SYSTEMIC SERVICE DESIGN

DESIGN FOR SOCIAL RESPONSIBILITY

Edited by

MARI SUOHEIMO, PETER JONES,
SHENG-HUNG LEE
and BIRGER SEVALDSON

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Systemic Service Design provides a comprehensive overview of how systems theories can be integrated into service design to address complex social-economic-technological challenges. Across 14 chapters split into two sections, the book connects theoretical backgrounds and practical worldwide case studies to explore various approaches to systems thinking.

The field of service design has evolved significantly in recent years, from focusing on touchpoints and user interactions to being seen as a driver for organizational transformation and increasingly, a key component in transdisciplinary spaces involving complex systems. However, while service design has grown over the past few decades, it has also recognized its limitations in addressing complex societal problems. For example, the book highlights how a lack of holistic understanding of the systems in place can lead to service failure, which ultimately results in societal issues relating to unemployment, healthcare, and public transportation. As such, this book offers theoretical and practical resources specifically tailored to service designers in order to equip them with the ability to develop solutions that are appropriate in scope, depth, and feasibility to address these complex issues. Contributing authors draw upon and integrate theories from related disciplinary fields to extend the contextualization of service design within complex systems, providing readers with more scientific frames of reference. The book also draws upon case studies from South and North America, Europe, Asia, and Australia, to offer readers wide-ranging perspectives and real-life examples to further their understanding of systemic service design and demonstrate how to integrate it successfully.

The book delivers theoretical and practical knowledge for students and designers in the fields of service design, design for policy, social design, and additionally for managers, public and private sector planners, engineers, and politicians.

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Design for Social Responsibility

Series Editor: Rachel Cooper

Social responsibility, in various disguises, has been a recurring theme in design for many years. Since the 1960s several more or less commercial approaches have evolved. In the 1970s designers were encouraged to abandon 'design for profit' in favour of a more compassionate approach inspired by Papanek. In the 1980s and 1990s profit and ethical issues were no longer considered mutually exclusive and more market-oriented concepts emerged, such as the 'green consumer' and ethical investment. The purchase of socially responsible, 'ethical' products and services has been stimulated by the dissemination of research into sustainability issues in consumer publications. Accessibility and inclusivity have also attracted a great deal of design interest and recently designers have turned to solving social and crime-related problems. Organisations supporting and funding such projects have recently included the NHS (research into design for patient safety); the Home Office has (design against crime); Engineering and Physical Sciences Research Council (design decision-making for urban sustainability).

Businesses are encouraged (and increasingly forced by legislation) to set their own socially responsible agendas that depend on design to be realised. Design decisions all have environmental, social and ethical impacts, so there is a pressing need to provide guidelines for designers and design students within an overarching framework that takes a holistic approach to socially responsible design. This edited series of guides is aimed at students of design, product development, architecture and marketing, and design and management professionals working in the sectors covered by each title. Each volume includes: The background and history of the topic, its significance in social and commercial contexts and trends in the field. Exemplar design case studies. Guidelines for the designer and advice on tools, techniques and resources available.

For more information about this series, please visit: www.routledge.com/ Design-for-Social-Responsibility/book-series/DSR

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INNOVATIONS IN THEORY AND PRACTICE OF SYSTEMIC SERVICE DESIGN

Mari Suoheimo, Peter Jones, Sheng-Hung Lee and Birger Sevaldson

As a collection of new work in systemic service design, we observe the convergence points of two design perspectives – systemic design and service design – that have only recently started to find common methods and practices. For service design, we see the expansive potential for a contribution from the wide range of systemic design practices and systems theories that have driven the emergence of systemic design. Service design publications have not typically expressed a whole systems perspective (until recently with service ecosystems), whereas systems science (the scientific basis for systems thinking) does not include design disciplines, or even service design in its corpus.

The editors are active in the systemic design and service design discourses, which have developed quite separately to date, with little crossover in conferences and even literature. We observe the contribution of systemics to service design has not gone mainstream yet, but we have recently seen more publications, as well as a notable special issue of the *Touchpoint* journal in service design and systems thinking.

Quite often a systemic intervention will influence a service and or a policy. It is good to bear in mind that services themselves, especially in the public sector, are implementations of overarching policy (Junginger & Sangiorgi, 2011) that often represents a larger system. With this book, we wish to stir up the view of the integration and interdependence of these discourses since we have reached an understanding with these that the design disciplines cannot be artificially separated from each other.

Service design and its connection to systems is a growing trend in service design literature. A search on Web of Science (Figure 1.1a) with the Boolean search terms "service design" and "system*" in May 2024 shows how the publications in this emerging area start in 2015 and triple by 2021.
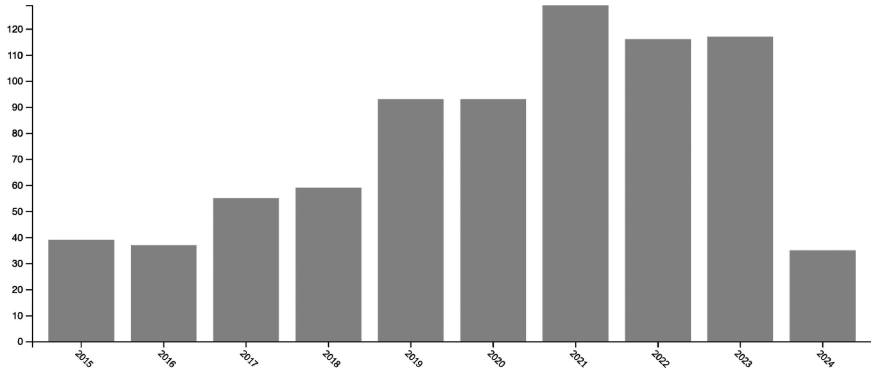
FIGURE 1.1A   Number of publications per year containing search terms "service design" and "system*" from Web of Science in May 2024.
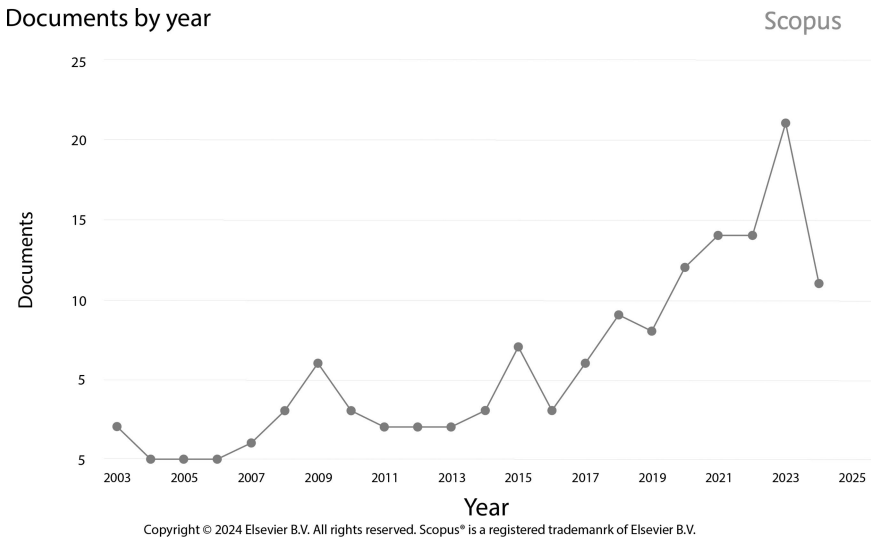
FIGURE 1.1B   Publications per year containing search terms "service design" and "systemic*" from Scopus, July 2024.

A Scopus search (Figure 1.1b) for adjacent terms, by comparison, shows a similar profile, but going back to an early emergence of a cluster of publications in 2009, and then again 2015, and growing to triple by 2023. However, a closer assessment of these publications shows a wide range of applications (healthcare, tourism, public sector) and little consensus around the forms of service design.

The authors in this volume show how different systems theories and practices can create better knowledge, competence and experience of addressing the complex

service and design challenges at hand. The service design field has matured and has worldwide practices – and yet we can acknowledge that services designed are not always optimal or sustainable; however, we believe a systemic perspective helps all to design the "better" thing or service, avoiding the problem of optimising the worse solution. It is not always that we will be in control of all the consequences that a new service might unfold, but yet service designers can become aware of the possible consequences of the interventions proposed and made.

There are numerous tragic stories where designers have had the best intentions of improving a situation, but in the end they have made it worse or improved one area at the cost of another. There are also systemic oppressions that services can unfold such as some banking services are often free or discounted for those with larger deposit amounts in a bank, and banking fees reduce the ability of the working poor to save. Also job application and public service platforms are often not accessibly designed for people with visual or physical disabilities, and immigrants or first generation citizens learning the common language.

We have observed that many design processes are defined as staged linear models of idealised practices and methods that are not conducted as such in practice. We suggest that linear reasoning tools, producing linear results, will greatly under conceptualise real complexity and lead to profound disconnects with purpose and future value. As systemic designers are systems thinkers, we question the assumption that any named problem has a solution (Rittel & Webber, 1973); we further recognise that the framing or drawing boundaries of problem contexts is a necessary function of complex design practices. There has been a growing number of creating new design models in the past years that are embracing this complex system level such as the Systemic Design Approach from the UK's Design Council (2021), Triple Diamond (Trippel Diamant Som Innovativ Metode) from the Norwegian Research Council (DOGA) or Transformation Service Design Research framework created especially for underserved contexts (de la Harpe & Ogundaini, 2023).

In design education and practice, we artificially separate different domains of design value based on what clients of design believe if possible and what we can guarantee as skilled designers. Service design opened up the practice of designing reliable experiences for space and time, for temporally extended value chains to many customers and mixes of users. Services create processes that realise (make real) an organisation's value offer to customers. Services offer several points of design integration with complex systems, not all of which lead to system value outcomes. As services, like systems, are also complex abstractions of preferential value interactions. They can be optimised by enhancing value realised at the points of cocreation in service-dominant logic, e.g., to maximise value for a service outcome for actors in a resource integration network (Vargo & Lusch, 2016).

Services within non-integrated or badly integrated complex systems such as healthcare can also be optimised within the system logic, e.g., the total value of the system according to the goals and potentials of the system (Patrício et al., 2018). Touchpoint interactions, the points of specific user value exchange, can also be

optimally enhanced, but according to system theory, this would suboptimise system value (Jones & Van Ael, 2021). The difference between these system types can be seen most clearly in a system such as healthcare, where many individual health outcomes must be realised, but the system logic is to maximise healthy outcomes for a level of shared costs for a population. For complex social systems entailing services, design often has the goal to optimise a whole system. The service design often aims to optimise the flow of service to enhance value for all, which is equivalent of effective product design for manufacturing at scale. However, complex systems resist optimisation, since it is not possible to grasp all aspects and they change while we plan. Systemic design intends to design in response to these dynamically changing complexes that resist optimisation.

This goal of systemic design aims to provide a base of thinking in systems in design, evaluating prototypes and defining a so-called minimal viable system. A whole system logic enables satisfactory interim outcomes, short of idealised final processes, and guidelines to construct arguments to avoid imbalanced compromises in early-stage processes.

When service designers deep dive into deeper systems levels and wicked problems in their practice, often the traditional tools are not enough to deal with the uncertainty. The saying "if the only tool you have is a hammer, each problem becomes a nail" can be seen in action. If we are unable to understand the complexity at hand, we will handle and treat it as a simple problem and thus make it smaller and manageable than what it actually is, thus producing consequences to the problems that we might not understand. Who should be accountable for the clumsy solutions or unintended consequences (Sevaldson, 2022; Grint, 2010) that are provided by designing services for health care, public transportation, obesity and refugee integration among others?

Depending on the context in which service designers are situated, the system we design, the system we design for and the system we design within (Lurås 2016), they can face different levels of problems. To illustrate this, an "iceberg model of design problems" was introduced (Figure 1.2) (Suoheimo et al., 2020). The typology or the problem categories as simple or tame, complex and wicked has been used by several authors (Snowden & Boone, 2007; Roberts, 2000; Rittel & Webber, 1973). An example of a simple problem is to tie shoelaces or purchase a bun at a coffee shop. The problem and its solution are known and there is a single party with a single opinion of the problem. A more complex problem is to design an inclusive library service. The stakeholders in this occasion partly agree and disagree on the problem and its resolution.

The iceberg model of design problems has similarities with the iceberg model often acknowledged to Daniel Kim (1999), who based it on anthropologist Edward Hall's (1976) metaphor of an iceberg. Above the waterline the metaphor refers to the visible events of situations. The layers beneath it are patterns and trends, systemic structures and mental models. The value and mental models are also a base for the iceberg since values introduce a mix of personal and
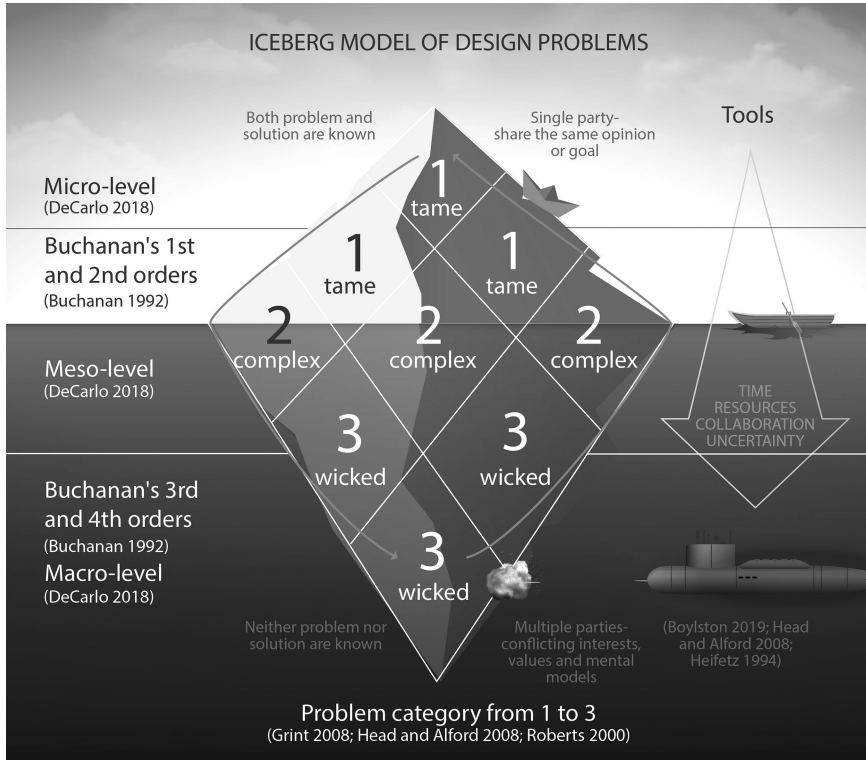
FIGURE 1.2   Iceberg model of design problems (Santos et al., 2025; Suoheimo et al., 2020, p. 243).

social drivers for any design situation. Values conflicts can be causes of wicked problems.

Wicked problems are most complex (showing as 3s) and the context often applies to systems, services and activities (as in Buchanan, 1992). The deepest level of the iceberg is the wicked problem layer, where stakeholders of the design contexts can and will have conflicting goals, values, and viewpoints. Almost any modern system suggests unresolved complexities that continue to confound management and use value if not addressed. Wicked problems are defined originally by Rittel and Webber (1973) as policy dilemmas that cannot be resolved by analysis or assessment, and that often persist in spite of collective determined actions. Consider how homelessness and housing prices have continued to increase even as cities have made historic attempts to address affordability issues. Universities continue to become more expensive because of economic inflation, and pass costs on to students, reducing accessibility of education, or reducing the quality of academics, eventually making that expensive education less desirable. A super-wicked problem might be local planning to address climate change effects, where design might

optimise near-term issues (increasing electric vehicle access) while interfering with long-term amelioration. The United Nations Sustainable Development Goals (SDGs) can be seen as resolutions to world-level wicked problems (Wohlgezogen et al. 2020). In systemic design analysis, Murphy, Rava and Jones (2021) have shown how the SDGs are interconnected by their leverage potential relationships, suggesting pathways for resolution.

Figure 1.2 illustrates how the different layers of the design iceberg will require different approaches or tools to handle the different levels of complexities. A paper boat can handle the tame problems, but one would need a submarine to be able to go to the root causes of a wicked problem. Also, it is worth noting that the level of uncertainty will also grow. One area is not separate from each other but rather coupled. The groups are not consistent since each problem, even a simple one, could be turned into a wicked problem if one just changes their perspective. Designing a bottle could be a simple task, but making a sustainable bottle would be a wicked problem. One would need to consider the raw materials, their productions, supply chain management, working hours and conditions, bottle manufacture and distribution (transportation footprint), and their sustainable disposal, among other issues, when designing a strongly-sustainable and circular "bottle." We recognise that different systems theories, methodologies, methods and tools are needed to handle these three groups of problems. The lower levels one deep dives the more time, resources and collaboration will be needed.

Birger Sevaldson (2022) presents a simple example of a paper coffee cup, shown in Figure 1.3. The simplest object demonstrates great complexity when seen as an intersection point of many processes and systems. In this example, the coffee production and distribution systems, branding, refinement world trade, the paper production with similar complexity, the water and waste systems involved and cultural as well as political aspects of fair trade in addition to bodily sensorial systems.

The combining of several perspectives by scale of the problem area highlights some of the inherent complexity of the space between service and systemic design, and their indeterminate relationship in practice. Service design has traditionally been defined by the scope of service redesign and the "user experience design of services" approach desired by its clients in the service industry, or public sector services. In many cases, the interface between the service and system (which entails policies, infrastructures, administration, multiple organisations, the multiplex of adjacent services) starts to blur and morph soon after a project is undertaken. This is also shown in the "iceberg model of design problems" how the multiple parties and conflicting interests grow in the lower levels of the iceberg.

A truly diverse range of design approaches, systems theories and their application in cases appears in this collection. The variety in perspectives (even if many are from Nordic researchers) shows the experimentation in service design in the public sector, the emerging synergies in service design and many concepts of systemic practises. We see that this book is also useful beyond the service design community for service marketing, systems thinking, design management,
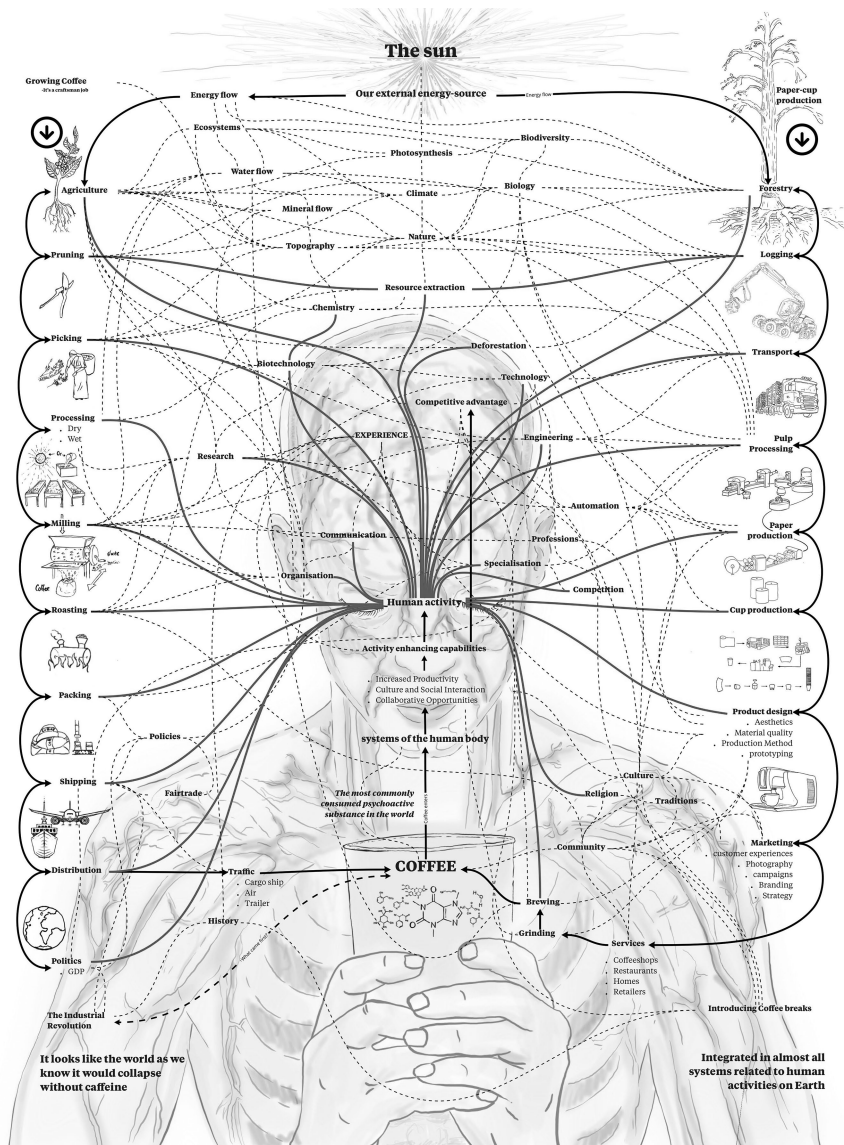
FIGURE 1.3 The complexity of a seemingly simple object, a paper coffee cup, portrayed in a Gigamap (Used by permission, image by Martin Hauge, 2021).

people in other managerial positions, new service development and social innovation. A range of different sectors can find this book helpful as local government, healthcare, financial services, transportation and social services. It is hard to name areas that would not have utility of using a systemic service design perspective.

1 Editorial summary of this book

The collection is organised into two groups of chapters by their source as a contribution to theory or practise cases, and two chapters introducing key concepts and the emerging literature. The current chapter (1), authored by all the editors, reviews the landscape, trends and controversies of the emerging area. Chapter 2 provides a systematic literature review that investigates the current literature relevant to systems-oriented design in service design. Section I consists of studies that build theoretical support and new concepts for service design from a systemic point of view. Section II is Systemic Service Design Cases, from Chapters 8–13.

2 Section I – Theoretical background for systemic service design

2.1 Chapter 2. Blending boundaries: a thorough exploration of systems-oriented design and service design integration

Authors Mari Suoheimo, Fidos, Kuronen and Lee investigate how systems-oriented design (SOD) and service design have been integrated in the literature through a blended scoping and systematic review. Two online focus groups are discussed that reveal different service design expert perspectives. The major contribution of this chapter is to present a new service design perspective, systems-oriented service design, that expands the capacities of service designers working with high complexity problems. The need for this perspective is required when service designers are handling issues that can be as small as a system of ordering a ticket or as large as a wicked problem such as immigrant integration. The authors define eight principles that distinguish systems-oriented service design.

2.2 Chapter 3. Mess Mapping and Gigamapping tools to understand systems in services

Mari Suoheimo, with authors Kist, Horn and Sevaldson, discusses and compares Mess Mapping and Gigamapping as tools for service designers to understand and create tangibility on often invisible complexities in service mapping. Both methodologies have been developed over years of practice to enable participatory cocreation to reveal connections among the relations in a complex service design challenge. In Mess Maps, conversations among the stakeholders are an essential part of the mapping process. Facilitated dialogue with stakeholders animates the Gigamapping practice as well, and both can be seen as expressions of the participant conversations. This chapter examines similarities and differences of both mapping modalities in the systemic service context.

2.3 Chapter 4. Emerging systemic turn in service design

Satu Miettinen, Suoheimo, Morelli and de Götzen examine the emergence of a new paradigm in service design as it affirmatively embraces more complex issues as a

field. The research is based on a literature review, a facilitated workshop discussion, and 20 interviews with industry experts. The authors discuss and frame triangulation of themes across the methods that show how service design is pushing more towards transitions, systems, policy design, decolonising design, business, organisational and strategic aspects. A holistic approach adopting multiple paradigms and epistemologies is recommended in this perspective.

2.4 Chapter 5. Dancing with power dynamics inside systemic service design projects

Mari Suoheimo, Giske, Pan, Fidos and Jones discuss the formation of power dynamics that service designers or designers in proximal fields experience during career progression. Power is a function in all human activity that can be expressed as different levels of scale. Here it is understood in the interpersonal relations in design and client organisations. Experiences of power were explored in the study in four focus groups, with participants describing positive, negative and neutral experiences with respect to the Bronfenbrenner ecological system model as a common image of social relations to compare across findings. Thematic analysis showed how experiences of power could be described in three themes that included hierarchies, diversity challenges and communication. These themes can help systemic service designers to identify the power challenges at their work.

2.5 Chapter 6. Systemic oppression in service design

Frederick Van Amstel, with co-authors Serpa and Secomandi, explores how systemic oppression manifests in service design. The study combines views from Science and Technology Studies, Theatre of the Oppressed (Boal and Freire), and Black intersectional feminism to visualise systemic oppression from a cybernetic perspective. This chapter shows how the theatre model is already used widely in service design, with backstage and frontstage metaphors. Drawing and extending from Boal, the study proposes new roles in the performance of service, including users and infrausers, and designers and metadesigners. The research stimulates systemic service designers to be more aware of the systemic oppression that can be reproduced in design outcomes. An example of a local social currency system developed in Brazil serves as the case for demonstrating how infrausers represent a solidarity for a larger class of otherwise marginalised people, providing an empowerment against potential oppressions.

2.6 Chapter 7. System-oriented service design in urban planning contexts

Authors Eevi Juuti, Rönkkö, Luusua, Markkanen and Hentilä explore wicked problems emerging in urban planning. They discuss how service systems and built environments work together in tackling wicked problems, using service design

and a systems-oriented design lens. This chapter makes a novel contribution that observes how socio-material environments are built with service encounters that can address wicked problems. The authors suggest service and systems-oriented design principles that provide guidance on addressing the problem complexity in this mixed environment. The special context of this chapter is to give understanding how planners and designers can better take into consideration the current global crises and how designers can react to them.

3 Section II – Systemic service design cases

3.1 Chapter 8. Case study of Mess Mapping process: improving long-term care services

Robert Horn introduces Mess Mapping as a tool or a process for service designers to use to comprehend complexities, systems, and wicked problems. Horn provides a template and a step-by-step guide on how to start the mapping process through a recent example of long-term care in a California county. The tool aids in conversations between different stakeholders to understand connections between different problem or challenge areas. Often the people participating in the mapping will discover how they might be creating the problems for each other in the system. Horn has developed the Mess Mapping process over many years and recommends its use in the service designers toolbox to provide a simple visualisation for non-designers to grapple with complexities and connections of multi-stakeholder problems for which they are decision makers.

3.2 Chapter 9. Social structures relevant to longevity service systems

Sheng-Hung Lee, Yang, Coughlin, Weck, Klopfer, Ochsendorf and Hodara explore the integration of longevity planning and financial planning as service systems, to investigate key design considerations for physical components and institutional elements within social structures. It reviews the most cited articles from 2019 to 2024 in Google Scholar to apply this framework in creating effective longevity service systems. The research highlights significant gaps in incorporating diverse demographics and underscores the importance of an interdisciplinary approach to improve the longevity services and systems. The findings reveal the vital role of social structures in these systems and suggest a comprehensive service design approach through the lens of tangible and intangible aspects that combines regulative, normative, and cultural-cognitive pillars to tackle the complex challenges of longevity.

3.3 Chapter 10. Designing for structural, social and political viability in national-scale systemic interventions

Jeff Foote, Graeme Nicholas and Gerald Midgley report on their work with a complete systemic intervention aimed at designing a national response to family

violence prevention in New Zealand. As a significant public sector issue, New Zealand allocates around NZ$1.5 billion each year to various programs and initiatives aimed at reducing or preventing family violence. The researchers applied Midgley's systemic intervention approach by providing a useful methodological basis for designing prevention systems. One of the contributions of this chapter is to show how policy advocacy, public engagement and communicative campaigns can be recognised as integral components of systemic interventions.

3.4   Chapter 11. From state of chaos to the essence of the issue: framework employing service and systemic design principles in the context of criminality

Michalina Fidos explores the root causes of criminality within the Norwegian context, employing systemic and service design approaches. Criminality not only poses physical and psychological damage within a society but also incurs significant costs due in maintaining the justice system. The study interviewed current or former offenders to explore the attitudes, beliefs and motivations behind criminal behaviour. A co-creation workshop developed a Gigamap in order to leverage insights for addressing the causes of criminality by identifying a portfolio of interventions. Fidos created the OARS Framework (Object, Actor, Regulator, and Stimulator) to integrate service design and systemic analysis tools that identify areas within the larger system requiring intervention for the improvement of services.

3.5   Chapter 12. Toward a digital remote care service ecosystems

Hong Li and Miria Grisot explore the development and implementation of digital remote care service ecosystems through an empirical case study focusing on postoperative rehabilitation for thoracic surgery patients in China. The study adopts a service ecosystem design perspective at a micro level to bridge theory and practice. This chapter investigates how digital remote care services can be designed and implemented to facilitate co-creation of meaningful and innovative services. It emphasises the importance of understanding the complex dynamics of digital remote care by examining a specific case study involving the use of digital technologies for the postoperative care of thoracic surgery patients. The study aims to offer practical implications for co-creating digital remote care ecosystems and discusses the potential limitations of their mixed-methods approach.

3.6   Chapter 13. Enhancing empathy through AI in service systems

Authors Titta Jylkäs, Song and Miettinen argue how AI might assist service designers using past behavioural data to advise on predictive user needs and expectations, drawing from large data models. This chapter based on literature review and two case studies argues that AI can be impacting the service system being designed. They suggest that AI and human designers can complement tasks in complex

analysis processes, by leveraging AI's data analysis and the designer's creativity and empathic understanding, maximising both contributions.

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SECTION I

Theoretical background for systemic service design

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, differ-
ent 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 com-
munications, 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),
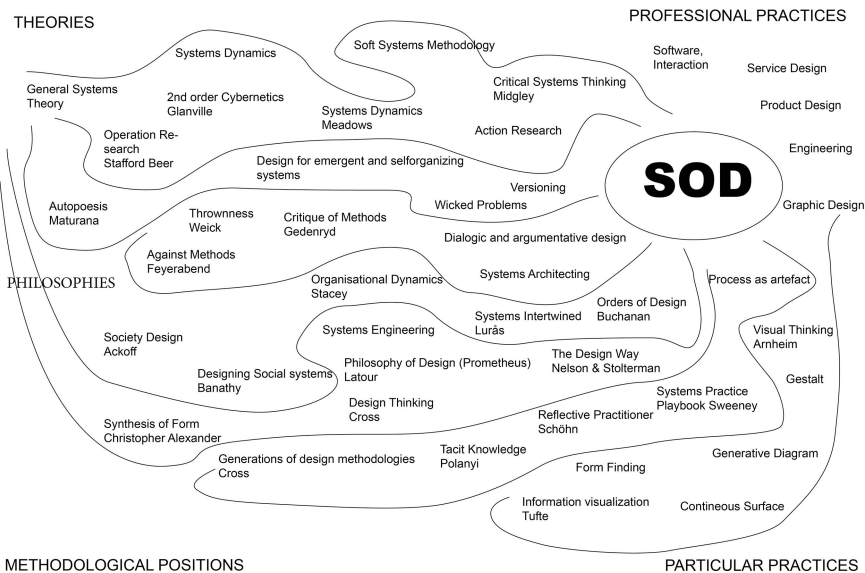
FIGURE 2.1   Figure illustrating where systems-oriented design is located within systems and design disciplines (Sevaldson, 2022, p. 189, published with an authorisation from the author).

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.
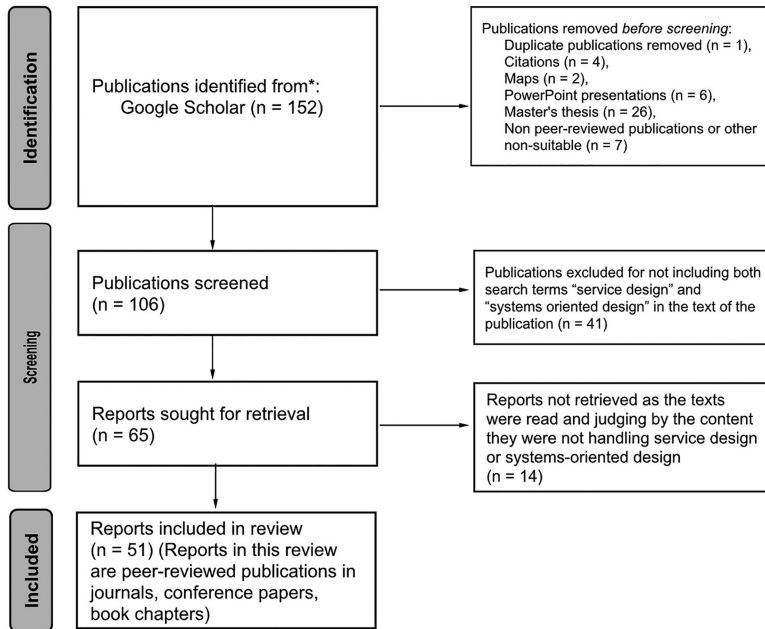
From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

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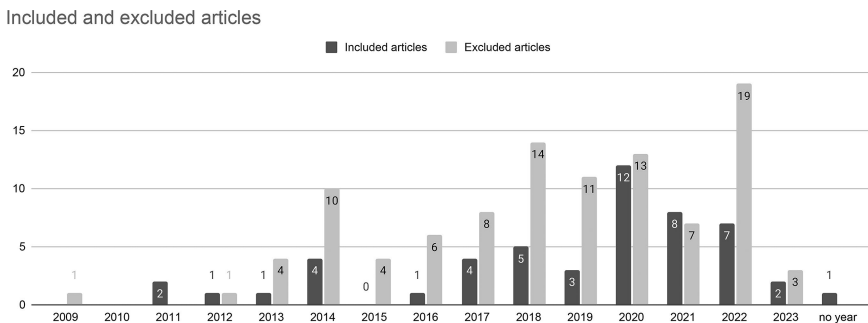
FIGURE 2.3 The number of included and excluded publications and their years of publication.

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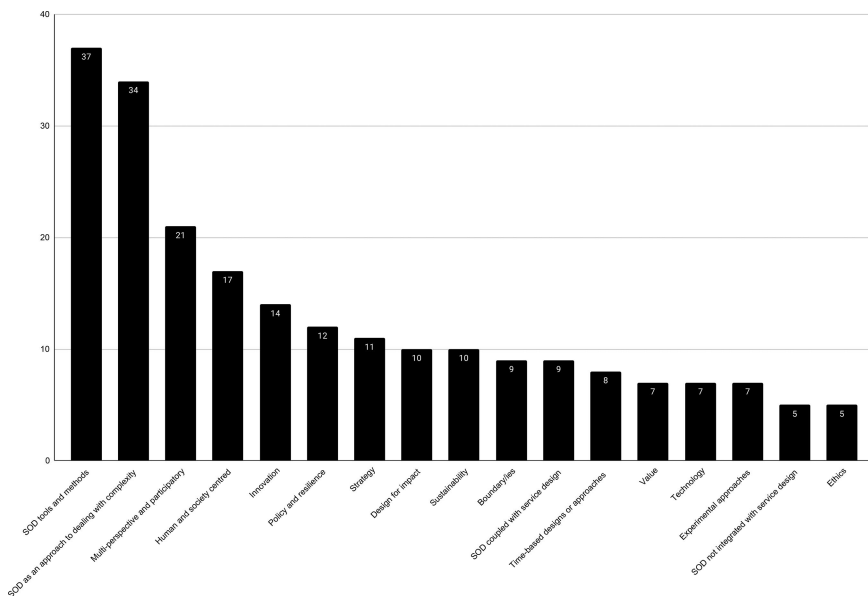
FIGURE 2.4 The themes related to SOD and the number of publications associated with each theme.

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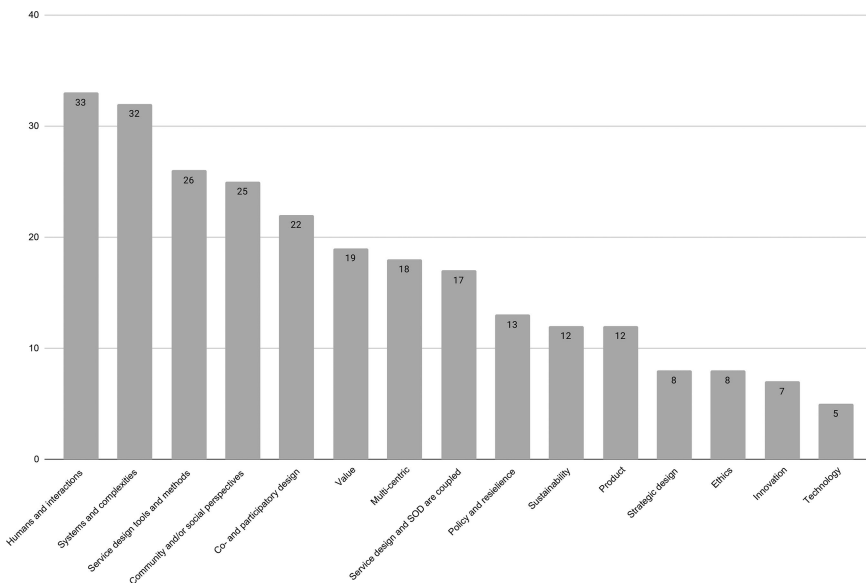
FIGURE 2.5   Themes related to service design and the number of publications related to the themes.

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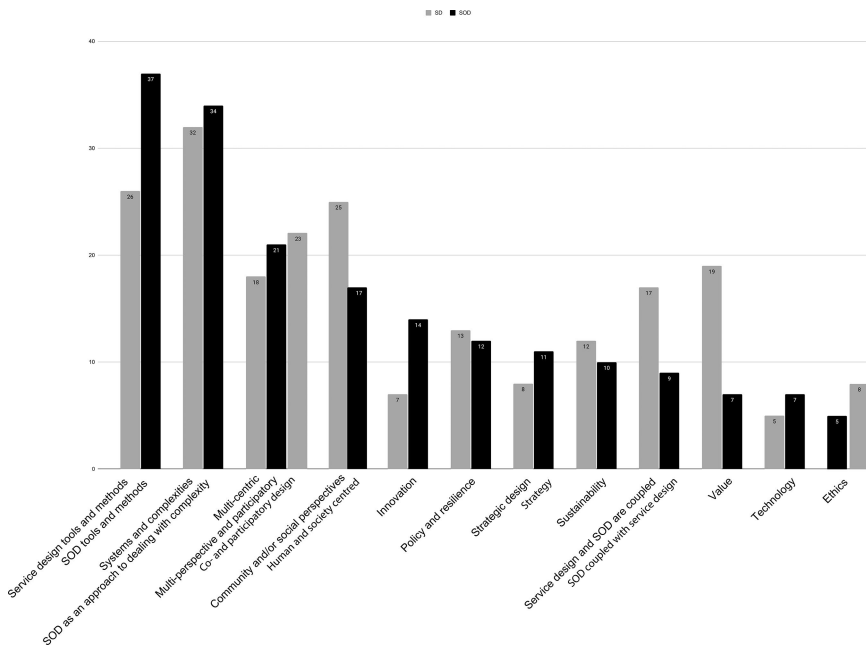
FIGURE 2.6 Diagram showing overlapping themes between SOD and service design.

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
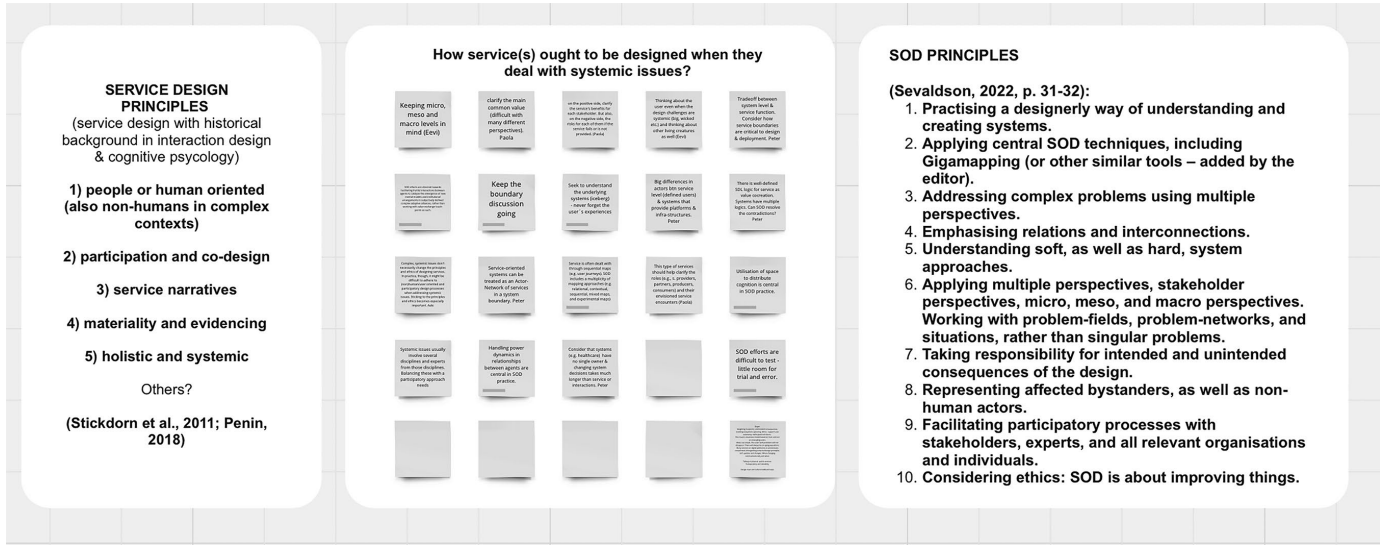
SERVICE DESIGN PRINCIPLES

(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. But also, 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 SDL logic for service as value cocreation. Systems have multiple logics. Can SOD resolve the contradictions? Peter

Complex, systemic issues don't necessarily change the pr.ologies and techniques, only the projects. In practice, though, it might be difficult to employ co-creation tools and participatory design processes when addressing systemic issues. Sharing information and effort is becomes especially important. Adm

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 maps to address 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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3

MESS MAPPING AND GIGAMAPPING TOOLS TO UNDERSTAND SYSTEMS IN SERVICES

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1   Introduction

Service design has expanded to deal with complexities in various fields. As a result, service design has moved towards a more systemic perspective (Koskela-Huotari & Vink, 2022). The field of service design deals with problems that are wicked and often political (Suoheimo, 2020). Different service design cases require tools created to grasp the complexity of the systems at hand. We have chosen to discuss and compare the Mess Mapping (Horn & Weber, 2007) and Gigamapping (Sevaldson, 2011) tools to take an analytical look at how they can aid service designers in their practice. These two tools were selected for several reasons. Firstly, they are visual tools for presenting complex data. This aligns with the key principle of service design, where visualisation is vital during development processes (Stickdorn et al., 2011). Both types of map deal with large amounts of information. More importantly, they are representations of systems at large, which offers a systemic perspective and practice and reflects the turn on handling systems in service design.

In service design, it is common to use service blueprints and other visualisations, such as service journeys, to understand and develop services. Service blueprints (Bitner et al., 2008) can become quite complex and be part of Gigamapping, but they alone are not Gigamaps. Traditionally, the service journey's scope is limited, focusing mainly on a service as it is experienced by users. Often a service journey is just the first layer of a service blueprint. However, as we know, taking the apparent system boundaries for given is a reductionist approach. Most often a system is interconnected with several other systems, e.g. cancer treatment is a system that is related to a larger system of healthcare services. Setting boundaries to a systems and its relation to another is important. Critically interpreting and delimiting the boundaries of systems is a central part of systemic service design, which is called

Boundary Critique (Midgley et al., 1998). For example, by solely mapping out what might bring client satisfaction in the short term, we may neglect societal, economic, ethical and cultural responsibilities, as well as political and other long-term issues. The step of raising these issues and to investigate their interconnections and map them out leads to what we call a Gigamap.

Mess Mapping and Gigamapping have several points in common, but they also have some differences. We will first introduce these two tools, and then we will critically analyse them via various aspects, such as where the tools originated and the systems or theories they reflect, as well as their paradigms and facilitation requirements. We will propose examples of how these tools can be used by service designers in their daily practice of tackling societal and sustainability challenges. The systems that service designers face can be simple, complex or wicked, and those three problem typologies or categories are often intertwined, which means that tools are required to bring visibility (and therefore evidence) by making visible the parts of a system that are invisible to the eye (Penin, 2018). Subsequent chapters of this book will introduce some case studies of the mapping tools.

2   Theoretical background

2.1   *Service design*

Service design is still a relatively new design discipline in academia. It sprang from the fields of interaction design and cognitive psychology (Rytilahti et al., 2015). Service design began to be viewed as a separate research domain within design research in the 1990s, when the Köln International School of Design (KISD) introduced service design courses (e.g., Hollins & Hollins, 1991; Sun, 2020). It is worth noting that the blueprints used by service designers date back to the 1980s (Shostack, 1982, 1984). Additionally, there are several other service design perspectives or orientations, such as product service systems, design for services or service ecosystem design (Suoheimo et al., 2023).

The principles of service design outlined by Stickdorn et al. (2011) and Penin (2018) are: (1) placing the user or people in the centre; (2) using a participatory/ co-design approach in designing a service; (3) discovering service narratives; (4) making the non-visible parts visible, or in other words, evidencing or discovering the material parts of services; and (5) doing the work in a holistic and systemic manner. Recently, there has been a shift in focus that challenges the traditional human-centred approach. New literature, exemplified by the Design Council (2021), suggests expanding the scope in order to design solutions that are both socially and ecologically sustainable.

