket online as well as all the logistics involved in providing a seamless service of flying from one place to another. Making the service and our flights measurably sustainable would escalate the same service to the level of a wicked problem. This example shows how service designers need to understand different systems on these three levels—simple, complex and wicked—which can also be framed as micro, meso and macro. Depending on the level of complexity, different approaches are needed since the ones used for simple problems are not valid for projects that are wicked because time, collaboration and resources need to be adjusted accordingly. Depending on the levels and types of complexity, different systems theories can also be applied (Suoheimo et al., 2020).

   Buchanan's (1992) four orders of design have been used to describe general design activities. The first order is often understood as symbolic and visual communications, the second as artefacts and material objects, the third as activities and organised services and the fourth as complex systems and environment. Often service design has been understood as an activity that can handle the second or third orders of design. Still, as Junginger and Sangiorgi (2013) pointed out, to make more efficient change, service designers should consider the fourth order. Lorenzetto (2019) addressed the fact that strategies for tackling complexity are not well integrated in the current toolkits of service designers.

Since service design addresses highly complex contexts at times, including projects in healthcare, child welfare or unemployment, this chapter, via a systematic literature review, aims to understand how systems-oriented design (SOD) is currently used to tackle challenges in services. This chapter will discuss the principles of service design and SOD and how they can be applied to SOD. Applying systems theories or systems thinking in service design is not itself novel (e.g. Kimbell, 2014; Patrício et al., 2018; Sangiorgi, 2011; e.g. Van Ael & Jones, 2021). Vink et al. (2021b) emphasises the understanding of ecosystems and designing social structures in services. Also, product service system design (e.g. Trapani et al., 2023) parts from the principle that systems make an essential part of a service. There is still little literature that would connect SOD and service design and this will be the focus of this chapter.

Our hypothesis is that there are many commonalities between service design and SOD, but our assumption is there could also be areas of divergence between the two. We believe that this chapter is valuable for the design field because services often fail due to a lack of knowledge about a system that a service is interconnected with. Service design is known for improving users' experiences through bottom-up facilitation; however, the individuals or the target groups' experience sometimes cannot be addressed without addressing the system. We wish to recognise that service design itself has been influenced by systems science for a long time, such as the use of blueprints (Shostack, 1982) or other tools that have been embraced by services or systems thinking (Øvretviet, 1996).

This chapter aims to systematically review the literature on integrating service design and SOD to address complexities, wicked problems or social messes to name a few. We have also shared our findings with experts through two focus groups to gather insights on designing services that face systemic issues. Wicked problems, prevalent in public services such as healthcare and transportation, require long-term management and are not complete solutions. Additionally, factors such as the green shift and Europe´s aim to be the first carbon neutral continent by 2050 (A European Green Deal, 2019) and other new regulations are prompting industries to adapt their service offerings. Systems-oriented service design offers a way to address these complex challenges, often necessitating political engagement.

Thus, this chapter asks:

A How have service design and SOD been used together in the current academic literature?
B How can service design deal with systemic challenges via SOD?

2 Theoretical background

2.1 Service design

Service design is often understood as a discipline that increases companies' revenue and creates innovations; service designers have a role in designing business

concepts and thus are seen as strategic partners with businesses. Service designers face increasing complexities when designing services to tackle global challenges such as receiving refugees in a country, tackling childhood obesity or planning sustainable supply chain management, to name a few. Many of these issues are social and must address more than the end users' needs in the system.

The field of service design originated from product design, interaction design and cognitive psychology (Rytilahti et al., 2015). It is worth recognising that there are several perspectives in service design and not only one way of practising it, depending on whether it originated in service marketing, environmental management or any other field (Suoheimo et al., 2023). One commonality in how services are perceived is that they are seen as intangible, in that they cannot be experienced as products even though physical products can make up part of a service experience via touchpoints (Stickdorn et al., 2018), such as using a cell phone to order a concert ticket.

In its most basic definition, service design is understood as the design of users' experiences by following the five key service design principles (Penin, 2018; Stickdorn et al., 2018):

Recently, the concept of being people oriented has been questioned, suggesting to go beyond human needs to address the health of our planet and ensure the sustainability of the environment. This is why non-humans are now included as stakeholders in the design field (Design Council, 2021), which is an additional consideration in designing services.

Many of these principles are relevant when designing in complex situations, such as how to engage in participatory service design with key stakeholders. In a complex service design situation, it is wise to apply certain principles from a service-dominant logic, as it acknowledges all actors involved; it also acknowledges that value is co-created through multiple actors and always includes the beneficiary (Vargo & Lusch, 2004), which can be understood as the end-user.

The end-user experience can be greatly improved by designing "behind the scenes"—in other words, designers can tackle underlying systems, e.g. the management of an institution or even policy decisions at the political level. Decisions made at the political level influence how services are implemented, so it is not a coincidence that service design is seen as policy implementation (Junginger & Sangiorgi, 2013).

Penin (2018) saw that narratives are important, as they can shed light on people's current realities. This can be applied to non-humans as well to avoid anthropocentrism (Shang, 2022) and designers can create narratives for them.

Discussing the fourth principle of materiality may not appear to be significant, as services are immaterial However, services still hold together a large set of touchpoints that are material and physical, such as the number taken for a queue, a help desk, in addition to the many immaterial aspects, such as social systems (Vink et al., 2021a). The last principle, "holistic and systemic" (Penin, 2018), cannot be overemphasised in service design, as they are the key features for addressing complexities in services. Maglio et al. (2009, p. 397) have written how a service system

is "a configuration of people, technologies, and other resources that interact with other service systems to create mutual value".

2.2   Systems-oriented design

SOD is one orientation within the systems design, which Figure 2.1 is illustrating. Service design and SOD are sometimes separated into two different disciplines, methodology or approach (Sevaldson, 2022; Stickdorn et al., 2018) in scientific publications (Peng et al., 2022). SOD, according to Sevaldson (2022), is not a separate design discipline, but a perspective or a lens into how service design, product design and other design fields can apply SOD to their projects. Sevaldson (2022, p. 29) emphasised that SOD "is one suggested approach in the larger pluralistic field of Systemic Design", and it is considered a more "designerly" approach to understanding systems. Concepts that characterise a project with a systems-oriented approach include ten principles that can be found in Table 2.1. These principles were placed together with service design principles to show how they are overlapping.