It is difficult to conceptualise services as concrete objects, as they are made up of different interactions between people. Still, there are several different physical touchpoints in a service, such as waiting in a chair, taking a queue number or using a website. The value comes through use, or by having people use the service

(Clatworthy, 2019). For example, a car is a physical object that a person purchases, but it also can be part of a larger service via leasing or carpooling. Services can be private, such as going to a restaurant, or public, such as increasing public security through improved health services; they can also be voluntary, such as collecting goods and support for people in need.

Especially working in the public sector, one is confronted with larger systemic challenges that are often created by policies, laws and regulations (Suoheimo, 2020). One also needs to know more about the larger context in which a service will be implemented. Here, systemic tools such as mapping can be useful, as they help to shed light on how a service can interact on different levels as micro, meso and macro. Mapping processes can be useful not only for identifying challenges but also for showing possible ways to tackle a challenge; mapping is also used for prototyping and in identifying and preventing any unintended effects of a service.

Knowledge of policies, laws and regulations is essential in service design, especially in the public sector, although the private sector follows many regulations as well. Laws and regulations set the stage for what is possible and not possible to do in a service. Often, while redesigning a service, one might notice that something needs to be changed in the policies, laws or regulations so that the service can work more smoothly. However, the fact that governments and policies change is also an issue that makes designing services a challenge (Suoheimo, 2020). Using mapping tools is one way to shed light on the complexity of the systems around the services we design.

2.2   *Mess Mapping and Gigamapping tools for systemic service design*

The aim of this chapter is to introduce, discuss and analyse the Mess Mapping and Gigamapping tools in relation to systemic service design. Additionally, Chapters 8 and 11 describe some case studies to show more broadly how these tools can work in practice. The purpose is to give an overview of both mapping processes, their principles and some situations in which the tools can be applied, thus offering readers a better understanding of how these mapping processes can be practical for service designers in tackling systemic challenges.

Both mapping approaches are based on visualisation and therefore visual thinking (Arnheim, 1969; Horn, 1998). This includes visual dialogue and communication. The main underlying idea is that complex systems are best understood with visual aids that underpin language. Comparing the two approaches, both use normal language and words to describe entities and relationships, but Mess Mapping contains more text chunks than what is normally seen in Gigamapping.

2.3   *Mess Mapping*

The Mess Mapping process is an innovative tool designed to address what are known as "wicked problems" (Rittel & Webber, 1973) or "social messes", a concept

introduced by systems thinker and organisational specialist Russell Ackoff (1974). This tool, as defined by Horn (2005), is powerful in tackling complex, interdependent issues that lack straightforward solutions.

Wicked problems, such as climate change, public health crises, social inequality and political unrest, are characterised by their complexity and the involvement of multiple dimensions, including economic, social, political and environmental factors. These problems are deeply rooted and multifaceted, making them challenging to resolve. All sustainable development goals have been defined as wicked problems (Wohlgezogen et al., 2020). We also understand the sustainable development goals are all interconnected wicked problems, e.g., goal 1 (eliminate poverty) is connected to goal 4 (quality education). If a person has a quality education, they can have positive changes in their life. However, to access quality education in many countries, resources are needed to pay for private education, which lower income families cannot afford.

Traditional problem-solving methods often fall short when dealing with these complex issues due to their inability to address the interconnectedness and complexity inherent in wicked problems. Common for most of the traditional methods is that are based on simplification, and therefore lack the depth needed for handling complex problems. Mess Mapping processes, however, retain this complexity and effectively illustrate the relationships and dynamics within these problems (Horn, 2005).

The primary purpose of the Mess Mapping process is to make sense of complex issues, which enhances informed and collaborative decision-making. As a visual instrument, Mess Maps help groups who are attempting to understand the labyrinthine nature of wicked problems. Figure 3.1 illustrates the dilemmas in social messes, such as resistance to change and the multitude of possible intervention points.

The creation of Mess Maps involves dynamic processes that evolve with stakeholder interaction and includes a wide range of participants such as policymakers, scientists, activists and the general public. The creation process serves as a neutral platform for discussion and collaboration, facilitating a comprehensive understanding of the issues at hand. The Mess Mapping process structures dialogues by categorising information into causes, consequences and interdependence. The problems are specifically described as what is causing 'pain' in a particular organisation. As different actors operate in the same complex field, some of the actions can cause problems for others 'pain.'

In two cases of the Mess Mapping process (one in Multnomah County, Oregon [Horn, 1999] that deals with mental healthcare [Figure 3.2] and the other in Alameda County, California [Horn, 2001b] that deals with healthcare), Horn invited department directors to participate in the process. Directors have an overall view of their operations and of other organisations involved in a mess. They can quickly express and understand others' organisational pain and the eventual organisational changes required to alleviate that pain (Horn, 2018). In this way, the Mess Mapping
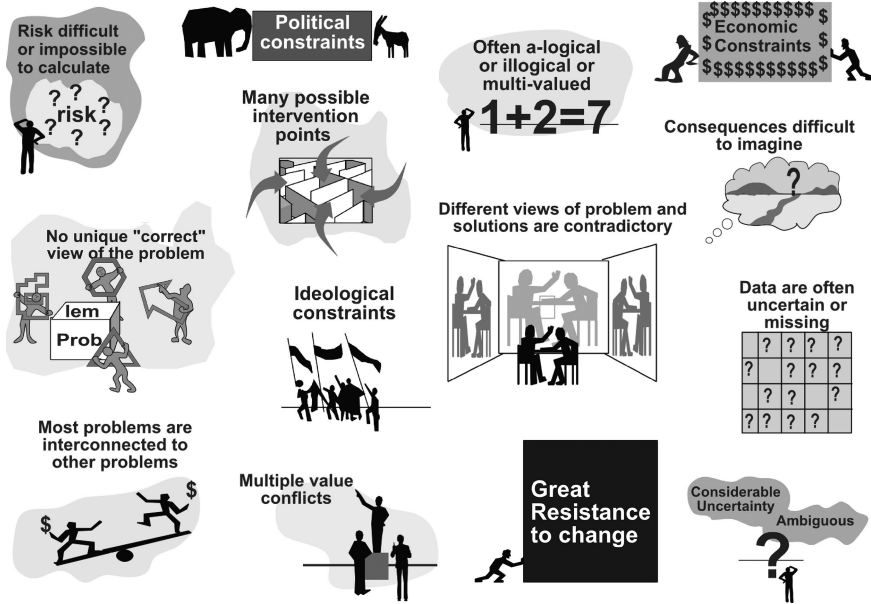
Risk difficult or impossible to calculate

? ? ? risk ? ?

Political constraints

Many possible intervention points

Often a-logical or illogical or multi-valued

1+2=7

Economic Constraints $$$$$$$$$$$

Consequences difficult to imagine

No unique "correct" view of the problem

lem
Prob

Ideological constraints

Different views of problem and solutions are contradictory

Data are often uncertain or missing

Most problems are interconnected to other problems

Multiple value conflicts

Great Resistance to change

Considerable Uncertainty   Ambiguous

FIGURE 3.1   Images of the challenges that social messes contain (adapted from Horn, 2018, p. 7).

process avoids needless organisational details and can set boundaries around the mess more easily.

The resulting visualisations, or Mess Maps, retain this complexity; they also illustrate how various elements are related, and they highlight the multiple layers that must be addressed. This type of process aids in prioritising actions and identifying key points for intervention, which then can guide stakeholders through the diverse aspects of a wicked problem. In an era marked by information overload and polarised opinions, the process of creating and using Mess Maps functions as a bridge builder, enabling data-driven conversations and helping to find common ground among differing viewpoints. The resultant Mess Maps visualise the entire landscape of a problem, making it difficult for stakeholders to ignore or trivialise aspects that do not align with their preconceived notions. The process explores the interconnectedness of problems and keeps out any possible solutions until the analysis is complete (Horn, 2005).

In their design and aim, Mess Maps focus on visually representing the complexity of a mess from a specific viewpoint. They simplify the mess by omitting extraneous details to concentrate on describing the problems and their interlinking causes, specifically those causing pain or suffering in an organisation. They introduce a form of causality, showing connections and causes that sustain the problems (Horn, 2005). Figure 3.2 is an example of a Mess Map focused on understanding the problems and issues of long-term care integration.
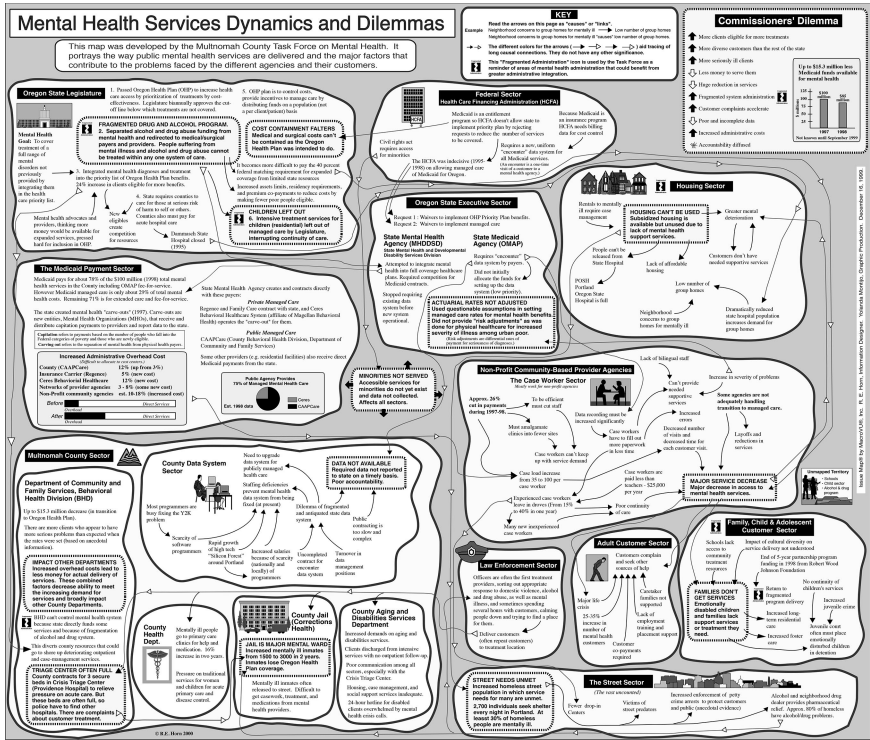
FIGURE 3.2 Mess Map of mental health services' dynamics and dilemmas (Horn 2001a).

However, Mess Maps are not without limitations. Their complexity can be overwhelming and difficult to interpret for those who have not been part of the process of making them. The effectiveness of a Mess Map depends heavily on the quality and diversity of the input it receives. A map built with skewed or incomplete information will produce a distorted view of the problem (as will happen with any analysis). While Mess Maps help in understanding complexity, they do not offer solutions. The map does not show a territory; it is a tool to navigate the territory more effectively (Horn, 2005).

Looking to the future, as the world becomes increasingly interconnected and its problems more intertwined, the need for processes such as Mess Mapping is likely to grow. Innovations in data analytics, machine learning, and real-time data visualisation can enhance the efficacy and accessibility of these maps. Integrating them into educational curricula could prepare future generations for systemic thinking and collaboration.

In conclusion, Mess Mapping processes play a crucial role in clarifying complexity, encouraging stakeholder involvement, structuring dialogue, and bridging informational and ideological gaps. Though they are still evolving, their potential

in transforming how we approach and solve complex problems is significant. In an age where the complexity of social issues is only escalating, Mess Maps, especially the processes of making them, offer a glimmer of hope for a more coherent, collaborative future.

2.4   *Gigamapping*

For systemic design and complex problem-solving, traditional linear methods often struggle to address the complexities of modern challenges. This is where Birger Sevaldson's concept of Gigamapping, developed around 2006 at the Oslo School of Architecture and Design (Sevaldson, 2011), comes into play. Gigamapping is part of a broader methodology known as systems-oriented design (SOD). Sevaldson describes Gigamapping as follows:

> A Gigamap is a very extensive map that includes large amounts of information across different scales and categories. The aim is for it to function as a rich picture, a collaborative device, a memory enhancer, and a learning device when designing for very complex situations.

> *(Sevaldson, 2022 p. 20)*

Gigamapping is not just a tool; it is also a comprehensive methodology that delves deeply into the intricacies of complex systems. It offers a multifaceted perspective, which is a crucial advantage over traditional methods that tend to overlook the nuanced interconnections inherent in complex situations.

To address what Lindblom (1959, p. 79) described as "muddling through" the problematique, Gigamaps are a way to muddle through complex systems and find synergies among different areas of the grand challenge. From this, it follows that Gigamaps are not meant to simplify problematiques, but to understand them as much as possible. The mapping's objective is to foster multifaceted viewpoints and to cultivate and align diverse perspectives through co-design. Gigamapping is characterised by its extensive mapping technique, which incorporates a vast array of information across different scales and categories and integrates quantitative and qualitative data. It serves as a rich, visual representation that captures the nuances and interconnections within a complex system, integrating empirical data, theoretical insights, and practical considerations. This integration makes Gigamapping a versatile tool in the designer's arsenal, functioning not only as a collaborative tool and memory enhancer but also as a learning device, which is particularly effective in designing solutions for complex situations (Figures 3.3 and 3.4).

The process often begins with hand-drawn maps on large paper, fostering an intuitive and collaborative process among stakeholders. This initial phase of mapping allows for the free flow of ideas and perspectives, making it an inclusive exercise. As the map evolves, it can be digitised for further development, enabling the integration of various visualisation formats such as diagrams, sketches, mind maps,
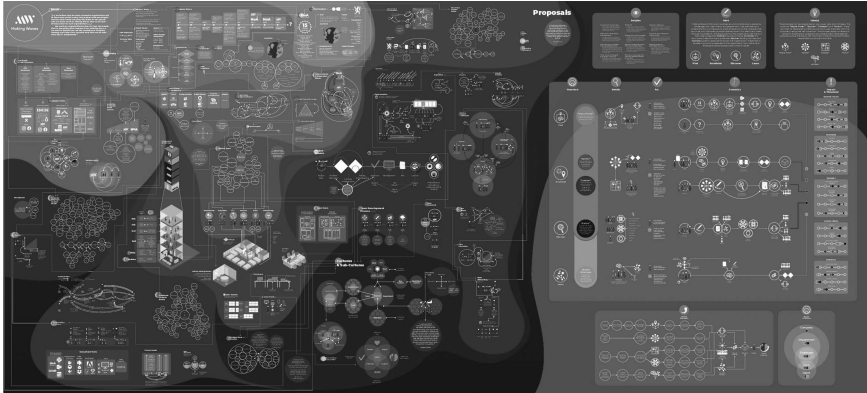
FIGURE 3.3   The final version of the Gigamap illustrating the organisational framework, cultural aspects and operational dynamics of a design company located in Oslo (created by Angel Lamar in 2019).
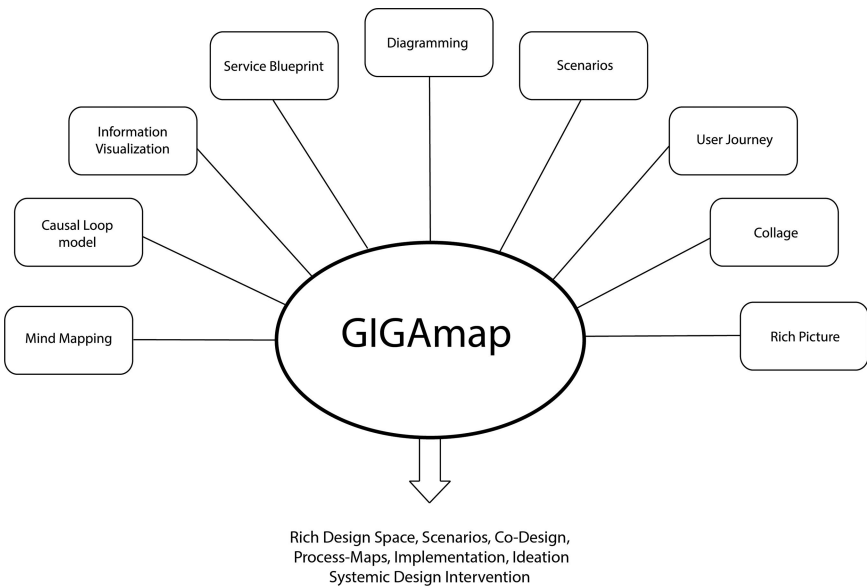

FIGURE 3.4   Gigamaps can include all kinds of information, from quantitative data to qualitative representation, as well as other maps and images (adapted from Sevaldson, 2018, p. 248).

and more. This amalgamation of different visual forms and different types of information aids in understanding the relationships and interdependencies within the system, offering a comprehensive view that is often missed in linear approaches.

One of the most significant aspects of Gigamapping is its collaborative and inclusive approach. The methodology encourages the involvement of a diverse

range of stakeholders, including those who might be marginalised or have unique perspectives. This inclusive approach ensures a more holistic understanding of the system under consideration. It facilitates co-design, where different individuals and groups can contribute their insights and knowledge, leading to solutions that are not only innovative but also more acceptable and sustainable.

In these dialogues, supported by visualisation, two especially important effects appear:

1 The elicitation of the unknown unknowns: The visual-supported dialogue, with its unstructured nature and openness, encourages participants to contribute information that was not asked for because the other participants would not know that it is relevant or even that it exists.
2 Jumping conversations: The visual dialogue allows participants in the mapping process to, at any moment, jump to another issue or place in the system. Such jumps, which normally would be disruptive and cause misunderstandings, are done smoothly by pointing to the map and jumping to another issue (Sevaldson, 2013).

One Gigamap is never enough to embrace all the aspects of a project dealing with complexity. We tend to create several maps, images models and other material. These are collected in a Rich Research Space. Rich Research Space are rooms or spaces where a team can work collaboratively and place the ongoing maps on the walls (Sevaldson, 2022, 2008). Working with complexity is a big challenge for our memory. Keeping all material and information easily accessible and organising it spatially is a very strong help to boost our memory and keep more aspects in play while the process unfolds. For teams the aim of the Rich Design Space is, participants can bridge differences, minimise misunderstandings (Sevaldson, 2008) and share different perspectives such as micro-, meso- or macro-perspectives, distanced or involved perspectives and perspectives from the point of from below, from above, looking at the distant elements and the details of a system as illustrated in Figure 3.5 (Sevaldson, 2022).

The process of Gigamapping is characterised by its dynamism and flexibility. It is not a static tool; instead, it evolves as more information is added and as understanding deepens. The methodology allows for dynamic "zooming in and out" across different scales, providing both detailed and big-picture views. This flexibility makes Gigamapping suitable for a wide range of applications and adaptable to different contexts, from urban planning and environmental management to organisational development and policy planning.

Gigamapping employs various tools and techniques to enhance its effectiveness. Tools such as ZIP analysis (zoom-in points for details, innovation points and problem points) and IMP analyses (impact and threshold analyses) are used to evaluate ideas and interventions. These tools help in identifying key areas for further exploration and in prioritising issues within the map. Such a structured yet flexible approach to mapping enables designers and stakeholders to navigate
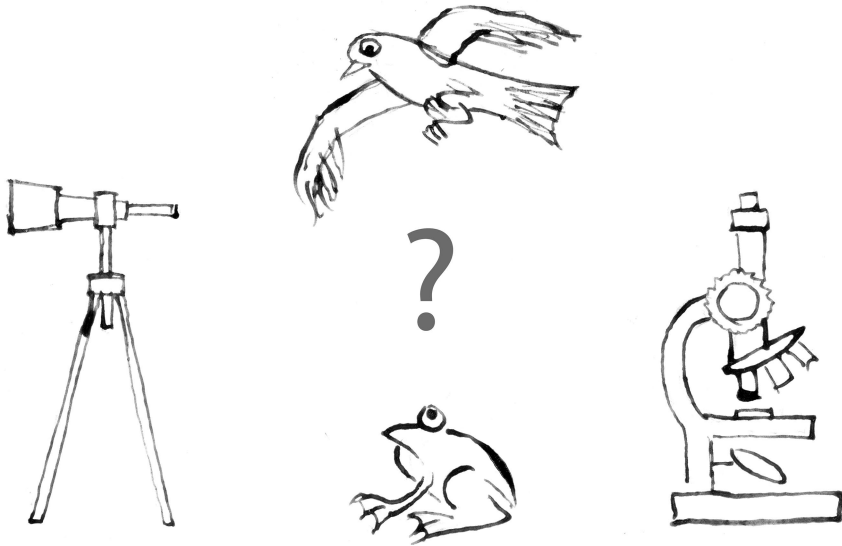
FIGURE 3.5   During the mapping process, one can take several different perspectives (Sevaldson, 2022, p. 213).

through the complexity of the system, identifying leverage points and potential areas of intervention.

The philosophical underpinnings of Gigamapping are as significant as its practical applications. The approach involves a constant critique of boundaries and assumptions (Midgley, 2000). Initially, it encourages exploration without preconceptions or limitations to fully understand a system and its environment. This phase of free exploration is crucial in uncovering hidden connections and potential areas of impact. Gigamapping views systems partly as mental constructs, emphasising the subjective nature of understanding complex situations (Sevaldson, 2022). This perspective acknowledges the role of human perception and cognition in shaping our understanding of systems, making Gigamapping a deeply reflective process.

Gigamapping has found applications in various fields, demonstrating its versatility and effectiveness. In urban planning, for instance, Gigamaps have been used to understand the complex interplay of social, economic and environmental factors in city development. In organisational development, Gigamaps help in visualising the intricate network of processes, relationships and external influences that shape organisational dynamics. The outcome of Gigamapping is a richer, more nuanced understanding of complex systems, which can lead to more effective and sustainable solutions (Sevaldson, 2022).

Sevaldson's Gigamapping is a transformative approach that redefines how we understand and address complex systems. Its holistic nature, combined with its dynamic and inclusive methodology, makes it an invaluable tool in the

designer's toolkit. By capturing the nuances and interconnections within systems, Gigamapping facilitates a deeper understanding and fosters innovative solutions (Sevaldson, 2022).

2.5   *Critically analysing the two tools*

We created Table 3.1 to show the different points through which we analysed the two tools, namely, paradigm, level of complexity and the academic field from which they emerged. Mess Mapping is inspired by organisational development (Ackoff, 1974) whereas Gigamapping is from the design field (Sevaldson, 2022). Both tools apply the theory of wicked problems to address societal issues such as workplace democracy, public health or climate change (Horn, 2005; Rittel & Webber 1973; Sevaldson, 2022).

Gigamapping draws on a social constructivist paradigm, where truth and reality are understood and constructed socially (Sevaldson, 2022). Suoheimo (2020) has used the Mess Mapping tool via interpretivism (social constructivism) and complexity paradigms (Jennings, 2015; McMillan, 2002; Suoheimo, 2020). As a research methodology, participatory action research has been used to conduct case studies via Mess Mapping (Suoheimo & Lusikka, 2020; Suoheimo et al., 2021). Mess Maps can draw on participatory action research methodology (Suoheimo & Lusikka, 2020; Suoheimo et al., 2021). Gigamaps can also use participatory action research, as well as research through design (Sevaldson, 2022) and constructivist learning (Hein, 1991; Sevaldson, 2022).

Both processes aim to understand wicked problems, aid stakeholder communication and understand visually what the challenge at hand is and what its interconnections are. Different systems theories, such as soft and hard systems approaches, can be included in making a Gigamap, in the spirit of critical systems thinking (Ulrich, 1987; Jackson, 1990; Flood, & Romm, 1996; Midgley, 2000) and its methodological pluralism. Gigamaps can be made at the micro-, meso- or macro-levels, employ these all at once or use a combination of any two of them whereas Mess Maps will always be at the wicked, macro level. In SOD, we call this the horizontal and vertical stretch.

The methodology for Gigamaps can be diverse, such as research through design, participatory action research (Sevaldson, 2022) or constructivist learning (Hein, 1991; Sevaldson, 2022). There are researchers who have applied participatory action research to create Mess Maps (Suoheimo, 2020, Suoheimo & Lusikka, 2020; Suoheimo et al., 2021). In general, these methodologies support collaboration and engagement with stakeholders and the community. Participatory action research is long-term research and development; it generally has three phases in a cycle, which are planning/thinking, acting and reflecting (e.g., Rasyid, 2020). The mapping tools can serve as a starting point to elicit a strategy on how to start the planning process.

Mess Maps are always made with the participation of stakeholders although it is not always easy to include everyone at the same table to discuss shared challenges

TABLE 3.1 Looking at how Mess Mapping and Gigamapping cover diverse topics

Topic	Mess Mapping	Gigamapping
Origin and theoretical background	Created by Robert E. Horn, based on "wicked problems" (Rittel & Webber, 1973) or "social messes" (Ackoff, 1974); emphasises the interconnectedness of the problems within a system	Conceived by Birger Sevaldson at the Oslo School of Architecture and Design; focuses on extensive mapping of information across different scales and categories; can be used for any kind of problem or challenge, including simple, complex and wicked problems (Sevaldson, 2022; Suoheimo, 2016)
Purpose and Application	Addresses complex, multifaceted issues such as climate change, public health and social inequality; aims to make sense of these complexities for informed decision-making (Horn, 2001a)	Used for exploration and conversations about problematiques and for designing solutions in complex situations, ranging from workplace democracy and housing market challenges to understanding how the government of a country works; functions as a collaborative learning and memory-enhancing tool; Gigamapping is central as a communication tool for bridging silos (Sevaldson, 2022; Wettre et al., 2019)
Paradigm	Suoheimo (2020) has used both the complexity paradigm (Gummesson, 2017) and the interpretative (social constructivist) paradigm (Jennings, 2015)	Social constructivism, critical systems thinking, SOD and design theory and praxeology (Sevaldson, 2022)
Scientific methodology	Participatory action research (Suoheimo & Lusikka, 2020; Suoheimo et al., 2021)	Research through design, participatory design action (Sevaldson, 2022); constructivist learning (Hein, 1991; Sevaldson, 2022)
Method	Visual representation of a problem's complexity from a specific viewpoint; focus on interlinking causes and effects; involves stakeholders in a dynamic, evolving process; requires omitting much information already known by the participants in order to focus on their organisational problems (Horn, 2005; Horn, 2018)	Emphasises the depiction of interconnections within a system; encourages exploring different perspectives and scales; facilitates jumping across conversations to develop, interpret and understand complex systems (Wettre et al., 2022); visual thinking (Arnheim, 1969) and visual dialogue are central; connected to composition and *Gestalt* (Sevaldson, 2022 p. 8)
Stakeholder Involvement	Encourages participation from diverse groups, including policymakers, scientists, and the public; facilitates dialogue and collaboration (Horn, 2018)	Promotes co-design and multifaceted viewpoints, including those of marginalised groups; bridges silos and brings diverse perspectives to a shared understanding; the mapping itself can be done individually or by involving relevant stakeholders (Sevaldson, 2022)

Reporting	The map makes sense for the people mapping and for people who will use the map later; the map is often used as a final report (Horn, 2018).	At the first stage, the aim is for the map to make sense to the people mapping and not necessarily outsiders; the map is not meant to be a stand-alone report (Sevaldson, 2022).
Visualisation and Structure	Illustrates relationships and dynamics within problems; categorises information into problems, causes, consequences and interdependencies (Horn, 2005; Horn, 2018)	Often starts with hand-drawn maps, later digitised; incorporates various visualisation formats such as mind maps, causal loops and service blueprints; utilises Rich Research Space for collaborative work (Sevaldson, 2022)
Tools and Techniques	Different coloured lines are used to show interconnections (red), collaborations required (green) and problems'/challenges' root causes (Horn, 2018; Suoheimo & Lusikka, 2020); it is also possible to use stickers to show what areas or points stakeholders are willing to start to develop further (Suoheimo & Lusikka 2020).	ZIP analysis for zooming in on details and identifying problems and ideas; IMP analyses for evaluating ideas (Sevaldson, 2022)
Time needed to make a map	From 4 weeks to 6 months, depending on the scope of the project (Suoheimo & Lusikka, 2020; Suoheimo et al., 2021)	Can be a simple minimap made in couple of hours to a more complex, months-long mapping process (Sevaldson, 2022)
Next steps after mapping	A task force will sit down to find points in the Mess Map to develop further in, e.g., scenario building (Horn, 2018).	Depending on the purpose and context, the next steps can vary from doing nothing to interventions, prototyping and continuous use and development of the maps for implementation (Sevaldson, 2022); many other models and perspectives can be integrated and related in the Gigamap; these can be different systems thinking theories such as systems dynamics (Forrester, 1989), soft systems methodology (Checkland, 1989) or second-order cybernetics (Glanville, 1994); it can also involve the use of particular models such as the iceberg model, the triple diamond (DOGA, 2023) the systemic design approach (Design Council, 2021) or any other theory, perspective or model that can work in a methodological, pluralistic approach inspired by critical systems thinking (Midgley, 2000).
Limitations and Challenges	Can be overwhelming due to its complexity; effectiveness depends on the quality and diversity of input; requires other organisational development methods to address the "resolution" of the messes (Horn, 2005; Horn & Weber, 2007).	Can be endless due to the interconnected nature of systems; requires discernment to focus on relevant areas for specific tasks (Sevaldson, 2022).

(Sarantou & Suoheimo, 2018; Suoheimo, 2020). We can use the example of how complex it is for social workers to talk together at the same table with clients who have alcoholism issues, as neither group is likely to speak freely in each other's presence (Sarantou & Suoheimo, 2018). Gigamaps can be made in a participatory manner, but they can also be a tool for designers to create understanding for themselves. Gigamapping can be done by reading reports or including people via interviews to specify points in the maps. As a result, Mess Maps will always need facilitation to make them whereas Gigamaps only need facilitation if the designers making them wish to include actors or stakeholders to do mapping in a participatory manner.

Although the term "Mess Maps" contains the word "mess" and the maps might look messy, they make sense once an outside person starts reading them, so they are often used as reports (Horn, 2018). In contrast, Gigamaps are made to make sense to the people that are making them, at least at the first stage, and they are not meant to be communication tools to distribute to a wider audience beyond the team and stakeholders involved (Sevaldson, 2022).

Visually, the two mapping tools may have similarities. Both look for connections, interdependencies, a careful representation of problems and the root causes of problems or challenges (Horn & Weber, 2007; Sevaldson, 2022). Gigamaps often begin with hand drawing, and then they are redrawn in a digital manner to distribute the map (Sevaldson, 2022). Gigamapping is quite versatile, since it utilises several other mapping tools such as mind maps, causal loops and service blueprints. It also utilises Rich Research Space for collaborative work (Sevaldson, 2022). Both mapping tools aim to create a shared understanding and to communicate the challenges at hand, and they create visibility for invisible structures and systems.

Gigamapping uses ZIP analysis to find leverage within the system in the form of different points or areas. These are seeds for creating future steps to start taking action. Each aspect of ZIP (zooming in, ideas/innovations, potentials and problems) is often shown in a map with balls coded in different colours. Interestingly, in the Mess Mapping process about San youth unemployment, Suoheimo et al. (2021) also highlighted separate opportunities as points for development. Problems are often the points that show what the opportunities for innovations are. Nevertheless, the map did not have a special point for zooming, since perhaps each box or blob represents a way of zooming in on a specific problem area. In a Mess Map project carried out by Suoheimo and Lusikka (2020), stickers were used so that the participants could point to areas that they found that they could work on in the future.

The time taken to a make Gigamap varies from a couple of hours to several months (Sevaldson, 2022). It depends much on how deep the process is and how the problem boundaries are defined. Additionally, how many stakeholders are involved will influence how long the process will take. How long a Mess Map can take is similarly ambiguous, but there are Mess Mapping processes that have taken around six months (Suoheimo & Lusikka, 2020; Suoheimo et al., 2021).

Gigamapping tends to move seamlessly from descriptive to generative, posing questions of how things could be or ought to be. To support this process, ZIP and

IMP analyses can be used to develop scenarios or concepts for systems intervention and to imagine and intervention's impact and consequences. Ideas can emerge at any stage and are normally integrated with other ideas and backchecked within the system represented by the Gigamap. After the Mess Map process, scenarios are frequently built to understand what the ideal future could look like and what should and should not happen to reach it (Horn, 2018). Both tools are quite flexible, and depending on who is executing them, there can be different "flavours" in making the maps. A final difference is that Mess Mapping is trademarked while Gigamapping is open source.

No tool is perfect, and there are some limitations and challenges with both tools. Using Mess Mapping can be overwhelming to people not involved in the mapping process due to its complexity (Horn & Weber, 2007). The effectiveness of the map will depend on the quality and diversity of input, and Mess Mapping itself does not offer direct solutions. Additionally, Gigamapping and Mess Mapping can go on endlessly if there is no critical boundary setting. It is possible to endlessly find connections to other problem areas, thus making the process longer than needed; in other words, participants must discern what is most essential to the challenge at hand.

3 Discussion

Both tools aim to understand wicked problems, but Gigamapping can, in addition to wicked problems, look at complex or simple problems as well and unfold the hidden complexity of simple problems or situations. Gigamapping does not necessarily handle the macro level of wicked problems every time, whereas Mess Mapping does only that. Gigamapping and Mess Mapping are methodologies that align closely with the principles of complex systems design. Both approaches consider the multiple interacting components that are typical of complex systems.

These components often interact dynamically, leading to non-linear behaviours, where small changes can have significant and unexpected outcomes. This non-linearity is a hallmark of complex systems and necessitates a methodological approach that can accommodate such unpredictability. They adopt a holistic view akin to the perspective required in service design. They look at the entire journey or lifecycle of a system or service, often identifying key touchpoints and interactions. This holistic perspective is crucial in complex systems design, as it helps in understanding how different parts of the system are interconnected and affect each other. A multidisciplinary approach is essential in addressing the diverse and interconnected nature of complex systems.

Co-creation is a significant aspect of both Gigamapping and Mess Mapping. These methodologies involve collaboration among various stakeholders. This collaborative process ensures that the system or service is designed with a comprehensive understanding of all perspectives, leading to more robust and user- and other stakeholder-centred solutions. Understanding users' needs, wants and limitations is

central to these approaches, often involving extensive research to gain insights into user behaviours, preferences and experiences. In addition to functional aspects, Gigamapping and Mess Mapping also emphasise the overall experience of interacting with the system or service. For Mess Mapping, for example, the users' organisational "pain" in a complex situation is a driving element. In fact, these mapping tools can be a way of enhancing the processes of community-centric design (Meroni, 2011) or planet-centric design within the systemic design approach (Design Council, 2021), where the sole focus of the end-user is taken to the system and different actors' needs, including both human and non-human actors, are central.

Another critical aspect of complex systems design that Gigamapping and Mess Mapping address is the concept of emergent behaviour. Complex systems often exhibit properties and behaviours that arise from the interactions of the system's components, which are not inherent in the individual components themselves. Both methods, processes or methodologies allow for the observation and understanding of these emergent behaviours. Additionally, they recognise the importance of adaptability and evolution in complex systems. Many complex systems are not static; they evolve and adapt in response to changes in their environment. Gigamapping and Mess Mapping facilitate the design of systems that are flexible and capable of evolving over time.

Both tools are quite flexible in terms of how they can be utilised, and they use visual elements to communicate the various points of the system. The idea is to draw connections among problem areas, which allows the participants to understand the potential domino effects of an intervention that is done in one area in terms of how it can influence the other problem areas or challenges at other points in the system. Both mapping tools allow different types of connections to be drawn. Even role-playing can be used (Horn, 2018; Sevaldson, 2022) to make more sense of a connection, e.g., the case of a grandmother handing money to a grandchild (figure 3.5) can show that there are several layers between the two actors (Sevaldson, 2022). Grandmother has a possibility to empower or use power over the grandchild by giving money at the same time the grandchild might be expected to do some jobs for the grandmother such as getting groceries from the store. Similarly the grandchild can exercise power by doing these jobs. Such multi-layered relations appear to form networks on their own and are normal in most relations, normally depicted as a simple line or arrow. It is not possible to map out all the richness of layered relations but it is helpful to keep them in mind.

It is a challenge and also a possible area of future research on these mapping processes to involve the "right" stakeholders or actors in the process. The Mess Map is commonly made with top management since it is crucial that the outcomes are understood and implemented by the managers in their subsequent strategies. In addition, in her thesis, Suoheimo (2020) looked at how involving the end-users of a service could be relevant, as it can make people take ownership and make invisible things visible for managers. This is also important when designing transitions (Pyykkö et al., 2021). Gigamapping itself is not limited to a group as the mapping process can be designed differently each time.

Since both tools share many similarities but also differences, it could be interesting to investigate further if there is a possibility of coupling the tools or whether they complement each other. Both mapping tools are focused on creating connections among problem areas or challenges, but how to make the connections is a bit different for each mapping tool. Applying both methods and their principles can bring higher levels of analysis of wicked problems for service designers, policy makers, social designers, transition designers, civil society, activists and experts in related fields. We suggest that Mess Maps could be a tool under Gigamapping, which would enrich the way Gigamaps can be made (Figure 3.7). Both processes are concerned with the *redesign* of complex organisational situations where "stuckness" and conflict are in the foreground.

We have updated Figure 3.4, which pictures the diverse mapping tools that a Gigamap can employ, and we have added Mess Maps to it (Figure 3.7). We see that Gigamapping tools, along with Mess Mapping, can allow systemic service designers to build a more holistic and deeper macro-level understanding of complex systemic services. As Mess Mapping draws on macro level, wicked problem understanding, it can offer systemic service designers a dialogical tool to design better services and understand what outcomes, both positive and negative, a service intervention could create. On the other hand, the micro- and meso-levels of understanding, specifically the use of zoom points in Gigamapping, are useful for designers using Mess Mapping.

Structural relation (Family)   STR
Flow (information in the form of genes)   FHS
Emotional relations   ESR
Action (Brings Flowers)   ASR
Economic relation (gives money to help studies)   FHS
Cultural relations (sharing the same cultural realm)   CSR
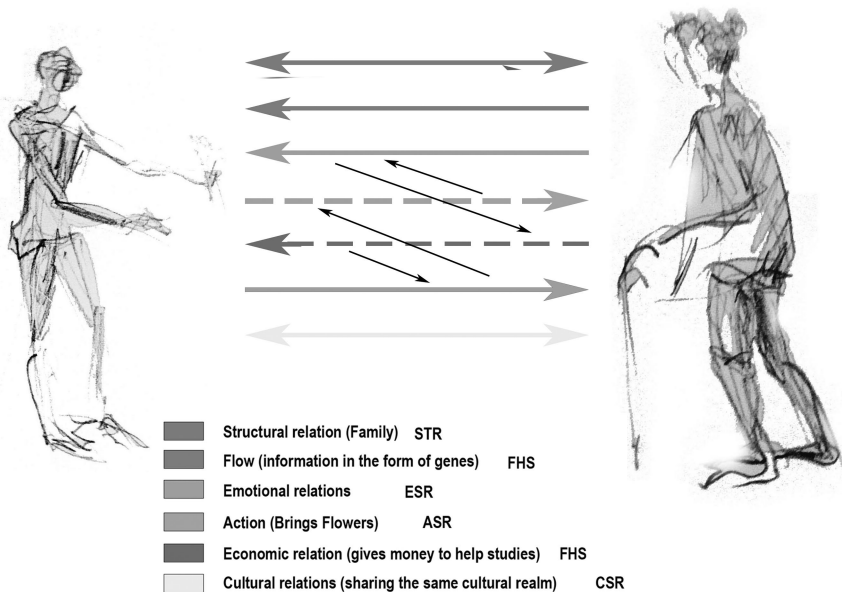
FIGURE 3.6   A model to illustrate the grandmother's and grandson's complex relationships (Sevaldson 2022, p. 258).

Rich Design Space, Scenarios, Co-Design,
Process-Maps, Implementation, Ideation
Systemic Design Intervention
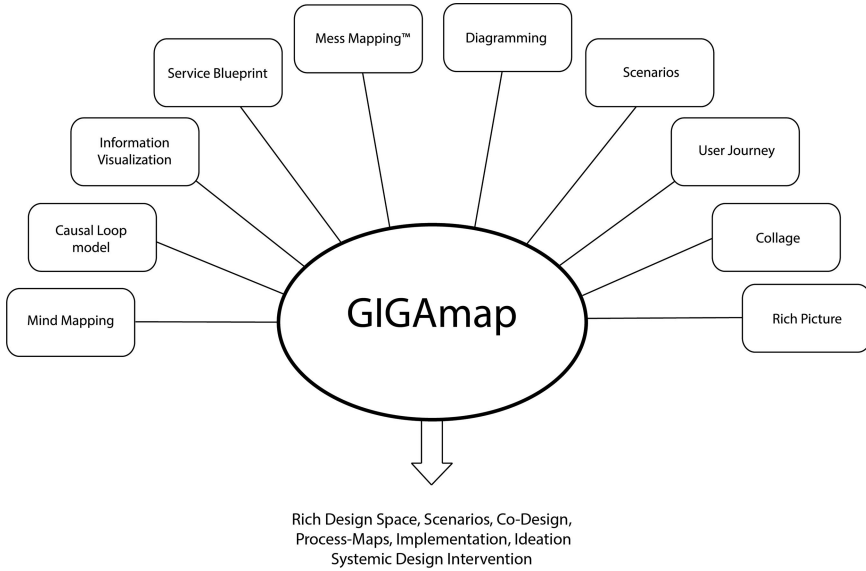
FIGURE 3.7   Updated image with Mess Maps included in the type of mapping tools a Gigamap can use (adapted from Sevaldson, 2018, p. 248).

Although both tools have been created to prevent oversimplification and to resist a reductionistic way of viewing problems, when making the maps, it is still difficult to completely cover the reality at hand. When making a Mess Map or Gigamap, one can unwillingly, in one way or another, reduce the complexity. It is not possible to capture the whole multi-dimensional nature of natural and social systems. In addition, systems and situations are often dynamic and changing. Designers need to bear in mind that a map made today might need to be updated tomorrow as the situations change or new laws are introduced.

4   Conclusion

It would be an interesting area for future research to look at how to use the Mess Maps process as a part of Gigamapping. Cross-pollinating the principles and ways of mapping could bring relevant knowledge for researchers and practitioners who tackle wicked problems in various domains. We also believe that in the future, the use of artificial intelligence could bring useful knowledge on how to make or interpret Gigamapping and Mess Mapping; thus, we recommend more research in this field.

In this chapter, we have concentrated only on Mess Mapping and Gigamapping. We recognise that there are many more mapping tools, such as information murals, that could also be investigated for the SOD community to use in their Gigamapping processes. Argumentation Maps (Horn, 2009) have been used widely to clarify the

course of policy debates. Differences of opinion, debates and arguments seem to follow the same build-up: there is a claim, and then there are counterclaims and rebuttals. These all may be supported by facts, reasoning or majorities. We would like to conclude by stating that both instruments, Mess Maps and Gigamaps aim to visualise societal complexities and that we notice an increasing need for visualising complexity.

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4

EMERGING SYSTEMIC TURN IN SERVICE DESIGN

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1   Introduction

A substantial effort of research and educational programmes in service design has focused on providing a methodological approach and methodologies that could qualify students to work in interdisciplinary teams. This has included experts in similar disciplines, such as industrial design, interaction design, management or process engineering (Holmlid, 2007; Morelli, 2009). Around the 1990s, service design started to be viewed as a separate research domain in design academia when the Köln International School of Design introduced service design courses (e.g. Hollins & Hollins, 1991; Sun, 2020). Service design education shaped an *operative paradigm* (Arbnor & Bjerke, 1997) that helped existing professionals include then-new user-centred, design-oriented, participatory methods and methodologies in their practices. This chapter proposes that service design research and education have grown into a new era, and that the questions they face are even more complex than they were in the last turn.

Service design in the educational context has been supported by research (e.g. Huan, Arvola, & Holmlid, 2020; Meroni & Sangiorgi, 2016; Sangiorgi & Pacenti, 2010). This has shifted the attention from a very hands-on focus typical for service design practice, especially in the early years of service design. There is already an extensive body of service design research initiated by the same scholars who teach in major service design programmes. Service design education is, by far, not only informed by practice but also by a strong research orientation. Service designers are educators and scholars who have initiated the first academic books on service design (Polaine et al., 2013; Stickdorn & Schneider, 2012).

The maturation of academic research rigour and the need for defining a professional profile for service designers often led to the development of technical

and methodological approaches to service design. However, the idea that design, as a discipline, could assume a *technical* positioning that only considers the professional role (i.e. functional, technical, or organisational aspects of its action) is proving to be wrong or at least insufficient to address the significant sociotechnical changes generated by the major crises in our society. Design research has already highlighted the need for design to take a position concerning the impact of major production and consumption systems (Norman & Euchner, 2023) and problems, such as migration, inclusion and gender issues, and the right of different design cultures to express their potential, outside a colonising umbrella of the Global North (Light, 2019). This chapter asks if a new turn in service design research and education is emerging.

The question about a paradigm shift was discussed by Thomas Kuhn (1962) in his book *The Structure of Scientific Revolutions*. Kuhn suggests that the dominant active paradigm is usually characterised by theories and tools for approaching certain problems. This can be challenged by anomalies that push the boundaries of what is known, and new theories and exploration are needed to explain the anomalies. During the shift, the new paradigm would encounter resistance before becoming normal.

While design research and experimentation look at this perspective change, service design education has often held a conservative position (Becermen & Simeone, 2019). It has focused on a profile of designers as problem solvers. In contrast, the hypothesis of a different engagement in society requires future designers to understand and learn how to work with conflicts, tensions, agonism, chaos and complexity (Ehn, Nilsson et al., 2014).

The cultural evolution for social change and increasing sensitivity to the emerging crisis find fertile ground in the increasing interest of several universities in cultivating a *third mission* (the first two missions being education and research) that focuses on the civic role of universities and their contribution to society (Compagnucci & Spigarelli, 2020). This perspective encourages universities to project their educational and research activities over their physical and social surroundings. In some European countries, especially in the Nordics, this third mission is discussed in the context of industry-university collaboration, and the industry relevance in teaching has already been discussed for some decades (Kivinen & Nurmi, 2014; Ranga, Perälampi, & Kansikas, 2016). This resonates well with the role of service design in adding value by applying, for example, more human-centred methods (Sangiorgi et al., 2019; Yu & Sangiorgi, 2018).

This perspective implies that service design education looks beyond the existing professional horizon and considers the role service design can have, for instance, in social innovation, in the public sector, or in the definition of policies that address emerging social (Staszowski, Brown, & Winter, 2016), urban (Villari, 2022) or health-related issues (Jones, 2013). Kuzmina and Bhamra (2014) studied service design as a transformative approach in education for sustainable development. Miettinen et al. (2022) studied how critical thinking and sustainability

can be included in a service design teaching model. Their design teaching model proposes more thematic study areas, such as strategic service design, digital service design and place-specific service design. Furthermore, some researchers have initiated research on the strategic role of service design in organisations (Foglieni et al., 2017). However, these efforts are a minor part of the vast research endeavour to discover the benefits of adopting service design methods and processes. Some scholars discuss service design in the context of more complex societal challenges, service systems and sustainability (Jones et al., 2014; Manzini & Vezzoli, 2003; Santos & Sustar, 2023; Van der Bijl-Brouwer, 2017).

Service design is evolving with the social, economic and technical systems with which it interacts, and this context is now severely challenged by multiple crises concerning environmental aspects, social inequalities, wars, migrations and deep cultural changes. This chapter discusses the turn in the service design paradigm from the micro-level operational and methodological practice towards designing at the macro level, which concerns more complex and strategic systems. This turn is discussed first through a literature review, then with service design researchers in a co-design workshop and verified through data collected in industry interviews.

1.1   *Thematic literature review*

This literature review is not exhaustive, and the article itself cannot mention everything relevant to the paradigm shift in design at large. It looks at design history and research from the service design point of view and focuses on literature that somehow mentions the term shift or turn. Papanek (1971) was perhaps the first to show the variety of social complexities in design. The issues of sustainability and social context must be considered when designing. Buchanan (2001) addressed knowledge production and the epistemologies of design that investigate how we know what we know. He sought to identify the value of design research.

Krippendorff's (2005) book *The Semantic Turn* has been a cornerstone in outlining a new way to look at design as a science. This helped designers review the semantic concerns in design history, present the philosophical background and shift the focus from product functionality to their meaning.

Kimbell (2009) argued for the emergence of service design. Her argument describes how service design can become formally established by becoming part of management and design education curricula and larger corporations' processes and methods. She presents the background to the turn of service design lying in the division of economics between raw materials, manufacturing and services, as well as service design responding to the value co-creation of experience economies that Pine and Gilmore (1999) proposed. Furthermore, she placed the turn to service design within management theories, looking at new ways to produce innovative products and services (Kimbell, 2009). Kimbell's proposal for the new turn did take place. Service design was established both in education and in business. Now, service design is taught in several academic institutions (Becermen & Simeone,

2019; Sarantou & Miettinen, 2022; Suoheimo, Vasques, & Rytilahti, 2020) and multitudes of companies (Accenture, Frog, Futurice, Deutsche Telekom, Volkswagen, Amazon, Netflix, Apple, Starbucks, Zappos, McDonald's, etc.) use it.

Muratovski (2015, 2021) provided background on the shift in the role of design towards a more strategic one. He illustrates a shift in the corporate world that embraces the role of design. He proposes that design's adaptability and the role of education support the evolving field and enable design to play a role in changing economies. This shift expands the role of design across disciplines to support the innovation process taking place almost everywhere. Opazo-Basáez et al. (2022) support Muratowski's idea of a shift from the service innovation point of view. They propose service innovation as a novel technological innovation that enhances performance, speeds up innovation and proposes collaboration across companies.

We can also discuss the ontological turn that Ansari (2019) proposes. He discusses the decolonial turn in design, which aims to bring marginalised designers' voices and concerns into a discussion from an Anglo-Eurocentric perspective. In his opinion, the start of this discussion should be the decolonisation of knowledge systems. The decolonising discussion has many voices in design, especially when addressing participatory research and its ethics (Seppälä et al., 2021).

The sphere of design has become more complex. It also raises questions about the polarities between these different turns. On one hand, design is an approach to speed up and expand technological innovation. On the other hand, the expansion of design demands that we address the questions of ethics, care and dismantling of colonial structures more carefully. Design as systems thinking (Buchanan, 2019) that addresses the design itself as a system consisting of its parts and the world consisting of systems has become more complex to understand (Higgins, 2014).

1.2   *Positionality as a second turn in service design*

Designers are mediators within a sociotechnical system. Because of this central role, they are also responsible for investigating their positionality and disclosing any power asymmetries in complex social systems (Rodriguez, Schon, & Celi, 2023). They must pay attention to their own biases and privileges and their ways of knowing and doing when undertaking this mediation.

When referring to research, Darwin Holmes (2020, p. 1) describes positionality as a reflection on the researcher's individual worldview or "where the researcher is coming from" concerns, reflecting on individual beliefs about the nature of social reality, the nature of knowledge and the way the researcher interacts with the environment they relate to. The author proposes that positionality unfold in three areas: the research participants, the research context and the subject under investigation.

When applied to service design research and education, the three positionality dimensions suggest some questions: What is the meaning and positioning of design action? Can we imagine service design research and education shifting its focus from individual experience to social mechanisms of change?

1.2.1   Positioning about the participants

An *outsider* positioning of service design education concerning the actors with which they collaborate often provides few elements for describing the participants in a service context (e.g. their needs, preferences, or functional requirements). An *insider* positioning (e.g. working in a context) would provide a deeper understanding of the people with whom a design student is collaborating, their culture and beliefs, and their power dynamics, diversities and social practices. Sangiorgi (2015) proposes a paradigm shift in which design agencies (practitioners) inform design policies and interdisciplinary work, producing specific knowledge that can support social transformation. She argues that all stakeholders can create public value through collaborative design. Furthermore, she argues for systemic change that can take place when operating at a complementary level.

1.2.2   Positioning about the context

While the root of service design in marketing and management disciplines suggests a focus on organisational processes, efficiency and problem solving, the complexity of the context in which service design education operates imposes a more open approach that looks at participatory processes. Consequently, the existing problem- and project-based approaches should be revised in favour of an open-ended *infrastructuring* approach (Björgvinsson et al., 2010) to facilitate social interaction between different practices in a dynamically changing relational context and changing dynamically.

   The new landscapes of design initiated the notion of the user as a co-designer (Sanders & Stappers, 2008). Manzini (2015) has developed this notion by considering citizens and everyone's ability to design. The participatory process is more complex. Noronha (2018) proposed a collaborative turn in design. She argues that there is a great challenge in recognising the multiplicity of overlapping worlds and other symbolic systems that promote the equilibrium of communities when doing the action of co-design. Miettinen et al. (2023) further developed this in art and design processes with communities.

1.2.3   Positioning about the subject

Service design education inherits its approach and methods from design disciplines focusing on material objects, be they products, architectures or urban spaces. The outcome of the design process is relatively complete and controllable through a codification process (a blueprint and technical representations). The nature of design intervention in a social context instead has the characteristics of an *enquiry* (Kimbell, 2011), and the results are open transformations at different levels (local interventions as well as policy actions) that cannot be easily controlled or represented by the designer.

1.3   *Ethics and values*

The expansion of the role of design demands more care. Van den Hoven (2017) discussed the design turn in applied ethics. In the mid-twentieth century, ethics needed to take steps closer to everyday life to be understood and utilised. The challenges coming from the evolution of technology and the designers' cross-disciplinary approach require re-visiting the concepts of agency and responsibility when discussing design, design histories or design agents. Designers themselves outshape the design practice. In this setting, many are already set by actors and previous actors. The global problems (climate change, healthcare, etc.) that we address as designers need more than common-sense morality, as they go beyond particular cultural constructs that may be familiar to us and are beyond individual capacity. Van den Hoven (2017) presents the concepts of "design for values" and "value-sensitive design." These concepts were originally addressed in the human-computer interaction (HCI) discourse by Friedman (1997) at the University of Washington in their Values-Centred Design initiative. Again, we face the question of how values become implicated in technological design, especially when facing the questions of artificial intelligence (AI) and a machine's ability to be an agent.

When addressing design as a system where the participants, the context and the subject play a role, one needs to understand that the new shift is addressing and problematising these positionalities. Understanding the design histories to make sense (Rylander et al., 2022) in this system is relevant.

1.4   *Paradigm shift in service design education*

Service design education comes from the convergence of design and marketing disciplines. It is the result of the progressive maturation of a branch of design, from the craft and studio-based industrial design in the 1980s to interaction design and human-centred design (HCD; Giacomin, 2014), under the influence of marketing and management disciplines (Normann & Ramírez, 1993; Normann, 2001), up to the development of a systemic perspective, matured through design research that includes social (Manzini, 2015), environmental (Ceschin & Gaziulusoy, 2019), organisational (Cooper et al., 2009) and policy-related (Bason, 2014; Buchanan et al., 2017) issues.

This evolution has paved the way for multidisciplinary service design. Budd (2011) comments on the changes in design education from studio-based learning to exponentially-grown tools that designers are now using. It has become impossible to master all the tools the technologies enable. From his perspective, the change is fast, and design education lags. The article, written in 2011, also references the D-school teaching model combining creative, analytical, and collaborative elements. There has been a shift towards ongoing learning technologies.

a   In their article, Meyer and Norman (2020) present major shifts in design education. They focus broadly on HCD. They reference Friedman's (2019) lecture and presentation that proposes that the new context in design is caused by the

challenges that design faces. Meyer and Norman (2020) divide the challenges into four groups: performance challenge focuses on the context of design action, what designers must do and make rather than their skill set.

b Systemic challenges are issues where design addresses large-scale economic, industrial and social frameworks and systems not only parts of them.

c Contextual challenge forces design to address environment, culture and politics and it deals with complex systems.

d Global challenges make us look at the major societal challenges such as Sustainable Development Goals (SDGs).

All these challenges ask for different skill sets, and most probably, designers strengthening their generic skills such as communication, teamwork and learning techniques to address this change. The many critical changes characterising the present historical moment require a deep reflection on the role of design, which should start from the technical, social and cultural grounds underpinning design education. Eggink (2021) proposes a strong interplay between design research and the philosophy of technology in design engineering studies. He presented an idea of the practical turn for applying ethics while teaching the responsible design workshop. The workshop creates a living laboratory for analysing and applying principles of responsible design proposed strongly in the philosophy of technology. He suggested that the practical context helps in understanding and applying philosophy.

The need for a paradigm shift in design education has been discussed by several authors over the years from different disciplinary perspectives (De Parker, 2013; Ranjan, 2010), often focusing on the skills and competencies that new designers should acquire throughout their education (Noweski et al., 2012; Rocha et al., 2018) and the need to change our educational practices accordingly (Adams et al., 2003; Carvalho & Goodyear, 2018). On the other hand, service design education has predominantly emphasised designers as problem solvers. At the same time, the proposition of a new form of societal involvement necessitates that upcoming designers grasp and navigate conflicts, tensions, agonism and complexity (Ehn, Nilsson et al., 2014).

The existing literature discusses the need for a paradigm shift, clearly highlighting the inadequacy of the existing paradigm in addressing emerging problems. However, the authors of this chapter proposed exploring how the need for change has been perceived and metabolised in the practice of service design and service design education. This led to a double investigation—through a workshop with service design educators and many interviews with service design practitioners.

2   Research methods

The research process is based on reflexive dialogical research, in which collaborative dialogue is supplemented with reflexive practice when writing theory (Hibbert et al., 2014). Hibbert et al. (2014) suggest a theory-building stage with pre-research

conceptualisation that includes the latent resources for theory building. As all of the authors of this chapter are service design scholars, it is obvious that there are a number of latent resources. After this, there are emerging theorisations while conducting research. Here are the different phases of the research process: (a) literature review, (b) co-design workshop and (c) expert interviews, all impacting emerging theorisations. Finally, there is a refinement of theory with a larger context. This approach includes both self-reflection and critical reflection through the process (Boyd et al., 2022). The authors had collective discussions throughout the process, combined with notes and article writing (Ripamonti et al., 2016).

The desktop literature review was conducted by searching for the most relevant publications in the field without limiting them to a certain journal or geographical region (Webster & Watson, 2002). One downside of literature reviews is that they are bound by time. The results from one day to another can differ. Affinity diagrams (Lucero, 2015) were used for the workshops and interviews. All three types of data collected aimed to find themes (Clarke & Braun, 2017); a cross-check found themes via method triangulation (Carter et al., 2014). In qualitative research, it is good to consider how the researchers' backgrounds and worldviews can influence the results (Creswell, 2009).

2.1   Co-design workshop

The workshop participants included researchers and educators in service design or related fields, such as experience or interaction design. The 16 participants were heterogeneous, presenting various educational levels, nationalities and universities.

During the workshop, the participants were divided into four groups to discuss three different themes in 15-minute sessions related to the paradigm shift in service design education. One of this chapter's authors facilitated the workshop, and two facilitated the discussion in two groups. The theme proposed to them was *if and how service design education can undertake a paradigm shift to address the complexity and challenges of contemporary society*. A radical change was initially proposed to the participants as a challenge that could lead to a discussion about the deep transformation of the existing system.

The three dimensions for the proposed repositioning were introduced to form the structure of the three workshop sessions. The first theme discussed the positionality of the participants. The second topic focused on service design education. The third theme concentrated on a larger focus on the mechanisms of social interaction or policymaking, which implies a deeper reflection on how to support change and radical transitions in social systems (communities or society). Each group wrote their ideas on Post-it notes during the workshop and placed them on a sheet. There was a five-minute discussion with the whole group after each session, in which each group presented their findings. The Post-it notes were analysed using the affinity diagram method (Lucero, 2015) and divided into themes (Clarke & Braun, 2017) on a Miro board, as shown in Figure 4.1.
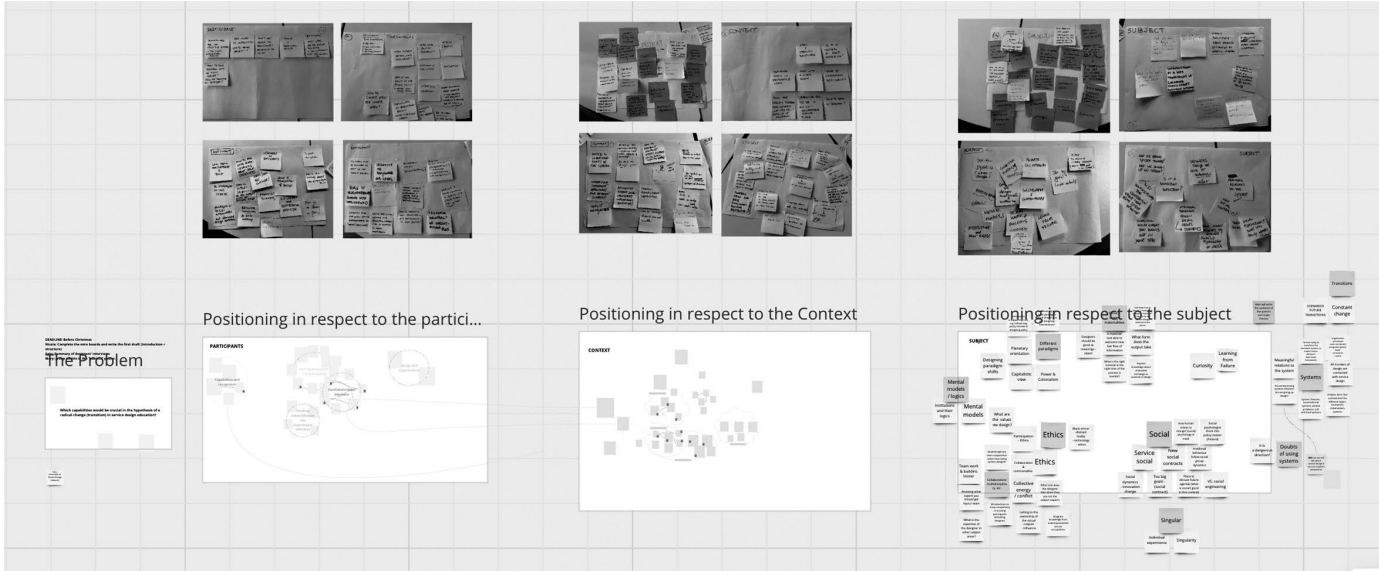
FIGURE 4.1 Clustering themes on a Miro board.

2.2 *Interviews with senior service designers and managers during the Empathy Business project*

For the Empathy Business research project (2023–2024), 20 interviews were conducted with senior service designers and managers during the spring of 2023. These interviews focused on developing digital tools for service designers. The strong focus in the interviews was on developing the future of service design as a practice and investigating the skill sets needed by the service designers and the topics that the service designers deal with in their daily work (Miettinen et al., 2024). There has been a significant change in working life since COVID-19. The post-COVID working life is more digitalised, and distributed online work has become part of daily life (Vyas, 2022). These requirements and jump in digitalisation outline the tools needed for service design.

The interviews had a pre-set of questions focusing on several clusters of different topics: service designers' workflow with digital tools and description of needs for these, questions of sustainability in designers' work and more strategic role of service design and its impacts. This created a structure for the interviews. The interviewer left sufficient room for the interviewee's intuition and experience and respected the choice of topics that the interviewee wanted to discuss. This set the tone of the interviews.

The interviewees represented a group of designers in Europe, Latin America and Asia. They could be categorised into three groups

a   working as a senior in-house designer in a major corporation,
b   working as a senior or partner in a medium-sized design consultancy, and
c   working as a senior designer in a small design consultancy.

The recorded interviews were analysed using the affinity diagram method (Lucero, 2015) and thematic analysis (Clarke & Braun, 2017); handwritten notes were made directly after the interviews. The interview recordings were transcribed with the help of AI. After this, the interviewers produced affinity diagram notes that were exported to a Miro board. The notes included key findings from the interviews. The research group worked collectively to categorise and cluster the notes and create an affinity diagram. Figure 4.2 shows the rounds of analysis of the interviews.

3 Findings

3.1 *Literature review*

We learned from the literature that service design education has a strong user-centred tradition. Still, in practice, when working on a participatory service design project, the subject is often a community (Meroni, 2007) and a "larger system of actors," such as ecosystems (Vink et al., 2017).

1. Clustering data on Miro board
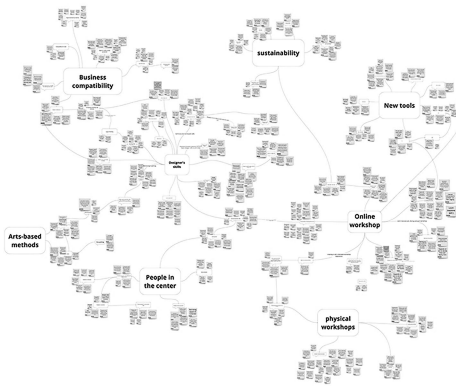
2. Cleaned data on Miro board
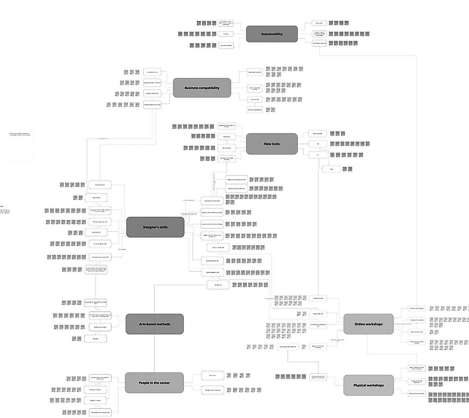
3. Research questions and PoC ideas

FIGURE 4.2 Affinity diagram on the Miro board used to analyse the interviews (Image credit: Satu Miettinen).

A combination of service design and "transition design" (Suoheimo, 2020) has been considered a relevant aspect of systemic opening design education. This discussion introduces the perspective of a "paradigm shift" that overturns the supporting role that design has had so far to a capitalistic view and forms of economic, social and cultural power. This paradigmatic change originates from a critical perspective on the idea of the designer as part of the problems caused by the climate crisis and globalisation (Morelli, 2012), and it becomes more weighty and urgent with the actions of the movements for the decolonisation of design (Smith et al., 2020).

Ethical issues that deal with the power dynamics and responsibilities of the designers arise. Working in collaboration with others also requires a deep understanding of "ethical issues" that may emerge, especially when considering perspectives such as feminist or decolonising thinking or the inclusion of disadvantaged groups. In this landscape, service design education should reposition itself in the new "decolonial and pluriversal context" (e.g. by recognising cultural plurality) (Duan et al., 2021; Seppälä et al., 2021). This is particularly urgent in light of the diffusion of service design education to countries and cultures, where the present sociotechnical paradigm, based on the dominance of Western culture, is revealing all its weaknesses (Duan, 2024). Scholars in the Global South have proposed a paradigm change to address inequality and to propose plurality for some time (Mignolo, 2009; Tejeda, Espinoza, & Gutierrez, 2003).

3.1.1 Workshop findings

The input for the first discussion session focused on participants (i.e. the people interacting with service design education) and the shift of the designer's role and the role of education from an *outsider* to an *insider* and co-participant position. The participants' discussion highlighted different issues summarised in the following subparagraphs.

3.1.2 Positioning with respect to the participant

The new role designers can have as *insiders* when working with communities or in public services implies that service design education also stresses the need to respect the people in their context, avoiding any extractive approach but learning how to facilitate interaction dynamics. This means that service designers are recommended to:

Focus on communities rather than individual "users" or "citizens": The workshop confirmed the need for a radical shift from a user-centred perspective to a community-related one. The participants discussed many of the issues related to this shift, including the need for a different way to "enter" the community, to consider them as partners instead of a source of information, and consequently to consider not only what the students can get from the community but also what they

can give back. Issues related to power relationships have been stressed as very relevant, especially in disadvantaged social contexts.

Consider the different competencies of the participants: When working among people, different competencies play a role. Some people will contribute highly specialised knowledge, and others will have expertise in managing their practices, traditions, and ways of doing and interacting with each other. The competencies a design education can offer (and simultaneously acquire by working in this context) concern both hard technical skills and soft skills, such as mediation, facilitation, trust building and critical thinking.

Ensure neutral facilitation: Issues emerge concerning the position of the facilitator, which may be external to the system (as an outsider) or embedded in it, and, with respect to those positions, it would also be essential to discuss the need for the facilitator to be neutral with respect to the issues to work on. The facilitator should also be able to consider different perspectives and highlight differences in participants' thinking and practices, not necessarily seeking opposition but considering the differences. Working in collaboration with others also requires a deep understanding of "ethical issues" that may emerge, especially when considering perspectives such as feminist or decolonising thinking or the inclusion of disadvantaged groups.

3.1.3   Positioning with respect to the context

The second session of the discussion dealt with the context in which service design education operates now and should/could operate in the future, moving the focus from problem solving and local solutions to systemic change. Service design education should consider the complexity of this scale of action. Therefore, the following themes were identified:

The context as a system: Different aspects of this condition have been discussed. They include an approach to wicked problems and the student's capability to consider or recognise the need for actions at different levels, from individual behaviours to small social groups (micro-scale) to infrastructure and policy systems (meso scale) and large cultural landscapes (macro-scale).

Evaluating the effects of design action: It is crucial and requires understanding different system components and figuring out elements for a quantitative or qualitative evaluation.

Teaching complexity and building the necessary capabilities: education should support students in making sense of complexity without overwhelming them. Students should be able to deal with uncertainty, for instance, by addressing the different system levels (structures, behaviours, etc.) separately.

Understanding power dynamics: It means recognising and possibly addressing the inevitable asymmetries and vulnerabilities that emerge in a participatory context. One group of participants discussed the need for design education to *be invited* into the context rather than proposing interaction with local citizens as a mere source of information.

3.1.4   *Positioning with respect to the subject*

The last session of the workshop dealt with the subject, or the *material,* of design action (Blomkvist, 2014), which, in service design, is shifting from the interaction between services and their users to the mechanisms of social interaction, the structure of public services and support for policymaking. Therefore, the discussion focused on supporting change and radical transitions in social systems (communities or society).

The shift towards a "system approach" has been discussed from different perspectives. On one hand, it has been observed that service design's domain (the *material* it manipulates) has expanded and is now covering all orders of design (Buchanan, 1992) and will, therefore, require service designers to learn how to orchestrate systemic components. On the other hand, the limits to service designers becoming system thinkers have been discussed—whether this expansion is going towards a different professional domain and, therefore a substantially different education.

One significant topic covered was the "social value" implied in the direct interaction of design education in real contexts. In particular, a need emerged to recognise the systemic results of social interactions as different and noncomparable with the sum of individual experiences of a service.

The contribution of service design to "transitions" has been considered a relevant aspect of the systemic opening that design education should face. This discussion introduces the perspective of a "paradigm shift" that overturns the supporting role that design has had so far to a capitalistic view and forms of economic, social and cultural power. This paradigmatic change originates from a critical perspective on the idea of the designer as part of the problems caused by the climate crisis and globalisation, instead of being part of the problem solution (Morelli, 2012).

3.2   *Interview findings*

The roles and job descriptions of service designers have become more varied. Designers need a very "broad spectrum of generic skills." This can also mean having a strong foundation in mathematics, engineering and history. Mathematical skills are very handy when making sense of probabilities and the scale of things and understanding the business side of services. Engineering skills facilitate the building of different prototypes and demos at the very core of digital service design.

Having a broad spectrum of skills makes it possible to operate as an agent in the design system and to analyse this front from a "holistic view." Service designers are crossing organisational boundaries and working in multidisciplinary teams that address "political topics" and need even to understand different legislation. The workload is distributed in international organisations, and information needs to be sourced from different channels. It seems evident that designers need to understand the world holistically and have strong analytic abilities to make sense of it. They

must be able to use tools such as mapping to analyse "relationships and interactions between different systems." This proposes that designers utilise design to analyse the world and understand what kinds of systems exist and how they interact.

The paradigm for "sustainable change" proposes that designers need sustainability tools and understanding. Tools are needed to help the designer evaluate what is sustainable. There is a call for sustainability and responsibility in strategic service design. For example, one must consider the need for travel and the use of resources. Sustainable development should be at the core of the service designers' toolkit. There must be a wide understanding of sustainability and what must be considered according to all 17 SDGs of the United Nations Department of Economic and Social Affairs (UN DESA, 2023). Designers' specific competence is to understand the product life cycle and the idea of circularity. An important aspect of sustainability is the social aspect and wellbeing of employees. Designers must understand the discourses and terms prevalent in "business" and have "strategic leadership and planning skills." The more designers work in management positions, the more they need to understand companies' processes, goals and strategies. Design managers can see a holistic view of the business. The strategic management process is not the same as the service design process. Designers must have strategic thinking, management and business modelling skills. There is a need for learning strategic business language and embedding it into design studies. When designers have strategic thinking skills, it is easier to imagine possible futures, understand goals (of the company, customers and service) and map ways to get there. Of course, strong service design skills increase the ability to evaluate service access, review services and understand how they bring value to customers and the company.

4   Discussion

Similar themes found in the data collection are summarised in Table 4.1. The contribution of service design to "transitions" has been considered a relevant aspect of the systemic opening that design education should face. This discussion introduces the perspective of a "paradigm shift" that overturns the supporting role that design has had so far to a capitalistic view and forms of economic, social and cultural power. This paradigmatic change originates from a critical perspective on the idea of the designer as part of the problems caused by the climate crisis and globalisation (Morelli, 2012), and it becomes weightier and more urgent with the actions of the movements for the "decolonisation of design" (Smith et al., 2020).

The workshops and interviews discussed in this paper present two perspectives relevant to service design education. These two perspectives describe the capabilities of service design education inside and outside the existing paradigm. While the interviews focused mainly on designers and practitioners working in the private sector, many workshop participants were instead researchers working in the public

TABLE 4.1 Similar themes found in different data collections

Literature review	Workshop	Interviews
Transitions	Transitions	Strategic skills
Ethical issues	Ethical issues	Sustainable change
	Understanding power dynamics	Political topics
	The context as a system/Evaluating the effects of design action	
	Ensure neutral facilitation	
	Consider the different competences of the participants	
Larger system of actors	System approach	Relationships and interactions between different systems
	Teach complexity and build the necessary capabilities	
		Holistic view
Decolonial and pluriversal context	Focus on communities rather than individual "users" or "citizens"	
	Social value	
Paradigm shift	Paradigm shift	
		Business
		Broad spectrum of skills, generic skills

sector or with a specific focus on social innovation. Interviews, workshops and literature reviews highlight the "systemic aspects" as an urgent topic to address in service design education. Still, in the interviews, the practitioners highlighted operational and organisational issues related to the present paradigmatic framework, thus suggesting an expansion and improvement of the paradigm for design education to include "business, organisational and strategic" aspects (and many design educations are already addressing this issue).

An extended view beyond the existing paradigmatic conditions for service design education would highlight issues that the existing methodological approach in service design education may not be able to address. Furthermore, the domain of service design overlaps and merges with "systemic design, policy design and social innovation," and it is impossible to define one specific or "pure" set of competencies related to service design, since the different perspectives are all connected. This was also suggested by the multiple paradigms or logics noted in the workshop's Post-its, confirming that working with complex problems and systems requires a more "holistic approach," which could include "multiple paradigms" and "epistemologies" (Midgley, 2000).

The radical and complex nature of the transition makes it hard to describe a theory of change in the practice of service design and service design education. However, the interviews and the workshop tried to highlight the directions for a change towards a systemic transition.

In both cases, service design must define a solid set of skills and capabilities to work on a systemic view of the context and content of the action. The material or the context for design action moves "from interactions to (sociotechnical) systems" (Ceschin & Gaziulusoy, 2019; Rylander & Eneberg, 2023). On the other hand, defining a direction requires a stronger capability of designers to read and understand how sociotechnical systems capture or facilitate the emergence of the most desirable directions from different social instances, expressed by the diversity of stakeholders, practices, cultures and economic conditions present in a context. The work service designers are requested to do for the participants is related to a view of the system not as a uniform material but as a "heterogeneous and pluriverse entity," in which the definition of the directions of change is often controversial and cannot ignore the cultural, social and economic differences that all the participants are bringing in. Compared to the workshop, the interviews emphasised the business knowledge of service design more.

A clear indication of a new *praxis* for service designers concerns the role and action of service designers in systemic processes of change. In this process, the role of designers can no longer be to generate solutions, but rather to facilitate a co-creation process. Design education should consider alternating project-based activities (i.e. controlled processes with a well-defined brief, a defined process timing and a "finished" solution) with open-ended activities in which the design students learn how to facilitate, provoke or trigger processes of change that escape from the designer's control (Hillgren et al., 2011). This could even imply a different organisation of service design education, as open-ended work would challenge the traditional project-based structure of many programmes or even the semester-based time structure. While this change may exceed the adaptability of several education systems, it may also suggest a new interaction within service design education, which establishes continuous interaction between design education and a "social context" (Fassi & Manzini, 2022; Thorpe & Rhodes, 2018).

Our findings go in part hand in hand with the proposed changes by Meyer and Norman (2020) and Friedman's (2019) lecture for design education that stresses the need for understanding performance that could be understood as business skills, systems, the contextual challenges and global challenges as part of the systems; some systems are global, such as sustainability in supply chain management services.

We recognise this study's limitations and how, for example, we could have selected other themes discussed in the workshop. We used the lens of participant, context and subject and understood that using others could lead to other results. In addition, other data collection methods could yield different outcomes.

5   Conclusion

In its maturation, service design thinking has expanded its complexity, thus including different or sometimes even divergent directions. The results of the workshop and the interviews show that service design thinking is still exploring areas of interest in the existing sociotechnical paradigm. At the same time, it is contemplating

the possibility of working outside this paradigm and exploring areas not fully explored by service design, even though they are the common ground of research for other disciplines, such as social science, anthropology and cultural studies. This could lead to embracing more paradigm incommensurability and using multiple paradigms to have a better and more holistic view of the challenge at hand.

From a systemic view, service design can be investigated as a design system. This helps us understand how to develop design education, and the interviews shed light on this. We recognise that it would require more investigation into what kind of service design system is. Positionality can also help analyse different systemic stances that are complex and plural; this complexity creates pressure for education to keep up with the speed of transformation and change.

This means that there are different avenues for the evolution of service design capabilities, and they may not necessarily belong to a unified profile of service designers. The complexity of the service design discipline has possibly matured to a point that needs a different articulation of competencies, including a critical review of the existing framework for service design education.

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5

DANCING WITH POWER DYNAMICS INSIDE SYSTEMIC SERVICE DESIGN PROJECTS

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1   Introduction

Service designers are known for running workshops or using other participatory methods to elicit insights and develop proposals from the perspectives of actors involved. Often the situations of making such facilitation may create tensions or reveal power dynamics between the actors. The actors can be both human (direct participants) and non-human (organisations, software) and they can hold different values, goals and aims that can be a basis for a conflict of power and decision. One needs to also recognise the power imbalance between the actors as some may have different hierarchical roles when working together. For example, an employee may be restrained from freely expressing ideas if engaging with managers or clients.

It can be a wicked problem even to define a problem (Rittel & Webber, 1973), as the definition necessarily is a reduction of other possibilities rendered inaccessible after the definition. Thus, it is an issue of some complexity to find and allow the "right" stakeholders to define what the essential problem is. Not acknowledging certain actors may lead to unwanted consequences for those not present in the early negotiations or participatory design of new services. The discussion of power in service design has origins in organisational relations, especially in information systems, such as Bloomfield and Best (1992) and from participatory design, such Bodker (1996) and Asaro (2000). We reference later work from Hay et al. (2023) via Bronfenbrenner's (1979) ecological systems theory. The tools of stakeholder mapping are employed to facilitate development of practical knowledge of the actors in the social ecology. This chapter also reflects on the nested levels of the socioecological model, and reveals the roles and types of collaboration or participation between service designers and other disciplines.

Ecological systems theory can serve as a tool for service designers to discuss the participation of diverse actors, the power balance between them and what kind of collaboration can be expected between the actors during the design processes as they are all interconnected. We are specifically interested in understanding how (service) designers experience power relations, with the following research question: How do service designers experience power on the different ecological systems levels, throughout their career?

Using the socioecological systems model from Bronfenbrenner, our initial assumptions were that service designers will likely report power issues at micro-level activities, since much of the service design facilitation is conducted via workshops and talking with people or observing the end-users. However, there has been more academic literature on questioning the positioning of the service design discipline on handling wider societal problems and thus opening the focus (e.g. Suoheimo, 2020; e.g. Vink, 2019).

This chapter further explains how we can understand power through structuralism, by considering social and political sciences theories as well. It is critical to share an understanding of power from fields that have studied power dynamics much longer than in design. Hay et al. (2023) suggest that the understanding of power in service design is a research gap in the current scholarly literature. We will continue to look at the ecological systems theory and how this framework can help us to understand what power is and how it is experienced in the nested socioecological systems levels that are commonly defined as individual, micro, meso, exo, macro and chrono systems. This chapter opens the "service design" perspective and how it works in a participatory manner to include the users and stakeholders. This is one of the reasons service designers come across different power structures in their work.

We further present the results of focus groups conducted in the workshop format with service design professionals, to learn how they have experienced power in their career. We show via stakeholder mapping and ecological systems theory, the possibility of identifying the actors and what kind of collaboration, multi-, cross- or transdisciplinary, would be useful for the challenge at hand. The implications and impact of the study will be discussed in the discussion of this chapter. Our study contributes to service design but also other fields that handle power relations and work in a participatory manner.

2   Theoretical framework

2.1   *Understanding power*

Discussing power dynamics is never easy, partly because it is a contested term, and there is no general consensus of its definition. In the most basic terms, power is "the production of causal effects" (Scott, 2001). This idea of power as causality is intrinsically linked to human agency, where human action produces causal effects

(Giddens, 1982). As suggested by the framework adapted from socioecological theory, power dynamics affect individuals on different levels. This sentiment is mirrored by Foucault (1982, p. 778), who states that "while the human subject is placed in relations of production and of signification, he is equally placed in power relations which are very complex". However, analytically, most dynamics of power relations can be analysed in terms of the principal, or the paramount agent, and the subaltern, the subordinate (Scott, 2001).

The debate surrounding power has sparked several typologies and ways to analyse and define power. Among two of the most influential theorists are Michel Foucault and Steven Lukes, who have both presented their own ways of understanding how humans interact in power-relations with each other. This paper draws on both theorists simultaneously – taken together, both scholars provide a strong basis from where to analyse power dynamics in service design. An important premise of this discussion is that we assume the agents have a degree of autonomy and the ability to choose among alternative courses of action. While external factors play a role in shaping the outcomes of this choice, they do not determine them (Scott, 2001).

Lukes (1974) outlined a three-dimensional view of power. The first, the one-dimensional view borrowed from Robert Dahl, is often seen as an "intuitive idea of power", where "A has power over B to the extent that he can get B to do something that B would not otherwise do" (Dahl, 1957, p. 203). While this can either refer to the *potential* of A to exert this sort of power, or the *actual* ability to do so, the core tenet is that A has some form of control over the actions of B, and that a potential necessary condition for the use of power is a certain level of disagreement of preferences between the actors. Common for this dimension of power is then that it is essentially direct and *observable*, which makes the first dimension of power mainly concerned with decision-making. The ones who succeed and prevail in decision-making processes can then be said to have more power than those who do not (Lukes, 1974).

Not surprisingly, Dahl's limited conceptualisation of power has been criticised for being too sparse or limited (Baldwin, 2015). Consequently, Lukes concurred that having one dimension of power was not enough. Building on the work of Bachrach and Baratz (1970), the second dimension of power is more focused on the existing set of beliefs, norms, values and institutional procedures which only benefit some people at the expense of others (Bachrach & Baratz, 1970; Lukes, 1974). Compared to the first dimension, which was mainly concerned with decision-making, the second dimension focuses on *non-decision making*. These are the suggestions and demands for change which are never voices as they are kept away from the decision-making arena. In other words, A has power over B when A can prevent B from doing something B otherwise would have done, for instance by controlling the parameters of a discussion or "preventing an issue from coming to the point of decision" (Scott, 2001, p. 8). Thus, while the first face of power was focused on decision-making of actual issues, the second face is more concerned with *potential* issues.

A common critique to both the first and second dimensions of power is their focus on actual behaviour and actual human actions. But as stated by Lukes, both dimensions revolve around situations of conflict, and it is "highly unsatisfactory to suppose that power is only exercised in situations of such conflict" (Lukes, 1974, p. 27). As a result, the third face of power, often referred to as *invisible power*, are instances where A exercises power over B by influencing and shaping B's wants and desires. Such influence removes the likelihood of conflict occurring, as it creates a shared understanding of goals and preferences by affecting the structure in which decisions and choices are made (Scott, 2001). Taken together, in all dimensions of power, the power of A lies in being able to restrict the opportunities of the subaltern to make a choice, either through force or manipulation, or through a more subtle influence.

Another point Lukes stressed in his work, which was also highlighted by Foucault, was that power dynamics between principals and subalterns have to be seen in relation to the potential resistance of the subaltern to the power of the principal. In other words, the subaltern has to be able to exercise resistance (Foucault, 1982; Lukes, 1974; Scott, 2001). However, for Lukes, power was often understood as an ability. For Foucault, to understand power, one has to understand the relations between the actors. As stressed by Foucault (1976), individuals operate in "discursive formations" which determine their actions and desires. Language, then, becomes a way of expressing power.

> It is a question of what *governs* statements, and the way in which they govern each other so as to constitute a set of propositions which are scientifically acceptable, and hence capable of being verified or falsified by scientific procedures.
> *(Foucault, 1980, p. 112)*

This goes to show that power is not something that exists independent of the actors, it is something that is created in the actors' interactions with each other.

While Foucault did not focus on formal organisations, his impact has been felt in the study of organisations as well, as power relations permeate our lives (Raffnsøe et al., 2017). Power interactions often take place within formal institutions and organisations, which creates networks of participation and power relations, both visible and invisible (Gärtner & Wagner, 1996). While these relations could be understood, in the sense of Lukes, as a hierarchy, they can also be understood as relational networks which are created as a result of interactions between the relevant actors. We understand both as relevant, to gain full insight into the power dimensions of service design.

2.2   The social ecosystem of power relations

There are several social science theories of power applicable to the dynamics of design cocreation. These can be described at different layers or boundaries of social

systems. One of the largest bodies of power theory in organisations is developed from Giddens structuration theory (Giddens, 1982), which can be seen as the formation of sites of agency and structures within the organisational ecology. There are many levels of organisational systems informed by power relations, including strategic management, organisational structure and dynamics, formal roles and positionality, workplace culture, and organisational values (e.g. Jones, 2002).

Service design involves cocreation engagements among multiple contributing participants, involving design and decisions for service implementations that may affect millions of users over time. Organised social practices such as service design, and the service configurations created by service design implementation, suggest several systems theories that further enable the mapping of power relations, providing feedback to system participants, and discovering opportunities for intervention. Actor-Network Theory (ANT) (Latour, 2007) has been employed for mapping and organisational-level analyses, such as Clegg and Cunha (2019) for organisational management. While ANT does not have a canonical mapping representation, the inquiry approach offers a vital precedent and is similar in positive ways to bioecological systems theory. Jones (2000) used structurational analysis of organisational practices and mapped systems models of activity theory, mapped organisational roles and relationships in innovation practice, to trace the networks of power observed in values conflicts between occupational communities and how the resolution of values conflict affected participation.

The current study employed the model of the Bronfenbrenner (1979) bioecological system theory, using the structure of the model and its essential system domains as indicators for identifying experiences in the study. Figure 5.1 shows a representation of the model used in the study presentation.

Ecological systems model (ESM) is concerned with the interaction and interdependence of individuals within their surrounding social ecosystems. Bronfenbrenner (1979) developed the theory as a developmental psychology model, to describe the social complexity faced by children as they learn to interact in a society and navigate the different social domains, expressed as nested "layers", micro-, meso-, exo-, macro- and chrono-system levels. Within the layers, individual development is expressed through interaction with people and institutions at each level, evolving an interdependence between individuals and their social ecosystem over time. The model components of the nested social ecological layers were primarily used. The contextual concepts of processes, persons, context and time (PPCT) were used analytically to define activities within the service design domain.

The social ecosystem levels expand structurally from relationships of environments shaped by complex social institutions, from micro to macro. The levels can be defined as follows. The microsystem is the first layer, which is the "starting point" of the growing child and their learning processes in the classical developmental application of the model. Here it refers to the most immediate environment in which individuals interact on an everyday basis, such as children with parents and siblings, friends and individuals within a close neighbourhood setting.
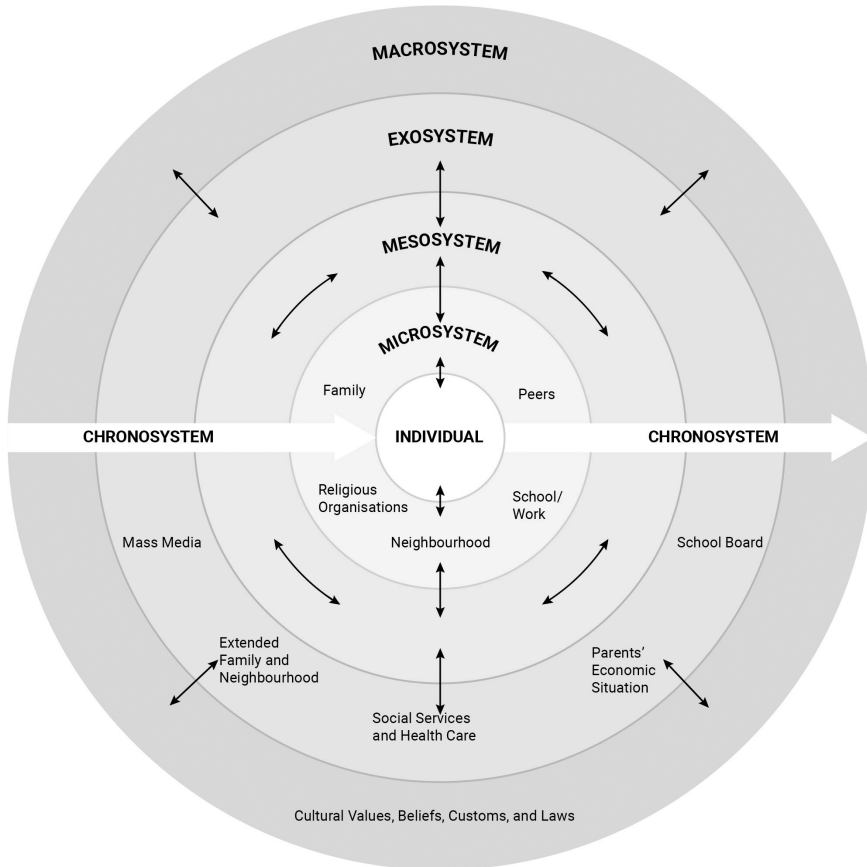
FIGURE 5.1 Layers in a bioecological system, as presented to participants (adapted from Bronfenbrenner (1979)).