Many, if not all, of the principles of service design overlap with the systems-oriented perspective. SOD is sometimes criticised for disregarding the user and the user experience. On the other hand, service design is criticised for oversimplifying issues and not looking at systems broadly enough. Still, service design and SOD are both interested in bridging silos (Sevaldson, 2022; Suoheimo, 2020),
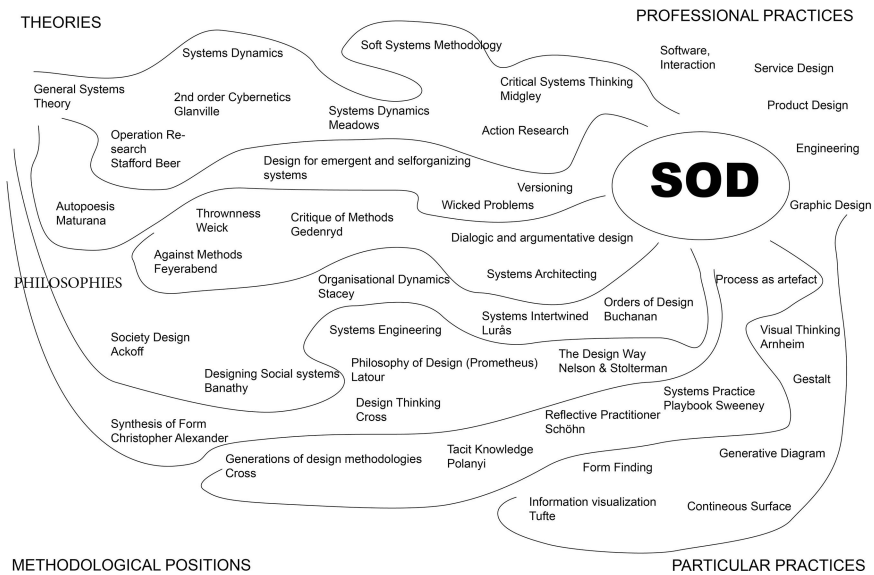
FIGURE 2.1   Figure illustrating where systems-oriented design is located within systems and design disciplines (Sevaldson, 2022, p. 189, published with an authorisation from the author).

TABLE 2.1 Principles of service design and systems-oriented design principles

Service design principles	*SOD principles*
1 Human and non-human-centred	1 Practising a designerly way of understanding and creating systems.
2 Participation and co-design	2 Applying central SOD techniques, including Gigamapping.
3 Service narratives	3 Addressing complex problems using multiple perspectives.
4 Materiality and evidencing	4 Emphasising relations and interconnections.
5 Holistic and systemic	5 Understanding soft, as well as hard, system approaches.
Penin (2018), Stickdorn et al. (2018)	6 Applying multiple perspectives, stakeholder perspectives, micro, meso, and macro perspectives. Working with problem fields, problem networks, and situations rather than singular problems.
	7 Taking responsibility for the intended and unintended consequences of the design.
	8 Representing affected bystanders, as well as non-human actors.
	9 Facilitating participatory processes with stakeholders, experts, relevant organisations and individuals.
	10 Considering ethics: SOD is about improving things. Sevaldson (2022, pp. 31–32)

and this requires stakeholder involvement at the micro-, meso- and macro-levels (Suoheimo et al., 2020). According to Johansson and Woodilla (2008), designers are good at handling chaotic situations, by using or applying abductive reasoning, which we believe is crucial when working with systemic challenges.

3 Methods

3.1 Systematic literature review

To gain an overview of how systemic and service designs are interwoven, we conducted mingled scoping and systematic literature review (Munn et al., 2018). To ensure rigor and reliability, a research protocol together with detailed description of all six cycles was created (Appendix A). Figure 2.2 shows the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) flow chart of included and excluded articles. The search was conducted on Google Scholar in July 2023. The total number of articles was 152 with search words "service design" and "systems-oriented design". We did not impose a date limitation on the publications; however, given that this discipline is relatively new, most articles were from the previous five years (2018–2023). Figure 2.3 shows the number of included and excluded articles and their publication year.
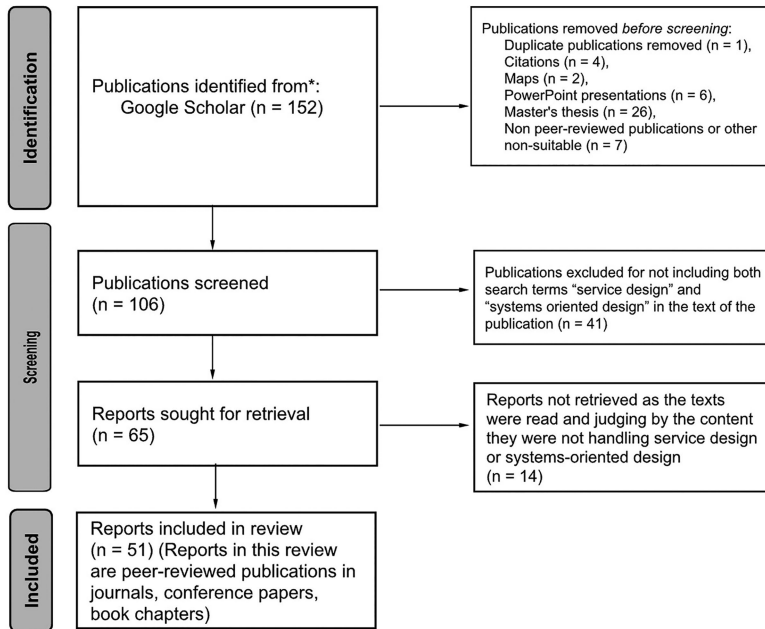
From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

FIGURE 2.2   PRISMA flow diagram showing how the records were included and excluded.
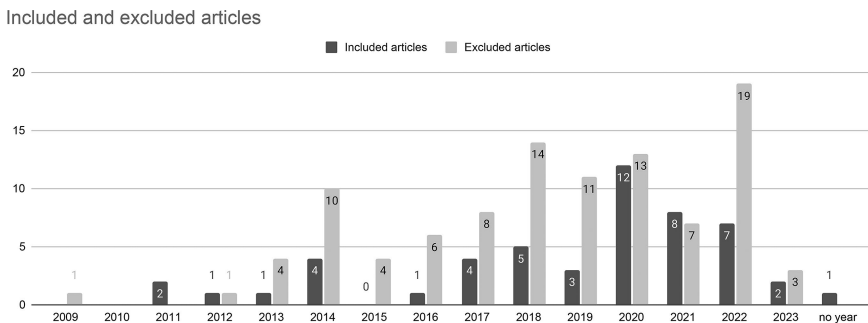
FIGURE 2.3   The number of included and excluded publications and their years of publication.