This microsystem layer can be seen to have the greatest impact on individuals, as it has the most influence over time. For example, the child's behaviour and morality are influenced by their parents and vice versa. For service designers, the immediate microsystem environment might be their co-workers and managers, but in a real sense remains the social ecology of their closest relationships.

The second layer is the mesosystem, which differs structurally from the microsystem. It is not the direct and immediate environment but rather the linkage between the different settings in the microsystem. For example, the emergence of connections between children's parents and the school, and the school and communications from the city. In the context of the service designing process, the mesosystem might define the relationship of the users to the service provider setting.

The third layer is the exosystem, which refers to the interaction between different systems that causes an indirect influence. For instance, parents (i.e. microsystem),

from time to time, receive some pressure from their work (i.e. exosystem), for example, working late or changing assignments. And this pressure may indirectly impact children (i.e. individuals in the development path) that they are not part of at all. In the case of service design, all participants come from different professionals working together; their participation and contribution may be influenced by the organisations they represent. Within this context, the design process can be shaped by this external system in practice.

The last layer in Bronfenbrenner (1979) is defined as the macrosystem, which encompasses the whole "society" in which people develop and participate, inclusive of their culture, national and indigenous customs, shared beliefs about the society, social norms, and accepted ideologies. Those broader systems within the macrosystem influence individuals (e.g. the children) by infiltrating all the layers, such as exosystem, mesosystem and microsystem (Barbra, 2022). The macrosystem may also implicitly influence the service designers' preferences at some point in practice as everyone comes from a different background in culture or worldview.

Besides those four different systems, the bioecological system theory also incorporates the role of time in shaping an individual's development. This ultimate layer of the ecosystem is called the chronosystem. It emphasises that individuals may encounter various challenges or opportunities which can shape their development. Development can take place over a lifetime, over a period for the model's use, or for a case study, such as in this case, where a designer's professional development can be self-recognised in service design from junior designer to an experienced, multiskilled expert.

In summary, ecological system theory provides us with valuable criteria for understanding the complex relationship between individuals and their internal and/or external environments. The individual's relationship not only is dynamic but also often tangles with different layers. And each layer involves different people and reflects different entanglements. Referring to Foucault's understanding, the relationship can be translated as an individual's development linked with different agents and powers. With the understanding of Dellve and Eriksson (2017), ESM can also bring healthy and sustainable psychosocial work conditions for leadership programs like service design. This explains why this paper employs theoretical frameworks for both power and social system development.

2.3   Participatory service sesign

There are several well-developed perspectives in service design (Suoheimo et al., 2023). The perspective that we base our research on is "service design" the way it has sprung from cognitive psychology and interaction design (Rytilahti et al., 2015). It is a designerly way of understanding and researching service design. The use of service blueprints in marketing is much older than service design as an academic discipline (e.g. Shostack, 1982). We also recognise how in the marketing research there has been a shift from goods-dominant logic to service dominant

logic (Vargo & Lusch, 2004). Value is no longer defined in plain products, but it is cocreated with different actors, and always including the beneficiary (Vargo & Lusch, 2004, 2016).

Stickdorn et al. (2011) has defined five common principles of service design that were later updated by Penin (2018): (1) place the user in the centre of the project, (2) use participatory and co-design principles, (3) service narratives, (4) evidence what is not visible to eye, or sequencing in other words, and (5) work holistically. In some recent systemic design approaches, the focus on user-centeredness has been questioned, since the anthropocentric view of the latest decades has not been the most beneficial for the planet, thus planet-centric views are currently under investigation (Design Council, 2021). The aim is to design socially and ecologically sustainable solutions.

Often a service design process as a work begins by stakeholder or ecosystem mapping to make sure that the right users and stakeholders will be included in the development process (Suoheimo et al., 2023). Service designers have a role to be a facilitator in the process and bringing the users' and multiple actors' interests on the project (Pyykkö et al., 2021; Suoheimo, 2020). The work can be diplomatic and requires a certain humbleness as service designers need to mediate between different partners (Suoheimo & Miettinen, 2018).

We find that power in service design remains an under-researched theme (Hay et al., 2023). Service designers are in a position of power in their work with clients and stakeholders, as well as within their own practices. Several recent publications (e.g. Fitzpatrick et al., 2024; Hay et al., 2023) discuss theories and practices to inform how individual service designers could be self-reflexive about power relations. Previously Sangiorgi (2011, p. 29) has appointed designers the need "to introduce reflexivity into their work to address power and control issues in each design encounter". The bioecological systems approach was used as an aid to reflexivity to explore power in service design and to explain the service design practitioner's inaction to address power dynamics.

3   Research method

In February 2024, we conducted four participatory focus groups with academic design leaders and service design practitioners to broaden the perspective of designers' roles in various contexts. Our aim was to gain a deeper understanding of participants' experiences, specifically aiming to gain insights into their career trajectories and how they have navigated power dynamics at various ecological levels within their professional contexts. This type of qualitative data collection allows us to reveal the nuances while presenting and discussing thoughts.

We selected focus groups since our goal was to capture multiple perspectives and allow participants to listen to one another, which could possibly stimulate an individual's memory and ideas, leading to richer data. This method can also help participants clarify their own thoughts in the context of a group discussion,

thereby enhancing group interaction and revealing contradictions in points of view, which are priceless for understanding the complexity of experiences (Grønkjær et al., 2011).

There were 15 participants in total in the four focus groups. In total, approximately 73% identified themselves as *female*, 20% as *male* and 7% as *other*. There was a wide age range among the participants, from 28 to 60 years old, with an average age of approximately 44 years. Experience levels also varied, ranging from 4 to over 20 years. The group was diverse in terms of nationalities, with four participants from Finland and one each from Canada, Puerto Rico, Mexico, Argentina, Brazil, Iran, Denmark, Estonia, Great Britain, Germany and Italy.

The data reveal that many designers are skilled in more than one area, as the total number of disciplines practised exceeds the number of participants. In this study, *service design* was a prominent strength, with 60% of participants identifying this as their area of expertise. A smaller proportion, ~47% of participants, set their strength in each *UI/UX design*, and *other*. *Strategic design* was highlighted by ~34% of participants. Other skills mentioned were *industrial design, graphic design*, *systems-oriented design* and *social design*. In terms of education level, ten participants held master's degrees, while five held doctoral degrees. The gathered data in focus groups consists of five hours of video, transcribed audio, material produced on a Miro whiteboard such as sticky notes, notes and observations made by the researchers.

The focus groups had an icebreaker activity and then explained to the participants what the ecological systems theory was with practical examples. There were also discussions about what power is and how it can be understood. After the first focus group, there was added a video that explains some basic theories of power. After this the participants were asked to join a Miro board where they wrote personal experiences on sticky notes and placed them in a template of ecological systems theory (Figure 5.2). The sticky notes were colour coded as red for negative power experiences, yellow for positive power experiences and blue for neutral power experiences. Participants had 15 minutes to fill in the notes and after it each one had time to talk about their notes and share their experiences with each other which led to conversations among the participants. We recognised that there was data saturation after the third and fourth focus group.

To analyse the collected data, we created a new Miro board where we brought all the focus group results in one place (Figure 5.3). We used thematic analysis to group the themes that we found in common in different layers of the ESM. Three authors of this chapter made the analysis and discussed the results among themselves to see if the interpretation of themes was understood similarly among the authors, thus also applying investigator triangulation (Denzin, 1978). There were several topics such as gender issues, diversity in professions and teams, trust, hierarchies and, psychological safety, among others. We further discussed these topics and saw that we could group them under three major themes: hierarchies, diversity and communication. We will open these larger themes in the next section.
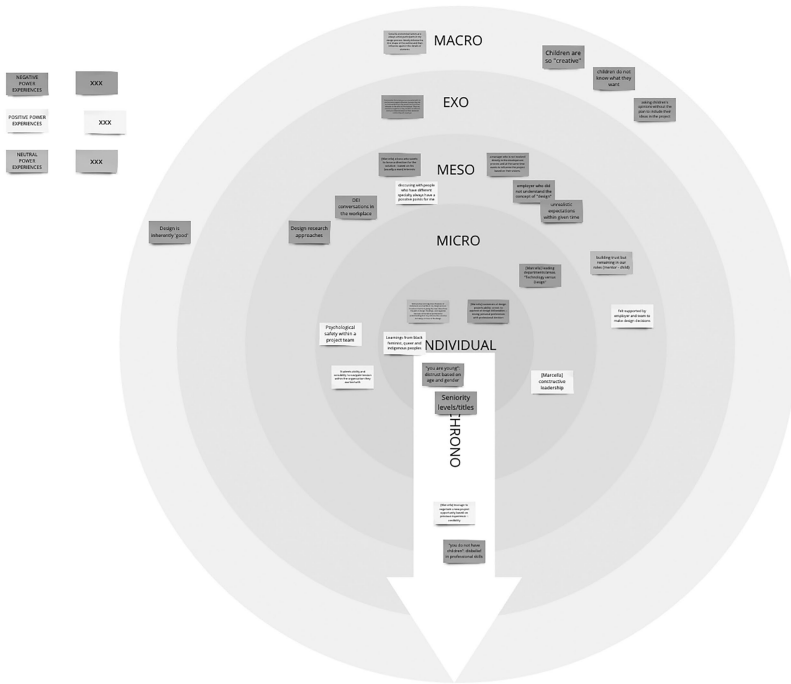
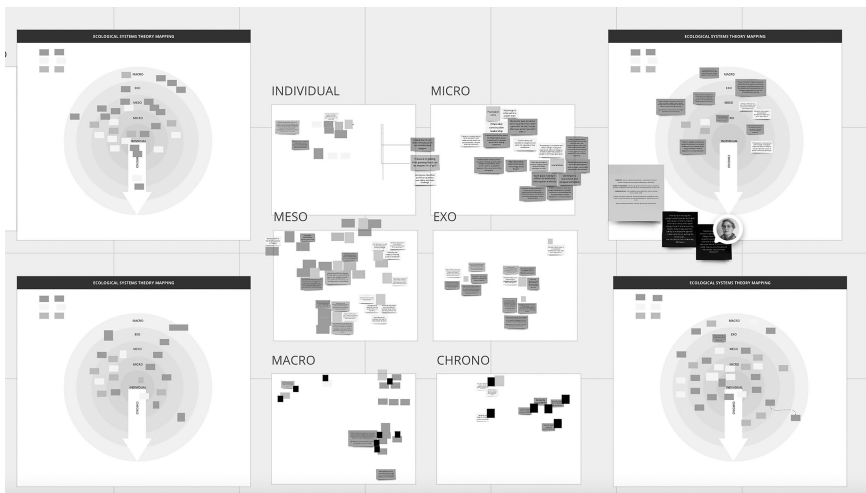**FIGURE 5.2** Structure example of the sticky notes filled by the participants in one of the focus groups.

FIGURE 5.3 Analysing sticky notes and grouping them into different themes in a Miro board.

4 Findings

4.1 *Hierarchies*

A recurring theme across all ecological levels is that of hierarchy. This theme overlaps and entangles with communication and diversity themes and sometimes poses a challenge to isolate it. Nonetheless, the theme of hierarchies, as a structure found in power relations, is evident in our analysis through aspects such as authority, titles and finance. Hierarchy thereby influences decision-making processes, among other issues.

In our study, hierarchy refers to addressing different levels of authority both in the academic environment and business field. It influences the structure and relationship within the organisation. Participants predominantly posted negative sticky notes about their micro-level experiences with hierarchical structures within academia, for example: "I went to a design school for my MA where there was a big hierarchy and program director also used their power position", or "during my bachelors in architecture (in Puerto Rico) I experienced the authoritative or hierarchical opinion and control of our architect/professors into our academic work". Such an approach can significantly impact the behaviour of an individual, as one of the sticky note claims: "Finding it difficult to defend my ideas against authority".

In a professional field, we can notice that authority is present while speaking about the position of designers. Participants expressed their frustration with design being perceived as a less valuable discipline: "As designers, and not scientists in the group, I really felt that our work was absolutely undervalued" (P7). This attitude reflects the hierarchical power dynamics that exist between designers and the tech department, who often have the final say in decisions, as one of the sticky notes: "Those who possess the data, information, or knowledge have much power. They can be seen as "technological gatekeepers". However, one participant observed a contrasting trend, being a designer and assuming more responsibility in a project. The designer in this scenario was not only perceived as the project leader but also actively placed in a position of authority, particularly when it came to communicating about the project.

In the realm of business, participants also described the authority dynamics between the teams and managers who are not directly engaged in the hands-on development or execution of a project, however, force their concepts influencing the decision making process, as we can read on some of the sticky notes in meso level: "a manager who is not involved directly in the development process and at the same time wants to influence the project based on their visions", or "a boss who wants to force a direction for the solution - based on his (usually a man) interests". Therefore, we can see that participants highlighted the significance of "constructive leadership" in ensuring a balanced consideration of everyone's perspectives that fosters "settings in which a power is a conversation: distribution of tasks, roles, etc. is taken care of".

Such a hierarchy, influencing the decision-making process, is also evident in conducting research. The process covers the aspect of selecting the criteria for inviting collaborators, and the methods used to interpret collected data. One participant (P15) highlighted the inherent biases we carry, admitting "It's hard to remain objective". Also, in workshops or participatory settings, facilitators play a crucial role in ensuring a balanced dialogue, as "participants with stronger voices might monopolise discussions". Therefore, one participant (P12) emphasised the need for awareness and critical reflection:

> Many designer's research approaches miss the power perspective and how the power that designer or the design team has over the research and how we look at research on many occasions. Who we decide to invite to the table, how we interpret the insights, how we make decisions.

In both academia and the business, hierarchical power often correlates with years of experience in the field. As we have already mentioned, program directors and teachers typically hold superior positions due to their extensive experience. Similarly, in the business field, age is frequently equated with experience, lending credibility to those who have been in their profession for a longer time. As one participant (P13) observed: "After years of working as a designer, I feel quite 'powerful' now, until I'm again in the 'wrong age'". The "wrong age" imbalance was also expressed by other participants who noted the age discrimination such as being old one is considered not to be more suitable for the job market.

We also noticed the hierarchical structure to be reflected in the financial management of projects. This imbalance of power is particularly evident in academic collaborations, where financially stronger researchers can dominate their colleagues. Participant (P7) highlighted an attitude present in projects led by superior countries: "We give you the opportunity to be included in the papers we write". A similar dynamic occurs in the workplace, where the sponsor of a project may force the trajectory of the project. As participants stated, this can lead to tensions between stakeholders, clients, and designers, often favouring those who stand to benefit financially from the situation. Even though hierarchy is also reflected in gender and race discrimination, we included these aspects in diversity themes, as they deserve a separate opening.

4.2   *Diversity challenges*

Diversity changes is another major theme we defined regarding ecological systems. This theme seems the most complex one among the three themes we found because it not only crosses over all different layers of ESM but also tangles various elements, such as gender issues, culture and race differences, and even professional differences.

Gender issues have been mentioned frequently by participants from micro-, meso-, exo-, macro- and chrono-layers. Most of the data we collected towards

gender is relatively negative, which makes women feel discriminated by men at different locations. For instance, one participant expressed in the workshop relating to a project that the person had participated in that "So with a very old perspective on things I felt very much that you know again the women perspective was a little bit silenced (P7)". This invisible power makes female participants feel like "crossing the physical and mental boundaries by the male co-workers" as one post-it note demonstrates. This gender issue is not only from the male co-worker. Occasionally, it occurs with female employees, sometimes related to minorities, too. As one participant mentioned on the exosystem, "woman and minorities [sometimes] get silent in specific settings. This happens in project settings often". A sticky note even names this discrimination supposedly "normal". Such gender stereotypes, in fact, give rise to biased judgments and decisions and impede women's advancement (Heilman, 2012).

Another high-rated diversity challenge in our analysis is in relation to race and cultural differences. They are often linked together from all perspectives. One of the sad stories we heard in our workshop is that one female participant (P4) told how at her workplace a colleague of hers was asked "not to wear her hijab while in the office or 'at least' when meeting clients". This makes her feel extremely offended in terms of race and religious differences. In contrast, another participant (P06) honestly pointed out that she truly received the privilege of being white at work. Surprisingly, those two opposite perspectives are demonstrated at different layers: the former is at the meso-layer, and the latter is at the macro-layer. In this context of cultural and racial differences, even languages play certain roles in power. One participant (P4) points out that languages close and open the doors of power. She mentioned one of her experiences in a European country without speaking a good local language, and it turns out her opinions were not taken into consideration in the co-working process. This race and cultural issue in the workplace has been exposed by four different case studies in North America. For instance, it reveals that East Asians are less dominant than white coworkers, and sometimes East Asian workers are radically harassed in the workplace compared to the white (Berdahl & Min, 2012).

Similarly, participants also expressed their disappointment when people stereotype where designers come from regardless of region and nation. One participant (P13) particularly mentioned that she received prejudice because she was not from the capital city. From this point, somehow, she lost her power, since the others would think that she would not understand the context. This certain prejudice also occurs between nations. For instance, another participant (P06) explicitly spoke that the colonising perspective still plays an important role. She has also mentioned from her own experiences that "it is still very hard to guide the project from non-Europeans" and suggested that "EU citizens should propose better tools for cooperation". This participant also sharply pointed out that the power still exists between the Global South and Global North.

In addition, the data we collected provides us with an opinion of the diversity of disciplines. This is going to say that the scientific-oriented disciplines address more

power than the design-oriented ones by some participants. It tells us that design has not yet been accepted as a scientific discipline. As one participant (P14) said, "We designers are not considered as skilful co-workers in a teamwork". It makes her feel excluded. In contrast, another participant (P15) in a focus group with more experience in design claimed that she, as a designer, received great respect at work. In any case, we recognised that the diversity of disciplines is an important finding through our collected data.

Also, the question how we design and think of design was questioned in relation of diversity and equity, which can well be seen in this comment:

> I started on the macro level and many of them are sort of experiences more in like ways of thinking. I see the concept of and the sort of like mindset of design is inherently good could be quite harmful. Specifically on project basis on how that sort of mindset might be, replicating harm. So that is something that I always face or not always. (…) I have some experiences not yet various in a way and having conversations at the workplace in terms of diversity, equity and inclusion, like how to wrap all around different perspectives and specifically when trying to discuss about power and design and how they are intertwined and oppression and all these different discussions. That is quite interesting. And sometimes, like barriers or reactions. (...) I think like there's a lot of learnings from black feminist, queer and indigenous peoples and theories that could be good to look into for as a designer since this one. And just like in chrono, I thought like sometimes seniority levels or seniority titles at the workplace have a lot of power that creates some tensions.
>
> *(P12)*

Still, it is worth noting how one male workshop participant (P11) felt how in his specific working context had more women, which could also influence the experience of power.

4.3   Communication

A minor theme we found was that of communication practices. It was also a theme that could be found in different layers of the ecological systems theory. Communication was identified as communication in the context of work and projects, the language one speaks, trust, interpretation, or respect. Also, the diversity and cultural differences were recognised as some issues that overlapped with this theme.

In the meso level, the lack of communication was relevant to power, as one participant expressed it: "So there I saw power being negative because the communication was lacking, you know (P5)". Other issues related to communication were such as people not understanding what design is, was a negative experience as well as colleagues crossing boundaries or development discussions related to discuss diversity, equity, and inclusion (DEI) in a working place. Also, in the meso level, it was

identified as part of building trust as between a mentor and a child. One sticky note in the exo level exposed power as a conversation between "distribution of tasks, roles, etc.", which could be also understood as part of the meso level as well.

In one way, the communication is part of the hierarchy theme since the designers need to communicate in between the different levels (individual, micro, meso, macro and exo). The policies or values from the macro level are part of the designing services in the meso level, but they also impact the micro- and individual-levels. In the macro level, the lack of knowledge or communication was noticed in a form of paradigms of the design context, the way we define the design as "inherently good", or being kind of stuck that things are not possible to change. The macro level can be seen also as part in setting the hierarchies and this way how the communication can flow.

One participant (P11) commented how the language and the heritage influence the "project" or perhaps the "place" and how to manipulate the system. The language issue was continued by another participant (P4), who discussed how it could also be the basis of discrimination and could open or close doors of access or participation.

Psychological safety in the micro level can be positioned as a communication issue. Many sticky notes were describing how having an environment that allowed expressions, constructive leadership, and shared power in the group was seen as important. Negative safety would be experienced in the way that if one would not do what was demanded, it could have consequences. In one way, this could be seen as a way of navigating between tensions, which is again related to power and hierarchies. Also, in general, design was recognised as teamwork. Having space to speak and express was seen also a way of practising power or hierarchy in projects as giving space for fellow colleagues from different fields to express their opinions as well (P15). There were also questions of power when analysing interviews if a designer could be objective when making it and this way interpretations could be a form of exercising power (P15).

5   Discussion

5.1   *Major themes*

A prominent finding was that the majority of themes, from the prevalence of sticky notes, were located in the meso level. We wonder if this could be that service design in its essence works more predominantly in the meso level? Nowadays, the term of service design is more commonly used in the design field, which also highlights the co-worker's role in the design process. Many designer-researchers debate that service design is not about design "for" the user, rather design "with" all participants (Findeli et al., 2008; Morelli, 2015). This could explain why the sticky notes were appearing at a higher prevalence in the meso level. Of course, the meso level represents activities influenced by social structures in the macro

level, including culture, laws and regulations, but the meso level also influences the micro and individual. For instance, Pan (2023) has claimed, in his dissertation about elderly care services, that service design should satisfy not only physical needs but also mental and spiritual needs. Physical needs refer to individuals' micro systems while spiritual needs deal with users' cultural and regional level, which we associate with the macro system. Service design is often described in shaping user experiences but to make these experiences better, one needs to look at the meso and macro. This finding breaks our initial assumption that service design would be predominantly micro-level activity.

Much of the design research is written in "me" form – qualitative research. The person designing has the power of making reflections and making decisions. It resonates with Luke's three faces of power, where in the first face the person uses decision making as a way to exercise power. This "me" form is also associated with the most inner layer of Ecological System Theory, the individual. This was also one of the findings as many of the sticky notes were self-reflecting as one having power when coding results or "flexibility and integrity in having a job as researcher".

The three overarching themes – *hierarchies, diversity challenges and communication* – are all interconnected and it is hard to discuss one without the other. Many hierarchical challenges could be solved or tamed with better understanding of cultures, diversity, but this requires communication and knowing each other better, knowing what are e.g. the competencies of each other and how these can enrich a systemic service design project. As our major contribution and finding, we see that service designers dance within these three themes of hierarchies, diversity challenges and communication. Figure 5.4 wishes to illustrate this framework of how power is currently experienced by service designers during their career experiences. During the analysis, we saw that the majority of notes were located on hierarchy, then next on diversity, and the least on communication.

We see that there are challenges experienced by female (or other gender) designers. Judging by the workshop results, the working places or projects that people work are much driven by male dominant dynamics or logics. We recommend future studies, how this could be overcome. Similarly, also people who belong to minorities suffer similar prejudices. Thus, we recommend future studies on how to create safe places to practise service design and that all voices will be heard. It feels a bit paradoxical that we use participatory design, but our working environments or projects that we work in are not always inclusive.

We can also question, if the data was collected in another form, e.g. via interviews, could the results be different from this study? It is possible that in interviews people could express other issues than in front of other workshop participants. The topics around power were sensitive, some participants during the workshop would ask if the data would be anonymised, although this was the first thing that was told when the workshop would start. Also, the permission to record was asked before the workshop via email and also again in the workshop. All the participants were coded in the audio transcriptions. Each participant has signed a consent form to
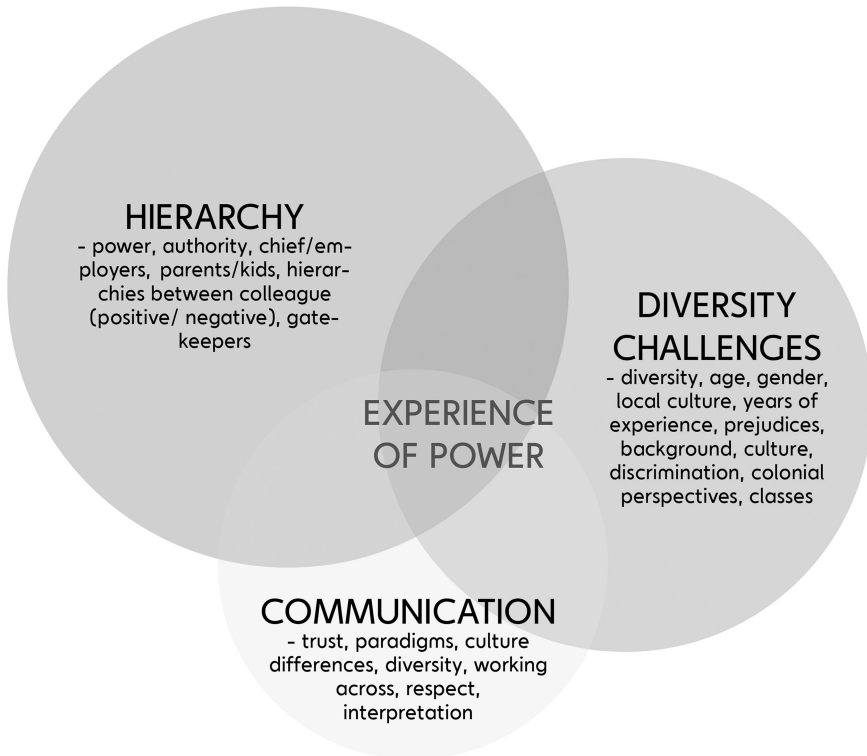
FIGURE 5.4 Framework of how power is currently experienced by designers during their career experiences.

participate in the research. We might also critique the resulting fact that most of the participants identified as female can reflect on the results. It is possible to question if the results were different if there were more participants that were male or other genders.

6   Conclusion

As Hay et al. (2023) have suggested using the ETMas an aid for self-reflection on understanding what power is. This chapter has now applied the theory and shed light on what types of power structures or challenges (service) designers face during their career. People of different ages, nationalities and years of experience have shared their experiences of how they have been exposed to or have practised power in different system levels or layers. The results were condensed into three different major themes that were hierarchies, diversity and communication. Each theme has several subtopics.

Service designers need to be excellent communicators to navigate the power structures. It would be good to investigate further how to visually expose them, but

also understand that these are areas of potential conflicts. Values are often the base of the conflicts, thus exposing them as well and negotiating how to create shared values could be a potential place to start.

The current data shows that (service) designers have faced much challenging or even racist power structures in their work. Participants of the workshop brought up perspectives that could be helpful in bringing more diverse views on making service design such as decolonising design, black feminist, queer and indigenous peoples' theories. These could be some ways to nurture more plural and equitable ways of creating safe service design environments. Challenges of diversity could be tackled by having people presenting these minorities or by that these theories would be embraced by the designers. It has probably been an egg-hen discussion whether a designer can or could present or design for example for indigenous people or another minority without being a presentative of that population. Participatory design has been used to tackle this challenge, by taking the people themselves as part of the process, but this also has been criticised in the latest scientific literature (Smith et al., 2020). On the other hand, if we do not get inside of other theories and worldviews, practice empathy towards e.g. minorities or women, will we not understand why the old ways of working would need to change?

In Figure 5.4 we present a framework to investigate more power dynamics in service design projects. We welcome research studies that could be both theoretical and practical case studies that can open and challenge this view of power dynamics on systemic service design. We think that the results of this research are valuable for systemic service-, social-, systems- and communication-design fields or any other scientific or professional practitioner group that works with participatory methods. Also, exposing the power dynamics and theories of power to the design students could be a form of capacitating the future professionals with more reflexive practices.

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6

SYSTEMIC OPPRESSION IN SERVICE DESIGN

Frederick M. C. van Amstel, Bibiana O. Serpa and Fernando Secomandi

1   Introduction

According to the Encyclopedia of the UN Sustainable Development Goals (Liedauer, 2021), systemic oppression refers to the subordination, humiliation, and domination of certain social groups, maintaining their political, social, and economic disadvantage relative to more privileged groups. By systemic, this definition underlines the systems that jointly shape human activity, irrespective of personal or individual choices.

Exceptional stories of magnanimous individuals who decided not to oppress others or equally exceptional stories of individuals who overcame their oppressed condition do not fundamentally alter the systems that divide those individuals. Similarly, stories of ousted rulers, replaced managers, and imprisoned convicted offenders do not end systemic oppression. Historical evidence suggests that significant changes in oppressive systems—improved labor rights or anti-discrimination laws—have primarily resulted from coordinated collective forces, i.e., social movements (Martin, 2020).

Social movements are becoming influential in service design in recent years. For example, Akama, Light, and Agid (2023, p. 10) recognize that "histories of social movements evidence what we might call service designs 'by other names'" (following Gutiérrez Borrero, 2015, 2021). By that, they mean people that do not call themselves service designers yet carry remarkable similarities (and differences) in how they design services. For example, while studying the Brazilian Digital Culture Movement, Siqueira and Van Amstel (2023) found that collaborative cultural producers do *service design as a practice of freedom* instead of a practice of oppression. They design their services collaboratively instead of relying on internal or external designers who can potentially oppress them.

Social movements typically approach oppression as a systemic contradiction that must be addressed on several fronts, which is why they organize as a movement that spreads through many institutions as well as deinstitutionalized spaces. In a similar way, systemic service design addresses the contradiction of oppression in multiple organizations (e.g. Hay et al., 2024); however, the topic still needs to be fully covered. To further this work and enable systemic service design to meaningfully engage with social movements, we propose here to examine its oppressive potential. In our view, the field needs to scrutinize its *practice of oppression* before moving to the *practice of freedom* identified by Siqueira and Van Amstel (2023). Distinguishing between the two practices may prevent service designs that oppress while trying to liberate disenfranchised people.

This chapter offers the first step in that direction. We begin by developing a more specific definition of systemic oppression than the one mentioned above. We position this definition as part of a dialectical-existential cybernetic theory of oppression that can account for its systemic aspect. This theory is constructed from the combined works of several authors who engaged with social movements in their scholarship, including Álvaro Vieira Pinto, Paulo Freire, Augusto Boal, Combahee River Collective, Kimberlé Crenshaw, and Patricia Hill Collins. Once outlined, we apply this theory to the analysis of contemporary digital labor platforms, a.k.a. crowdsourced services, and reveal the systemic oppression that interlocks designers and users, but also *metadesigners* and *infrausers*, in service cocreation. This chapter does not aim at devising methods or approaches to combat systemic oppression in this or other cases. Rather, it seeks to foster critical consciousness among service designers and researchers, encouraging them to revise their theories and models and better align them to the liberatory practices of contemporary social movements.

2   Collective embodiment in systemic service design

Oppression is rarely addressed in service design. The few works that deal with it conflate oppression with power, i.e., a relationship between individuals in an organization (Hay et al., 2024), not a relationship between social groups in a society. According to mainstream literature, service designers are typically regarded as individual agents guided by apolitical professional values and practices (Fayard et al., 2017), not as societal members who are subjected or who subject others to oppression based on class, race, gender, and other factors (Goodwill et al., 2021). In their education, service designers learn how to approach others through social groups using methods like personas (O'Keeffe et al., 2022), yet this classification often lacks the critical self-reflection that can help them find their place within larger systems of oppression (a rare exception can be found in Prakash, 2022).

Systemic service design may contribute to filling this gap. Among the several theories that underscore this emerging approach (Darzentas and Darzentas 2014), second-order cybernetics offers a good prospect for dealing with this issue. In this

branch of cybernetics, the minimal unit of analysis is a nested cybernetic feedback loop between an observed system and an observer system (Dubberly and Pangaro, 2007). Every time one system changes, both change by their connection. Applied to service design, this concept reveals the mutual shaping of services (an observed system) and designers (an observer system): in their inner processes, designers reflect on their designs as much as designs reflect on their designers (Borgefalk, 2021).

As insightful as this may be for critical self-reflection, this application of second-order cybernetics does not account for the influence of social groups in such interactions, not to mention oppression. Dubberly and Pangaro (2007, p.1314) recognize that "an approach to design that considers second-order cybernetics must root design firmly in politics" or rhetorical argumentation. That is not enough to grasp oppression. The embodied, dialectical, and existential aspects of cybernetic politics cannot be reduced to rhetoric, even if that is an important aspect of it.

To address this gap in systemic service design, we will revisit some ideas about collective embodiment in services developed by the first and third authors elsewhere (Van Amstel and Secomandi, upcoming). That work is premised on the understanding that human bodies in service are not treated, manipulated, and designed as singular individuals but as particular individuals of determinate social groups. Moreover, human bodies are not just passively observed (and designed) objects; they are also self-determining subjects who design themselves as much as design other subjects, including their observers (Secomandi and Van Amstel, 2023). As such, human bodies are experienced in service as things that mediate the constitution of Self and Other—a dialectical interface of a corporeal sort.

From this bodily understanding of service interfaces, systems of oppression can be realized. Historically, services have always tapped into human bodies' physical and emotional labor, from ancient slavery to modern waged employment (Kim, 2018). By inscribing bodies at the service interface with socioeconomic, racial, and gender markers, humans have been differentiated between those who should *serve* and those who are supposed to *be served* in each system. Oppression here is a historical negative differentiation between collective bodies that can be used to justify regimes of servitude (Van Amstel & Secomandi, upcoming). Yet, oppressed bodies may affirm their positive body difference and find other ways of being in service without servitude.

Second-order cybernetics, when applied to service interfaces, must account for the contradictions that arise from their collective embodiment. Human bodies often play ambivalent roles, sometimes as oppressors (observers) and other times as oppressed (observed). To address this complexity, we will build upon a philosophy of technology that offers a dialectical and existential treatment of oppression. Later, we will extend this theory with insights from Theatre of the Oppressed and Black intersectional feminism to account for body ambivalence. This theoretical articulation will assist in incorporating the contradiction of oppression as a concrete formalism in systemic service design.

3 A dialectical-existential cybernetic theory of oppression

In philosophical terms, the concept of oppression can be traced back to Georg W. F. Hegel (2018) and his widely discussed master-slave dialectics. In Hegel's dialectics, the masters dominate the slaves to fulfill their desires and become independent from working directly on nature. However, by doing so, the masters gradually become dependent on the slaves, and this does not satisfy their strive for freedom. Conversely, the slaves, who are at first dependent on the master's command, fulfilling desires that are not theirs by accepting the subservient position and obeying the masters, eventually gain greater independence from the natural desires that plagued the masters. Even so, none of them achieve absolute freedom in this coercive relationship.

Hegel (2018) did not characterize such relative freedom as an "oppression"—a term he reserved for abstract collectivity imposed over concrete individuality. Still, many authors elaborated upon the above dialectic to better understand oppression between social groups, including imperialism, classism, racism, homophobia, and sexism. Paulo Freire, Augusto Boal, and Álvaro Vieira Pinto are some of the prominent authors who built on it. Of the three, Vieira Pinto is lesser known because some of his work was suppressed by the Brazilian military dictatorship. In particular, the work from which we mainly draw remained unknown for several decades and was published posthumously (Vieira Pinto, 2005a, 2005b). Nonetheless, Vieira Pinto is often credited with deeply influencing Paulo Freire's widely regarded academic contributions to oppression studies.

Vieira Pinto established an original connection between Hegel's master-slave dialectics and cybernetics. Other authors have also seen Hegel as a precursor of cybernetic theory due to his approach to thinking through dialectical cycles (e.g. Sommer, 2017). Yet none went as far as to develop an entire philosophy of technology based on Hegel's dialectic as Vieira Pinto did. Finished in 1973, his two-volume work *O Conceito de Tecnologia [The Concept of Technology]* (Vieira Pinto, 2005a, 2005b), still unavailable in other languages beyond Portuguese, brings together not only Hegel's dialectics but also Marx's historicism, Jaspers' existentialism, systems thinking, and other philosophical traditions. The master-slave dialectics is just a piece of this treatise, and we rely here only on the parts needed to analyze systemic oppression as a cybernetic phenomenon.

To combat oppression, Vieira Pinto (2005b) had to revise the basic tenets of cybernetics, as they were rather ambiguous about this topic. Instead of seeing it as a science of human/animal control and communication (Wiener, 1948), he saw it as a science of self-reflection. According to him, cybernetics study how humans and other living beings (not just animals) reflect on being in the world while acting in the world: "nature gives each living species ways of structuring matter that make it receptive to certain kinds of influxes from the outside universe" (Vieira Pinto, 2005b, p. 268).

Like all living beings, humans are cybernetic *by nature,* as they can regulate their behavior based on an internal model of the world. Unlike other living

beings, humans are not born with an operative internal model. Rather, they must undergo a long interaction process with other humans to develop their internal models. Moreover, humans have a unique capacity to externalize their models and share them with others, be that through language or things. Such creations, the so-called cybernetic beings *by construction*, are not meant to adapt to but to change the world.

Let's consider a simple example. Every clock, as a cybernetic being by construction, contains an internal model of the world meant to change the human experience of time. This model is *designed* and not *up to par* with the humans' internal model of experiencing time, as the latter constantly actualizes by redesigning itself—a remarkable characteristic of cybernetic beings by nature. Nevertheless, the clock, as an external thing, still carries information that can trigger internal model redesigns. When the information provided by clocks is judged insufficient for the *world-to-be-made*, humans redesign their internal models of experiencing time and externalize them in new clocks. This process of self-actualization, mediated by cybernetic beings by construction, enables what Vieira Pinto (2005a) calls cultural evolution, which contrasts with the biological evolution of other living beings, tied as they are to (epi)genetically transmitted models of the world.

As can be seen, cybernetic beings by construction play a fundamental role in defining the cultural standards for distinctly human ways of interacting with the world. To put it bluntly, humans *become human* by designing and redesigning cybernetic beings by construction in their worlds. In this positive feedback loop, humans and their worlds become ever more human.

In certain historical circumstances, however, a group of humans may attempt to design and redesign other humans as cybernetic beings by construction, ignoring their self-designing nature. Like in the master-slave dialectics and second-order cybernetics, one system observes and controls another system by design. The enslaved people's feedback loop for interacting with the world folds into the masters', henceforth subordinated to the internal model of the world designed by the masters. Nevertheless, since the masters no longer interact *directly* with the world but only do so *indirectly* through the slaves, the model soon becomes outdated. Even so, the masters prevent, deny, or ignore the slaves' model redesigns for the sake of preserving domination. As a result, masters and slaves both lose touch with their worlds. Thus, conceived in cybernetic terms, systemic oppression hampers the loop of humanizing, causing cultural evolution to slow down or stall.

Luckily, this existential condition is temporary. In earlier work, Vieira Pinto (1960a) characterizes the apex of oppression as a *limit-situation*, a situation wherein the oppressed are up to do something extraordinary: "limit-situation is not the boundary between 'being' and 'nothingness,' but the boundary between 'be' and 'be more' [...] It is not the abode of despair, but of hope" (Vieira Pinto, 1960a, p. 349). Vieira Pinto firmly believed that the slaves could revolt against their masters and repurpose their technology (primarily a body trained to perform as a thing) to rehumanize themselves and their masters (Vieira Pinto, 2005a). Like other

hopeful Latin Americans (Nieto Larrain, 2022), he believed that cybernetics could support a new kind of revolution in his nation.

Paulo Freire (1970) further expanded Vieira Pinto's earlier understanding of oppression, redefining it as a constant force of *being less* directed towards the oppressed.[1] This force generates the historical negative body differentiation mentioned in the last section. Instead of *being more* by stealing the humanity of the oppressed, the oppressor ends up *having more* things in their world and yet *being less*. "No one can be authentically human while he prevents others from being so. Attempting to *be more* human, individualistically, leads to *having more*, egotistically, a form of dehumanization" (Freire, 1970, p. 85, our emphasis). The oppressor *has*, thus, many *more* things in their world than the oppressed. In Vieira Pinto's philosophy (1960b), such a wider reachable world is known as a high degree of handiness. The world of the oppressor, thus, establishes a standard for being human that can never be attained by the oppressed due to the negative feedback loop established between them. The oppressor will always have more than the oppressed within this loop.

Figure 6.1 shows a cybernetic formalism articulating Vieira Pinto and Freire's take on oppression. On the left side is the oppressor, the human who states, "I am the human." On the right side, the oppressed, who hears what the oppressor, says: "You are not human, or at least you lack some humanity." The *being more* of the oppressed is transformed into the *having more* of the oppressor, and it doesn't return to the oppressed. Instead, what the oppressed receive back is *being less*, i.e., being treated as less than human by the oppressors' failed attempt to *become* more. Like in the master-slave dialectics, the oppressor is *having more* (things) but *becoming less* (human), whereas the oppressed is *having less* (things) and also
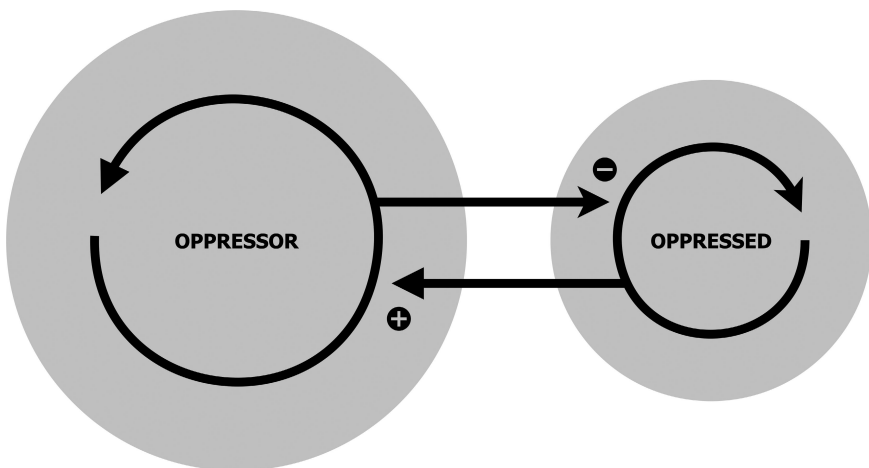
FIGURE 6.1   The cybernetic nested loop of systemic oppression. The oppressor depends on the oppressed to interact with the world.

becoming less (human). In cybernetic terms, this is a runaway or self-destroying negative feedback loop that ends up depleting the humanity of both oppressor and oppressed. This is why systemic oppression leads to super-exploitation, violence, war, and even genocide.

However, even if the oppressed *have less*, they always *have something* to react to their oppression. The oppressed can counter the oppressor by rejecting the dehumanizing standard set by the oppressor and rehumanizing themselves in a different way, i.e., by *having their own things* (Van Amstel, 2023). Freire (1970, p. 86) does not endorse the politics of austerity of *having less* for *being more*: "Not that it is not fundamental to have to be human. Precisely because it is necessary, some men's having must not be allowed to constitute an obstacle to others' having." The oppressed, thus, should have enough to be more.

Exchanges of being are not interrupted, though, as the oppressed still carry the historical task of liberating the oppressor from the dehumanizing loop of oppression (Freire, 1970). The oppressed feel compelled to convince or force the oppressor to *be more, have enough* and interact directly with the world too. Self-criticism on this *reaction* is fundamental not to miss the long-term goal of *being more* with the oppressor, therefore re-establishing the cultural evolution process hampered by systemic oppression. Liberation equalizes worlds to the point they are partially shared (Figure 6.2). Speaking of nations as worlds in themselves, Vieira Pinto believed that cybernetic beings by construction, constructed by peripheral nations for their political ends, could help them develop differently than developed nations.

Freire (1970) and later Boal (1979) expanded Vieira Pinto's concept of oppression towards banking education, *latifundium*, racism, sexism, and other systems of oppression. Inspired by this expansion, design researchers built on Freire's and
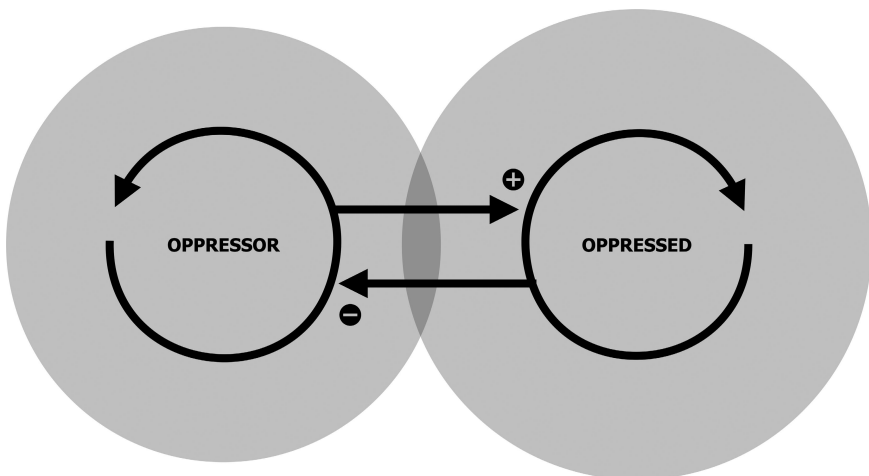
FIGURE 6.2 The cybernetic Speaking of liberation. Both oppressor and oppressed interact with the world.

Boal's to devise participatory design approaches (Ehn, 1988; Penin & Tonkinwise, 2009). Following this trend, we can generalize that, in systemic service design, the oppressed are Indigenous, Black, women, LGBTQIAPN+, immigrants, disabled, and user bodies from the Global South. On the other side are the oppressing bodies: men, cisgenders, heterosexuals, settlers, Whites, citizens, able, designers, and from the Global North.

They can and should work together to overcome systemic oppression, but significant challenges are involved. Recognizing who is who is hard because the same person can be on both sides of these classification systems depending on the *limit-situation* at hand. In order to take this complexity into account, we must further extend the double cybernetic loop of oppression with thoughts coming from Augusto Boal's work and Black intersectional feminism.

4   Twistted loops of oppression

In his Theatre of the Oppressed, Augusto Boal (1979) dealt with many kinds of oppression, from sexism to ableism. He was adamant that the fight against oppression must always be against all forms of oppression (Boal, 2005). Otherwise, one form of oppression might replace another in a twisted relationship. For example, a unionized man may, after a long day of fighting capitalists at work, return home and beat his wife, a woman. If this man does not become conscious of the oppression he is reproducing at home—sexism—chances are that his fight at work will not put anything much better in place of classism. This ambivalent collective embodiment can be visualized as a twisted loop (Figure 6.3). The same body, oppressed in one relation, is also oppressor in another.
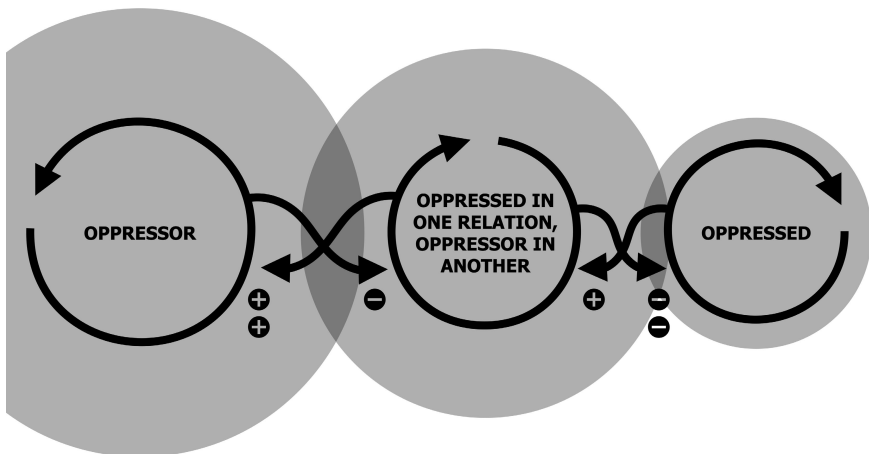
FIGURE 6.3   Interlocked cybernetic loops of oppression. The central loop is twisted.

Incapable of understanding the systemic consequences of reproducing oppression, the oppressed can adopt the same strategies and technologies of their oppressor against their kind or towards another social group just to *have more* than what they already have (Freire, 1970). In these cases, the oppressed move to the oppressors' side and oppress their closest others to compensate for *being less* in relation to their distant oppressors. However, doing so does not rehumanize them or help them become more, as the action is insufficient, if not contrary, to dismantle any of the existing relations. Oppressor's and oppressed's worlds remain intact. This twisted exchange of being can go on and on through several social groups, in what we are calling a *cascading* effect of systemic oppression.

Notwithstanding, in this effect, some bodies accumulate *being less* in several relationships. This is one of the main findings of Black feminists in the 1970s, who, through their scholarship and activism, found their worlds severely reduced by interlocking systems of oppression like class, race, gender, and sexuality (Combahee River Collective, 1979). Later on, these findings have been generalized in legal studies through the concept of *intersectionality* (Crenshaw, 1989). According to its underlying metaphor, the oppressed are standing at a crossroads, having their humanity undermined from various sides. Each side is a different oppression relation. For example, a lesbian Black unemployed trans woman user is more likely to lose their potential of *being more* when getting through an AI-assisted job application than a straight White employed cis man designer. Besides adding nuance to understanding systemic oppression, intersectional Black feminism enabled the simultaneous coordination of actions against oppression in several systems, and it is a recurrent resource for social movements (Collins, 2019).

Returning to cybernetics, although the oppressed may be eventually put into the role of cybernetic beings by construction in an intersectional *limit-situation*, i.e., reduced from a self-designing human to an other-serving thing, they are not condemned to stay in that existential situation forever. They can always develop the potential of their natural design capabilities and redesign the purposes of their cybernetic beings by construction, even if that would generate conflicts with the oppressor. As cybernetic beings by nature, humans always have a choice either to maintain the cascading effect of systemic oppression or to contain it, even if not treated by society as fully human. The cascading effect is thus not a natural given, but it evolves historically according to specific cultural circumstances and could be redesigned otherwise. In the next section, we elaborate on how this cascading effect manifests itself in the design of services and, in the last section, how it is possible to contain it.

5   Cascading oppression in service design

The *theater model* is one of the most prevalent internal models of the world in the design of services and the most effective disguise for the cascading effect of systemic oppression in this field. Devised in the early service marketing literature

as a conceptual model to prioritize customer satisfaction in service development (Grove & Fisk, 1983), this model formalizes a particular perspective on the social division of labor that, in our view, is oppressive.

A vital aspect of the theater model is approaching service providers as "actors" performing services before an "audience" of customers or end-users. Like in traditional theater settings, their performance depends not only on actions at the *frontstage* interacting with users but also on supporting activities performed by themselves and other workers at the *backstage*. The stage curtain that demarcates these two regions—preventing the audience from seeing the hidden work of service providers—is the equivalent of the *line of visibility* of Shostack's (1982) service blueprint method.

Influenced by industrial operations management (e.g., Chase & Hayes 1991), the theater model prescribes that service providers' actions should remain as much as possible invisible, restricted to the backstage, and decoupled from immediate interaction with users. However, when the higher economic value from improved customer satisfaction offsets the lower operational efficiency owing to humans' variable performances, the provider is warranted to step out of invisibility and cocreate "memorable experiences" with users, who should still be the main protagonists of the story being staged (Pine & Gilmore, 2011).

Over the years, service design developed several tools and methods that encourage the cocreation of experiences in alignment with the theater mode. Some methods, like customer journey mapping and service blueprinting, strongly support the labor division described above. Others, such as figurine playing and bodystorming, encourage looking at the back-to-frontstage transitions. In either of them, human bodies are treated as a design "material" (Secomandi and Van Amstel, 2023), or as we call them here, cybernetic beings by construction.

The invisible social structures manipulated by service designers (Vink & Koskela-Huotari, 2021; Penin, 2018), we hold, can turn out pernicious for some social groups, even when they incorporate such positive values as holism, empathy, and cocreation (Fayard et al., 2017). Service designers sometimes explicitly oppose automation at the frontstage, highlighting the added value of having skilled clerks at the service interface to provide custom offers and humanize service delivery (Teboul, 1988). They also advocate abolishing clear divisions between providers and users (Yu & Sangiorgi, 2018). Yet, in a capitalist service market, more often than not, the satisfaction enjoyed by a few oppressors comes at the expense of exploiting the work of many oppressed hidden behind a carefully crafted service interface.

Service design performs for the experience economy (Pine & Gilmore, 2011), by and large, a similar function classical theater had: to justify the *status quo*. According to Boal (1979), ancient Greece was a society marked by a stark social division between citizens with democratic rights and non-citizens and slaves without rights. In that historical context, theater was the "theater of the oppressor" because it made the audience believe that any societal injustice would be fixed by

a divine force in the future, not by human forces in the present. In line with our dialectical-existential cybernetic theory of oppression, it is as if this type of theater designed an internal model of the world (an ideology) for both oppressed and oppressors, which consolidated their unequal condition as a fate, not as a design.

Inspired by Boal, we will scrutinize service design's "theater of the oppressor" to elucidate how systemic oppression may manifest in this field. For that, we will refer to the specific case of digital labor platforms that increasingly permeate contemporary life (Van Doorn, 2017). These platforms rely on the digital mediation of human work to attain a growing variety of service outcomes, including home delivery of food, transportation by cars, and training of algorithms, among many others. These services display a highly structured and mostly fixed body hierarchy, hence our choice to focus on them here. Our aim is not to produce a thorough criticism of this particular kind of service design but to unveil the cascading cybernetic loops that may appear in this and potentially other service systems.

First, we propose characterizing customers and providers of digital labor platforms as distinct types of users: there are the ordinary *users* (i.e., customers or end-beneficiaries of service production) and there are the *infrausers*, who work under temporary contracts as outsourced workforce, as third-party providers, or as workers who don't see themselves and are not seen by others as workers. Second, we propose differentiating designers between ordinary *designers*, who give form to the service interface between users and infrausers, whether it is digital or corporeal, and *metadesigners*, who influence or guide the work of designers, users, and infrausers at the service interface indirectly, by making decisions about the workplace, the design process, the business strategies, etc. This extraordinary type of designer includes financial investors, business owners, directors, vice presidents, politicians, government administrators, and other people who have the power to set the conditions in which ordinary designers operate.

Metadesigners, designers, users, and infrausers are the current existential positions we identify in this particular service design situation. In line with the labor division underpinning the theater model expounded before, their performance can be allocated to different regions of the service system, as illustrated in Figure 6.4. Users belong to the frontstage, and infrausers, to the backstage. Beyond this classical distinction of service research, we identify two further regions that expand on the theater model: the *belowstage*, to which designers belong, and the *abovestage*, reserved for the metadesigners. Although novel within service design research, this distinction alludes to the class/racial division between the "factory floor" and the "upper office."

Instead of overcoming industrial capitalism's prototypical division of labor, the experience economy and digital labor platforms may have only made it less visible: "At every level in any company, workers need to understand that in the Experience Economy every business is a stage, and therefore work is theatre" (Pine and Gilmore, 2011, p. xxv). Instead of implementing anti-specialization routines and rotational roles like self-management does (Gonzatto et al., 2021), the experience
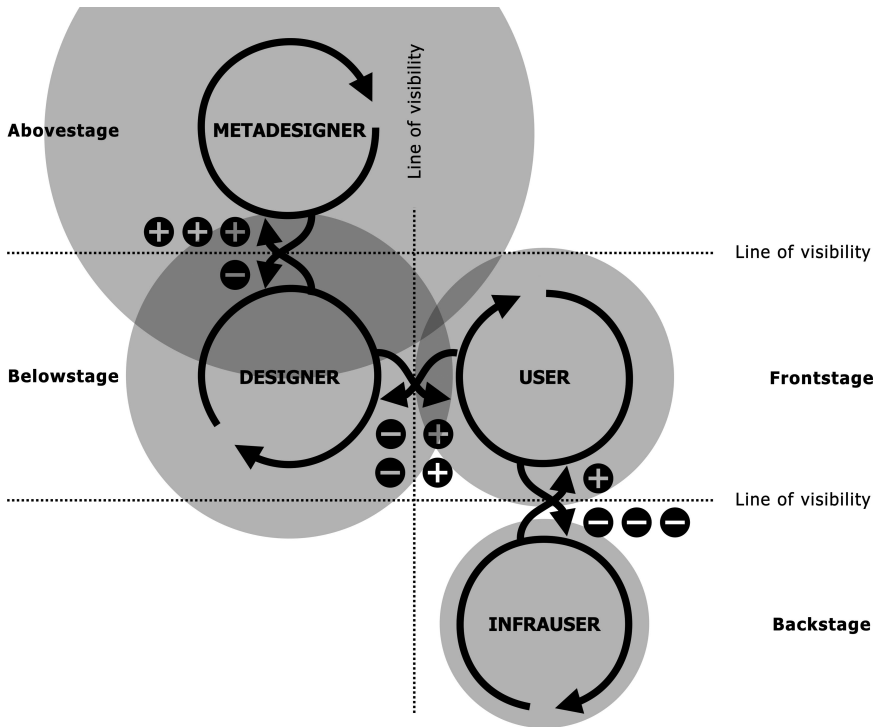
FIGURE 6.4   Cascading cybernetic loops of oppression in service design.

economy turns the division of labor into a spectacular internal model of the world: "Let us be very clear: we do not mean to present work as theatre. It is not a metaphor but a model" (Pine and Gilmore, 2011, p.157).

The line of visibility has a specific meaning in our critical cybernetic model, which is different from its regular use by professional service designers to help orchestrate this spectacle of "playful labor." The line represents the socially produced boundaries between human bodies in an oppressive service system. Even if visible gatherings of different groups may occur, that does not mean displacing the invisible thresholds. For example, when precarious workers remotely operating from the Global South are tasked to contribute to computer design by quietly correcting and updating the internal models of these machines (Ekbia and Nardi, 2017), that does not turn infrausers into designers. Nor does the CEO of a digital labor platform company migrate to the designers' stage when going out of their way to publicly suggest how the user interface should be made more aesthetically pleasing and friendly for (infra)users. Likewise, a platform-based food deliverer does not ascend from the backstage to the protagonist position of the beneficiary of value cocreation when interacting with users at their front doors. Lastly, designers do not acquire any real power to shape the organization's vision and strategy

by *having* a seat at the table with the metadesigners. To do that, they need to *be* metadesigners, by significantly owning and controlling the means of design and production.

The theater model presupposes that metadesigners *have* the highest degree of handiness over the design world, i.e., a socially produced design space they can explore and dwell in Van Amstel et al., (2016). In contrast, infrausers *have* very limited design possibilities around them; they are not supposed to design anything, just use what others have already designed and used. They are "humans in the loop" who fulfill a legal responsibility, a required human moderation action, or a task that hasn't been fully automated yet. Designers and users are in the middle of this hierarchy, eventually performing the role of design tools or designed things.

This cascading model of oppression in service design allows for further analyses, which we can only begin to elucidate here. Metadesigners design the service backstage by means of designers and users. Even if designers are not fully aware of the oppressive system they are part of, they keep giving form to interfaces that prioritize user satisfaction rates, putting extra pressure on backstage automation. Designers rarely have a say on backstage automation, not to mention a remote backstage that the company is trying to hide from the public. Designers cannot do otherwise because they implement customer-centric strategies and labor structures devised by metadesigners. By their token, users take advantage of infrausers because they don't see the gigs and micro-tasks they order as a work (or ethical) relationship with another human. Infrausers, in turn, often accept this unfairness as an unquestionable feature of these platforms (Fieseler et al., 2019), accumulating several ways of *being less* in an experience-economy service system.

In these systems, users can typically demand from and rate infrausers as if they were cybernetic beings by construction—not by nature. For example, in 2023, a White woman user attacked a Black man courier infrauser in Rio de Janeiro because he delivered her food too late, at least from her perspective. Empowered by the courier rating system that makes no regard for working conditions, she considered reenacting the despicable racist ritual of weeping the Black man with her belt. A public attorney prosecuted her, yet the company did nothing to prevent this racialized interaction from occurring again besides excluding her from the platform (Portes and Nascimento, 2023). The company and its designers could have done much more to mend the precarious working conditions of their infrausers, clearly intersectionally racialized and exploited. Their omission could be explained by the fact that the metadesigners behind the labor platform did not foresee a sufficient impact on profits. Given that senior designers working for such service systems are more likely to reproduce the capitalist discourse of the platform metadesigners (Costa, 2023), nothing different could have been expected.

This experience economy theater model, with its hidden labor and highlighted protagonists, is not merely a choice but a design based on entrenched societal hierarchies. Human bodies oppress and are oppressed in these positions largely because of the social groups they are socialized in or identified with. Historically privileged

groups tend to take on the roles of metadesigners and designers, whereas groups facing intersectional oppression fulfill the roles of users and infrausers. Design workers are not oppressed by metadesigners just because they are designers, but because they are workers in an exploitative relationship under capitalism. Metadesigners, in contrast, are still designers, but they are oppressors because they are (or work closely with) the capitalists who exploit other designers, users, and infrausers.

Following the cascade of oppression, designers oppress users, not just because users are mostly women, Black, or disabled bodies but also because they are precisely that: users. Women, Black, Indigenous, immigrants, LGBTQIAPN+, and other historically oppressed groups, despite differences, more often stay within the bounds of what users are supposed to do; otherwise, "they might break or disrupt the system." While designing "idiot-proof" service interfaces, designers deny the oppressed to become co-designers of their service interfaces.

This existential situation is the service design equivalent of what Gonzatto and Van Amstel (2022) called userism: the historical and structural reduction of the oppressed to the condition of being a user (and only a user) of computers. In the case of labor platforms, userism is realized through service interfaces that make (infra) users feel like just users, not as workers or potential (meta)designers. Looking more broadly, userism is the oppression that structures the experience economy's theater model and enables the cascading effect described above. Other service systems that follow this same model will likely display similar systemic oppression.

Newer forms of service design focused on value cocreation may be more effective in preventing userism (Yu & Sangiorgi, 2018). Nevertheless, they cannot prevent metadesigners from oppressing designers. Metadesign theory in service design suggests that users can temporarily join metadesigners (Menichinelli, 2018), yet this same theory in other fields raises concerns about the authoritarian potential of privileged designers designing the means of production for underprivileged designers (Vassão, 2008). Even if the boundaries between metadesigners, designers, users, and infrausers are blurred temporarily, their collective body inequality remains. For example, recent research has shown that marginalized users have more difficulty cocreating self-services than privileged ones (Darmody & Zwick, 2024). As Freire (1970) and Boal (1979) found out from fighting several kinds of oppression, there is not much one can do against oppression on the oppressor side. Siding with (infra)users—i.e., *designing as an oppressed*—seems to be the only way toward liberation in systemic service design.

6   Prospecting liberation in service design

Designing as an oppressed requires, first and foremost, excluding oppressors' biases in systemic service design. The case of collaborative cultural producers in Brazil is illuminating here (Siqueira & Van Amstel, 2023; Gonzatto et al., 2021). Originally, users of a free and open collaborative design platform, these cultural producers participated in the platform's open metadesign project and became more than just

users. They cocreated a new social currency feature to move beyond the traditional volunteer structure in their community service operation. Based on open-source software, this feature was rolled out to other platform users, who became designers of their own Local Exchange Trade System (LETS). In these systems, infrausers typically take responsibility for a community task and are rewarded by the beneficiaries of those tasks, the main service users. Infrausers may or may not be part of the community to use their credit and order the community services they helped to coproduce. The cascading effect of systemic oppression is temporarily reverted, but the roles are sustained, and oppression can return at any moment.

Crafting solidarity bonds across different oppressed bodies seems to be the way to prevent the return of the cascading effects of systemic oppression. Insurgent design coalitions woven around matters of care can sustain such liberating relationships (Van Amstel et al., 2021; Eleutério and Van Amstel, 2020). The history of social movements is full of these "service design by other names," as Akama and colleagues (2023) have pointed out. We would like to highlight the Black Panther Party for Self-Defense, a multi-structured service program that enabled their intersectional anti-racist and anti-sexist organizing activities (Pope & Flanigan, 2013, p. 457). Collaborative services included breakfast programs for school children and food aid for families; schools, adult education, and childcare; medical care and ambulance services; and cooperative housing, among others. In this way, they avoided defaulting to capitalist and gendered services that would undermine their fight (Hilliard, 2008).

These are just initial prospects of liberating systemic service design from systemic oppression. Future research must continue exploring alternatives to the oppressive theater model. The main contribution of the present research lies in outlining a dialectical-existential cybernetic theory of oppression that can take hold of complex service systems such as labor platforms. As part of larger capitalist, patriarchal, and colonialist systems, platformized service systems seem to be condescending. However, social movements are experimenting with delivering solidarity services through similar platform structures, the so-called platform cooperatives. For that, they need a new internal model of the world.

Theatre of the Oppressed (Boal, 1979), a recurrent *praxis* adopted by social movements in local initiatives, was key in criticizing the theater model in service design, but in past works, we have also demonstrated how it can be used to develop alternative models. For instance, converted into an embodied design practice, Theatre of the Oppressed can support conscious bodies in designing interfaces that challenge oppression (Gonzatto and Van Amstel, 2017). The joker system at its core, with its emphasis on task rotation, participation, public debate, and solidarity, could well inspire a new theater model for service systems.

Previous research in interaction design has found out that changing systems without changing the human bodies that constitute them is not enough because the system itself is never the oppressor—even if it is oppressive (Gonzatto & Van Amstel, 2017). Similarly, systemic service design can contribute to changing collective bodies, but this entails prospecting new ways of being of service to

society. Service designers are not doomed to work only for capitalist companies and institutions devoid of anti-oppressive policies. They can work for progressive companies that serve progressive users (a rare case at this historical moment, we must admit) or for governments, non-profits, international agencies, trade unions, and institutionalized social movements that do have profit as their ultimate goal. Designing *for* the oppressed, as if service designers could liberate users from their condition, does not take full advantage of this existential situation. Instead, this situation calls for a design akin to the Pedagogy of the Oppressed: "a pedagogy which must be forged *with*, not *for*, the oppressed (whether individuals or peoples) in the incessant struggle to regain their humanity" (Freire, 1970, p. 48). Hopefully, this collective endeavor would render service (meta)designers free from systemic oppression together with service (infra)users.

Acknowledgments

Note

1 These terms are often translated inconsistently. In Pedagogy of the Oppressed (1970), Myra Bergman Ramos translates *ser-menos* as "being less" and *ser-mais* as "to be more fully human". We prefer here to use *being more* and *being less* to emphasize their opposite directions in the process of humanizing.

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7

SYSTEMS-ORIENTED SERVICE DESIGN IN URBAN PLANNING CONTEXTS

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1   Introduction

Services are a critical part of contemporary cities and play a crucial role in maintaining the smooth functioning of our daily lives (Wallin & Horelli, 2010). Governments place significant pressure on the production of services in cities. In the EU, services comprise 75% of GDP and employment, making it the most dynamic economic activity (European Commission, 2023), while public service costs constitute about 25% of the gross domestic product in Europe (OECD, 2023). The design of services and service networks in cities of many high-income countries battle pressures created by an aging population, a lack of economic resources, and many global crises.

The pressure is focused on the substance of singular services and planning the service networks in cities. In this chapter, we are concerned with both. As a part of strategic urban planning, service network planning involves determining when and where new service units should be constructed and how much service capacity is required. The ultimate purpose is to meet citizens' needs while maximizing societal benefits with minimal costs. Network planning involves organizing and producing services for a city or region to meet short-, medium-, and long-term demands (Rönkkö & Herneoja, 2021).

Designing services and the systems of services in urban environments is a complex task. When doing this, we must address several questions: What services can and should be offered based on service need or demand? How are these services arranged, and who are they for? What is the quality of these services, and do the services answer the needs of changing times and needs? What elements must we consider to ensure their success, and whom must we involve in their design? What is especially important from the point of view of urban planning and of interest in

this chapter is the question: How can services of urban environments be designed to consider all the complexities and interdependencies they should?

The design of services in urban environments is made challenging by at least three factors discussed here: (1) the complexity and interconnectedness of the various aspects of urban environments, which can be identified as systems; (2) a plethora of stakeholders involved in their design, and (3) the current global crises that design decisions must react to or at the least take into consideration. Urban environments are settings for enormous complexity, making the design of services in that context a tricky domain. This complexity is best acknowledged by referring to the systemic quality of urban environments. It is no wonder that cities have been called the "systems of systems of systems" (Berry, 1964) with systems and their subsystems. Because of this systemic essence of urban environments, it is impossible to design any subsystems, for example, services in isolation from other systems. It is essential for this reason to involve many stakeholders from different administrative sectors in the design of services in urban environments. Incorporating strands of perspectives, knowledge, and often conflicting interests makes the design process more challenging.

To complicate matters further, crises such as pandemics and climate change impact the design of urban environments and service systems. Even when the effects of crises are not immediate, they may cause ripple effects that show directly in their design. What all this compounds to are wicked problems for the design of services in urban environments. We will discuss the definition of wicked problems later but will provide one suggested by Horst Rittel in 1967:

> The term "wicked problem" refer [*sic*] to that class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing. The adjective "wicked" is supposed to describe the mischievous and even evil quality of these problems, where proposed "solutions" often turn out to be worse than the symptoms.
>
> *(Churchman, 1967)*

The wicked problems born in the context of the challenges listed above are those we will discuss in this chapter.

Much has been done to develop urban planning and service design approaches and practices through the years for better urban environments. In many countries, such as Finland, law demands participation in developing urban environments. The Land Use and Building Act states that "everyone has the right to participate in the preparation process and that planning is high quality and interactive, that expertise is comprehensive and that there is the open provision of information on matters being processed" (The Land Use and Building Act, 132/1999). Urban planning practices have sometimes been criticized for lacking user-centricity. Today, service design approaches are applied in urban planning mainly to ensure better service

experiences and to engage end-users through inclusive and iterative methods used in design thinking and service design. These collaborative methods are applied to gain a user centric perspective and include citizens in planning (Mensonen & Af Hällström, 2020).

While service design is considered a holistic, even systemic design approach, more systems-oriented approaches are needed. Discussion has been raised on the necessity for the service design field to better handle complexities without over-simplifying them (e.g., Sangiorgi 2009). Even though the call for solutions and research on this topic is high, many research gaps exist. A search at Google Scholar with the search words "systems-oriented design" and "urban planning" shows in May 2024 a total of 61 results. We can see that there are some connections already between the two. Adding in the same search "service design," there are only 35 results showing how small the sample size is. For this reason, we can see that our chapter is bringing novelty in bridging systems-oriented design and service design for urban planning.

This conceptual chapter participates in the conversation concerning complexity and design. We wish to open a dialog to explore whether using systems-oriented service design in urban planning could improve the design of services in urban environments, especially when dealing with today's complex design problems. In urban settings, the service environments are not designed in a vacuum or isolation; service environments, built environments, and the socio-material environments they comprise are intricately connected. In practical terms, this means that even when we focus on the design of services, we must recognize that services take place in the physical settings of the built environments and specific social settings. This chapter supposes that human-oriented service design and planning with a systems-oriented approach may help consider all relevant aspects.

This chapter will proceed as follows: We begin by introducing the central concepts for the further development of ideas. Then, we explore a possible way to understand where wicked problems arise in urban planning and what makes designing services in an urban planning context a challenging design domain. We also explore what wicked problems mean, as presented in the existing literature. In the final part of this chapter, we explore systems-oriented service design and Gigamapping as a tool for addressing these wicked problems in urban planning. We suggest that Gigamaps can operate as boundary objects between stakeholders in urban planning and as an analytical and creative tool for design.

2   About the object of design action and the act of designing

This section delves into the central concepts that serve as the foundation for developing ideas and arguments in this chapter. It is worth noting that many concepts introduced here overlap and are entangled. This is because nothing in an urban environment exists in isolation. When we are concerned with designing services and systems of services in urban environments, it is equally difficult to pinpoint the

object of design action and the design perspective that could execute the design of that object exhaustively. When designing urban services, the design target is not one but many at a time; therefore, we need many stakeholders to perform design actions in collaboration.

2.1 *The object of design action: urban environments comprising socio-material, service, and built environments*

The objects of design action discussed in this chapter are the urban environments comprising socio-material, service, and built environments. Urban environments are characterized by high-population density, with many people residing together (Gharipour & DeClercq, 2021.) We frame our discussion to urban environments because urban environments are unique, with particular social norms and challenges, such as inequality and segregation, examples of wicked problems that urban planning can address. It is important to note that the urban environment could be defined in other ways, and the boundaries between its parts could have been drawn alternatively. However, this dissection into socio-material, service, and built environments is helpful for our purposes here.

Furthermore, we view urban environments as socio-material environments (Figure 7.1). As humans, we are material beings in a material world and social beings living in a social environment. The social environment refers to cultural practices, beliefs about place and community, religious institutions, social and economic processes, wealth, power and race relations, and labor markets (Letters, 2001).

The built and service environments are nested within the socio-material environment with partly overlapping spheres. The service environment encompasses how the provision of services unfolds within cities and how residents can access them (Dannenberg et al., 2011). Examples of urban services include healthcare and social services, daycare and educational services, emergency services, and public transport services. Urban dwellers heavily rely on organized services for their daily activities. Service networks are thus instruments for generating well-being for citizens and contributing to their quality of life (Rönkkö & Herneoja, 2021). Urban living environments (and social systems in them) depend heavily on service systems. Many participate in providing and organizing services, such as different administration departments, private companies, and non-governmental organizations, making the service structure complex (Wallin & Horelli, 2010).

The built environment consists of

> those settings designed, created, and maintained by human efforts—buildings, neighborhoods, public plazas, playgrounds, roadways, and more. Even seemingly natural settings, such as parks, are often part of the built environment because they have been sited, designed, and constructed by people. The built

URBAN ENVIRONMENT

SERVICE
ENVIRONMENT

SOCIO-MATERIAL
ENVIRONMENT
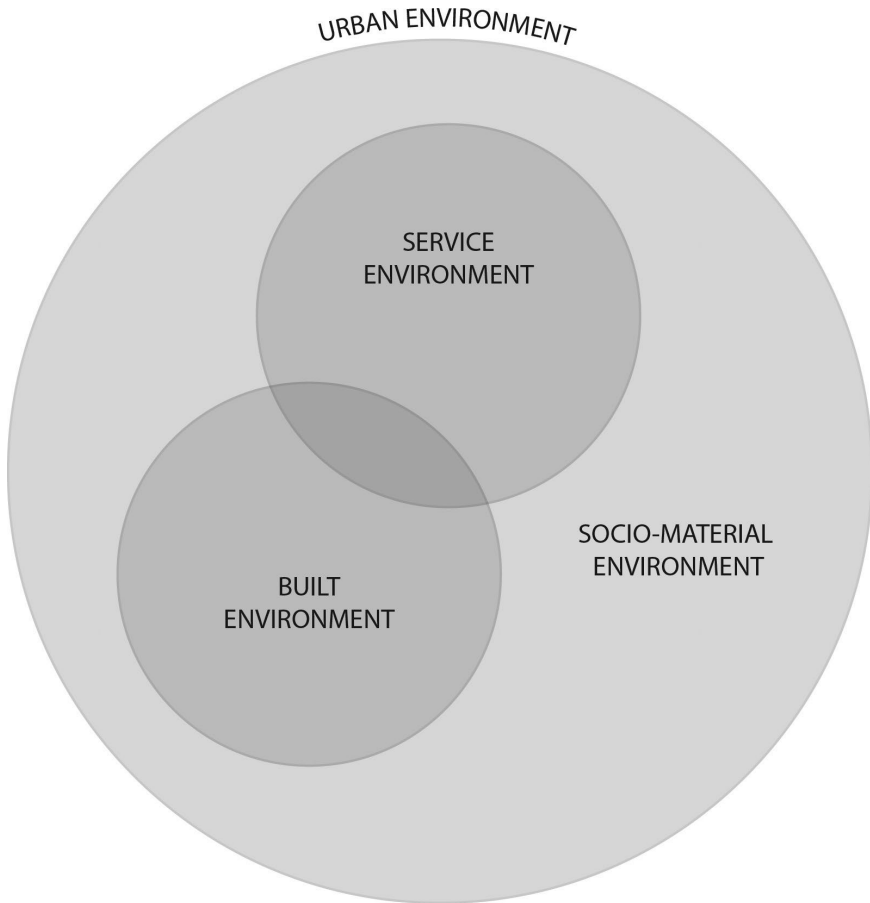
BUILT
ENVIRONMENT

FIGURE 7.1   The urban environment comprises socio-material, service, and built environments.

environment depends on supporting infrastructure systems for such necessities as energy, water, and transportation, so these systems are also considered part of the built environment.

(Dannenberg et al., 2011)

Built environments are, therefore, human-made, physical places and settings where people carry out their daily activities. Multiple elements of the built environment can promote, hinder, or influence these actions and are closely linked to service systems.

The challenges of designing services in urban environments stem from the complexity born at the intersection of socio-material, built, and service environments. Section 3 will discuss these challenges further.

2.2 The act of designing

The central concepts describing design activity used in this chapter are urban planning, service design, systems-oriented design, and systems-oriented service design (Figure 7.2). We also mention service network planning but consider it a subtask of urban planning activities that focuses on adjusting the locations of service facilities with overall urban layout and traffic systems. Even though we offer definitions here and can recognize similarities and differences between these design perspectives, their boundaries are often blurry. It is challenging to confirm once and for all where one perspective ends and the other begins. We argue, however, that the act of

URBAN
PLANNING

SERVICE
DESIGN

SYSTEMS-
ORIENTED
DESIGN

SYSTEMS-ORIENTED SERVICE DESIGN
IN THE CONTEXS OF URBAN ENVIRONMENTS
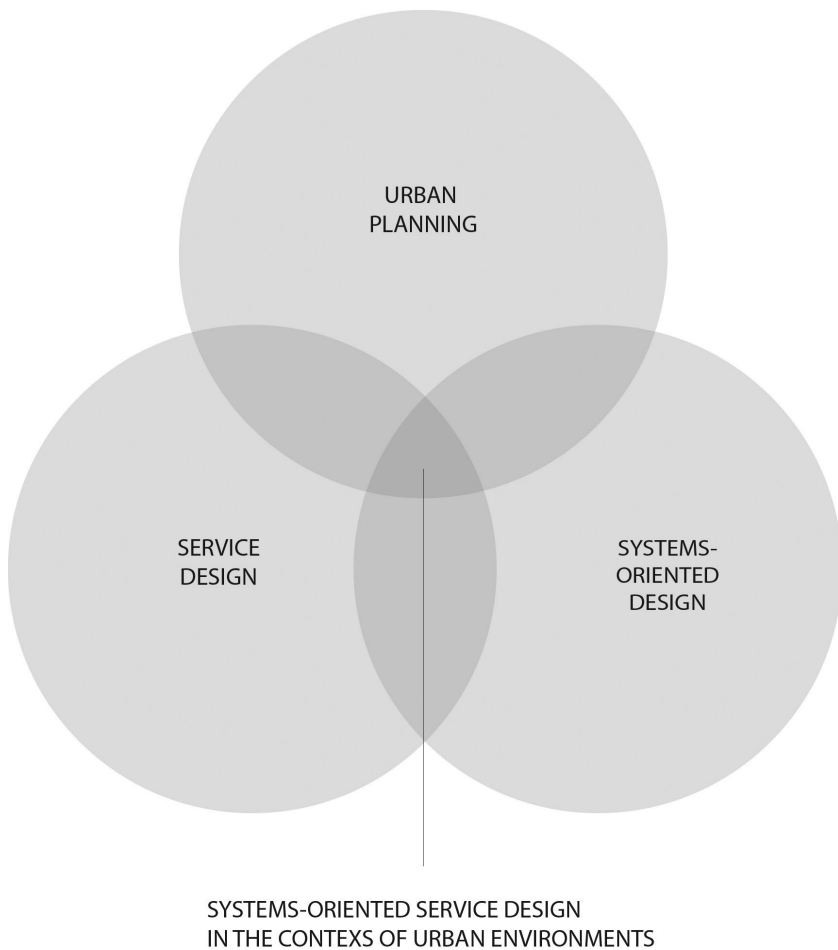
FIGURE 7.2 Systems-oriented service design in the context of urban environments arises at the intersection of urban planning, service design, and systems-oriented design.

designing is their common denominator. Furthermore, they share a common thread of intentionality and the act of making design representations. We take the liberty of discussing these design perspectives in the same plane because of this shared similarity. In Section 4, we will discuss service design, systems-oriented design, and systems-oriented service design in length. Here, we want to offer an overview of the concepts to aid further reading.

Design is considered intentional action, while we understand that not all intentional action is design. In addition to intentionality, designing is the action of making design representations, such as maps, drawings, models, and descriptions. According to Galle, these design representations play two roles: a means of communication and a vehicle for exploration (Galle, 1999). The Gigamaps, discussed later in Section 4, are an example of such design representation.

By definition, "urban planning encompasses the preparation of plans for and the regulation and management of towns, cities, and metropolitan regions" (Huxley & Inch, 2020). Design of services refers to the substantial design of services and their organization. Therefore, service design refers to the design of services and considers that services are the object of design activities, just like products are the object of product design (Sun, 2020). On the other hand, systems-oriented design is a "design methodology and design practice that is especially geared toward understanding and working with complex systems" (Sevaldson, 2022). Finally, in this chapter, we propose that systems-oriented service design in the context of urban environments is at the intersection of the perspectives presented above.

3   Systemic characteristics of urban environments and the grounds for complexity

From the grounds presented above, it is fair to say that designing services and systems of services in urban environments can be a wicked task. This is due to three factors: First, urban environments are complex and interconnected systems with various aspects to consider. Second, multiple stakeholders are involved in the design process, adding to the complexity of decision-making. Lastly, global crises must be considered when making design decisions.

3.1   *Systemic characteristics of urban environments*

Previously, we presented that urban environments comprise socio-material, built, and service environments. Urban environments can be considered in systemic terms, implying that systems of social environments, built environments, and service environments form the sub-systems of the urban environment. The systemic trait of urban environments is characterized by at least two components: interconnectedness and dynamic essence. These systems of the built environment are in interconnected relationships. Hospitals offer healthcare, transportation systems provide transportation services, green areas offer recreational services, schools

offer education, etc. From this perspective, the built environments are arenas for social interactions and services.

While interconnected, the urban environments are also in continuous change. The systems and subsystems of urban environments can be seen as dynamic. The idea of the dynamic nature of things goes against what Birger Sevaldson calls objectification. According to Sevaldson,

> Objectification is dependent on the assumption that the conceived objects are fairly stable. We assume that an apple from our grocery store will be the same apple tomorrow. In fact, this is a perceptual error because the apple has inevitably changed since yesterday. The apple is its own dynamic system.
>
> *(Sevaldson, 2022)*

The same can be said for urban environments; they are continuously changing.

The interconnectedness and dynamic nature of urban environments can be illustrated by the impact the COVID-19 epidemic had on urban environments. During the COVID-19 pandemic, cities were particularly vulnerable to the spread of the disease due to their high-population density. Social norms greatly affected urban life and people's interaction in cities during that time. For example, social distancing became a norm, though not all were in an equal position in this regard. Many groups were more vulnerable to contracting COVID-19 due to a lack of access to safe physical environments that enable social distancing. The built environment, therefore, affected the spread of disease by either facilitating physical distancing or reducing opportunities for maintaining space between individuals. The city's physical structure and the characteristics of the social environment affect service environments, for example, the arrangement, access to, and availability of health services (Gharipour & DeClercq, 2021).

This example also illustrates the dynamic nature of urban environments. The needs for urban environments were changed utterly with the pandemic during the crisis. Usually, urban environments are expected to bring residents together for meetings and interaction. This was not the case during the COVID-19 pandemic. The characteristics of lively urban settings became unwanted qualities of safe living environments. After introducing vaccines and increased natural immunity, lively public places became desirable again. This fluctuation describes the dynamic nature of urban environments. The needs of citizens and the forms and arrangements of urban environments are continuously changing.

The example above illustrates that the design of service systems in urban environments could not be done by only zooming into the service's operations, such as healthcare. However, it needed to widen the angle to consider the settings that services are part of. The design of urban services and the supporting infrastructure concerns a wide range of value-related aspects, multiple interests, needs, facts, uncertain forecasts, and, ultimately, values and opinions that must be taken into consideration (Rönkkö & Herneoja, 2021). In this aim, a holistic perspective on urban planning is required.

3.2   *The challenges of cross-disciplinary work in urban planning*

Precisely, the requirement for a holistic perspective leads to cross-disciplinarity and the involvement of many stakeholders. Several actors participate in urban planning processes where the elements of built, social, and service environments are synchronized and aligned to create adequate living environments for citizens. The public organization operates at different planning levels, and stakeholders include experts and teams from various sectors of society, including the public, private, and third sectors, as well as citizens. In addition to this, planning activities are sometimes outsourced to private companies that may contribute to urban planning projects.

Various stakeholders and participants bring their knowledge to the table with different backgrounds, perspectives, and sometimes conflicting interests. The knowledge creation between actors poses challenges, and the horizontal knowledge transfer can be considered particularly problematic. Urban planning processes may also face problems in the unclear division of responsibilities, maybe as a reflection of the vague boundaries between the systems of built, service, and social environments.

Knowledge should flow horizontally across different sectors and vertically from participants to administration. The most prominent information asymmetry still exists between administration and citizens, who appear more as objects to be informed than subjects included in the process where knowledge is generated. Even in countries where public participation in urban planning is required by law, the participants may feel like they only take part in "participation theatre," referring to ostensible participation (Leino et al., 2018).

There has been a calling for new approaches to ensure better inclusion of participants in urban planning processes (Mensonen & Af Hällström, 2020). The OECD Recommendation, also known as the Luxembourg Declaration, aims to improve people's experiences with public services by making them more effective, fair, and user centric. When public services fail to function appropriately or face disruptions, the citizens are most affected. These problems can arise mainly as issues in access and inefficiencies in the delivery of services. Public services play a crucial role in the intersection of policy and people. Therefore, they must be designed to serve all users' needs, especially the most vulnerable and disadvantaged individuals. Access to high-quality social services and environmental, cultural, and recreational facilities is essential. This is important for the sake of a functioning society and the rights and well-being of individuals. Ultimately, when people's expectations for high-quality public services are unmet, it can erode their trust in the government (The European Economic and Social Committee, 2015). Such recommendations cannot be fulfilled without appropriate approaches for recognizing the user perspective in planning services in urban environments.

3.3 *The wicked problems in designing services in urban environments*

The complexity of designing services for urban contexts arises from the systemic characteristics of urban environments and the plethora of stakeholders participating in the design activities. The systemic complexity urban environments face is further increased by the wicked problems of our time. Fifty-five percent of the world's population currently resides in urban areas. However, the population in cities is growing, which is predicted to increase to 68 percent by 2050 (Gharipour & DeClercq, 2021). At the same time, our urban environment has been exposed to a myriad of crises in recent times. These include challenges related to the climate, pandemics, social issues, digitalization, housing, financial instability, and demographic changes (Castaño-Rosa et al., 2022).

Many of these wicked problems culminate in urban environments and significantly affect the people in them. Urban planning and service design aim to address or at least consider these challenges. Urban residents' well-being is closely tied to their social, built, and service environments. It is no wonder that urban planners and service designers alike seem to experience increasing complexity and urgency when dealing with the current challenges. The call for new methods and approaches is high, as traditional urban planning has not been able to steer a complex service structure of urban environments successfully (Wallin & Horelli, 2010).

Wicked problems have been discussed in literature since Rittel and Webber coined the term in their article "Dilemmas in a General Theory of Planning" in 1973. They characterized wicked problems through ten points: (1) There is no precise formulation of wicked problems; (2) wicked problems do not have a stopping rule, meaning that wicked problems do not have a "final solution" because the resolution can constantly be improved; (3) solutions to wicked problems are not "true" or "false," but "good" or "bad"; (4) there is neither a final test nor an immediate solution to a wicked problem; (5) each attempt at a solution to a wicked problem is a "one-time operation," and each attempt counts significantly; (6) wicked problems do not have enumerable sets of potential (or exhaustively descriptive) solutions; (7) each wicked problem is unique; (8) each wicked problem can be considered a symptom of another problem; (9) the existence of discrepancies in the representation of a wicked problem can be explained in several ways and choosing an explanation determines the nature of the problem's resolution; and (10) the planner cannot be wrong because wicked problems have consequences (Rittel & Webber, 1973).

Another definition that fits well with the urban planning context is the one by Weber and Khademian (2008). They have condensed the characteristics of wicked problems into three key elements: Cross-cutting, unstructured, and relentless. First, cross-cutting, meaning the presence of independent stakeholders with varying perspectives and solutions; second, unstructured, referring to the difficulty of

identifying the links between causes and effects; and third, relentless, implying that the resolution is a moving target (Weber & Khademian, 2008).

Wicked problems constantly evolve, highlighting that each wicked problem is a symptom of another wicked problem. Finding a solution to a wicked problem is challenging because there are no clear-cut solutions. Using terms like "taming" or "tackling" wicked problems is common, but the answers are not true or false nor right or wrong; they can only be good or bad. Providing a final test or an immediate "solution" is impossible since the resolution can continually be improved (Suoheimo, 2020).

One question in literature is what problems qualify as wicked. According to Buchanan, most design problems can be considered such (Buchanan, 1992), while some argue that this is not the case; many problems are relatively tame and simple (Ritchey, 2013). It can, however, be said that there are different levels of complexity, from simple and complicated to complex (Hummelbrunner, 2011). Buchanan (1992) described four types of design problems in the "Wicked Problems in Design Thinking": (1) "design of symbolic and visual communications," (2) "design of material objects," (3) "design of activities and organized services" and (4) "design of complex systems or environments for living, working, playing, and learning." From the perspective of this chapter, the last two are the most relevant; the third and fourth areas deal with wicked problems mainly (Suoheimo, 2020). The third aspect is connected to the service design – the design of intangible elements and service contents. The fourth aspect is related to the design of systems and environments, contexts, or settings (Johansson-Sköldberg et al., 2013). Therefore, the design of services in the context of urban environments could be regarded as wicked.