The articles were analysed in Google Sheets in six cycles. For a detailed analysis of each cycle, please refer to Appendix A. Briefly, our approach involved the following key steps. At first, critically analyzing all the articles in two different cycles, only 51 publications remained. The list of excluded articles is in Appendix B, and the selected articles are in Appendix C (for the inclusion/exclusion criteria-refer to Appendix A). In the third cycle, we analysed 51 articles to identify themes via

TABLE 2.2 Themes under systems-oriented design

SOD 1	SOD as an approach to dealing with complexity
SOD 2	SOD tools and methods
SOD 3	Multi-perspective and participatory
SOD 4	Human and society centred
SOD 5	SOD coupled with service design
SOD 6	SOD not integrated with service design
SOD 7	Strategy
SOD 8	Sustainability
SOD 9	Policy and resilience
SOD 10	Ethics
SOD 11	Innovation
SOD 12	Design for impact
SOD 13	Value
SOD 14	Technology
SOD 15	Experimental approaches
SOD 16	Boundary/ies
SOD 17	Time-based designs or approaches

Note: SOD: Systems-oriented design.

thematic analysis. The figure 2.3 shows the number of included and excluded publications and their years of publication. Our initial approach involved closely examining specific sections of the selected articles, either extracting direct quotations from the text (in vivo coding) or recording our interpretive insights (Yin, 2016). We acknowledge that there are many ways to extract themes and the background of the researchers can influence the selection (Braun & Clarke, 2006).

In the fourth cycle, higher-level concepts were recognised based on the emerged themes. Frequently repeated or most significant themes were sorted, synthesised and integrated to organise and name themes for both service design and SOD. Altogether the researchers recognised 15 themes for service design and 17 themes for SOD (Tables 2.2 and 2.3).

Themes were created to be larger umbrella terms for several fields. For example, the *multi-perspective* theme is the umbrella term that covers co-design, stakeholder engagement, participatory design, and other similar themes, as they all have some element of looking at the design from multiple perspectives. All the themes were discussed among the authors. To enhance the inter-rater reliability of the findings, we employed a process of author triangulation (Carter et al., 2014). In the following cycle, two or more authors (C1, C2 and C3) separately examined each article to reassess the assigned code. In the final cycle, fourth researcher C4 examined the two parallel coded rows in Excel and made the final decision.

3.2   *Participatory focus groups*

Alongside the SSLR, we held two focus groups with service design and SOD experts to deepen understanding of the SSLR findings and discuss best practices

TABLE 2.3 Themes under service design

SD 1	Systems and complexities
SD 2	Service design tools and methods
SD 3	Service design and SOD are coupled
SD 4	Humans and interactions
SD 5	Multi-centric
SD 6	Community and/or social perspectives
SD 7	Co- and participatory design
SD 8	Policy and resilience
SD 9	Innovation
SD 10	Strategic design
SD 11	Technology
SD 12	Sustainability
SD 13	Ethics
SD 14	Product
SD 15	Value

Note: SD: Service design.

for service design in the face of systemic challenges. SSLR provided comprehensive, evidence-based findings, while focus groups provided us with qualitative, in-depth insights that SSLR alone might not have revealed. Focus group helped us to contextualise the findings of the SSLR, enriching our results. This is a sort of method triangulation when one method confirms or disconfirms the results of the other (Carter et al., 2014).

The two-hour focus groups were held in September 2023. In the first group, there were eight participants, while the second had five. About ~46% identified as male and ~46% as female, with the remaining ~8% identifying as "other". Educationally, ~62% held doctoral degrees, ~38% had master's degrees, and ~2% had bachelor's degrees. There was diversity in job titles, including senior lecturers, associate professors and special advisors, with most participants holding university positions. In terms of expertise, ~38% felt strongest in SOD, ~31% in service design and ~23% in other areas. Participants' design experience ranged from 3 to 40 years, averaging ~11 years. Similarly, participant ages varied from 24 to 70 years, with an average of ~48 years. We can conclude that the service design and SOD professionals in our study represented a heterogeneous group.

The participants (represented by P and a number) in the two focus groups did three activities. First, they were shown the results of the SSLR where they could comment on green Post-It notes on a Miro board displaying the main results. The main activity involved examining the principles of service design and SOD. On the Miro board (Figure 2.5), where two sheets outlined the principles of each field with a space in between for yellow Post-It notes. Here, the participants were asked to reflect on the question "How should service(s) be designed when they deal with systemic issues?"
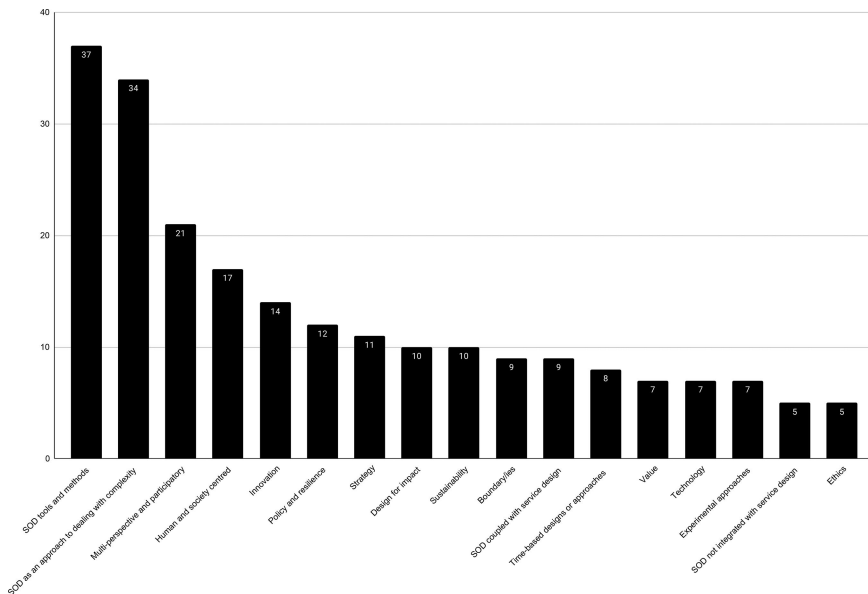
4   Findings