Suoheimo points out that separating one area from another can sometimes be challenging as they can be intertwined (Suoheimo, 2020). When we discuss the design of services in urban environments, the different subsystems overlap, and separating these areas should not be an aim at all; they should be designed in tandem as they are so intrinsically connected. Banathy crystalizes this well, saying: "Social systems are unbound. Factors assumed to be part of a problem are inseparably linked to other factors. A technical problem of transportation becomes a land-use problem linked with economic, environmental, conservation, and political considerations. Can we really draw a boundary? When we seek to improve a situation, particularly if it is a public one, we find ourselves facing not a problem but a cluster of problems often called a 'problematique'" (Banathy, 2013). At the intersection of the spheres of socio-material, service, and built environments are where many of the wicked problems culminate in urban environments. This is also the point where we lack adequate tools for service system design. On the other hand, the same overlap is also the place for solutions. Next, we will explore the systems-oriented service design and its use in the design of services for urban environments.

4 Toward systems-oriented service design in urban contexts

The premise for further development of ideas is based on the awareness that urban environments consist of socio-material, service, and built environments (Figure 7.1). Therefore, urban environments are systems that consist of subsystems. These systems are interconnected and in a dynamic state of continuous change. This has implications for urban planning and service design. Next, we propose incorporating service design methods with systems-oriented approaches to ensure a comprehensive and systemic grasp of urban planning in the face of wicked problems.

4.1 Service design in urban planning

In the last 20 years, service design has become a popular subject of study in Service Science. Service Science is "the study of service systems, aiming to create a basis for systematic service innovation" (Maglio & Spohrer, 2008). The development of service design has been closely linked with the rise of the service economy or service society. In the late 1990s, many design thinkers had a revelation: As a result of the "servitization of everything," much of what we design is, in fact, intangible – such as services. Sun describes the core idea of this shift well, writing that "'designing services' considers that 'services' are the object of design activities, just like products are the object of product design" (Sun, 2020). This is also called the shift from product-dominant logic to service-dominant logic. Service design is, therefore, considered a relatively new research topic. However, academic publications started recognizing service design as a distinct discipline in 2010 (Sun, 2020), and it is safe to say that service design has become an established field both in research and practice – also in urban development.

Service design is intended to create deep satisfaction and well-being by focusing on the purpose of the service (Parker & Heapy, 2006). At the core of service design is creating a well-planned and optimal customer experience (Mager, 2009). Service design practice consists of several activities defined by Stickdorn and Schneider (2011) using five principles. These principles include (1) designing from the user's perspective, (2) involving users, stakeholders, or communities in co-creation, (3) visualizing sequences of things or systems, (4) using evidence to illustrate problems, and (5) handling the service from a holistic point of view (Stickdorn & Schneider, 2011). Co-creation implies that service design is about designing with the people rather than just for them (Clack & Ellison, 2019). At the least, it implies that stakeholders are engaged in the design process.

Service design has been used in the design of built environments, especially in the scale of buildings, for example, in the design of hospitals (Miettinen & Alhonsuo, 2019) or libraries (Mensonen & Af Hällström, 2020). Service design is particularly fitting in this case due to the vital link between the environment and the service. Service design has been explored in the context of smart cities

(ex., Komninos et al., 2014), but less academic research has been done on using service design in urban planning. In that context, design thinking is a more commonly used term (Mensonen & Af Hällström, 2020).

Even so, today, especially in urban planning, the wickedness of problems seems to increase. One example of this is the discussion around biodiversity. Just ten years ago, the users of cities were automatically thought to be only humans, but today, cities are designed for all living beings. We argue that the traditional service design methods are insufficient when dealing with such problems. Even though service design is a holistic and systemic approach, it should embrace and "level up" a more systems-oriented method when dealing with complex design challenges in the context of urban environments.

4.2   *Defining systems-oriented service design in the context of urban environments*

The concept of systems thinking has a diverse background, and there is no universally agreed-upon definition for it. Systems thinking can, however, be seen as a "philosophy, art, and science of interconnectedness or perspective, mindset, or worldview that can help us better understand how things are interrelated and connected" (Sevaldson, 2022). Systems thinking is a sense-making process that organizes the world's messiness into concepts and components, allowing us to understand it better (Meadows, 2008).

The history of systems thinking is vast and diverse, with extensive academic research. Different approaches include Operations research, Cybernetics, System Dynamics, Soft system methodology, and Critical systems thinking (Sevaldson, 2022). Many of these approaches are heavily theoretical and are primarily utilized in academic settings (Sevaldson, 2022), such as research in biology, communication studies, anthropology, sociology, and management (Hummelbrunner, 2011).

Systems thinking has developed in three stages. The first wave of system thinking had a mechanistic worldview and cause-and-effect perspective. Systems were mostly considered descriptive and predictive. The Soft System Methodology shifted the focus from describing to taking action, breaking away from a mechanistic view in the second wave (Checkland & Scholes, 1999). Systems-oriented design leans on critical systems thinking, or the "third wave of systems thinking," where "different systems perspectives are used pragmatically and critically (Sevaldson, 2022)." Here, systems are approached with freedom and flexibility that better fits the needs of design practices. Sevaldson writes that "design reflects the mess of human life and the constant struggle between order and chaos as well as control and anarchy" (Sevaldson, 2022). System thinking, when applied in design, should reflect this.

Systems-oriented design is a "design methodology and design practice that is especially geared toward understanding and working with complex systems" (Sevaldson, 2022). Five features characterize systems-oriented design: (1)

"systems are everywhere"; (2) "we must look beyond the object"; (3) "systems are dynamic"; (4) "we must look at the Gestalt of the system"; (5) "designing means working with systems" (Sevaldson, 2022). The first suggests that many mundane things are part of a system or a system of systems. Therefore, systems can be seen everywhere, and everything can be seen as part of a system. The systems-oriented approach aids designers in seeing the world in this way. The second point implies that every object results from complex systemic processes. Instead of looking at objects per se, attention is focused on understanding how different elements within the system interact and impact one another. Third, the systems are seen as constantly evolving entities and moving targets for design. Fourth, we should maintain an overview perspective of the system and avoid a reductionist approach. From this point of view, the whole is more than the sum of its parts. Lastly, the essence of design is to deal with systems. If systems are everywhere, then design is inherently systemic. Further, design may be the best way to deal with systems. These five points can also be seen as necessary changes in mindset for a systems-oriented approach (Sevaldson, 2022).

According to Sevaldson, systems-oriented design is, first and foremost, a design practice (Sevaldson, 2022). This is a central distinction in this article and the lens through which we look at systems thinking in this context. In this chapter, we look at systems thinking from the perspective of design practice as a pragmatic, hands-on method for the "real-world" practice of urban planning and service design. Design is often messy, fussy, blurry, and unruly. Systems-oriented design is an applicable tool that helps designers navigate or "muddle through" (Lindblom, 2018) the complexities of the day-to-day life of design. In this vein, the representations of systems, such as maps, do not aim to be "scientific" representations of the subject matter. These representations are not "right" or "wrong," but they can either succeed or fail in capturing the relationships and central aspects of the things they convey (Hummelbrunner, 2011; Sevaldson, 2022) for the people involved in making them.

Systems-oriented design has been applied to many design areas, including large-scale, complex, societal, and governmental projects (Sevaldson, 2022, p. 15). In urban planning, little academic research has been done on applying systems-oriented design. However, for example, Chen et al. (2020) have explored Systems-oriented design as a toolkit for city analysis. Systems thinking has been more broadly developed and applied in urban planning by J.W. Forrester (1970), Christopher Alexander (1964, 1977), and Peter M. Groffman et al. (2017).

When applied in urban contexts, systems-oriented service design occurs at the intersection of service design, urban design, and systems-oriented design (Figure 7.3). Systemic wicked problems can be addressed at this intersection through interdisciplinary collaboration. The inherent quality of the design as an intentional action to create representations is what builds the foundation for this union between practitioners. The vehicle of exploration and collaboration used for systems-oriented service design is Gigamapping, explored in the next section.
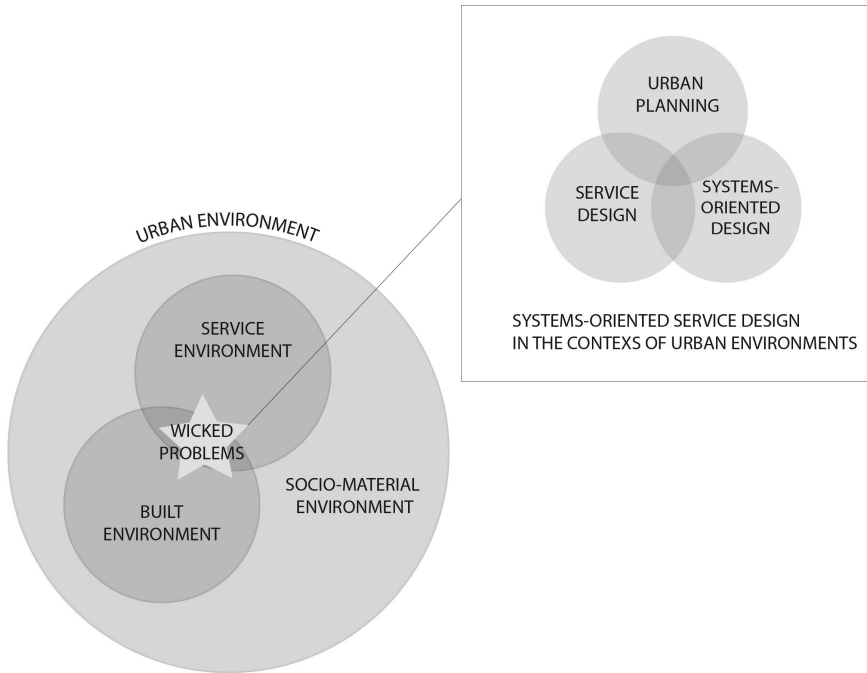
FIGURE 7.3   Urban environments consist of socio-material, service, and built environ-
ments. Urban environments are also systems that consist of subsystems. At
the intersection of socio-material, service, and built environments lie the
wicked problems in urban planning. These entities' entanglement and sys-
temic characteristics should be considered to tackle the wicked problems
of urban environments. Systems-oriented service design may help address
the wicked problems of urban environments, which arise at the intersection
of service design, urban planning, and systems-oriented design.

4.3   *Gigamaps in systems-oriented service design approach*

Systems-oriented design is considered a mindset or a worldview but also a prac-
tice. It is defined as a methodology without fixed methods and specific guide-
lines for practicing it (Sevaldson 2022). With that in mind, the primary tool of
systems-oriented design is Gigamapping. According to Sevaldson, it is "an exten-
sive genre and category breaching mapping method to grasp complexity across
artificial silos and ruptures, across scales and sectors" (Sevaldson, 2022).

Gigamaps are a tool for design and can, therefore, serve as an analytical and
creative tool. The map is a process tool not necessarily intended for communication
beyond its producers. The Gigamap may help its makers understand the system's
structure, shape, complexity, and other central features. Gigamapping is a tool that

enables the exploration and development of relations across various fields, silos, boundaries, and disciplines. It may also support dialogues in teams across various scales and groups of people (Sevaldson 2022).

The possible benefits of using Gigamaps for design in urban contexts could be many and diverse. Gigamaps may help stakeholders understand that the challenge they face is very complex and cannot be solved with easy fixes. Gigamap may also be used to map existing knowledge and identify possible knowledge gaps. It may help to find what Sevaldson calls "unknown unknowns," which are problems we do not know yet. Gigamaps may act as a tool to analyze, discuss, and gain feedback from relevant stakeholders. It may also be helpful as a collaborative tool for open-ended yet focused conversations, which can help identify problems, ideas, and places for intervention. Gigamapping is a method that allows actors to transform from descriptive mapping to analysis of relationships and entities. Implementing and combining the discussed techniques are possibly the fastest way for designers to acquire deep and wide insights into their collaborators' or clients' needs and potential (Sevaldson, 2022).

Gigamaps can operate as boundary objects for information and knowledge creation between stakeholders. The concept was introduced by Star and Griesemer (1989, p. 393), saying that

> boundary objects are objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use and become strongly structured in individual-site use. They may be abstract or concrete. They have different meanings in different social worlds, but their structure is common enough to more than one world to make them recognizable, a means of translation. The creation and management of boundary objects is key in developing and maintaining coherence across intersecting social worlds.

The value of Gigamaps in systems-oriented service design is their possibilities as boundary objects between the different actors involved in the design process.

As shared boundary objects, mapping may help gain an understanding of complex issues quickly. However, it is essential to acknowledge that complex issues can never be fully comprehended by relying on one approach. Gigamaps may aid "assumptions to be triangulated, balanced, and negotiated between the different explanatory models and world views. The approach does not aim to overcome uncertainty but leans toward it to harness different perspectives, skills, and domains. It allows us to 'navigate and design within a state of uncertainty'" (Sevaldson, 2022). Gigamaps as design representations and boundary objects may help actors share and navigate uncertainty through collaboration.

Therefore, what we propose is that the Gigamaps in systems-oriented service design in urban environments could incorporate knowledge and perspectives of the

socio-material, built, and service environments and bring together service design, urban planning, and systems-oriented design perspectives in one shared design representation operating as a boundary object (Figure 7.3).

5   Discussion and conclusion

Services are a central part of citizens' well-being in urban environments. The design of urban services is crucial but challenging in the context of urban planning. Urban environments can be identified as systems, making them very complex, interconnected, dynamic, and ultimately moving targets for design. Designers must consider the current global crises when formulating design proposals. These factors make the design of services in urban planning a challenging and multi-faceted task or a wicked problem, as we have discussed.

Many stakeholders, including government agencies, community groups, and individuals, are involved in the design process. A city-wide system perspective is needed, as urban planning involves integrating land use, housing, transport, services, and economic development on different spatial levels and sectors of government. We see systems-oriented design as a pragmatic tool for design and a boundary object around which many stakeholders can gather to understand the multiple perspectives that exist in the real world of urban planning. We have explored systems-oriented service design and Gigamapping as tools for addressing these wicked problems in urban planning and suggested that Gigamaps can operate as design representations and boundary objects between stakeholders in urban planning and as analytical and creative tools for design.

Systems-oriented service design is needed in the intersection of urban planning and service design. It is a natural expansion of service design practices toward a more systems-oriented direction. Even though holism and understanding of systems are engraved in service design, we still lack the tools and practices to achieve this aim. Gigamap, as a systems-oriented design tool, should be explored as a solution. This development is a sound step, as service design and systems-oriented design combine the user-centric approach and focus on service experience with the worldview of systems-oriented design, which leans toward bracing complexity and crossing traditional boundaries of design.

Systems-oriented service design should not be seen as an antidote to all problems but as a small step toward finding comprehensive design strategies for designing services in urban environments. It is essential to acknowledge that, as Sevaldson points out, complexity cannot be designed away (Sevaldson, 2022). Complexity is a characteristic of systemic problems. In the vein of what Rittel and Webber and others after them have discussed about the characteristics of wicked problems, it is valid to question if we should discuss "solving" problems in this context. However, it should only discuss design proposals that can either lean toward being better or worse, never right or wrong. What systems-oriented service design may do is aid with embracing complexity and help accept its existence in cross-disciplinary work.

Systems-oriented service design could be very well applied in "designerly" practices of professional designers, but also in transdisciplinary work that includes actors of many backgrounds. Systems-oriented design can also be criticized for incorporating multiple perspectives and knowledge from different domains into the same system without recognizing that they might come from utterly different ontological and epistemic grounds. How do these pieces of knowledge relate to each other? How are they valued and weighed with each other? In practical terms, can the same system entail knowledge about budgets, user understanding, legislation, and questions of inequality?

We argue that the complexities of the "real world" exist for designers whether we make representations of this notion. All these perspectives must be discussed and negotiated when service design is done in an urban environment. Systems-oriented service design makes this visible and brings the domains to the same plane of complexity. Messiness is present in design and is made visible by systems-oriented design practices. With systems-oriented service design, we can marvel together at the complexity of our design problems and lean into their wickedness.

A more urgent question concerns the challenge of selecting and justifying the integration of information in design. One of the key ideas in all evidence-informed design and planning is putting "right" information into the design process. This question is as vital as ever in systems-oriented approaches. It is essential to discuss what information should be incorporated into systemic modeling tools such as Gigamaps and how designers can be aided in selecting the "right" information, whatever that may mean.

An even bigger question is whether all that we have discussed in this chapter is only a gateway to a broader conversation about the possible need for "service planning" that combines the design of services and service network planning together and operates at the level of cities and regions as a systems-oriented perspective. In this chapter, we have discussed the need for a more comprehensive and systems-oriented approach to the design of urban services and service networks and explored Gigamaps as a practical tool for this aim. Beyond this, we should have a broader conversation about the strategies and the means cities have in designing services in a way that better considers the socio-material environment. This is something that should be explored and discussed in future research.

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Systemic service design cases

8

CASE STUDY OF MESS MAPPING PROCESS

Improving long-term care services

Robert E. Horn

1   Editors' preface

Robert E. Horn is known as the forefather in mapping in the field of systems design. He is a legend of his time and has been requested by several governments in the United States and abroad to map grand challenges such as nuclear waste planning in the UK, or via information murals aid in strategic development for organizations such as the World Business Council on Sustainable Development Task Force–Vision 2050 or European Commission-sponsored project on resource efficiency by 2050 (Foresight Canada 2024).

Robert Horn started the practice, which has become known as Mess Maps, as now we are dealing with higher complexity situations. While most people know Bob Horn from his huge impact on the art and design of infographics, fewer know about his practice in mapping complex situations, known as "messes" in the colorful expression of systems thinker Russell Ackoff. As Horn's work was found in popular media, as a practitioner, many of us first learned about his ideas and work directly from the actual products of visual explanations and infographics. Many of Bob's academic publications are found in the 1970s and even as early as 1969. As a pioneer in information design, Horn developed the field when computer-based visualization tools had not even been invented yet. Since then he has influenced design, and systems thinking, across a long career and created the earliest forms of the practices that we have since formalized and teach in systemic and service design,

Perhaps his best-known (or cited) article in the literature was in Jacobson's (1999) influential collection *Information Design*. For the current collection in Systemic Service Design, where we have sought the state of the art in another emerging area of design practice, we are delighted to include Robert Horn's latest contribution, which remains current and informative for creative practices in

dealing with complexity. With Bob's work now covering over 50 years of contributions in design and visual thinking, we believe this chapter will add to our knowledge and practices for a new generation of "systemic" service designers.

Horn has taught at Harvard and Columbia Universities and was a research scholar and artist in the Human Sciences and Technology Advanced Research Institute at Stanford University. Beyond it, he is also the chief executive officer of MacroVu.com and a Fellow of The World Academy of Art & Science (WAAS).

2   The concept of "social messes"

Often we do not seem to be making progress on our so-called social and political problems. The focus of this chapter is to show how we misconceive these problems. The way we represent problems to ourselves is a direct result of our way of thinking about them. Too often our scholars, analysts, media observers, and politicians have ignored the deep difficulties that a whole series of interrelated problems presents to society. The task forces and committees we assign solve our problems rarely start by understanding the mess they have found themselves in. Instead, they often superficially analyze a few of the causes and costs of the "problem" and immediately move to formulating recommendation. If we are to make any progress, we need to be far more modest about our understanding of the looming issues we face. We need to start thinking about a great deal of our world as a collection of social messes.

Russell Ackoff observed that we do not have an English word for "an interrelated set of problems, *a system of problems*." He suggested that we use the technical term "mess" for this situation. The Mess Mapping process is a practical application of Ackoff's idea for various organizational contexts that are stuck or in conflict. In many organizational meetings, high-level directors experiencing the mess are typically gathered together for a series of half-day sessions. They are asked to describe the mess from their own standpoint, which is how their organization or group is suffering as a result of one or more of the inter-related problems.

Russell Ackoff originated the concept of a mess, as follows:

We have also come to realize that no problem ever exists in complete isolation. Every problem interacts with other problems and is therefore part of *a set of interrelated problems, a system of problems*. For example, the race problem, the poverty problem, the urban problem, and the crime problem, to mention but a few, are clearly interrelated. Furthermore, solutions to most problems produce other problems; for example, buying a car may solve a transportation problem but it may also create a need for a garage, a financial problem, a maintenance problem, and conflict among family members for its use. English does not contain a suitable word for "system of problems." Therefore, I have had to coin one. I choose to call such a system a *mess*.

(Ackoff, 1974, pp. 20–21)

Complex problems have been called "wicked problems" (Horst Rittel) and "ill-structured problems," (Ian Mitroff). I call them "social messes" (after Russell Ackoff, who simply referred to them as "messes").

What they are *not* is merely "problems." Problems have solutions.

Social messes do not have straightforward "solutions." (Sometimes they have resolutions or "progress" is made on them.)

2.1   *Social messes (synonyms: wicked problems; ill-structured problems; messes)*

Social messes are those systemically interrelated problems about which different people have very different perceptions and values concerning their nature, their causes, their boundaries, and their solutions. They are the problems that immediately bring out at least two or more points of view at their first mention.

2.2   *Characteristics of social messes*

Most messes are interconnected to other messes and to lesser problems. Data about them are often, partial, uncertain, ambiguous, or missing (and sometimes downright wrong). Since different views of problems and solutions are contradictory, there are many contradictory intervention points as well. Risk is often difficult or impossible to calculate, and therefore, consequences of different action plans are difficult to imagine and assess.

Social messes, thus, have these principal characteristics:

- complicated, complex, and ambiguous
- much uncertainty, even as to what the "problems" are, let alone what the "solutions" might be
- great constraints
- tightly interconnected, economically, socially, politically, technologically
- seen differently from different points of view, and quite different worldviews
- contain many value conflicts
- are often a-logical or illogical.

Messes represent the context in which business and government strategies are made (Horn, 2005). They are the underlying situations that produce what we call the uncertainties and risks involved in business and government strategy, or "public messes." Figure 8.1 shows a simple diagram of such a complex mess.

You can start anywhere in the diagram and navigate anywhere within it. Start, for example, at the inner city in America, the connection with drug gangs, which connect to the US government's war on drugs (a very expensive proposition), which connects to the nation of Columbia, where the drug is cultivated and manufactured, and the war on the Mexican border that has cost 20,000 lives in the last few years.
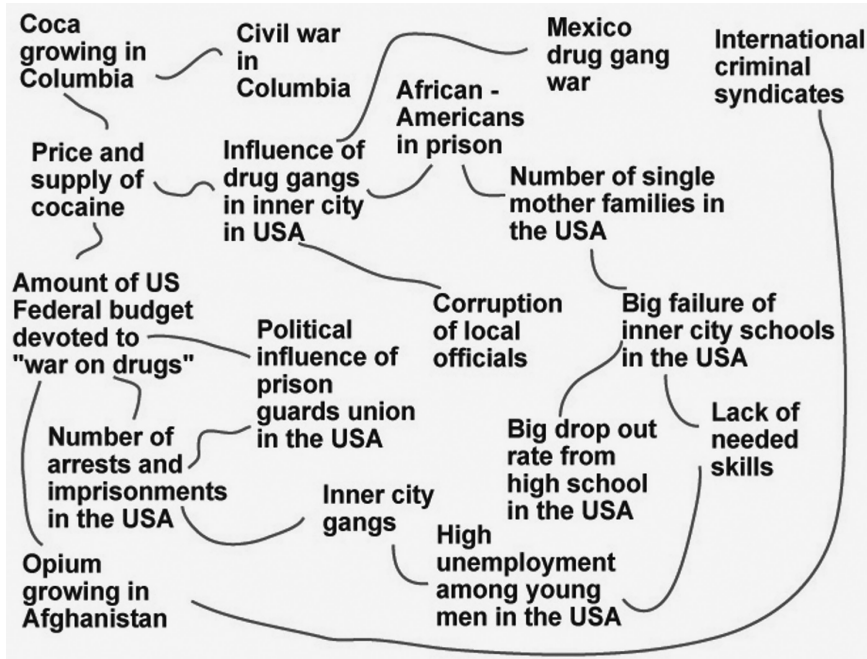
FIGURE 8.1 Simple system diagram of a public mess.

And then we can add Afghanistan, a major supplier of opium, that becomes heroin, the wars in the Middle East, and so on.

How do we name such a mess? I call this one the inner-city-drug-war-drug-gangs-drop-out-rate-unemployment-prison-guards-Mexico-Columbia-Afghanistan mess. But naming the mess is not really an important issue. The diagram is used as a tool for understanding.

Some of our messes have been in existence for a long time, such as poverty and environmental degradation, for example. Other messes, such as nuclear weapons proliferation, ocean acidification, cybercrime, and cyberterrorism, are more recent.

We need to develop some better processes and tools for dealing with our messes. They are very complex, demanding new concepts, new representational tools, new group processes, and perhaps new software to support us in their resolution.

In this chapter, I outline the progress made in these developments. The first key concept was introduced as Russell Ackoff's proposition of a mess as an interrelated group of problems and other messes. Ackoff introduces the idea by suggesting this background:

> In the Machine Age problems were thought of as "out there," as purely objective states of affairs. But John Dewey, the great American philosopher challenged this notion and argued that decision makers have to extract problems from the

situations in which they find themselves. They do so, he said, by the situation. Hence problems are products of thought acting on environments; they are elements of problematic situations that are abstracted from these situations by analysis. What we experience, therefore, are problematic situations, not problems which, like atoms and cells, are conceptual constructs.

(1974, p. 21)

Beyond the initial framing of the mess concept, there are other challenges we must address, including the idea that we cannot identify precisely the boundaries of the problems, that we will have to proceed in a partial fog, and that we are not going to be able to ultimately eliminate the fog from obscuring parts of the different problem areas that comprise the mess. We must embrace the relatively recent flourishing of the idea that groups of people with very different backgrounds, perspectives, and experience are necessary to help us analyze the messes. We have to deeply understand that no one has ever approached a complete concept or resolution of these social messes. Crucially, we have to be able to provide the group addressing them with representations (we call them "Mess Maps") that will help them create, as a group, *common mental models* of the mess.

3   A process for Mess Mapping

In our group mapping processes, high-level directors experiencing the mess for their organizations are usually gathered for a series of half-day meetings. They are identified and selected by the typically more political leaders who are experiencing their own version of the mess, and are dealing with the stuckness of some of the organizations and processes they control.

Once assembled, the directors are asked to discuss the mess each from their standpoint, which is how their organization or group is suffering as a result of one or more of the interrelated problems. Usually, consultants or recorders develop a visual representation of these descriptions of interrelated problems on a template of a Mess Map. These notes are then synthesized, printed, and brought back to the executives for editing and interlinking. This is a general explanation. As you will see, the details are very important and distinguish the mass mapping process from many other group processes.

Several of these Mess Mapping processes have been conducted for service delivery organizations at the county level. A case study follows of one such Mess Mapping process and project.

4   Alameda long-term care

Our case study is of a long-term care program in Alameda county, a region located directly across the bay from San Francisco, with a population of approximately 1.5 million people. In 2001, an organizational development (OD) consultant

contacted me to invite me to join their project, which was to improve the delivery of services to the elderly and disabled in the county. They had tried a number of methodologies over several years to move forward, without success. It had been suggested that a Mess Mapping process might help where other approaches had failed.

4.1   Mapping structure

Working with the OD consultant, we created a rough visual template of the organizations involved on a large table size (24 × 36 inches) piece of paper.

Figure 8.2 shows an image of the template.

4.2   Meeting process

Approximately 15 directors or senior managers of the organizations involved in delivering services to the elderly and disabled in the county were assembled for the first half-day meeting. They were divided into smaller sub-groups at tables with
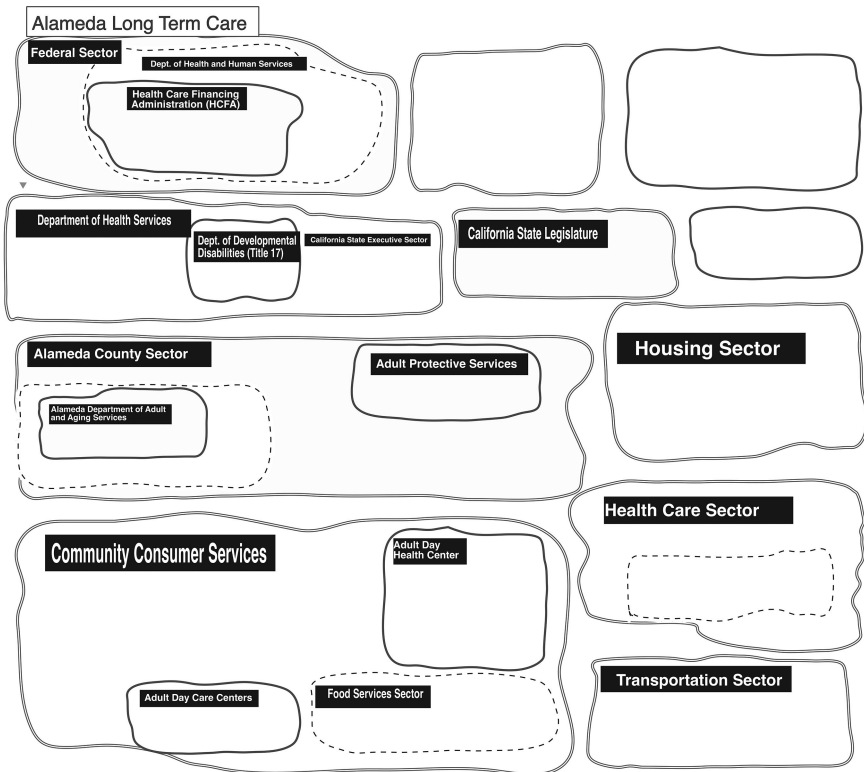
FIGURE 8.2   Mapping template for Alameda County case.

three to five people. I pointed out the sectors and organizations on the template and asked them to describe how their organization was experiencing the mess. *How was it painful for their* organizations? Our assumption was that the best way to identify a problem was by involving people from the organizations experiencing the pain. They then spent about three hours, adding to our template their descriptions of how the problems were seen *from their point of view*.

We had recorders at each of the tables to write down how they described their suffering, and described their problems. Recorders assembled their notes at the end of the meeting into single visualization.

In between the half-day meetings, we then sketched an initial draft of the Mess Map using visualization software on a computer. The software allowed us to subsequently modify and improve the map in successive versions as we asked in subsequent half-day meetings of the directors.

4.3 Mapping in multiple meetings

In the second meeting, we handed out new printed versions of the draft Mess Map and divided the task force again into table size sub-groups again. We asked them to edit and change and correct the problem boxes. We asked if our recorders had correctly captured the pain of each organization correctly. Was there anything directors wanted to add?

We then asked them to describe *what is holding the problems in place*? In other words, identify the causes of the problems. This was our way of beginning to identify and represent the systematic inner relationships of the problems, as perceived by the directors. The recorders wrote down what the causes mentioned.

Here the directors had to specify what phenomena or structures were holding their problems in place. These often were policies, regulations, or laws that exist outside the boundaries of the organization experiencing the problem or pain. That is to emphasize that the causes holding the problems in place came from other organizations across the boundaries. Or they were customary habits or behaviors of organizations, other than their own, over which they had no control. In one sense, the context of many of the organizations involved was that of having too many phenomena, behaviors, or structures that caused pain.

The recorders also added arrows, meaning influences or causes, between the problems, and the descriptions of the events and phenomena they had identified as holding the problems in place.

The identification of these causes and their discussion in the groups and their representation on the prototype Mess Maps took an additional two half-day meetings.

Our recorders continued to take notes and we continued to add and integrate them to improving, iterative versions of the emerging Mess Map on the computer.

Directors were also provided with copies of these improved printed versions of the maps, so that they could take them back to their organizations to gather more information and share with their staff members for updates and feedback.

4.4 *Phenomena, structures, societal habits, behavior of others*

Not surprisingly many of the problems were caused by multiple factors. We did not attempt to obtain any kind of consensus on the major causes. Initially, they were often obvious to the participant directors. But also, it had been necessary, sometimes to resist the proliferation of causes, while still trying to unravel the tangle of causality in the mess. Facilitators would sometimes push back on task force members with the question: *Is it really an important cause? Is that what is really keeping the problem in place?*

From inside the blobs many problems are identified or expressed by considerations such as "we can't do that because we depend on permissions, funds, timely information, referrals, resources, vetoes, etc. from other organizations across the boundary of our silo."

The final map (Figure 8.3) and the recommendations of the test scores were presented to the county commissioners in a public session. One of the commissioners
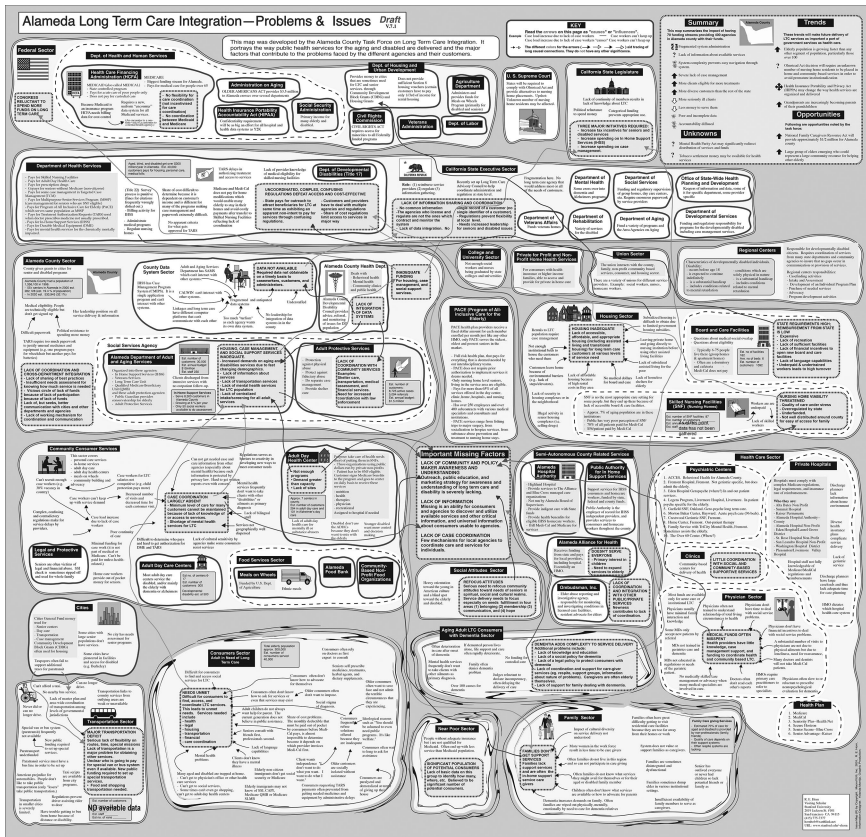
FIGURE 8.3   Final version of the Alameda Mess Map (Horn, 2016).

thanked the task force for not producing another 80-page report that he would have to read. And the commissioners were happy that the recommendations did not involve the appropriation of new funds.

5   Visual components of the map

Here we pause to look at how specific kinds of elements have been presented visually on the Mess Maps.

5.1   Blobs – captures organizations or sectors involved in the mess

The prototype template presented to the participants on their small tables at the beginning of the Mess Mapping process are composed of blobs. One of the interesting things we have found in dealing with these groups is that attempting to create engineering-like diagrams with carefully drawn boxes, is something the participants do *not* like. They always get a chuckle when the facilitator tells them all they have to do is put their problems into blobs.

5.2   Phenomena, rules, law, structure, behavior

The various contributors to holding the problem employees are written out in short phrases or sentences contained in the blobs. Figure 8.4 shows a detailed example of a blob and problem box.

5.3   Problem boxes

Within the blobs, we do eventually outline carefully the problems after the participants have been working together for a while and are comfortable with the visualizations. Yellow is used to highlight that what we are doing in the Mess Mapping process is interlinking visually the problems that are expressed by the participants.

Aging Adult LTC Consumers with Dementia Sector

Often deterioration in care after onset of dementia

If demented person lives alone, life support and care often rapidly deteriorate.

Mental health services frequently don't want to take clients with other ailments as primary diagnosis.

Family often denies dementia problem

No funding for custodial care

Judges reluctant to declare incompetency, often delaying the delivery of care

Over 100 causes for dementia

DEMENTIA ADDS COMPLEXITY TO SERVICE DELIVERY
Additional problems include:
- Lack of knowledge and education
- Lack of a social policy for dementia
- Lack of a legal policy to protect consumers with dementia
- Lack of coordination and support for care-giver services (eg. respite, support groups, information about nature of problems). Caregivers are often elderly themselves.
- Lack of support for family dealing with denmentia.

FIGURE 8.4   Detail of a Mess Map showing a sector blob and a problem box.

5.4 *Example of problem boxes*

Transportation sector

- Serious lack of flexibility on route time and special missions.
- Lack of transportation is a major problem for obtaining other services.
- Unclear who is going to pay for a special van or bus system, even if available. New public funding required to set up special transportation services.
- Food and shopping transportation needed.

Alameda department of adult and aging services

- Lack of information about services.
- Lack of mental health services for the long-term care population.
- Lack of centralized intake and screening for all adult services.

If a mess, is to be shared with larger groups who have not been involved in the creation process, it is sometimes important to include show explanatory, definitions, or other information and data that will help these groups.

5.5 *Different perspectives*

One of the general rules of diagramming or visualization is that you should not put too much into a single diagram if you want people from outside of your creation team to use the diagram. This requires different visualizations with different perspectives. In the Alameda case, one of the perspectives that was identified in the group meetings was that funding was coming from multiple levels government in silos. This was complicated enough to require a separate visualization illustrated in Figure 8.5.

6 Discussion

Looking back to review a number of Mess Mapping processes, we can see that putting together some old concepts, and some relatively new ones produce useful ways of working through messes.

6.1 *A visual large-group process for capturing expertise*

The Mess Mapping process is a way to provide the input to a process for more efficiently and effectively capturing and synthesizing group expertise early in a task group project. It is based on the assumption that *multidisciplinary task groups need special forms of group process for them to use well the expertise assembled*. Too often such groups try to lecture to each other and nearly everybody in such a group of smart people has already arrived with "solutions" to the problem. This interferes with deeper exploration of the mess, as well as often preventing creative exchange.

The Silo Phenomena

Over 100 different Federal, State, and local funding programs and over 800 delivery agencies in one county

Key Characteristics
- Separate funding organizations
- Separate and unique eligibilities
- Separate and unique regulations
- Different information systems
- No structural coordination

1 Some Federal funds go directly to the County

2 Some Federal funds go directly to the State and then to the County

9 Virtually no coordination system and no information system to tie funding programs and their services together

5 Some funds have only Federal regulations; some have only State regulations; some have both Federal and State regulations

3 Some programs are funded by the State

4 Some programs are locally funded and have unique criteria

8 Little or no case coordination for individual consumer

Federal   Federal   State   County

Meals on Wheels

Skilled Nursing Facility   Hospital   **Alameda County**   7 Individual consumer must go from agency to agency to get services   In-home support

This map was prepared for the Alameda County Task Force on Long Term Care Integration by Trilogy Integrated Resources (Bruce Bronzan, President) and R. E. Horn

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6 Separate individual agencies deliver services (e.g. food, housing, medical, etc.)   Senior Center   Transportation services

FIGURE 8.5   A different view of one aspect of the Alameda mess.

The use of the concept of a "mess" as an interrelated set of problems breaks that initial set and challenges the experts to work together to produce an analysis they wouldn't have produced by themselves or in a conventional group process to focus on structure function and solutions. This reframing changes their motivation from displaying their expertise to involvement in exploring new territory together.

The use of the physical metaphor of a "map" also intrigues them. The abstract concept of a mess intrigues and reframes the task groups. It draws on their experiences of navigating in new territory as well as in the process of constructing the map which changes significantly over several sessions.

6.1.1   Avoiding single answer and single root cause

Too many task groups want THE answer. Too many are looking for a singular root cause. The mess reframing helps avoid these pressures in groups.

6.1.2   Enables a different kind of listening

A second idea is that the visualization or Mess Map enables the participants to listen to each other's suffering and to incorporate the causal in the linkages of this suffering to their idea of problems. They listen in a different way. Creating a Mess Map together enables them to begin collaborating and understanding that: "I am creating your problems and you are creating my problems." This is visually represented on the maps as well. Mess Mapping focuses on better understanding the situation that the organizations together create.

6.1.3   Different understanding of causality

Among the concepts used in Mess Mapping is a different framing of causality: What is holding the problem in place? These barriers are labeled, often providing participants ways to imagine other ways of relieving the suffering.

One of the interesting and novel ideas that appeared in the creation of the mapping mess process. What is the idea that problems will disappear if they were not one or more causes keeping them in place so that was one of the criteria for problems. Did they caused pain to a person or an organization and were there causes holding them in place?

6.1.4   Causes are largely anthropogenic

In the Mess Mapping process, we often see that the causes of shared problems are largely anthropogenic, or human-caused. We cause many of our own messes by the way we generate our systems, by our rules, our boundaries, our fears, our budgets, our bureaucratic turf protection, and our organizational empire building.

6.2   Different levels of analysis for social messes lead to different levels of map detail

Messes can be analyzed and described at different levels of focus. For example, we have helped county task forces on mental health, long-term care of the elderly, and national and international task forces to address their messes. Figure 8.6 is an example showing potential levels of Mess Maps of the Alameda County long-term care issue. The single map illustrates the county, and units within the county system. We can also show context in the map, that Alameda County is embedded in the state and national levels.

6.3   Feelings of ownership of the product of the group process

Collaboration is necessary for people to own their own work products. Working together enables the task group over time to take considerable ownership in the Mess Map. Working together also contributes to the experience of building shared expertise of a group mind, especially since the facilitator continually emphasizes that what we are after here is a "common mental model" of the mess.

6.4   The effect of the blobs and messes nomenclature and graphic form

The terminology of the "mess" and blob is meant to be naturalistic, in a common and unfussy vernacular, enabling experts and senior staff to let down their guard and participate more fully. The deliberate use of "blobs" as the major visual element relaxes the experts' tendency to be overly precise, as we encourage a learning context where high precision is generally not helpful.
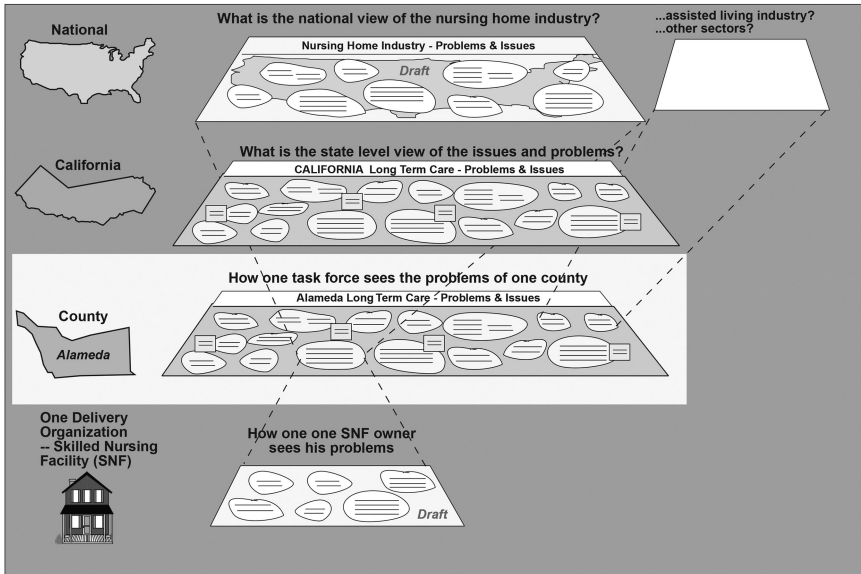
FIGURE 8.6   Levels within Mess Maps.

The facilitator normally emphasizes that blobs are easier to work with than rectangles. Blobs are not as demanding of participants as neat and tidy rectangles. Curved and loopy arrows add to the messiness of the drawings. The curvy arrows and blobs portray that a more humanistic style is preferred, and they remind partici-pants that they are working with ideas, not engineering drawings.

Blobs also introduce an element of playfulness in situations of considerable seriousness which most of the task groups are addressing. It is well-known that playfulness aids creativity, both in individuals and in groups.

6.4.1   No final report

One of the interesting things about the working groups that have created Mess Maps is that *they did not write final narrative reports*, reports that they strongly suspected would not be read. They felt their maps and scenarios were the best rep-resentation of the issues and so they gave the maps and scenarios themselves to key decision-makers and authorities as their report. For recommendations, the Alameda task force created another visualization shown as Figure 8.7.

6.4.2   Social learning processes

We view the use of Mess Maps as important new social learning capabilities for communities and organizations to work through their messy problems. Other small group, task force processes are inherently opportunities for social learning because
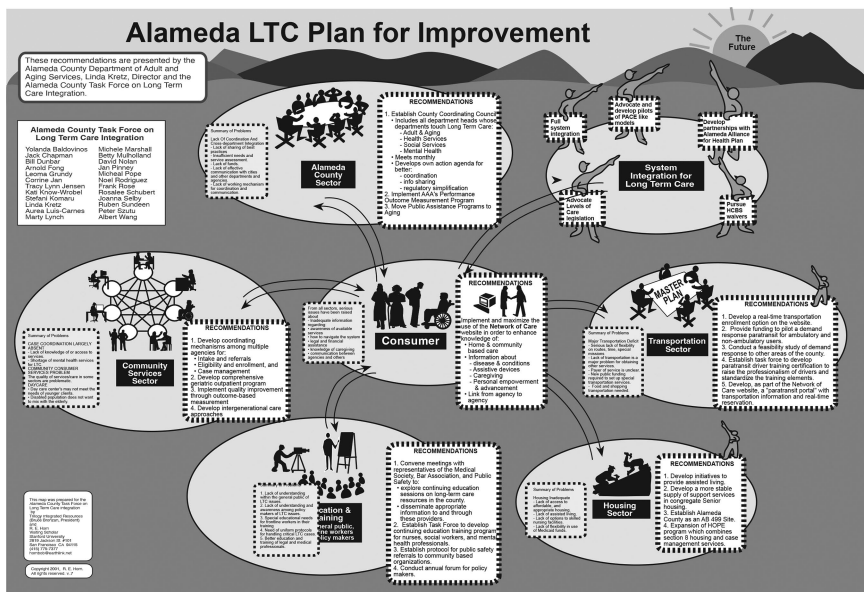
FIGURE 8.7 Final report of the Alameda project as presented to county supervisors.

the messes we face must be dealt with together. Every member of a task group has something to contribute. It is only when we learn together, and only when we can begin to represent concretely our common understandings that we can make rapid progress with our social messes. Only through group processes that facilitate social learning can working groups begin to untangle one or another of the several messes that affect our individual and collective lives.