4.1   *Systems-oriented design literature review findings*

4.1.1   *Results for systems-oriented design*

Figure 2.4 illustrates the themes related to SOD and the number of publications linked to each theme. Our analysis revealed that the theme of *SOD tools and methods* was highlighted in ~73% of the publications. The theme of SOD as an approach to dealing with complexity appeared in ~67% of the publications. It's important to note that SOD was a keyword present in all the publications. The *multi-perspective and participatory* theme was mentioned in fewer than half (~41%) of the publications. To a lesser degree (~21%), SOD publications mentioned SOD as valuable in fostering *human- or society-centeredness.*

 Innovation was a theme in ~27% of the publications, followed by *policy and resilience*, at ~24%. SOD as a strategy was discussed in ~22% of the publications. Both *design for impact* and *sustainability* were themes in ~20% of the publications. *The strategy* was covered as a theme in ~25%. *Boundary/ies* and *SOD coupled with service design* both had values of ~18%. Additionally, ~16% of the publications discussed themes related to *time-based designs or approaches*. Three themes—*value*, *technology* and *experimental approaches*—appeared in ~14% of
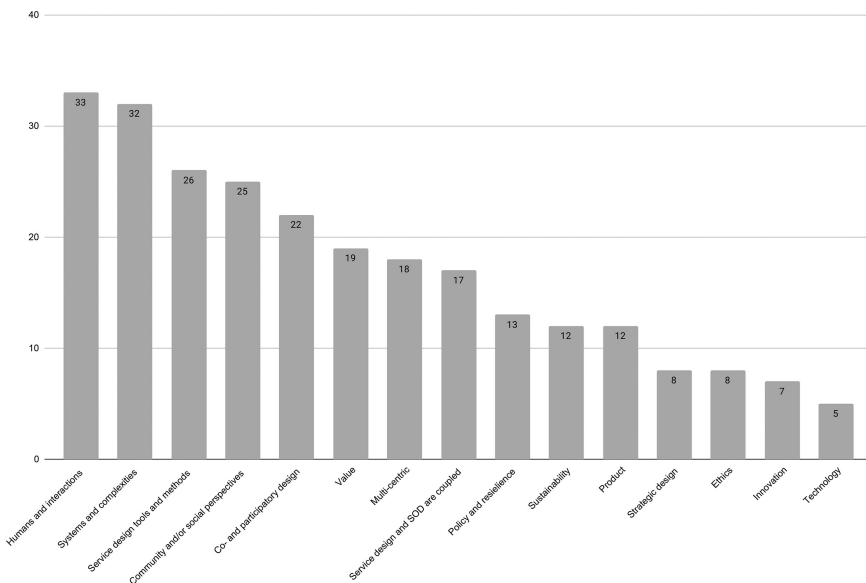

FIGURE 2.4   The themes related to SOD and the number of publications associated with each theme.

the publications. The two least frequently mentioned themes (~10%) were *SOD not integrated with service design* and *ethics*.

4.1.2   Findings of service design

Although we as the authors are in the field of "service design", which is historically rooted in product design, interaction design and cognitive psychology, we did not exclude other service design perspectives in the SSLR results; for example, we included "product service system" even though we see that the "service design" was predominant in the publications. Figure 2.5 illustrates the related themes. The dominant theme across the publications was in the *humans and interactions* approach to service design, accounting for ~65%. The next most frequent theme was discussions on *systems and complexities*, constituting ~63% of the discussions. *Service design tools and methods* was the third most prominent theme, appearing in ~51% of the publications. *Co- and participatory design* was covered in ~43%. The themes related to *community and/or social perspectives* were prevalent in nearly half of the publications, comprising ~49%.

Other noteworthy themes included discussions on creating *value*, which made up ~37% of the discussions, followed by the concept of *multi-centric* approaches at ~35%. How *service design and SOD are coupled* garnered ~33%, and themes related to *policy and resilience*, *sustainability* and *product* received comparatively

FIGURE 2.5   Themes related to service design and the number of publications related to the themes.

less attention, each accounting for ~25%. Both *strategic design* and *ethics* were equally addressed, each representing ~16% of the discourse. Interestingly, *innovation* as a theme held a lower share at only ~14%. Finally, *technology* emerged as the least addressed theme, appearing in only ~10% of the publications.

4.1.3   Findings of systems-oriented design's and service design's overlapping themes

In both domains, there was significant overlap between the themes related to SOD and service design. To illustrate this, we created another diagram (Figure 2.6) that aligns similar themes side by side, allowing for a visual comparison of the number of publications addressing each theme.

   First, the themes of *tools and methods* for both SOD and service design emerged as the most prominent. Second, both approaches dealt with *systems and complexities*. The *multi-centric* and *multi-perspective together with co- and participatory design approaches,* appeared quite often in relation to both topics. Similarly, the incorporation of *community and/or social-centred-perspectives* and *human and society-centred* perspectives is highly featured in publications related to SOD and service design. The themes related to *innovation, policies and resilience* are also shared in both fields. Both fields also emphasise *strategic* planning and highlight concerns about *sustainability*. The publications show the interplay between *service design and SOD*
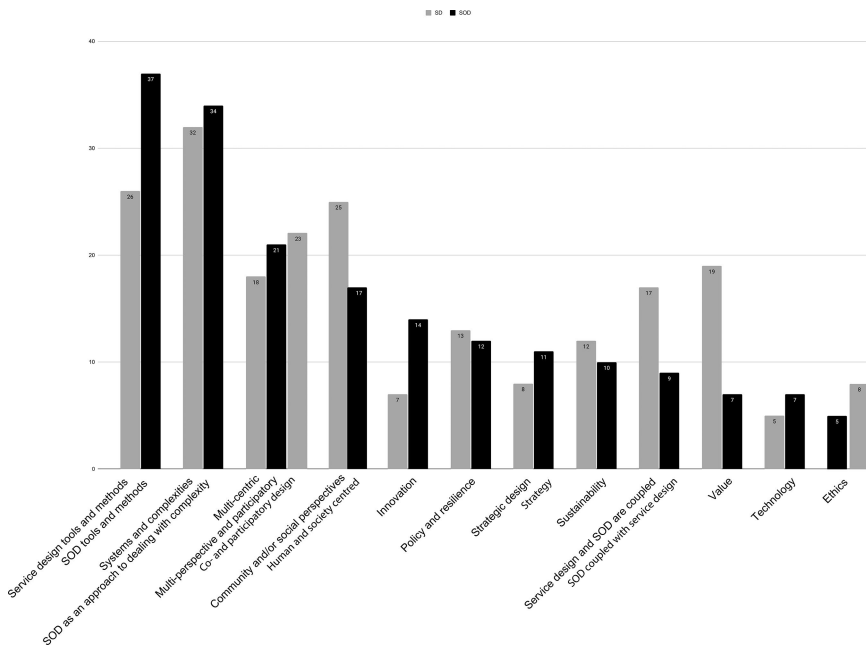

FIGURE 2.6   Diagram showing overlapping themes between SOD and service design.

and how they complement each other. Lastly, *value* creation and the application of *technologies* stand out as essential themes in SOD and service design.

SOD and service design are coupled in the publications, e.g. by being part of a larger framework (Davidová, 2020), by using specific systems theories to understand service systems, e.g. *service ecosystem design* (Vink et al., 2021b) and *cybernetic service design approach* (Borgefalk, 2021), and by generally considering complexity as a whole in service design (Vink et al., 2021a). In both the service design and SOD articles, there is a strong emphasis on *tools and methods*. For example, visualisation tools such as Gigamapping are employed in both service design and SOD, including workshops to synchronise diverse viewpoints (Sevaldson, 2013). These tools are utilised to tackle system complexity at strategic, tactical and operational levels (Sevaldson, 2018). Therefore, such tools aim to gain a better understanding of the complexity of a system.

Therefore, both service design and SOD address *systems and complexities* (Sevaldson, 2013) through understanding causal relationships (Beirne & Patricia, 2014). Service design draws on design-driven evaluation approaches to support system change in the context of complexity in social–technical systems (Norman, 2021). SOD is widely acknowledged to help in addressing complex, large-scale societal problems that pose unfamiliar challenges (da Costa Jr et al., 2017).

The theme of *multi-perspective and participatory* approaches in SOD paired with the *multi-centric* theme and the *co-participatory design* theme in service design addresses the involvement of multiple stakeholders and their perspectives within the ecosystem (Blenkinsop & Fettes, 2021). Achieved through participatory and co-creation processes, these themes utilise tools like Gigamapping (Sevaldson, 2018) and highlight the advantages of multi-disciplinary teams (da Costa Jr et al., 2017). They recognise the diverse logics of various disciplines (Santos Delgado, 2017) and emphasise the agency of non-human stakeholders, treating them as significant as humans (Latour, 2007).

Both SOD and service design necessitate designing within contexts that include community, human and social factors, which are represented in the themes of *community and/or social perspectives* together with human and society-*centred perspectives*. Developments in the design field, from designing artefacts to designing complex systems, have made it feasible to engage in SOD practice that applies human-centred design to intricate, multi-stakeholder service systems (Blenkinsop & Fettes, 2021).

Both SOD and service design create *innovation* within their processes. SOD fosters innovation within its practice by adopting a systems mindset, which takes a holistic approach as a fundamental assumption (Sevaldson, 2009). As articulated by Sevaldson (2014, p. 1768), "The systems-oriented designer is both humble and bold. She is not scared by the complexity of a task but rather embraces this complexity for its inherent potential for innovation". Similarly, the service design process aims for innovation (Sangiorgi, 2011).

Service design and SOD are considered core competencies of many design labs as a general term for the labs mentioned in the publications, that could e.g. promote

the process of social transformation (Auger, 2013), along with policymaking and community design (Lin et al., 2023). "Designing sustainable, inclusive, resilient systems and services is a need for policymakers, organisations, and businesses, as well as delivering solutions closer to the people and citizens" (Lin et al., 2023, p. 2). These approaches respond to the goal of supporting democracy. Therefore, the theme of *policy and resilience* is also common in both SOD and service design articles.

The themes of *strategic design* and *strategy* within our study includes a multitude of considerations as a design progresses and designers examine designs through critical and speculative lenses. Both SOD and service design are used as orientations in *strategy creation and* both are concerned with *ecological, economic and social sustainability* (Beirne & Patricia, 2014). In the study, *value* was conceptualised in both economic and social terms. Both SOD and service design contribute to value creation, through processes such as co-creation. From this perspective, value is co-created by multiple actors in a contextual, resource-integrative and relational way (Vargo & Lusch, 2004).

Technology as a broader theme consists of issues such as designing digital or AI-related services or systems. *Technology* can be seen as an area of challenge (Sevaldson, 2018), but also as a tool for tackling challenges, such as using SOD or service design to develop new technologies (Lin et al., 2021). Additionally, both service design and SOD consider *ethics*. SOD takes the entire system into account, including its relationships and interconnections, which makes it possible to implement intentional, ethically grounded interventions when addressing a social issue (Sevaldson, 2013).

4.1.4 Findings about differences between systems-oriented design and service design

The theme of *boundary/ies* was not recognised in relation to the themes in service design. In contrast, *boundary/ies* was a theme in ~9% of the SOD publications. One theme in SOD was *design for impact* (~15%), and another theme that SOD covered was *experimental approaches* (~14%), which was not a theme in service design. In the service design results, we did not find themes where service design was not coupled with SOD; however, this happened the other way around, where *SOD was not coupled with service design* or they were seen as two separate fields. The theme of *time-based design approaches* (~16%) was a theme repeated in the SOD publications but not in service design. Service design also had a theme of *products* (~25%) that was not found in SOD.