6.4.3   Different approach to exploring frontiers

Mess Maps can be used in other ways that we have illustrated with the Alameda case. For example, in 2005, we used a Mess Mapping exercise as one of the inter-active processes in the "PanDefense 1.0" conference that was held to put Avian Flu on the public agenda. We used the process to help the group contribute their expertise to elaborating aspects of the mess that had not already been identified in the scientific literature. In this way, it was a "stage setting" exercise to help the conferees move on to the major goals of the conference: (1) to focus on increasing public policy awareness of an avian flu pandemic, and (2) to identify gaps in what was being done to prepare for that possibility.

7   Following the Mess Map process

A further phase usually follows the Mess Mapping phase of a task force group and may involve a number of standard organizational interventions. I will describe a

few of the ones we have used. But I want to emphasize that it is very important to keep the Mess Mapping separate and distinct from the "what to do about the mess phase."

I've emphasized that Mess Mapping is a way for task groups to get into their issues. It is an initial stage process. It enables groups to get started to form common mental models is the issues, to learn about each other, and to quickly achieve clarity about the interrelated set of problems they face.

Because working groups typically make recommendations on the basis of their study, they have to focus on the network of forces that are creating and maintaining the messes while at the same time impeding their resolution. And because these causes often *cross boundaries* of existing sectors and organizations, the initial formal name for Mess Maps was "cross boundary causality maps."

But what happens after the mapping? The short answer is "It depends." Different task groups with different missions make progress using quite different next steps. I'll talk about each of them. Please note that any of these next steps can be combined in a single project.

1   Focus on creating solutions to the multiple problems identified – all at once

One of the most difficult problems that surfaced from the Mess Mapping exercise was the difficulty of identifying changes that could be made without requiring new legislation to change the entire structure. This was a very difficult problem.

In the Mess Map we made with the Alameda Long Term Care Integration Task Force, we had the team brainstorm solutions to the approx. 30 problem boxes in an hour and a half. We set a time limit of a maximum of four minutes per problem-solution brainstorm segment for each identified problem. The task force came up with a complete set of recommendations to the county supervisors who had appointed them.

2   Use the Mess Map as the centerpiece of an organization-wide dialog

We did a Mess Mapping process for the health insurance organization of the Methodist Church (Horn, 2016). They were struggling with the question of why Methodist ministers were among the least healthy of all professionals in the United States. After creating a Mess Map that looked like this with their nation-wide task force, they decided to use the map as a tool around which dialogs about the mess could be conducted in congregations across the country. This would lay the groundwork for a wider organizational discussion about changes that needed to be made in the church's structure and organization.

After the Mess Mapping process what is completed, another task force was formed and worked for a year and a half – deepening their understanding of the issues and taking the Mess Map back to their home congregations and organizations to ponder the meaning of it before coming up with recommendations. This

very large dialog throughout multiple levels of the church has produced a set of recommendations for organizational change. What was important the process was the reframing of the mess, not one about insurance or the clergy, but about organizational and systemic issues that needed restructuring. Helped start a process of a church-wide study that is resulting in major changes in how the church (of 10 million members) organizes itself.

3 Move on to a scenario planning process to suggest ways of resolving the messes

Another way of taking what has been learned in Mess Mapping for groups involved in thinking strategically, is to use a scenario planning exercise. It has to deeply involve the decisions makers who will be guiding and managing the multi-year strategy. It is one of the ways to begin to resolve – not solve – the social messes that we attempt to understand with the Mess Mapping process. Among the several scenario approaches possible, I prefer the one that provides several alternative scenarios that incorporate critical events supported by reasonable assumptions and portrayed visually. We have done this in our climate change and energy security work.

8   Conclusion

Following Russell Ackoff's suggestion, this case study demonstrates that Mess Mapping is a distinct process for addressing a situation where many organizations contribute to each other's systemic network of problems.

Among the important properties illustrated in the case are:

- Usually Mess Mapping is used when multiple organizations are "stuck" or when many parts of old single large organization are stuck.
- The problems that are systemically interrelated can be located within particular organizations by ensuring that the director, or deputy director of the organizations, involved is present at the Mess Mapping process meetings.
- That asking of the directors to help create the map enables them to listen to each other more easily.
- That many of the causes of an organization's problems involve crossing one or more boundaries of the organization and hence are in someway caused by other organizations.
- That an important way to think about causes of systemic problems is to ask what is holding the problem in place.
- To make progress in improving the mess, one of the possibilities is to ask the participants in the process to solve all the problems together at once, rather than attempt to solve one problem at a time.

  – That an important factor is to focus the efforts of the group on carefully describing the inter relationships of the problems, and not addressing solutions in the midst of securing a good description of the inter-relationships of the individual problems.

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9

SOCIAL STRUCTURES RELEVANT TO LONGEVITY SERVICE SYSTEMS

Sheng-Hung Lee, Joseph Coughlin, Eric Klopfer, Olivier de Weck, John Ochsendorf and Sofie Hodara

1 Introduction

Services play a crucial role in modern economies, constituting a significant portion of economic output and employment (Wizinsky, 2022; Downe, 2021). The service sector's growth reflects changes in society (Meroni & Selloni, 2022; Meroni & Sangiorgi, 2011) and the economy, moving away from manufacturing-based economies to those where information, knowledge, and creativity are primary drivers of economic activity. With emerging technologies (Lee, Yang, et al., 2023; Hamid & Suoheimo, 2023; Etkin, 2021), supportive education, accessible healthcare systems, and other critical social infrastructures and governmental policies, people's life spans and health spans have been extended (Norman, 2024; Justice, 2019; Schwab, 2016). The World Health Organization (2022) estimated that the world's population over 60 years old will approximately double from 12% to 22% between 2015 and 2050. This transformation will greatly impact our lives and perceptions of work (Welch & Krystopowicz, 2023; Lim & Gandini, 2022).

1.1 Context: longevity, service systems, and financial planning

Longevity economics (A. Scott, 2024; Gratton & Scott, 2017) studies the economic implications of increasing life expectancy and an aging population. This field encompasses topics including the labor market, healthcare costs, economic growth and productivity, and policy development. Overall, longevity economics seeks to provide insights and strategies to manage the economic challenges and opportunities of a longer-living population, ensuring sustainable economic development and quality of life for all ages.

The rise of longevity economics is mirrored in our social infrastructures, encompassing transportation, housing, education, communities, investment, finance, policies, and other areas spanning industry and academia. The increase in life expectancy and health span enables individuals to weigh quality of life in terms of time, resources, and investments. To address the complex design challenges inherent in the social structure, the field of service design has transformed, including re-evaluating the materials, theories (Lee, de Weck, et al., 2023; Crawley et al., 2016), and methods (Jones & Ael, 2022; De Weck et al., 2016) that constitute service design.

According to Google Trends data for the US population from 2019 to 2024, there is a rising interest in the key phrases: longevity (gray, avg. = 46), service system (black, avg. = 70), and financial planning (light gray, avg. = 33). Figure 9.1 shows search interest relative to the highest point on the chart for the specified region and period. A value of 100 represents the term's peak popularity and 0 signifies insufficient data for the term. This outcome implies a potential opportunity to investigate the intersection among longevity planning, service systems, and financial planning.

1.2   *Research questions*

The study examined the convergence of longevity planning, service system, and financial planning through a preliminary systematic literature review, utilizing the modified PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) checklist (Page et al., 2021). The research question is: *What are the key design considerations for physical components (symbols, artifacts, activities, relationships) and institutional elements (regulative, normative, cultural-cognitive pillars) within the social structure to develop comprehensive, meaningful, and respectful longevity service systems?*

The research question explores the integration of critical social structures into longevity services and complete systems for such services, by examining physical components and institutional elements. This study treats social structure (e.g., social norms, beliefs, values, culture, politics) as an integral component of service
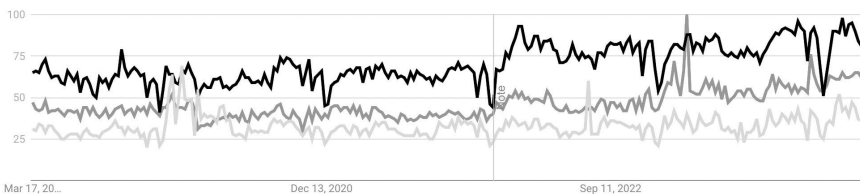
FIGURE 9.1   Trends in interest for the keywords: longevity (gray), service systems (black), and financial planning (light gray) from 2019 to 2024.

Source: Google Trends.
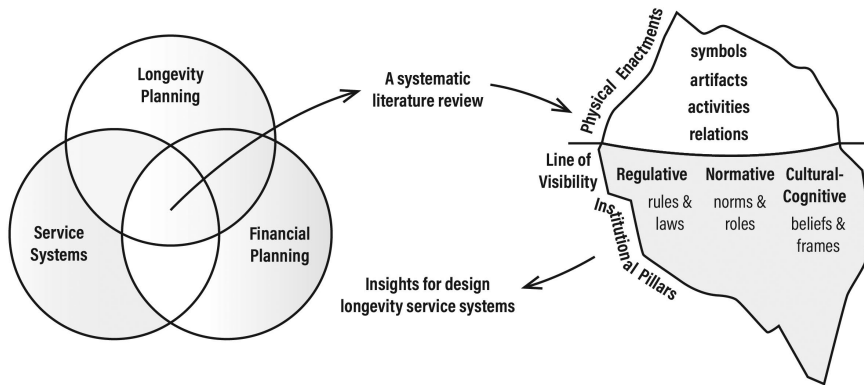
FIGURE 9.2 This study employs a systematic literature review within Vink and Koskela-Huotari's conceptual iceberg framework (2021), which views social structures as materials for service design.

design in developing systems for longevity services. This research focuses on the USA because its special healthcare system impacts longevity planning and financial planning significantly differently from those in Europe, Asia, and other countries. The findings prompt a discussion on developing longevity service systems by applying the conceptual iceberg framework (Vink & Koskela-Huotari, 2021), emphasizing comprehensive and interdisciplinary perspectives (Figure 9.2).

2 Background studies

2.1 The shift in service design materials: from tangible artifacts to social structures

Shostack (1982) highlighted the significance of tangible evidence in the service management field, introducing the concept of tangible artifacts within service design. This idea resonates with Bitner's (1992) proposal of the servicescape, which examines service interactions, behaviors, and emotions within a physical setting. Clatworthy (2011) expanded on this by introducing the concept of physical service touchpoints (toolkits) as the materials of service design, while Secomandi and Snelders (2011) focused on service interfaces considered objects of service design and in relation to service infrastructures. However, it's clear that the tangible aspects, such as service touchpoints, interfaces, and servicescapes, only represent a fraction of the service system's social structure.

The invisible aspects of social structure should also be explored to understand complex service systems fully. Kimbell (2011) explored the concept of socio-material configurations, emphasizing the characteristics of duality (social and material) and the integration of people, processes, and technologies. Blomberg & Darrah

(2015) viewed services as assemblies of both immaterial and material components, including institutions, lifestyles, technologies, and networks. The concept of assembled service fragments was influenced by individuals and communities beyond the designers. Blomkvist et al. (2016) regarded different phases as design materials that help navigate the design process in a service system of value co-creation, suggesting that service design materials evolve over time, surpassing the tangible to encompass more abstract materials and concepts.

Most recently, Vink and Koskela-Huotari (2022) stressed the importance of incorporating and reflecting on the social structure in service design, highlighting institutional social structures and the interplay of widespread arrangements of entrenched social structures like rules, roles, norms, and beliefs. This underscores a shift toward a broader understanding of materials in service design, integrating both tangible and intangible elements to capture the full essence of service systems (Table 9.1).

Current research in service design seeks to explore and influence aspects of social structures, such as shaping cognitive frameworks (Vink et al., 2019), transforming organizational development and community culture (Sangiorgi, 2011), and understanding the networks of co-creative value (Čaić et al., 2019). The authors focused on identifying longevity economics as an emerging social structure and culture and adopting Vink and Koskela-Huotari's (2021) conceptual iceberg framework to identify a complex social structure, investigate physical enactments and institutional pillars, and examine the development and considerations of building longevity service systems.

2.2   The conceptual iceberg framework

The design of services and systems is an iterative process of value co-creation, influenced and restricted by institutionalized social structures (Vink et al., 2021). This underscores the importance of focusing on these complex systemic social structures within the field of service design. The emergence of longevity economics represents an extension and reflection of our social structure, influenced by shifting demographics, technological advancements, and other social infrastructure factors shaping longevity services. Given the complexity, privacy concerns, ambiguity, and systematic challenges associated with longevity service systems, the authors employed Vink and Koskela-Huotari's conceptual iceberg framework, complemented by insights from a systematic literature review, to investigate new design considerations for service systems.

Greenwood et al. (2017) and Scott's institutional theory (2014) underscore three key characteristics that identify social structures as crucial materials for service design, forming a foundational basis for Vink and Koskela-Huotari's (2021) iceberg framework. Vink and Koskela-Huotari's study highlights two pivotal contributions to the service design field. Firstly, the iceberg framework underscores the significance of social structures as design materials by highlighting three distinct

TABLE 9.1 The progressive expansion of design materials in service design literature

Source	Service design material and its interpretation
Shostack (1982)	**Tangible evidence** is crucial in service design for confirming a service's existence or completion, contrasting with product design, which doesn't require such evidence. Service design often involves physical objects that aren't considered actual products.
Bitner (1992)	**Servicescape** involves examining service interactions within a physical environment. This encompasses ambient conditions, spatial layout and functionality, signs, symbols, artifacts, and service types. It includes the study of behavior, social interactions, and cognition related to the service environment.
Clatworthy (2011)	**Physical service touchpoints** applied as a toolkit can enhance new service development processes, linking service designers, organizations, project teams, and researchers as valuable resources for innovation. They offer insights into service design materials and the essence of service design itself.
Secomandi and Snelders (2011)	**Service interfaces** are often considered secondary, a byproduct of service infrastructure, which overlooks the importance of design discussions and limits design discussions to service management, marginalizing disciplines like product and interaction design, which are critical for enhancing service interfaces.
Kimbell (2011)	**Socio-material configurations** refer to the integration of diverse elements such as people, processes, and technologies. This concept highlights that designing for service is a dynamic, iterative process, where traditional boundaries between products and services become less significant.
Blomberg and Darrah (2015)	**Assembled service fragments** are the idea that services are often composed of practices, institutions, lifestyles, technologies, and networks rather than intentionally designed. This limits designers' ability to translate intentions into cohesive products.
Blomkvist et al. (2016)	**Service design materials** are considered guidance for conceptualizing the service design process. Unlike other fields where materials are transformed into a final product, service design materials navigate between the concrete and the abstract at various stages of the design process.
Vink et al. (2021)	**Institutional social structures** embody service design's evolution and its influence on individuals. The concept of reflexivity—recognizing and understanding existing social structures—aims to prevent the unconscious replication of social structures.

Modified from Vink and Koskela-Huotari's diagram (2021).

characteristics: invisibility, duality, and the composition of multiple institutional pillars. These traits shed light on the materiality essential for informing the design of services and systems. Secondly, the framework offers a rigorously tested, practical process that guides academics and practitioners on how to engage with social structures as service design materials. It outlines six steps: (1) gather diverse perspectives, (2) sensitize through experiences, (3) identify physical enactments, (4) unpack intangible social structures, (5) critically reflect on social structures, and (6) explore possible alternatives. Additionally, each step contains two core activities and provides detailed advice on the considerations when identifying and utilizing social structures as design materials.

Figure 9.3 illustrates the physical manifestations of social structures' tangible components, comprising four types of carriers: symbols (e.g., language for written or visual communication), artifacts (e.g., tangible objects), activities (e.g., routines, habits, and preferences), and relations (e.g., interactions). These carriers are also shaped by the intangible aspects of social structures encompassing rules, norms, and beliefs (W. R. Scott, 2014). The invisible and complex institutional social structures are divided into three categories: the regulative, normative, and cultural-cognitive pillars. The regulative pillar relates to structures that establish order and promote promptness through coercion, often expressed explicitly, for example, through rules and laws. The normative pillar encompasses structures that use social obligations to set expectations for appropriate behavior in specific situations, such as norms and rules. The cultural-cognitive pillar pertains to the implicit social structures, like beliefs and frames, that foster a common understanding, thereby facilitating certainty and the creation of meaning.
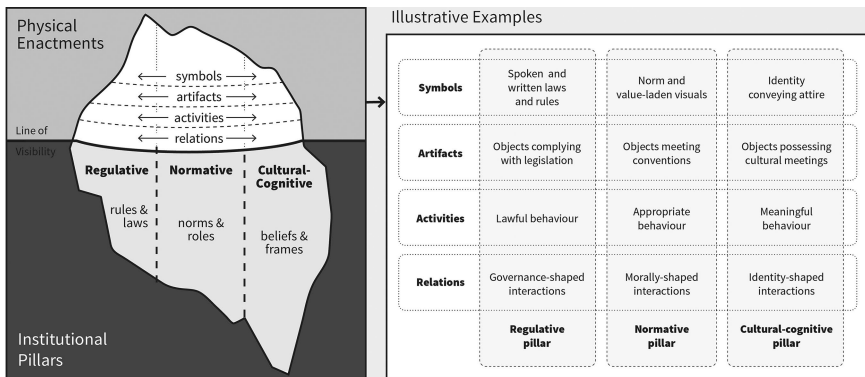
FIGURE 9.3   Vink and Koskela-Huotari's (2021) conceptual framework for considering social structures as materials in service design, with an example on the right showing four tangible aspects (symbols, artifacts, activities, and relations) as carriers of physical enactments, alongside the three intangible institutional pillars (regulative, normative, and cultural-cognitive).

2.3   *Longevity economics, planning, and services*

The era of longevity and service-based economics has come (Pine & Gilmore, 2020; Coughlin, 2017). People not only want to live longer. They want to live better. Therefore, the concept of longevity planning products and services has become increasingly popular (Heye, 2023; Stanford Center on Longevity, 2022; Barone, 2021; Albrecht et al., 2014). A successful longevity service should lead to a better quality of life, with physical and mental health, independence, mobility, financial freedom, purpose and meaning, with family and community support. The mindset and behavioral shift from age to stage has raised interest in developing longevity services and AgeTech to fulfill people's needs across different life stages (Etkin, 2021).

The traditional three stages of "born, learn, and retire" are being replaced by the values of living in a multigenerational society. For example, Bank of America Merrill Lynch, an American investment management and wealth management firm, provides a life plan product with 18 defined life stages incorporating people's needs beyond finance. They hired a financial gerontologist to help design products to ensure better preparation for solving longevity challenges while simultaneously creating an estimated $7–8 trillion in potential business. Warby Parker Inc., an American eyeglasses brand, launched a lifelong service providing eyecare and product services across various age ranges catering to the $10–15 billion longevity consumer market in the USA (Golden, 2022). Experience-driven services have transformed industries and how people perceive user experiences.

3   Research method: a preliminary systematic review

We developed a systematic literature review protocol, employing the modified PRISMA checklist to guarantee a rigorous and standardized process in Appendix (Table A.1).

3.1   *Develop the review protocol*

The authors referred to a PRISMA checklist as an essential guide for conducting literature reviews with thoroughness and transparency, ensuring the inclusion of all relevant information. We considered key criteria for article selection, including search engine (article database), date (limiting the search to a specific publication period), language (English and others), publication type (certain types of publications), population (specific populations with a specific condition), geographic focus (specific regions or countries), and study quality (peer-reviewed articles), detailed in Table 9.2.

3.2   *Conduct a comprehensive search*

The study employed a defined review protocol to conduct a thorough search for relevant articles, considering three systematic approaches: line-by-line, block-by-block, and single-line. The authors chose the single-line method, combining all search

TABLE 9.2 The key reviewed criteria for article selection

Search focus	Explore and discuss the concept of longevity service systems
Search engine and scope	The top 100 cited peer-reviewed articles on Google Scholar from 2019 to 2024.
Geography and language	USA and English-based material.
Publication type	Peer-reviewed articles (e.g., theoretical frameworks, case studies, review papers, and book chapters) along with gray literature, non-peer-reviewed articles (e.g., theses and reports).
Population	Typical individuals, excluding those who are disabled (e.g., people with intellectual and developmental disabilities), disadvantaged (e.g., people with lower socioeconomic income or refugees), or need special caregiving services.

TABLE 9.3 The search keywords and their synonyms for Google Scholar

Keywords	*Synonym*
Longevity planning	Longevity Planning OR "longevity service" OR "longevity planning service" OR "design for longevity" OR "D4L"
Service	Service OR "service design" OR "service system" OR "service ecosystem" OR "systemic service"
Finance	"Financial planning" OR "financial service"

terms and concepts into one line. This approach utilized Boolean operators (AND, OR) to link key terms between concepts and parentheses to group concepts together, streamlining the search process. The authors list keywords and their synonyms used in Google Scholar to retrieve the top 100 cited articles from 2019 to 2024. The search was conducted using search software (Anne-Wil, 2007), with keywords entered in a single-line format for full-text searches (Table 9.3).

The authors included gray literature such as government documents, theses, toolkits, and technical reports sourced from organizations like the Teachers Insurance and Annuity Association of America, the American Association of Retired Persons, and the Royal College of Art's Helen Hamlyn Centre for Design. This diverse range of sources is vital for a thorough systematic review. However, many reports from the insurance, financial, and fintech industries may not be indexed by academic search engines. Quality assessment of gray literature is critical due to its variable evidence quality, which can introduce bias and affect the validity of the review's findings.

3.3   Screen results for eligibility

The systematic review's screening process entailed a detailed evaluation of all identified articles to assess their relevance and eligibility for inclusion. To minimize bias, the authors conducted the screening collaboratively, with cross-checks to ensure accuracy. This study's screening was divided into two phases: screening of titles and abstracts, followed by full-text screening. The 72 out of 100 articles were excluded based on geographical restrictions (outside the USA), relevance of the publication topic (unrelated to longevity planning and service systems within the context of financial planning), and population constraints (Table 9.4).

TABLE 9.4 Materials excluded during the first round of screening of titles and abstracts

Criteria	The explanation for excluded articles
Geographic limits: outside USA (n = 18)	In this study, we excluded regions such as Canada (including Ontario), Delhi, Islamic nations, Latin America, Italy, Europe, Australia, Africa (including Ghana and Ethiopia), and parts of Asia, including India, Malaysia, and Indonesia.
Relevance of the publication topic: not relevant study (n = 50)	• **Energy system**: electric power system, electric generation planning, electrified transport, energy planning, energy storage system, power plant, EV, electric bus planning, charging facility planning, hydrogen storage, IoT, fuel treatments • **Supply chain system**: product information management, production planning, project management, logistic network, renewable hydrogen supply chain, workforce planning, Industry 4.0 • **Urban planning**: city planning, estate planning, offshore wind farms, green building, housing, public facility planning, urban light pollution, waste management, water management, railway track maintenance planning, climate change • **Business**: enterprise resource planning, tactical sales and operations planning, leadership, customer retention, public capital budgeting and management, pension • **Health** (n = 8): health monitoring, ethical wills, family planning, long-term care insurance, modeling of mortality and survival curves, environmental health services, disease, surgical system
Population limits: not target user (n = 4)	In this study, we aim to encompass a diverse range of demographics, including ethnicity, age, physical abilities, financial conditions, cultural backgrounds, and social-economic status, to ensure broad applicability and inclusivity. However, certain specific populations remain underrepresented in our research, such as senior surgeons, residents of slums, physicians, and individuals with intellectual and developmental disabilities (IDD).

FIGURE 9.4 The PRISMA flow diagram to investigate the concept of longevity service systems.

Following the initial screening of titles and abstracts, which excluded the 72 articles, the authors conducted a full-text review of the remaining 28 articles, alongside an analysis of 9 non-peer-reviewed reports to evaluate the studies' quality. After screening the full texts, the authors excluded 7 articles because of geographic limits (n = 2), content relevance (n = 4), and qualitative research (n = 1). The PRISMA flow diagram (Figure 9.4) was employed to document the results, serving as proof of the search process's thoroughness.

3.4   *Evaluate the quality of the studies to extract data for synthesis*

The objective is to evaluate the strengths, weaknesses, and potential biases in the research findings. Assessing the validity and relevance aids in avoiding inaccurate conclusions. The synthesis phase entails meticulously examining the included studies to uncover patterns, themes, and connections among them. The author analyzed how the selected articles applied concepts of service design, service systems, or system methods to examine longevity planning.

4   Results and discussion

4.1   *Insights into longevity service systems from a systematic literature review*

In the field of longevity services, individuals face a broad array of challenges influenced by social and technological advancements. This scenario is markedly different from the era before the Industrial Revolution when labor-intensive tasks dominated most people's lives until they died. In contrast, the 21st century has seen a shift toward a greater demand for services that enhance and celebrate quality of life through the enjoyment of products and experiences. This transition heralds the emergence of the experience economy within the domain of longevity services. The convergence of longevity trends and economic developments highlights the critical need to focus on service systems. The evaluation of 30 selected articles (21 papers and 9 reports) aimed to gain a deeper understanding of longevity planning and its implications and to gather content relevant to the design of service systems (Figure 9.5). The findings from this analysis are documented in Table A.2. The
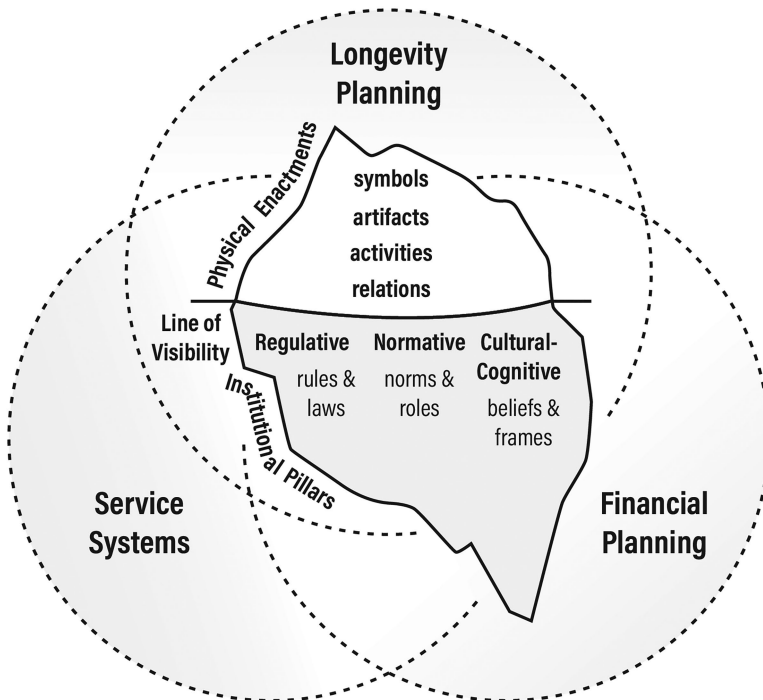
FIGURE 9.5   The study utilized the conceptual framework proposed by Vink and Koskela-Huotari (2021), which views social structures as materials within the service design field.

table presents (1) the sources of the selected articles, (2) definitions, concepts, and examples related to longevity or financial planning, and (3)implications and challenges associated with the service system.

4.2   Social structure as material for designing services and systems for longevity

In the preliminary systematic literature review, we extracted data from the reviewed articles (n = 30) by examining not only the paper titles and abstracts but also the content and conclusions to ensure unbiased and comprehensive insights. Table 9.5 presents the synthesized learnings and insights derived from the review, examining the materiality of social structures for longevity service systems. It includes physical enactments, which cover four tangible materials as carriers (e.g., symbols, artifacts, activities, and relations), alongside the complex and invisible pillars of social structures, the regulative pillar (e.g., rules and laws), the normative pillar (e.g., norms and roles), and the cultural-cognitive pillar (e.g., beliefs and frames).

TABLE 9.5 Social structure as input and material for designing longevity service systems

	Regulative pillar	*Normative pillar*	*Cultural-cognitive pillar*
Symbols	Improve education and knowledge focused on longevity, such as enhancing longevity literacy (Tinofirei et al., 2023; Bandopadhyay, 2023; Dickson, 2023)	Develop longevity strategies (Hodin, 2023) and rituals for transformation, such as elevating longevity well-being (Carstensen, 2022).	Foster lifestyle changes and impact people's perceptions, for example, promoting longevity fitness (Kolluri, 2024; Transamerica & MIT AgeLab, 2022)
Artifacts	Crafted to meet standards based on qualitative assessments. They exist in either physical or digital formats (Brown & Lin, 2021) and are primarily distributed through in-person engagement.	Crafted for self-reflection (The School of Life, 2023) and self-identification, such as personal values and worldviews (Enete & McDowell, 2024; Cherry & Asebedo, 2022), and are made available through an omnichannel product service experience (Jantan, 2020).	Created for self-expression, incorporating cultural, socioeconomic, and technological elements (Briscoe, 2022). They serve as touchpoints within an immersive journey, offering a mixed reality (XR) and AI-empowered user experience (Cao, 2023; Manser Payne et al., 2021).

(*Continued*)

TABLE 9.5 (Continued)

	Regulative pillar	*Normative pillar*	*Cultural-cognitive pillar*
Activities	Indicate that individuals are path followers with instructional behavior: People often look to traditional stereotypes as role models for societal success (Leshner, 2023; Dew et al., 2020).	Indicate that individuals are path seekers with transformative behavior: People seek paths to success that extend beyond financial achievement (Lee, Hodara et al., 2023; Solhi et al., 2022; Goyal et al., 2021).	Indicate that individuals are path builders with adaptive behavior: People forge paths by adapting their needs according to various lifestyles, genders (Yen & Chong, 2022), and ages (Rappaport, 2019).
Relations	Focus on transactional financial planning goals, tasks (Fallaw et al., 2020), and discussions to hit the standard evaluation (Xiao & Tao, 2020).	Focus on conversational interaction and have evolved from retirement planning to longevity planning (Scott, 2021; Coughlin, 2019).	Focus on integrating longevity services, personal objectives, and systems (Rappaport, 2021).

Table 9.5 was initially structured using the iceberg framework to summarize the findings from the comprehensive literature review. In subsequent analysis, the author expanded the scope to incorporate emerging themes such as the impact of social technology, artificial intelligence, climate change, and other significant social challenges that could affect the design and development of longevity planning service systems.

In this study, the authors applied a systematic approach that considers the intersection of longevity planning, service systems, and financial planning. It emphasizes key principles such as integration, a holistic view, user-centricity, adaptability, sustainability, and collaboration. These principles are crucial in navigating the complexities of service environments like healthcare, finance, longevity planning, urban planning, organization cultures, and digital platforms, where the interplay of multiple actors and elements influences system dynamics. This notion impacts industry and resonates within academia. Suoheimo et al. (2023) highlight the essential role of leveraging emerging technologies to redefine service design research methodologies. Grimes (2018) proposed applying the modified service ecosystem as an adaptable, transformative approach to studying complex systems in relation to users' behavior. Vink et al. (2021) expanded on this by investigating the service ecosystem design through a multi-level process model encompassing micro, meso, and macro phases. Adopting a systemic viewpoint allows industry

and academia to forge services that are more efficient, resilient, and user-centric, thereby enhancing the overall health of systems in the context of longevity.

5   Conclusion

Utilizing insights from a systematic literature review (n = 100) of the intersection between longevity planning, service systems, and financial planning 2019–2024 and conducting US-based research on Google Scholar with the modified PRISMA checklist, we identified and analyzed 21 reviewed articles and 9 non-peer-reviewed reports. This analysis adopted Vink and Koskela-Huotari's iceberg framework (2021), focusing on social structures as materials, to analyze longevity service systems. This framework was applied for analyzing complex systemic challenges, and enabled researchers and designers to transform intangible topics like social norms, values, cultural differences, and policies into tangible elements. This was achieved through the framework's terms, including the regulative, normative, and cultural-cognitive pillars, and examples.

Analyzing 30 selected articles, the authors discussed four tangible elements—symbols, artifacts, activities, and relations—in longevity service systems. These elements integrate aspects of longevity literacy, strategy, well-being, and fitness into the design of the longevity service systems. Specifically, longevity service systems address a wide array of individual concerns, including physical health, overall well-being, retirement preparedness, safety, financial security, and wealth and risk management. This approach underscores a more nuanced, layered perspective compared to financial planning services, advocating for a paradigm shift from financial value (e.g., monetary assets) to people's value (e.g., life quality).

The iceberg framework highlights three intricate and invisible aspects of social structure—regulative, normative, and cultural-cognitive dimensions—adding a layer of sophistication and complexity. Thus, it forms a comprehensive understanding that encompasses social-technological factors such as gender, identity, artificial intelligence (AI), immersive media, policy impacts, worldviews, and socio-economic status. Crafting a successful longevity service system, as differentiated from standard financial planning services, demands a tailored approach that respects individual preferences and has the flexibility to adapt over time to changing life stages, financial circumstances, health status, and familial or community relationships. The adaptive nature of the service system assists individuals in setting and pursuing long-term longevity objectives. Further studies can explore insights that systems-oriented design (SOD) might provide (Sevaldson, 2022; Jones, 2021; Jones, 2013) in developing longevity service systems. Additionally, it will be important to consider the situations and social structures of countries beyond the USA, such as those in Asia, Europe, and Africa, as well as diverse demographics, including refugees and people with disabilities. This is particularly pertinent as longevity service systems have evolved and become interconnected worldwide.

Appendix

TABLE A.1 Systematic literature review protocol

Aim	Explore the design and development of longevity service systems by examining four key physical components—symbols, artifacts, activities, and relationships—and three institutional elements (regulative, normative, and cultural-cognitive pillars) derived from social structure (Scott, 2014), using the conceptual iceberg model (Vink & Koskela-Huotari, 2021).
Question	What are the key design considerations for physical components (symbols, artifacts, activities, relationships) and institutional elements (regulative, normative, cultural-cognitive pillars) within the social structure to develop comprehensive, meaningful, and respectful longevity service systems?
Objective	Review peer-reviewed articles from 2019 to 2024 related to longevity planning, service systems, and financial planning. Using the conceptual iceberg model (Vink & Koskela-Huotari, 2021). Findings will be analyzed and integrated to enhance the design and development of longevity service systems, considering social structure.
Protocol	Concentrate on peer-reviewed articles and gray literature, like reports, to identify relevant materials in longevity planning, service systems, and financial planning. The detailed flow can refer to Figure 9.4.
Search strategy	Utilize the following single-line search string: "longevity planning" OR "longevity service" OR "longevity planning service" OR "design for longevity" OR "D4L" AND "service" OR "service design" OR "service system" OR "service ecosystem" OR "systemic service" AND "finance" OR "financial planning" OR "financial service."
Process of selecting articles	Used Anne-Wil's journal search software (2007), with a single-line search string in Google Scholar targeting full text. After ensuring no duplicates, the list of peer-reviewed articles was finalized. Articles from 2019 to 2024 were sorted by citation frequency to select the first 100 results.
Inclusion and exclusion criteria	The search string was designed to yield peer-reviewed articles relevant to longevity planning, service systems, and financial planning, although few articles integrated all three topics. Most focused on one or two fields, often indicated only in keywords. Each article was initially screened by title and abstract, with those not meeting the study's criteria excluded. Articles advancing in the literature review were examined in detail. The main objective was to understand and incorporate social structure as a design material, enhancing the design and development of comprehensive longevity service systems.

TABLE A.1 (Continued)

Process of extraction of relevant information	The data extraction involved two phases: initial screening of titles and abstracts, followed by full-text reviews. An Excel table captured key publication details, including author, year, institution, faculty, country, article title, journal, keywords, and citation count. To minimize bias, authors collaboratively conducted screenings with cross-checks for accuracy.
	• Round 1: 72 articles were excluded due to geographical restrictions (18 outside the USA), topic relevance (50 unrelated to longevity planning and service systems in financial planning), and population constraints (4 not targeting the intended users). See Table A.1. • Round 2: The full-text review was applied to the remaining 28 articles, alongside 9 selected non-peer-reviewed reports, to assess study quality. Seven articles were excluded due to geographical limits (2), content relevance (4), and qualitative research methodology (1). Refer to Figure 9.4.
Result	The review results and synthesized insights are displayed in Table A.2.
Discussion	The discussion is presented in the form of an article.
Reference	The modified extensive literature review protocol was made according to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) checklist (Page et al., 2021).

TABLE A.2 Summary of the reviewed papers (n = 24)

Source	The definitions, concepts, and examples regarding longevity or financial planning	The implications and challenges connecting to the service system
Enete and McDowell (2024)	**Integrating personal values with worldviews and financial strategies**. This paper investigates the influence of worldviews on individuals' financial perspectives and actions, and creates tools for identifying personal values and worldviews to help them accomplish their life objectives. The diagram depicting the circumplex model of values, a value-measuring tool adapted from Grouzet et al. (2005), signifies the application of service design thinking.	Cultural-cognitive pillar (personal values with worldviews and financial strategies)

(*Continued*)

TABLE A.2 (Continued)

Source	The definitions, concepts, and examples regarding longevity or financial planning	The implications and challenges connecting to the service system
Leshner (2023)	**The diverse longevity planning portfolios**. This paper presents five case studies covering provisions, including children, students with loans, part-time and active employees, pre-retirees, retirees, and employers, to demonstrate the intricacies of longevity planning services, highlighting how they cater to different individuals' varied backgrounds and requirements.	Normative pillar (different demographics influence social norms and diverse cultures)
Tinofirei et al. (2023)	**Exploring the role of education in enhancing financial planning and literacy**. This paper indicates that higher education levels correlate with increased salaries, which, in turn, enhances overall literacy in healthcare and financial planning decisions.	Regulative pillar (education)
Ingale and Paluri, (2023)	**Financial decision-making process and systems**. This paper offers insights into the financial decision-making process for retirement savings and identifies constructs to operationalize and measure financial behaviors in retirement planning. The study employs the Theory, Context, Characteristics, and Method (TCCM) framework for literature analysis.	Regulative pillar (measurement) Normative pillar (behavior)
Zehra and Singh (2023)	**Household finance and national economics**. This paper examines the current research landscape in household finance (HF), summarizing key findings to underscore its significance in national economies. It explores HF's conceptual and practical aspects.	Regulative pillar (considerations to connecting to national economies)
Hodin (2023)	**Longevity science and wealth management.** This paper introduces tools and strategies that adapt and evolve to accommodate extended work lives, caregiving management, and improved longevity planning, incorporating insights and actions for employers, policymakers, financial institutions, and individuals.	Normative pillar (perception centered around financial security) Cultural-cognitive pillar (embracing the principles of healthy aging and adjusting financial planning and policy frameworks)

(*Continued*)

TABLE A.2 (Continued)

Source	The definitions, concepts, and examples regarding longevity or financial planning	The implications and challenges connecting to the service system
Bandopadhyay (2023)	**Improved financial literacy and behavior.** This paper recognizes the escalating life expectancy and consequent elongation of retirement spans, and delves into demographic, sociological, and, notably, behavioral dimensions influencing retirement investment decisions. It recommends a retirement planning strategy, highlighting the importance of improved financial literacy and behavioral understanding in developing pension policies and retirement schemes.	Normative pillar (retirement planning behaviors, risk tolerance, and future time perspective)
Yeo et al. (2023)	**New theory of financial planning behavior.** This paper develops a theory on financial planning behavior by reviewing literature through the theory of planned behavior (TPB) and proposes a theory where financial satisfaction, socialization, and literacy influence the intention and adoption of financial planning in various forms.	Regulative pillar (financial literacy) Normative pillar (behavior) Cultural-cognitive pillar (financial satisfaction, socialization)
Cao (2023)	**Artificial intelligence and data science in finance.** This paper provides an overview of the use of artificial intelligence (AI) and data science (AIDS) in finance, covering its evolution over decades from classic to modern techniques. It begins by highlighting the challenges in financial businesses and data and then offers a detailed classification and summary of AIDS research in finance.	Physical enactments (AI products) Regulative pillar (AI-empowered financial business) Normative pillar (behavioral change)
Solhi et al. (2022)	**Systematic considerations and strategies for aging preparedness**. This paper suggests preparations for aging across six dimensions: health, psychological well-being, financial security, housing, social connections, and active leisure.	Cultural-cognitive pillar (financial preparation for aging as a multi-dimensional, ongoing service)

TABLE A.2 (Continued)

Source	The definitions, concepts, and examples regarding longevity or financial planning	The implications and challenges connecting to the service system
Briscoe (2022)	**Technology roadmap for longevity economics.** This paper examines how service systems for longevity technology progress through five phases: innovation trigger, the peak of inflated expectations, trough of disillusionment, slope of enlightenment, and plateau of productivity. It explores the technology roadmap for the longevity economy over the next two years, between two and five years, five to ten years, and beyond ten years.	Physical enactments (through the lens of a technology roadmap to reconsider symbols, artifacts, activities, and relations)
Yen and Chong (2022)	**Adapting financial planning and strategies to reflect gender, cultural, and social norms**. This paper examines gender as a moderating factor in financial planning for retirement. Cultural and social norms have significantly influenced women in terms of decision-making, environment, and social support.	Normative pillar (social norms) Cultural-cognitive pillar (gender)
Cherry and Asebedo (2022)	**Personality traits and finance decision-making.** This paper suggests personality traits as a new factor influencing life insurance ownership. It offers insights for financial planners and insurance professionals to tailor their advice based on clients' personality traits, potentially enhancing decision-making and encouraging life insurance purchases.	Physical enactments (life insurance products and services) Cultural-cognitive pillar (personality traits influencing financial decisions)
Brown and Lin (2021)	**New opportunities for FinTech**. This paper conducts a comprehensive review of recent developments in the FinTech sector to pinpoint opportunities for practitioners, researchers, and policymakers. It considers technological innovation (FinTech) as a catalyst for service innovation and recommends fostering synergistic collaborations among researchers, practitioners, and regulators to enhance social welfare.	Regulative pillar (policies reflecting the needs and applications of applying FinTech) Normative pillar (new lifestyle and work behavior impact by FinTech)

TABLE A.2 (Continued)

Source	The definitions, concepts, and examples regarding longevity or financial planning	The implications and challenges connecting to the service system
Scott (2021)	**Longevity society through the lens of policy**. This paper investigates the transformative shift from an aging society to a longevity society through the lens of policy, taking into account significant changes in life course and social norms. The study underscores the necessity of a new stage for humanity aimed at enhancing the quality of life.	Regulative pillar (policy) Normative pillar (social norms)
Rappaport (2021)	**The changing environment for longevity planning.** This paper investigates retirement planning's changing landscape, focusing on economic risks (e.g., inflation and interest rates), personal planning challenges (e.g., longevity and post-retirement work), and unforeseeable events (e.g., policy shifts and health care needs).	Regulative pillar (emergence rules, laws, and policy shifts due to economic risks) Normative pillar (behavioral change)
Manser Payne et al. (2021)	**Financial service ecosystem with AI integration**. This paper introduces a digital servitization framework to examine AI services' effects on value perceptions, consumer engagement, and firm performance, focusing on the financial service ecosystem.	Normative pillar (value perceptions, consumer engagement, and firm performance impacted by AI integration)
Goyal et al. (2021)	**Personal financial management behavior**. This paper explores the current research on Personal Financial Management Behavior (PFMB), emphasizing its antecedents and consequences. Introduces a framework to depict PFMB's antecedents and consequences, including mediation and moderation linkages.	Normative pillar (behavior)
Jantan (2020)	**Retirement-pension systems and challenges**. This paper analyzes challenges within the retirement-pension system. It aims to address issues encountered by households in retirement savings, including the longevity risk associated with retirement plans and the adequacy of retirement savings.	Regulative pillar (pension system)

(Continued)

TABLE A.2 (Continued)

Source	The definitions, concepts, and examples regarding longevity or financial planning	The implications and challenges connecting to the service system
Fallaw et al. (2020)	**Household finance and financial tasks**. This paper analyzes performance criteria in household financial management to evaluate the effectiveness of the household chief financial officer (HCFO), highlighting the frequency and importance of financial tasks for success.	Physical enactments (artifacts, activities, and relations impacted by household chief financial officer)
Xiao and Tao (2020)	**Consumer finance and future research**. This paper defines consumer finance, outlines its scope, explores future research directions, compares it with related terms like household, personal, and family finance, and reviews key studies on consumer financial behavior across money management, insurance, loans, and saving/investment.	Cultural-cognitive pillar (consumer finance is defined as an interdisciplinary research field with various personal values and beliefs)
Dew et al. (2020)	**Financial-helping fields and education.** This paper investigates financial-helping fields—family resource management, financial education, personal financial planning, and financial counseling—to identify evidence-based practices for addressing money-related issues.	Physical enactments (symbols, artifacts, activities, and relations to reflect financial education) Regulative pillar (financial-helping platform with accordance policies and social structure)
Guido et al. (2020)	**Consumer financial behavior and services supporting an aging population.** This paper examines the financial service choices and behaviors of elderly consumers, focusing on their decisions related to asset management and legacy. It summarizes key research findings and offers practical insights for marketers.	Physical enactments (symbols, artifacts, activities, and relations reflect the heterogeneous nature of elderly consumers' values and lifestyles) Cultural-cognitive pillar (culture of demographic differences)
Rappaport (2019)	**Financial perspectives regarding aging and retirement across diverse generational cohorts.** This paper, in collaboration with the Society of Actuaries, explores financial perspectives on aging and retirement across generations, offering insights for employers, policymakers, and financial planners to develop inclusive and effective financial wellness and retirement strategies.	Regulative pillar (policy) Normative pillar (multi-generation norms) Cultural-cognitive pillar (inclusive financial wellness and retirement strategy)

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10

DESIGNING FOR STRUCTURAL, SOCIAL AND POLITICAL VIABILITY IN NATIONAL-SCALE SYSTEMIC INTERVENTIONS

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1   Introduction

This chapter contains methodological reflections on a participatory design approach undertaken in New Zealand to develop a national response to family violence prevention. Family violence significantly affects the wellbeing of individuals, families and communities, especially children, women and Māori (the indigenous people of New Zealand) (Gear et al., 2021). The New Zealand government spends approximately NZ$1.5 billion annually on various programmes and initiatives designed to reduce or prevent family violence, including intimate partner violence, child abuse and neglect, elder abuse, inter-sibling abuse and parental abuse (Carne et al., 2019).