4.2 Findings from the participatory focus groups

In the workshops, the participants wrote about issues such as their concerns about ethics, especially about how to inform stakeholders of the possible negative effects of a design (P1, P2, P3, P5, P9, P11). Similarly, the inclusion of non-humans and the influence of a system on them was seen as relevant or as a departure from
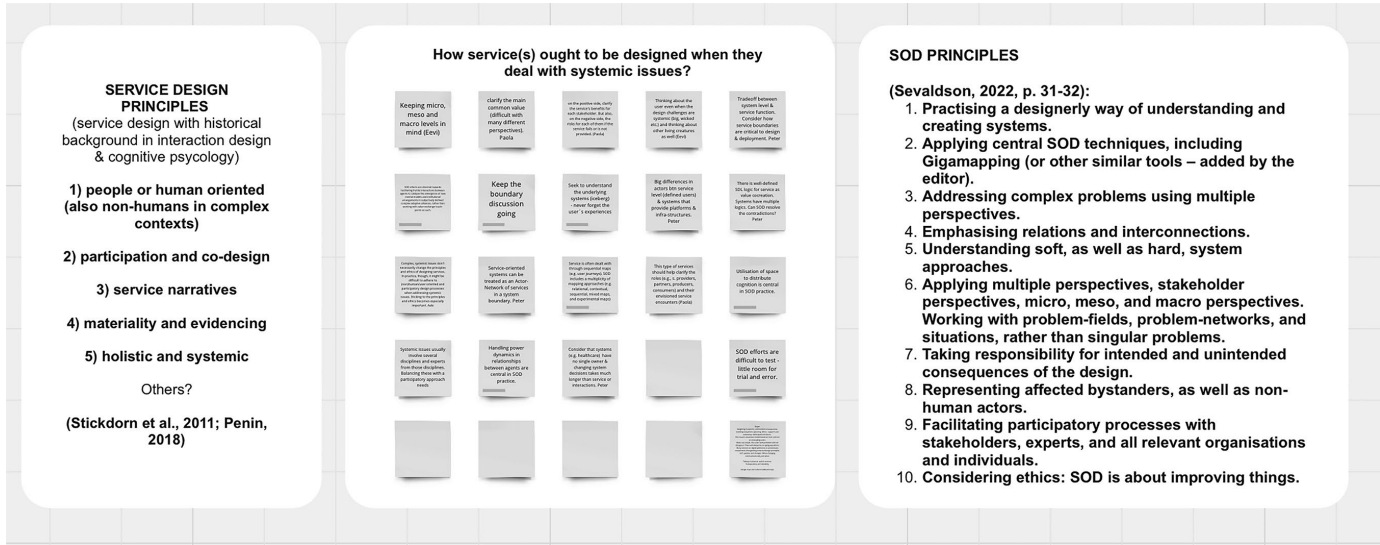
SERVICE DESIGN PRINCIPLES

(service design with historical background in interaction design & cognitive psycology)

1) people or human oriented (also non-humans in complex contexts)

2) participation and co-design

3) service narratives

4) materiality and evidencing

5) holistic and systemic

Others?

(Stickdorn et al., 2011; Penin, 2018)

How service(s) ought to be designed when they deal with systemic issues?

Keeping micro, meso and macro levels in mind (Eevi)	clarify the main common value (difficult with many different perspectives). Paola	on the positive side, clarify the service's benefits for each stakeholder. On the negative side, the risks for each of them if the service fails or is not provided. (Paola)	Thinking about the user even when the design challenges are systemic (big, wicked etc.) and thinking about other living creatures as well (Eevi)	Tradeoff between system level & service function. Consider how service boundaries are critical to design & deployment. Peter
	Keep the boundary discussion going	Seek to understand the underlying systems (iceberg) - never forget the user´s experiences	Big differences in actors btn service level (defined users) & systems that provide platforms & infra-structures. Peter	There is well defined 30L logic for service as value cocreation. Systems have multiple logics. Can SOD resolve the contradictions? Peter
Complex, systemic issues don't necessarily change the principles and perspectives being important, though, it might be the other way around: principles and participatory design processes when addressing systemic issues. Reconnecting the loops and ethics becomes especially important. Aale	Service-oriented systems can be treated as an Actor-Network of services in a system boundary. Peter	Service is often dealt with through sequential maps (e.g. journeys). SOD includes a multiplicity of mapping approaches (e.g. relational, contextual, sequential, mixed maps, and experiential maps).	This type of services should help clarify the roles (e.g., s. providers, partners, producers, consumers) and their envisioned service encounters (Paola)	Utilisation of space to distribute cognition is central in SOD practice.
Systemic issues usually involve several disciplines and experts from those disciplines. Balancing these with a participatory approach needs	Handling power dynamics in relationships between agents are central in SOD practice.	Consider that systems have no single owner & changing system decisions takes much longer than service or interactions. Peter		SOD efforts are difficult to test - little room for trial and error.

SOD PRINCIPLES

(Sevaldson, 2022, p. 31-32):

1. **Practising a designerly way of understanding and creating systems.**
2. **Applying central SOD techniques, including Gigamapping (or other similar tools – added by the editor).**
3. **Addressing complex problems using multiple perspectives.**
4. **Emphasising relations and interconnections.**
5. **Understanding soft, as well as hard, system approaches.**
6. **Applying multiple perspectives, stakeholder perspectives, micro, meso, and macro perspectives. Working with problem-fields, problem-networks, and situations, rather than singular problems.**
7. **Taking responsibility for intended and unintended consequences of the design.**
8. **Representing affected bystanders, as well as non-human actors.**
9. **Facilitating participatory processes with stakeholders, experts, and all relevant organisations and individuals.**
10. **Considering ethics: SOD is about improving things.**

FIGURE 2.7   Miro board screenshot with Post-It notes showing participants' perceptions of how services should be designed when they handle systemic issues.

human-centricity to planet-centricity (P9, P10, P11, P12). Additionally, it was recognised that in a systemic service, one deals with multiple perspectives, values, mental models and logic systems that might be in conflict; thus, systemic service designers might need to know how to deal with conflict (P1, P6, P7, P11). Several participants also mentioned the importance of understanding the boundaries or limits of systems related to services (P6, P7, P11), as one cannot handle the "entire universe" as everything is connected.

Other issues that were recognised included the understanding of systems' levels and their dynamism (P4, P12); additionally, the importance of creating trust, transparency and reliability was seen as an important issue (P1, P3). It is also important to understand the power dynamics within the contexts of systems (P1) and to clarify the main common values between the principles of service design and SOD (P5). One participant (P1) pointed out that systems help to go beyond the design of the touchpoints in services. In larger systemic services, there is no "single owner" of the service; thus making any decisions take much longer than in a traditional service or interaction (P6). P1 also commented that services often use sequential maps, but SOD includes a variety of mapping approaches. Figure 2.7 shows a workshop activity in which sticky notes were used to describe how services should be designed when dealing with systemic issues.

In the last task, one person pointed to the issue of how to "make our way into policy design, government and public management" (P3). Another participant asked what would be "the role of the service designer in the SOD context" (P9). The workshops aided us in putting the findings of the book review into context, for example ethics and non-humans as a part of the systems emerged as a stronger theme among the participants than in the literature.

5 Analysis and discussion

5.1 *Analysis and discussion of the results of the systematic literature review*

5.1.1 *Systems-oriented design analysis and discussion from systematic literature review*

After analysing the results of the SSLR, we concluded that SOD adopts a human-centred approach and includes non-human stakeholders to create holistic solutions and interventions within complexities (Sevaldson, 2009). However, managing complexity can pose a challenge for all actors. Entering, comprehending and synthesising such complexity can be extremely difficult; Gigamapping (mentioned as a SOD tool in several publications) can assist in visualising a system's complexity and reduce the communication barrier (Sevaldson, 2013). By emphasising a multi-perspective and participatory approach, SOD concentrates on the context, connections and interactions within a complexity, facilitating the bridging and linking of disparate perspectives. At the same time, it does not neglect setting boundaries and a research scope.

Involving many stakeholders can reduce project ownership and slow decision-making, making the approach less agile. However, some challenges may not suit agile methodologies. As Laurence (cited in Conklin, 2006) wrote, "Some problems are so complex that you must be highly intelligent and well informed just to be undecided about them". It is beneficial to embrace a problem for a long time to become aware of the possible intended and unintended consequences of a design.

5.1.2   Service design analysis and discussion from systematic literature review

The results of the SSLR suggest that the field of service design is deeply concerned with understanding human experiences, navigating complex systems and employing practical tools and methodologies. There is also a strong emphasis on collaboration, social impact and value creation.

The prominence of the *humans and interactions* theme suggests that the field of service design places a strong emphasis on understanding and improving the human experience within services. However, the high prevalence of discussions on *systems and complexities* indicates an acknowledgement that services are intricate systems with numerous interconnected elements. This might suggest that the field is grappling with the challenges of designing services within complex environments. In the realm of service design, it is vital to acknowledge that the end-users operate within a broader contextual framework. Even when practising end-user-oriented design, complex systems and various complex factors must also be considered.

5.1.3   Similarities and differences between systems-oriented design and service design

It was interesting that *boundary/ies* was not a theme in the context of publications focusing on service design. In other words, there need to be limitations in understanding a system because if there are no set limits, a designer could end up defining the interconnected relationships across the entire universe (Midgley, 2000). Also, Van Ael and Jones (2021) have written how user-centred methods fail to address complexity, still blueprints and service journeys can be visualising part of the complexity. One would need to consider larger boundaries when facing organisational challenges that could include public services, policies and infrastructures. Although we understand that everything is connected, in the context of a project, it is necessary to discuss the most relevant areas, such as the micro-, meso- and macro-levels (Sevaldson, 2022).

We believe that although only SOD had the theme of *design for impact* in the results, this does not mean that service design does not deal with this as well. We think it is possible that *value* as a theme in service design could also deal with impact, since value is part of sparking change, as well as *innovations*. This may

also show how SOD could be more focused on systems interventions, impact and service design in designing value for users or the community and the experiences that they encounter in services. Since the theme of *products* was not covered in the SOD themes in these publications, we also speculate that currently, service design has a strong connection to *products*, as these can be viewed as touchpoints in the service system and thus play a role in the creation of services. It can also show how, in terms of the four orders of design (Buchanan, 1992), service design is between the physical (artefacts and material objects) and non-physical (complex systems and environment) worlds.

By looking at the results, we can understand that there are no unique voices in the current academic literature on how service design and SOD are coupled. The themes related to how SOD is coupled with service design appeared in a total of ~18% of the publications, but a minority (10%) treated them as separate fields. In contrast, how service design is coupled with SOD appeared in 33% of the publications. This could be explained by the fact that service design uses SOD as a lens to create better services. From how the publications were coupling the principles, we could also see that both fields benefit from each other.

5.2   *Analysing the results of the workshops in light of the systematic literature review*

Many findings from the conversations and Post-It notes align with the SSLR findings. There were conversations about tools, with the recognition that mapping in the SOD context is more comprehensive because it goes beyond sequential tools, such as blueprints, used in service design. It is interesting to note that the workshop participants were more concerned about ethical issues than what the results of the SSLR showed. Multi-centricity was also important for both the SSLR and the workshop participants, as the participants raised the issue of considering non-humans or planet-centricity (i.e., going beyond human-centricity) or including several experts in the process. Additionally, boundaries were discussed by the systems designers in the workshop, as it was part of the SOD themes in the SSLR.

Workshop themes not addressed in the SSLR included systemic service ownership and conflict resolution for designers in such contexts. While the SSLR covers multiperspective approaches, conflicts are expected due to differing stakeholder values, mental models, and perspectives.

5.3   *Contributions of this chapter: systems-oriented service design principles*

By viewing service design through a SOD lens, we have learned that service design becomes systemic, which can be called *systems-oriented service design*. This may lead to a chicken-and-egg discussion about whether one should use SOD or service design principles first, or if we should merge them. We decided to merge them based on the literature review and the findings from the workshops.

It is easy to say that one can apply a SOD lens, but we thought merging them would make it more evident what systems-oriented service design is. It is valuable to recognise that the evolved principles of service design from Penin (2018) already address systems.

It is worth bearing in mind that each wicked problem is unique; thus, we need multiple and perhaps adjusted multiple perspectives when designing services. By integrating SOD principles into service design and vice versa, a more holistic approach emerges that not only designs user-friendly services but also ensures that the underlying systems are robust, efficient and aligned with the overall objectives of the organisation. This integration can lead to more resilient and effective service offering systems. The integration of SOD and service design principles in the context of systems-oriented service design offers a comprehensive approach that addresses the complexities and interdependencies within a service system.

Since SOD serves as a dialect of systemic design, therefore, we recommend that our principles be applied in broader projects also with systemic design. This broader application ensures that service design is capable of addressing systemic issues, whether using SOD or broadly systemic design perspective making the resulting solutions more effective across various contexts.

5.3.1   Understanding interdependent experiences

When designing experiences for human and non-humans, it is crucial to recognise the importance of understanding the interconnections and dependencies of experiences within a service system. This includes, e.g. technological, human, policy and process components. By including multiple stakeholders and their paradigms, values, mental models, perspectives or logics in a service system, we see that systems-oriented service design is about inclusivity and plural ways of making sense. For example, in a hospital, a patient's experience will not improve unless the doctors' and nurses' experiences of providing service are excellent as well. This is because the service providers' and receivers' experiences are interconnected within the wider system around them.

5.3.2   Multi-perspective and service narratives

Service designers must listen to users, community and non-humans and their narratives of the challenge or design at hand. It is also important to represent the affected bystanders. For example, developing tourism in a local municipality may bring tensions as well as divergent narratives of the benefits and downsides of tourism for the environment, local communities, tourists and developers. This is why it is essential to listen to multiple perspectives and the narratives of the community and the environment (including nature, e.g. lakes, animals and insects). Therefore, a designer faces difficult decisions while balancing actions or designs. It is important to consider every perspective in the system.

5.3.3   *Participatory and co-design approaches*

Stakeholder mapping is one way of finding the right entities to be involved in the systems-oriented service design process. While mapping stakeholders, we should acknowledge that their values and logic are reflected in their paradigms and perspectives, and therefore, these should be integrated into the greater design process. This acknowledgement is rooted in the understanding that certain design challenges may persist over extended temporal scales, ranging from decades to potentially even centuries. An example of stakeholder mapping is the development of a patient information system, where it is crucial to thoroughly map all stakeholders, including healthcare providers, patients, insurance companies and regulatory bodies. Understanding their values and perspectives is essential. For instance, healthcare providers may emphasise quality in patient care while insurance companies may focus on cost-efficiency. By recognising the long-term nature of healthcare challenges, the platform can be designed to adapt to evolving healthcare practices over time. Since there is complexity in the different values and logics of the stakeholders involved, the systemic service designer will necessarily meet with conflicts.

5.3.4   *Materiality and evidencing*

Designers need to recognise the relationships and interconnections of the different physical and non-physical materialities of a service. Systems-oriented services may have social and technical aspects that are static or even dynamic. Designers use the form/material to shape the meanings, processes, applications and values of visible/invisible systems-oriented services. Complex socio-economic-technological dynamics in systems, such as redesigning public transportation system across the levels of products, services and experiences, present significant challenges. Therefore, leveraging the features and relationships between materiality and evidence better informs the decision-making process and improves results

5.3.5   *Working with problem fields within the micro-, meso- and macro-levels*

Service designers design for problem networks and situations, as opposed to singular problems. However they still acknowledge the boundaries in a service system, as it is not possible to address everything. The underlying systems must also be designed to effectively and efficiently support a service's goals. By considering the micro-, meso- and macro-levels, the designer can also understand and design for policy. For instance, at the micro-level, we might design an experience of an employer in a company, and at the meso-level, we would consider management and human resources and how they are part of a larger system. At the macro-level, the designer examines how municipal and national politics, laws and even "landscapes" (macro-trends such as climate change) can influence the system.

In addition to understanding the various levels, service designers also employ the concept of leverage points derived from SOD. Leverage points are strategic intervention points within a system where a small shift in one element can lead to significant changes in the overall behaviour or performance of the system (Meadows, 1999). Therefore, service design, with its defined boundaries, may serve as a leverage point within the entire system.

5.3.6   Holistic and systemic approaches

Systems-oriented service design is not concentrated on a single theory of systems or complexities. Instead, it can use different theories depending on the context, e.g. soft and hard systems, ecosystems, cybernetics and wicked problems, to name a few. Multiple paradigms, theories or methodologies can foster better holistic or pluralistic understandings.

Systems-oriented service design also recognises a holistic approach to implementing plans and desired outcomes. Spreading change across the system requires a top-down approach (e.g. from administration to individuals) and a bottom-up approach (from individuals and communities to changes in legislation, etc.). This wave of change is often organic and not straightforward, but the desired outcome also lives with the change.

5.3.7   Using systemic tools as part of the service design toolbox

Systems are opened via central SOD, e.g. Gigamapping (Sevaldson, 2022) and Mess Mapping (Suoheimo, 2020), that will expose the connections and interdependencies in systems. Blending SOD and service design tools will enable better systems-oriented service implementations and interventions. For example, understanding the system around a service blueprint will lead to a better implementation of the intervention in the surrounding system.

5.3.8   Considering values, sustainability, and ethics

Considering the unintended consequences of the service being designed is crucial, as the challenges can be dynamic and wicked. Systems-oriented service design fundamentally aims to enhance existing processes and often needs to adjust to a dynamic reality. It involves revealing hidden feedback loops, which may not be immediately evident. This approach acknowledges that services are dynamic and involve interactions among a variety of stakeholders. Imagine a hospital that is focused on maximising patient throughput to meet performance targets. To achieve this, it may implement policies that prioritise quick patient turnover, aiming to discharge patients as soon as medically possible. However, this emphasis on rapid discharge may inadvertently lead to patients being released before they have fully recovered, potentially resulting in re-admissions shortly after their initial discharge.

This can strain both the patients and the healthcare system, as well as lead to poorer health outcomes.

6   Conclusion

In this chapter, we have provided, via a SSLR and two focus groups, insights into how service design and SOD have been used together in the current academic literature. Our hypothesis or assumption was confirmed in the sense that there are many things in common, but also some divergent issues between the two. Some overlapping themes were related to participatory and co-creational ways of designing with users and the community.

The results of the thematic analysis and the workshops showed the importance of SOD for considering boundaries when designing services. Since there were themes that were the same or similar, but also some non-overlapping themes, we found it valuable to explain in a more theoretical way what it means to use the SOD lens for service design, thus introducing the *systems-oriented service design* principles. This does not mean that services were not already being designed with systems in mind, but rather this chapter aims to provide a framework or a set of principles that can provide some guidance based on the findings of the SSLR and focus groups.

We suggest that these principles should be tested in case studies in the private and public sector services that face major systemic challenges. We invite the academic community to give critical constructive feedback on the proposal and to re-edit it as they see fit. As already mentioned, the systems or challenges that service designers face can be unique; thus, they need to adjust the principles according to that situation. We hope that the principles are malleable enough to face diverse situations and challenges. We also feel positive about how the principles can offer a valuable framework in the sense that our attitudes and ways of designing within systems are set "right" at the start, neither minimising nor overly maximising the challenge at hand.

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Appendix A

https://bit.ly/APPENDIX_A_protocol

Appendix B

https://bit.ly/APPENDIX_B_Excluded_Articles

Appendix C

https://bit.ly/APPENDIX_C_Included_Articles

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