One criticism of New Zealand's approach to family violence has been that it is like a patchwork quilt. While skilful quilting involves careful planning and design, the metaphor suggests that disparate local responses have been developed and implemented without sufficient regard for how the *whole system* will work in the interests of family violence prevention. Having said this, the patchwork of policies and services *does* include some 'good practices' and innovations. Also, the range of responses to family violence extends beyond formal or official responses, including informal community support. Nevertheless, the New Zealand Productivity Commission (2015) and Family Violence Death Review Committee (2017) have noted systemic failings in policy development and service delivery (Carne et al., 2019).

Family violence is increasingly recognised by scholars, policymakers and practitioners as a 'wicked problem' (Rittel & Webber, 1973; Sydelko et al., 2021, 2024), given high levels of complexity, uncertainty and contestation (Stephens & Liley, 2021; Stephens, 2023). The complexity of family violence is reflected in the dynamic relationships between various actors, risk and protective factors, policies,

programmes, initiatives and implementation contexts, which influence the effectiveness of family violence responses (Foote et al., 2015; Gear et al., 2021). Framing family violence prevention as a 'wicked problem' highlights the importance of taking a systems approach, as many authors have talked about the utility of systems thinking in the face of such problems (e.g., Williams and van 't Hof, 2016), although the form systems approaches can take may vary depending on the emphases that are placed on structural, organisational, perspectival and/or coercive complexity (Jackson, 2019).

There is a tendency to confuse systems thinking with service integration (Carswell et al., 2020), and it is important to go beyond 'joined up' services to ask what the system should be providing to people in the first place. Our interest is how systems thinking can support participatory design by enabling stakeholders to develop a shared understanding of issues and potential responses, and ultimately develop feasible, sustainable and systemically desirable solutions to persistent problems that frustrate attempts to prevent and reduce family violence. The term 'systemically desirable' is important because it means more than a stakeholder wishlist: it is about what desirable solutions will work in the context in which they will be embedded (Checkland & Poulter, 2006). The systemic intervention reported here engaged stakeholders in creating a framework for a national service system that would govern, manage, coordinate and implement service development and delivery at local, regional and national scales.

This chapter makes three contributions to relevant scholarship. First, it speaks to the increasing awareness of the critical role that upstream prevention systems play in reducing the downstream need for urgent intervention and consequent costly service provision. Prevention systems usually consist of networks of organisations and may include lead or network-administrative bodies tasked with network management, leadership and governance (Khayatzadeh-Mahani et al., 2018). Scholars such as Provan and Kenis (2007), Poole (2008) and Turrini et al. (2010) have noted the benefits of networks, including coordination, communication, learning and resource efficiencies, while others have drawn attention to problematic aspects, such as conflicts of interest (Holt et al., 2021) and how power relations marginalise some stakeholders in the design and evaluation of collaborations (Walsh et al., 2018; Clark, 2021; Sydelko et al., 2021). Given that societal challenges such as family violence cannot be addressed by any single organisation, policy or programme, there is a pressing need to understand how to design prevention networks to leverage stakeholder capabilities, insights and resources for collaborative advantage (Huxham & Vangen, 2004). The design process needs to explicitly consider what systemically desirable prevention networks should do, and also counter fragmentation through integration and systems change (Bensberg et al., 2021). This chapter demonstrates how Midgley's (2000, 2006, 2015, 2018, 2023) systemic intervention approach provides a useful methodological basis for designing prevention systems, as it allows for critical reflection on the boundaries of analysis (including participation) and the combination of multiple systems methodologies

and methods to structure and facilitate stakeholder deliberations about problems and improvements. Through this facilitation, the findings and recommendations were co-created with stakeholders. The systemic intervention approach is illustrated with a detailed account of our work around family violence prevention.

The second contribution is to the development of thinking about the methodology of systemic intervention, examining Midgley's (1997) suggestion that political action and campaigning need to be seen as a legitimate part of systems practice. Our systemic intervention was undertaken as part of a philanthropically funded public inquiry, intended to influence government policy ahead of an upcoming general election, and we reflect on how the Inquiry's findings were received by the main political parties. A distinction is made between structural, social and political dimensions of viability, with this distinction shaping the systemic intervention so it was seen as salient, credible and legitimate by stakeholders.

Finally, a third contribution identifies the need to expand the boundaries of analysis to the supra-system by recognising how the system in focus (in this case, a family violence prevention network) is connected to or nested in other service systems. In New Zealand, as in other countries, the design of large-scale service systems intended to meet health or social needs typically involves recognising the importance of the government as a funder, regulator and service provider (Osborne et al., 2022). Future work to design national-level service systems needs to focus more on political viability by enhancing what systems thinkers call *boundary critique*: reflection on whose voices need to be listened to, what concerns are relevant and what could or should be done in response to those concerns (Ulrich, 1994; Foote et al., 2007; Midgley and Pinzón, 2011). Boundary critique needs to be undertaken, not only with stakeholders (including those with relevant lived experience) but also in the context of dialogue between the systems practitioners and public policy communities. Critically, the boundary critique needs to consider how the intervention interfaces with the machinery of government.

The chapter is structured into three parts, beginning with a description of the context of our project and the development of its participatory design approach, which needed to be sensitive to the social, cultural and political contexts surrounding family violence prevention. Several dilemmas that characterised our systemic intervention are discussed, and it is explained how the concept of viability, distinguished in terms of its structural, social and political dimensions, was used to craft the systemic intervention. Finally, the systemic redesign is presented along with reflections on the outcomes of the systemic intervention, considering its relationship with the machinery of government.

2   Background

The context of the systemic intervention was concern about New Zealand's alarming rates of family violence and child abuse, which, in 2012, led Sir Owen Glenn (a New Zealand philanthropist) to fund a NZ$2m independent investigation of the

situation and potential solutions. This became known in the media as the Glenn Inquiry (henceforth referred to as 'the Inquiry'), and it was explicitly intended to influence government policy (RNZ, 2013 & 2014a). The Inquiry collected first-hand accounts from approximately 500 victim-survivors, frontline workers and professionals about the challenges and failures of New Zealand's existing approach to family violence prevention. *The People's Report* documented accounts of ineffective, under-resourced, culturally inappropriate and 'siloed' services, and concluded that the system urgently needed transformation (Wilson & Webber, 2014a). These stories indicated a 'broken' system and the need for a systemic approach to address the disjointed efforts of government, non-government organisations, iwi (Māori tribes), hapū (Māori sub-tribes) and community groups. The Glenn Inquiry strongly held the view that government action to address family violence was inadequate (Stuff, 2015), and the Inquiry's Chair, when the *People's Report* was first published, noted:

> I believe the country will be shocked by the descriptions of family violence … and it is my hope that shock will translate quickly into widespread agreement, including between the main political parties, that something has to be done as a matter of urgency.
>
> *(Stuff, 2014)*

A key challenge facing the Inquiry was translating the insights in the *People's Report* into actionable recommendations. The Inquiry commissioned our team of systems thinkers (two of whom were then working in the Institute of Environmental Science and Research, an independent New Zealand government research institute, and the third was advising from the University of Hull in the UK) together with family violence prevention experts (from the University of Canterbury's Te Awatea Violence Research Centre) to work with family violence sector academics and practitioners ('sector experts') to design a high-performing national system for policy and service delivery (Foote et al., 2014a, 2014b; Nicholas et al., 2014). Our participatory design approach would feed into the Inquiry's *People's Blueprint* recommendations, alongside other commissioned research, such as an economic analysis of family violence impacts. The recommendations were intended to advocate for changes to government policy and service delivery, including how the government should fund not-for-profit services (Wilson & Webber, 2014b). The timing around the publication of the *People's Blueprint* was tight, given an upcoming general election. We selected and adapted well-known systems methodologies and methods to undertake a participative redesign of the family violence prevention system.

The success of the participatory design would depend on the extent to which the Inquiry, the family violence sector, and the current government saw the findings as salient, credible and legitimate (Cash et al., 2002). As a result, the concept of *viability* (Beer, 1984) guided the systemic intervention, and this refers to the ability of an

organizational (or multi-organizational) system to maintain a separate existence while it learns and adapts to opportunities and threats in its external operating environment. Beer (1984) developed the viable system model (VSM), which sets out the structural conditions necessary for viability in terms of five critical subsystems and information channels. These manage different aspects of system functioning, from operations to intelligence to governance (Ríos, 2012). However, the VSM has been criticised for paying insufficient attention to culture and power relations (Jackson, 2019). Indeed, a transformed system could not be imposed on stakeholders, and the potential for people to find new ways of relating together was critically important (Sagalovsky, 2015), so there was a need to challenge dominant ways of thinking, organising and allocating resources (van Raak & de Haan, 2017). At the same time, the participatory design needed to be culturally feasible and have sufficient alignment with existing norms and values (Checkland & Poulter, 2006) to secure the support of powerful individuals, groups and organisations, including the newly incoming government. In systemic interventions, it is often necessary to undertake critiques of the status quo while keeping on board stakeholders who will be responsible for implementing the system change, and sometimes significant tensions have to be addressed along the way (Smith, 2022; Smith & Midgley, 2025). Accordingly, the boundary of the analysis was widened to focus on the structural, social and political dimensions of viability.

3 Methodology

Our research and practice was grounded in a commitment to critical awareness, improvement and methodological pluralism (Midgley, 1996). We adopted Midgley's (2000, 2006, 2015, 2018, 2023) systemic intervention approach to guide our participatory work to support stakeholders in redesigning the existing family violence prevention system. This redesign was the basis for the stakeholders making evidence-informed recommendations to the Glenn Inquiry, which would then advocate for system change. While the language of intervention suggests implementation or the deployment of improvements in practice, Midgley (2000) considers systemic intervention in terms of three interrelated processes:

- *Boundary critique*, which examines and questions who or what (stakeholders, issues, knowledge) is included in or excluded from a systemic intervention, and this is intended to address power relations and resulting conflict and marginalisation processes that shape how problems and solutions are understood.
- *The creative design of methods*, which operationalises a commitment to combining ideas from different systems methodologies, and it also emphasises the importance of a bespoke, flexible and responsive approach to intervention by mixing methods and tailoring them to social, cultural and political contexts.
- *Action for improvement*, which involves implementing the bespoke approach and facilitating stakeholder reflections on how improvement can be understood, giving rise to recommendations for change.

We structured our boundary critique by drawing on soft systems methodology's (SSM) analysis one (focused on the design of the intervention in relation to stakeholder requirements), analysis two (the social context of whatever is being intervened in – i.e. the family violence prevention system) and analysis three (the political context, which could affect both the progress of the systemic intervention and the implementation or marginalisation of expected recommendations and potential outcomes) (Checkland & Poulter, 2006).

Given the tight timeframe we were subject to, we were unable to formally interview multiple stakeholders (a common practice in boundary critique) and drew on discussions with Glenn Inquiry managers and an in-depth understanding of the family violence sector from our team's family violence experts. Nevertheless, the SSM analyses helped alert us to potential marginalisation processes that might limit which stakeholder concerns would inform the design of a high-performing system, and identified several barriers to reaching accommodations between stakeholders about what a national response should look like that would need to be addressed by combining systems methods from different methodological sources. We needed to decide what was to be included or excluded in the system redesign process, including which stakeholders to involve, which viewpoints to consider and which aspects of the current system to maintain or change. Below, we explain how the SSM analysis one shaped our thinking, but insights from analyses two and three (relating to norms, values, roles and commodities of power), which are not discussed in this chapter, also influenced how the participatory design engaged with sector experts.

Analysis one examined three roles contributing to our systemic intervention: the client (the person or organisation who asked for the intervention), the practitioners (those undertaking the intervention) and the issue owners (stakeholders of the issue leading to the intervention).

Our boundary critique highlighted that the client, a wealthy New Zealander with the financial resources to establish an independent Inquiry, aimed to mobilise sector and public support for the transformation ahead of an upcoming general election. The Inquiry would be led and endorsed by other high-profile New Zealanders, including a former Supreme Court Judge and a previous Governor General of New Zealand (the Governor General is the representative of the British King, who is the official Head of State, even though the country is no longer a British colony).

Our understanding of the *client role* shaped the boundaries of our intervention in two ways. First, as it was an election year, it was inappropriate for government officials to participate in any stakeholder deliberation intended to influence government policy. However, excluding policymakers would run the risk that our design for a high-performing system might not align with current policy thinking, and the recommendations from the *People's Blueprint* might clash with the current configuration of the family violence policy subsystem and its beliefs, values, problem definitions and strategies (Howlett & Ramesh, 1998). To address this risk, we included ex-government officials with a working understanding of existing policy priorities. This ensured that the current policy perspective was not marginalised. The second

challenge was that the Glenn Inquiry became caught up in controversy after past allegations of violence surfaced against the client, and concerns were expressed about the Inquiry's safety processes related to how stakeholder information would be handled (RNZ, 2013). The Glenn Inquiry's director resigned and undertook separate work on a proposed integrated family violence system (Herbert & MacKenzie, 2014).

Our team faced a dilemma about whether to proceed with our systemic intervention: transformation would only be possible if the inquiry was seen as credible and legitimate by people in the family violence sector, policymakers and the public. Success would not be judged solely by direct participants, who we hoped would experience benefits like enhanced collaboration and shared learning, which Ackermann (2012) describes as important outcomes of deliberative processes. In addition to direct participants, stakeholders not involved in our workshops would also evaluate the effectiveness of our systemic intervention, and they might use criteria to do so that included whether our time had been funded by a 'tainted' source. Our team's family violence experts expressed the view that the controversy surrounding the Inquiry would settle over time, and they wanted us to go ahead because they saw considerable value in using a participatory systems approach to engage them and other sector experts. We therefore proceeded as planned.

Given that the Glenn Inquiry focused on the intersection of family violence and child abuse, our systemic intervention adopted an expansive understanding of family violence, including intimate partner violence, child abuse and neglect, elder abuse, inter-sibling abuse and parental abuse. Setting a wide boundary was important. While child abuse and other types of family violence have distinct protective and risk factors, necessitating tailored policy and service responses (Pinheiro, 2006), we focused on the wider system that would address the patchwork of individual policies and programmes to ensure a coordinated and coherent approach across responses (Bensberg et al., 2021). This wider boundary of analysis swept in a diverse range of *issue owner roles* or stakeholders, and a review of the *People's Report* highlighted their diverse and conflicting perspectives, including disagreements about state, family and individual responsibilities, and the centrality of gender and ethnicity in addressing family violence. At the very least, there were victim-survivors and perpetrators, health and social service providers, law enforcement and judicial agencies, iwi and hapū, policymakers, politicians, researchers, communities and the public – all of whom held distinctive perspectives on the causes of family violence, what should be considered relevant to it, and how to address it appropriately.

Our team was also conscious that Māori were not just another issue owner, even though they are disproportionally represented in family violence statistics (Joint Venture, 2021). Instead, Māori are Te Tiriti o Waitangi (Treaty of Waitangi) partners with distinct constitutional rights in New Zealand related to partnership, participation and protection. The systemic intervention would therefore need to ensure that Māori involvement was meaningful rather than tokenistic, and that Māori concerns

and values were centrally placed in our systemic redesign, otherwise the vision for a transformed system would lack legitimacy (Foote et al., 2021).

The diversity of 'issue owners' created three key challenges for our systemic intervention and shaped our *practitioner roles*. Attention needed to be paid to both process and content complexity (Ackermann, 2024). The first challenge related to harnessing the sector's social complexity in ways that would lead to accommodation around a national response. The selection of sector experts would influence the credibility and legitimacy of the systemic intervention, and the set of participants needed to include practitioner and academic expertise in areas such as child abuse, family violence, elder abuse and sexual violence. The people bringing this expertise needed to be well-regarded by those in the family violence sector, and they had to be able to provide diverse perspectives. There was also a need to mediate strongly held stakeholder views by creating a safe space for social learning and engaging with the scholarly literature to combine stakeholder perspectives with policy and scientific knowledge. Reviews of the literature canvassed a variety of topics, including New Zealand government legalisation, policies and initiatives; research on the prevalence, incidence and different types of intimate partner violence, child abuse and sexual violence (and any intersections), plus the impacts of these things and challenges of responding to them; and reviews of international frameworks for addressing violence against women, including the need to adopt a 'holistic' (we would say systemic) approach to interventions (Taylor et al., 2014a, 2014b).

The second challenge was that the team's systems thinkers were very aware that they lacked subject matter expertise, so credibility and legitimacy with our stakeholders, including our sector experts, might have been an issue. While this challenge was partially addressed by our team's family violence experts reviewing the scholarly literature and being able to provide expert commentary during workshop discussions, we would need to carefully emphasise our process expertise and critically reflect on the potentially problematic aspects of our identities (we were male and non-Māori), showing how the systemic intervention took questions of structural injustice and power relations seriously. See Midgley et al. (2007) for a discussion of the role of practitioner identity in systemic interventions. Not only would our approach need to be conscious of boundary judgements around whose perspectives, experiences and expertise would be considered, but we would also need to attend to issues of salience, credibility and legitimacy through attention to these boundary judgements and through the process of critically informed engagement with sector experts (Gregory & Romm, 2001).

4   Crafting the systemic intervention

The participatory design took the problem of partial perspectives seriously by creating a safe space where stakeholders could reflect on boundaries of relevance (whose voices should be heard and what issues should be considered), enabling

them to rethink what might actually be possible and desirable to change. This is critically important in the context of joining up fragmented systems at multiple scales (Helfgott et al., 2023). Following Midgley's (2000) approach to methodological pluralism, interactive planning (IP) methods (Ackoff, 1981; Ackoff et al., 2006), SSM (Checkland, 1981; Checkland & Poulter, 2006), critical systems heuristics (CSH) (Ulrich, 1987, 1994) and the VSM (Beer, 1984; Espinosa, 2022) were selected and adapted. Individually, these systems methodologies have been applied to various wicked problems, but the systemic intervention aimed to draw methods from them that could be combined synergistically to address the following challenging questions specific to the Glenn Inquiry's context:

1 How can we encourage sector experts to think creatively about the elements that constitute a transformed system?
2 How can shared learning between sector experts about the future be encouraged that moves beyond entrenched views?
3 How can a design for the future move beyond merely patching up what some see as poorly funded and fragmented service delivery?
4 How can the significant system building that has occurred at the national and regional levels be recognised (so we avoid starting from scratch), but without replicating or reinforcing problematic aspects of the current system of service provision?
5 How can the workshop outputs be socially robust and triangulated with other sources, including the scholarly and policy literature on high-performing family violence prevention systems?

Specifically, IP provided the rationale for a stakeholder-informed, idealised design system to focus engagement and strategising about system change and encourage creative thinking beyond the status quo; CSH surfaced and developed a shared understanding of the desirable qualities of the transformed system by critically examining boundaries, values and assumptions, and by making stakeholder tensions visible and discussable; and the VSM highlighted the links between resourcing, activities and purpose, and it structured stakeholder discussions about key features of the transformed system that would lend themselves to adaptation and structural viability.

Eight to twelve participants drawn from academic institutions, leading national providers (including peak bodies) and subject and sector experts in previous roles in central government agencies attended three full-day workshops to design a transformed system to address family violence. The workshops mirrored the IP stages of formulating the 'mess' (workshop 1), ends planning (workshop 2) and means planning (workshop 3) (Flood & Jackson, 1991). Idealised design (Ackoff et al., 2006) was a key part of ends planning in workshop 2 – planning as if the service system no longer exists, but making sure the design is technologically feasible, viable and adaptable into the future. Twelve CSH questions (Ulrich, 1994)

were integrated into the planning, as they helped stakeholders be more critical with respect to motivations for systems change: who should have decision-making authority, what should count as relevant expertise, and what will give a transformed system legitimacy. Midgley et al. (2023) note that embedding these questions into idealised design is particularly useful for governance innovation. We also used the CATWOE mnemonic from SSM [Customers, Actors, Transformation, Worldview, Owners and Environmental constraints] (Checkland & Poulter, 2006), which helps build mutual understanding between stakeholders on the specifics of the different transformations they want to bring about. Finally, means planning was enhanced with the VSM (Beer, 1984), as it offers a template for diagnosing organisational problems and designing new institutions or organisations. The latter was used participatively to facilitate stakeholder discussions, as explained by Espejo and Harnden (1989), Espinosa (2022) and Sydelko et al. (2024).

The first workshop began by mapping the current family violence system, although following Checkland (1981), we were agnostic about whether the existing policy development processes and service delivery already constituted a 'system' in the formal sense of the term. Formulating the 'mess' included interactive exercises using methods such as rich pictures (Checkland, 1981) to identify the various issues, opportunities, threats and interactions the transformed system would need to address. Reflecting on the rich pictures, the sector experts critiqued New Zealand's current approach by ascribing formal and informal purposes to the existing system using SSM's language of transformation (the T in CATWOE), and they reflected on the boundaries of their systemic understanding by asking questions from Ulrich (1987) on who benefited, how success was defined and who had decision-making power. The experts also considered what social, cultural, political and economic factors might constrain greater levels of system performance, and they created scenarios to explore potential outcomes of the current situation. Having formulated the 'mess', our sector experts began to develop a shared understanding of the context and areas for change, including the way the existing system of service development and delivery – encompassing government policies, sector capabilities and societal discourses – reproduced persistent problems. This understanding highlighted the need for a systemic understanding and interventions at both service touchpoints as well as government and societal levels. Aspects of the 'mess' considered germane included how the status quo:

- reinforced a 'Western' worldview at the expense of Māori perspectives, seen most notably in the system's foci on individuals and nuclear families, downplaying the importance of whānau (extended families), hapū (villages) and iwi (tribes) – it would be necessary to look at the impact of family violence in terms of Māori cultural values and practices (also see Ahuriri-Driscoll et al., 2005);
- focused on outputs rather than outcomes;
- drifted towards popularism and simplistic analyses, while ignoring more nuanced understandings of family violence, such as structural analyses;

- amplified disconnects between service providers and the government when it came to planning;
- failed to listen sufficiently to the voices of those most affected by family violence; and
- struggled to make use of research and evaluation when commissioning and improving services.

The second workshop focused on ends planning, with an emphasis on idealised design. Here, we treated the national response as if it was a purpose-built system. After imagining that the current system had disappeared overnight, stakeholders were tasked with selecting a mission and determining the desired properties of the new design, as if they had the power to redesign the system. Central to idealised design is the capacity to question taken-for-granted assumptions that limit creativity by encouraging stakeholders to have "imaginative irreverence for things as they are and encourages exploration of areas previously precluded by self-imposed and culturally imposed taboos" (Ackoff, 1978, p. 28). However, idealised designs should not be utopian but should remain technologically feasible, viable and adaptable (Ackoff, 1981; Ackoff et al., 2006).

The workshop began by exploring the overarching purpose of a transformed system. We worked with the Glenn Inquiry's stated aim and refined it using SSM's CATWOE method to create the following system definition (or mission) for what needed to be brought into being:

> A system that reduces the rate of family violence by giving credence to the experience of those most affected by such violence and changing how New Zealand deals with these problems. The ultimate goal, specified by the Glenn Inquiry, is to make New Zealand a great place for families, particularly women and children.

After confirming the transformed system's mission, we examined the first-hand accounts of the diverse affected stakeholders in the *People's Report*. This is when we used the CSH questions (Ulrich, 1987, 1994), and in line with many previous CSH applications (e.g., Cohen & Midgley, 1994; Midgley et al., 1998; Boyd et al., 2004), we modified the questions to improve their accessibility (Midgley, 2017) and to make them specifically relevant to the family violence prevention system. We then applied these adapted questions to generate a list of desired properties so that the vision of the transformed system was considered relevant, credible and legitimate by our sector experts. In line with the mission and Ulrich's (1987) original intent for the questions, we asked the experts to be especially mindful of those who would be affected by system change but might not be involved in implementing it, or who could become marginalised in the process, such as children, women and Māori. We also reflected on the conditions that encourage political viability, given that our analysis of the 'mess' strongly indicated the need for increased and

TABLE 10.1 Properties of the idealised design (extract)

Who is this system designed to benefit?	• Those who have been subject to family violence and those who are at risk of abuse. • Those who have perpetrated abuse and those who are at risk of doing so. • The whole society, as family violence sends ripples over time throughout the community. • An important tension exists between a focus on victims and perpetrators, and those at risk of being a victim or perpetrator.
Who will have the power to decide what matters and what success will look like, and how should they work?	• Decision makers need a framing of need that includes primary (prevention), secondary (crisis response) and tertiary (rebuilding lives) responses. • Stakeholder participation is vital in decision-making bodies. • Decision makers need to include cross-government representatives, service providers, researchers, iwi and hapū, and be responsive to service user feedback. • Decision makers need to use evidence generated from well-designed planning processes, impact and outcome evaluations, cost/benefit analyses and analyses that account for the needs and cultures of particular populations. • An important tension exists between centralised and standardised vs. context-dependent planning and implementation.

sustained investment in policy change; service development and delivery; striking a balance between prevention, crisis and recovery-focused services; and securing cross-party commitment in Parliament. Extracts of important properties of the idealised design are listed in Table 10.1, and they include areas of active debate or disagreement among our sector experts and those working in the wider family violence system. Our application of the CSH questions identified at least seven conditions that would need to be met by the system:

1 Exist to improve the situation of those who have been subject to family violence, those vulnerable to such abuse, those who have perpetrated abuse and those who are vulnerable to doing so.
2 Monitor system performance using evaluation evidence (outcomes data) and the lived experiences of individuals and communities directly affected.
3 Represent service users in governance and balance the advice of experts with that of communities and practitioners who are informed by the experience of those most affected.
4 Focus on prevention response, and recovery in planning and implementation; involve stakeholders; use the best evaluation evidence; and balance central control with local context.

5 Secure cross-party political commitment and government capacity to advise on direction and interventions.
6 Use accurate documentation and well-designed evaluations that are culturally responsive.
7 Be based on commitments to human dignity, the application of human rights and respect, and the recognition of cultural diversity.

The third and final workshop supported sector experts in exploring how a transformed system might sustainably give practical effect to the desired properties. The VSM (Beer, 1984; Espinosa, 2022) was used to structure these discussions and help participants think about how a transformed system's idealised properties might be realised. This movement from IP (Ackoff et al., 2006), incorporating the CSH questions (Ulrich, 1994), to institutional design using the VSM (Beer, 1984) was borrowed from Midgley et al. (1997, 1998), who first put together this combination of systems approaches to redesign housing services for older people. We engaged with the sector experts to outline requirements for a 'viable system'; that is, an integrated approach that produces the desired outcomes and will remain effective over time. Key communication and accountability channels were discussed. Finally, we conceptualised viability as both 'structural viability' (how the necessary functions in the system need to work together) (Beer, 1984) and 'socio-political viability' (how the system can be made relevant, credible and legitimate in the eyes of key stakeholders) (Wynne, 1983; Espinosa et al., 2005).

The VSM focuses on five critical functions, or subsystems, and how they work together to ensure viability. We labelled each subsystem with numbers, as recommended by Beer (1984), to avoid negative value judgements that can sometimes come with the use of management terms like 'strategy' and 'operations': System 1s ('operational units'), System 2 ('coordination'), System 3 ('tasking, resourcing and monitoring performance'), System 4 ('scanning and planning') and System 5 ('purpose and guidance'). Figure 10.1 shows the model of the transformed system created by the participants, which does not allocate responsibilities to particular organisations, but instead focuses on what needs to be done to deliver a viable system (specific allocations could happen later, at the implementation stage).

We report on illustrative recommendations from the sector experts here, but the full systemic redesign can be found in Foote et al. (2014a, 2014b), including our team's recommendations to the Glenn Inquiry that were co-created with stakeholders. The System 1s involve operational activities that carry out the main work of the transformed system, and include prevention, targeted prevention, response and advocacy, which were populated with programmes after an evidence-based review. System 2 enables coordination between the operational activities, so they work together rather than undermine each other. This involves service mapping and knowledge sharing, as well as developing national best practice guidelines and tools that reflect a common language and set of core values. System 3 ensures that operational activities are appropriately tasked, resourced and held accountable, and
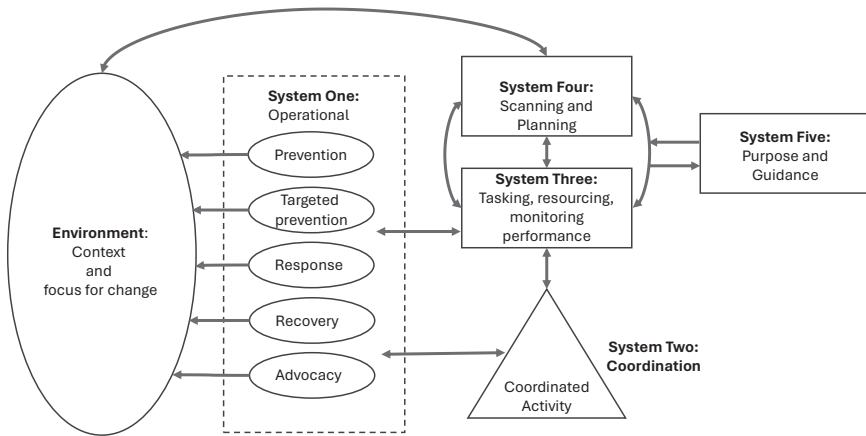
FIGURE 10.1   The transformed system (adapted from Foote et al., 2014a, p. 36).

it focuses on improving how funding agencies identify and evaluate programmes and initiatives, noting the need for methods to incorporate community perspectives in decisions about purchasing services and monitoring performance. System 4 alerts the transformed system to new developments, including threats and opportunities, and includes a proposal for a national Family Safety Authority that would ensure decision makers are well informed on national and international trends and developments. The Family Safety Authority would also standardise data on family violence so it can be meaningfully tracked over time and triangulated with other data. Finally, System 5 provides a coherent and explicit purpose for the transformed system, and arbitrates when there are difficult to resolve conflicts between the need for ongoing, high-performing and well-resourced operational activities (as judged by System 3) and pressure for change to business as usual to meet emerging threats and opportunities (identified through System 4). Our sector experts highlighted the need for a national policy framework with commitment and ownership across political parties, sector stakeholders and Māori. Such a framework would facilitate and express broad 'buy-in' to the underlying values, strategies and outcomes driving the transformed system to prevent and reduce family violence.

5   Discussion

Having provided an account of our systemic intervention, we now turn to the question of whether the participatory design had created a systemically, socially and politically robust vision for a coherent and impactful approach to family violence prevention. While the workshop participants were confident that the systemic redesign represented an improvement, and our team's recommendations mirrored stakeholder deliberations about what would constitute a high-performing family violence prevention system, uncertainty existed about how the team's

recommendations would be taken up by the Glenn Inquiry and then be presented to the government who would be free to accept, reject or ignore any recommendations. Overall, there was a clear connection between the systemic redesign and the Glenn Inquiry's *People's Blueprint* (minus systems terminology and technicalities, which were removed to facilitate accessibility to a more general audience). Also, the press release accompanying the publication of the *People's Blueprint* contained a quotation from Sir Owen Glenn, who had funded the Inquiry. He noted that:

> The Blueprint provides the basis of just such a coherent, integrated strategy. Now that the Inquiry's work is done, the challenge is laid down to implement it. I am anxious to see the strategy adopted by political parties, across the spectrum, and taken up over the whole of our society.
>
> *(Glenn Inquiry, 2014)*

Yet, the *People's Blueprint* recommendations received a mixed response. The Chair of a prominent anti-violence organisation and former principal Family Court judge described the report as "comprehensive and courageous" (RNZ, 2014a). Women's Refuge strongly supported the *People's Blueprint* proposals for a single court for domestic violence cases and a monitoring agency to ensure outcomes for victims and those at risk (RNZ, 2014b). The then Ministers of Justice and Social Development noted that the report contained "useful contributions to the insights and information being gathered by officials" and "reinforced the importance of taking collective action on family violence" (Beehive, 2014). However, they also pointed out that "there are a number of initiatives in place across Government … which address the issues raised in this report" and that there was a "ministerial working group … taking a broad [whole of government] look at how the Government is working on family violence, how effective those interventions are, and what more can be done" (Beehive, 2014; Stuff, 2015).

A year after the *People's Blueprint* had been published, Sir Owen Glenn expressed disappointment that no government official had been in contact to discuss the Inquiry's recommendations, and the widespread public support for change that the Inquiry hoped to mobilise was not realised in practice (Stuff, 2015). Nevertheless, the opposition party Leader, Jacinda Ardern, who would become New Zealand's 40th prime minister (2017–2023), was critical of the government's approach, describing it as "picking off bits without looking at the whole" (Stuff, 2015). Marama Davidson, who was a member of the Glenn Inquiry, would go on to become the Minister for the Prevention of Family and Sexual Violence under Ardern's Labour Party-led government. She introduced *Te Aorerekura,* New Zealand's first national strategy to eliminate family and sexual violence, which prioritised 'whole of government' action, including investment in prevention and integrated responses (Joint Venture, 2021).

It was unclear how we should judge the impact of the participatory design. As noted, while our sector experts found value in our participatory systems approach,

and the Glenn Inquiry had drawn on the accommodations between stakeholders to make recommendations, the lack of engagement from politicians and officials in the then-government was puzzling. This was especially so, as our team's systemic intervention was one of a number of initiatives at the time that had attempted to articulate a 'whole system' solution to family violence prevention. Others included the work of Ruth Herbert, who had left the Glenn Inquiry and co-authored *The Way Forward* (Herbert & MacKenzie, 2014). Indeed, our team was also commissioned by the government's Social Policy Evaluation and Research Unit to develop a 'whole of system' evaluation methodology (Foote et al., 2015), and Carswell et al. (2020) reviewed New Zealand research on the family violence system for the Office of the Auditor-General. Their report included a chapter on systems approaches.

While we were careful to incorporate inquiries into social and political viability within our systemic intervention, our understanding of the fateful ways in which the family violence prevention sector was nested in or connected to other service systems (such as the health, legal and political systems) was limited. Indeed, these service systems may have had resource dependencies and overlapping interests or interacted with similar stakeholders: it is common for stakeholders to borrow strategies from, form alliances with or come into conflict with neighbouring systems (Laamanen & Skålén, 2015). To what extent was the lack of political engagement with the Inquiry report a result of it being seen as a threat to such neighbouring systems?

One finding of our 'formulating the mess' exercise, early on, was that the ex-government officials we involved had expressed some concern that the then-government might perceive the independent funding of a public inquiry as a challenge to their own policy making rather than an aid to it. If the government viewed the Inquiry as unwelcome, then their lack of engagement is quite understandable. Based on what the ex-government officials told us, we believe that this was a significant factor, but it is unlikely that any representative of the then-government would admit to it, so it is not possible to validate the claim any further.

We are pleased that the new, incoming government chose to create a national, whole-of-government family violence prevention strategy, as mentioned above. So, the eventual outcome was close to what our participants had planned. However, the precise causal relationship between the Inquiry and the eventual policy outcome remains unclear, not least because causality in such situations is nearly always highly complex, and may be seen differently by different stakeholders (Midgley et al., 2013; Foote et al., 2021; Reed et al., 2021): it could be that the *People's Blueprint* raised the profile of the issue of family violence, so the next government was willing to prioritise it; perhaps the Inquiry had influenced some key stakeholders participating in the new policymaking; maybe the *Blueprint* was consulted by civil servants; or possibly a whole-of-government approach to family violence prevention had been on the agenda of the incoming government before the Inquiry took place. Without further research, it is impossible to know for sure.

As a general point, it is surprising that many systemic interventions pay only cursory attention to the 'supra-system' by (perhaps) noting the big-picture drivers shaping the problem context. They often have only a thin understanding of the wider considerations that impact systemically desirable and culturally feasible change (Checkland, 1981). While this may not be a significant issue for systemic interventions in local contexts where structural and social viability can be addressed with sound processes and shared learning (Midgley, 2000), we suggest that future systemic interventions to design national-level service systems need to place greater emphasis on *political viability*, which means taking seriously the machinery of government, including the role of policy sub-systems in agenda setting and implementation. While there is a risk that widening the boundaries of analysis by 'sweeping in' policy or political considerations too early on might lead to unnecessary compromises, understanding the context in which the use (or non-use) of any findings or recommendations will be shaped by interests, values and concerns of policy and political actors is crucial. This analysis may suggest a different combination of systems methods to structure systemic redesign, but equally, it may point to the need to enrol different stakeholders in either the client, practitioner or issue owner roles (Lewis, 2007).

This greater engagement with policy and political contexts will necessarily involve dialogue between the systems practitioners and public policy communities. However, we are conscious that policymakers face obstacles in using systems ideas and methodologies, such as the diversity of systems methodologies and associated jargon terms in the literature (Cabrera et al., 2023) and the limited ability of government agencies to adopt systems approaches in the context of business-as-usual policymaking (Foote et al., 2015; Haynes et al., 2020; Hobbs & Midgley, 2020). It may therefore be incumbent on systems practitioners to better understand the tensions and trade-offs (McColl-Kennedy et al., 2020), conflict over public value (Skålén et al., 2024) and the role of legitimacy (Kinder et al., 2022) in public service ecosystems.

To support systems practitioners in this endeavour, we propose enhancing the theory and practice of boundary critique (Midgley et al., 1998; Midgley, 2000; Córdoba & Midgley, 2003, 2006, 2008; Foote et al., 2007; Midgley & Pinzón, 2011) by drawing on theoretical frameworks that clarify the relationships between the system in focus and the supra-system, such as the way Lewis (2007) uses Actor Network Theory and Foote et al. (2021) use institutional logics. Indeed, frameworks such as Geels' (2002) multiple level perspective (MLP), Fligstein and McAdam's (2012) strategic action fields and Helfgott et al.'s (2023) multi-level integrated planning and implementation process are possible candidates, given their foci on multiple levels of analysis, agents and agency, stability and change, and context. While the use of frameworks such as the MLP are common in systemic design practice (Systemic Design Toolkit, 2021), there is potential here for the wider systems thinking community to learn from it.

For example, Simoens et al. (2022) apply the MLP to examine the role of discursive dynamics within socio-technical systems, focusing on how certain discourses

can lead to lock-ins, where problem framings become entrenched, making it difficult to implement new solutions or approaches. Indeed, this framework signals the importance of niche projects in generating alternative discourses and the non-linear way in which new understandings about problems and solutions can challenge, replace or be assimilated into dominant ways of thinking and organising. It is highly likely that our use of the VSM (Beer, 1984) was perceived by some stakeholders beyond our participant group as making the case for integrated service provision rather than addressing family violence prevention as a wicked problem, which would require the prioritisation of children, women and Māori. Our alternative framing is unlikely to overcome the dominant understanding of systems in 'whole of government' discourses.

Of course, it is an open question to what extent these theories lend themselves to "generalizable analytical tools that [actors] can use to develop … strategic assessments of the sociological contexts in which they act" (Noy, 2008, p. 3). This situation creates an opportunity to explore the utility of these frameworks in future systemic interventions.

6   Conclusion

Our chapter has reflected on a systemic intervention to engage family violence prevention stakeholders in a redesign of a system that was considered 'broken' and in need of transformation. We have illustrated how systemic intervention's boundary critique and creative design of methods can craft an approach that is sensitive to structural, social and political conditions needed for a viable approach to family violence prevention. In doing so, we have shown how methods drawn from a variety of different systems methodologies guided stakeholder deliberations about a transformed system.

Our research contributes to the ongoing discussion about using systemic and participative methods in service design, particularly within the domain of family violence prevention. We make the case that service systems need to be structurally, socially and politically viable, but beyond the meaningful engagement of stakeholders, there is a need for understanding how the wider system in which the redesigned service system is nested shapes what changes are considered systemically desirable and culturally feasible.

We note the need to enhance boundary critique with frameworks that account for social theories of change, and we suggest Geels' (2002) multiple level perspective, Fligstein and McAdam's (2012) strategic action fields and Helfgott et al.'s (2023) multi-level integrated planning and implementation process, amongst others, as prime candidates for future research on augmenting boundary critique with multi-level analysis in systems practice.

As New Zealand continues to refine its approach to family violence prevention, the lessons drawn from this intervention can inform future efforts. This work not only paves the way for more systemic and sustainable transformations in social policy, but also serves as a model for grappling with similar 'wicked problems'.

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11

FROM STATE OF CHAOS TO THE ESSENCE OF THE ISSUE

Framework employing service and systemic design principles in the context of criminality

Michalina Fidos

1   Introduction

Crimes generate significant economic burdens for society. The study by Eggen et al. (2022) estimated that in Norway in 2019, the overall socio-economic impact of crime ranged from NOK 110 to 177 billion. This includes government expenditures on crime prevention and legal responses (NOK 35.6 billion), private actors' costs for risk reduction measures like security systems (NOK 12.8 billion), victim costs for healthcare and productivity losses (NOK 94.7 billion), and productivity losses from imprison individuals (NOK 1.5 billion). There are also non-priced effects such as behavioural alteration, mental health issues, consequences for significant others, and the time spent for those who have been exposed to crimes (Eggen et al., 2022).

However, crimes stem from multiples of sources and are entangled in multiple societal problems. For example, the lockdown restrictions during the COVID-19 pandemic led to a decrease in urban crime (Nivette et al., 2021). Conversely, the pandemic also resulted in the emergence and prevalence of cybercrimes (Lallie et al., 2021). Furthermore, these cybercrimes can be seen as an unintended consequence facilitated by the development of AI (King et al., 2020). Similarly, the advancement of AI has significantly impacted hybrid warfare (Yan, 2020). However, the conventional Russian-Ukrainian war has not only worsened the humanitarian crisis (Haque et al., 2022) but also triggered global inflation (Maurya et al., 2023). Consequently, economic downturns could potentially be linked to an increase in crime rates (Finklea, 2012).

Addressing these problems becomes a problem in and of itself due to:

a   saliency of the problem, as there is a lack of clear identification and full comprehension of the mechanisms that lead to societal changes, combined with the inherent complexity and uncertain consequences (Moore et al., 2014);

b institutional complexity referring to conflicts arising from coordination, collaboration, and information flow in the governance of social systems (Folke et al., 2005);

c social plurality meaning that individuals approach problems based on their unique perspectives, values, priorities, and interests (van Bueren et al., 2003).

To illustrate the above three aspects, this chapter, built upon data gathered for a master's thesis (Fidos, 2023), will present the criminality as a wicked problem. Then, it will highlight key challenges in current preventive methods in Norway, and address the strategic goal posed by the Norwegian government. Based on the identified needs, this chapter asks a question:

How to determine, map out, and comprehensively address the primary causes of societal and systemic disorders that can lead an individual to commit a crime?

In the following sections, I examined a thematic analysis of retrospective, semi-structured interviews with both former and current offenders. The analysis results in overarching themes that serve to analyse qualitative data. Subsequently, stakeholders using these themes engage in a co-creation process, leveraging these insights to address the problem by implementing a portfolio of interventions.

2 Literature reviews

2.1 *Criminality as a wicked problem*

I have condensed and interpreted Rittel and Webber's (1973) ten-point characterisation of wicked problems (WP) (Appendix B) into three core elements to capture the essence of the original concept, tailored to the specific needs of this study.

2.1.1 *Saliency*

The examination of criminal behaviour necessitates an understanding of the complexity of causality and the dynamic interplay between an individual and the various environmental levels with which one interacts. Saliency, then, refers to the stimuli that are noticeable or influential in shaping thoughts and behaviour (Corbetta & Shulman, 2002). It, thus, helps to identify which elements within an individual's environment are likely to impact their actions and decisions (Kahneman & Tversky, 1988), thereby influencing societal changes (Moore et al., 2014).

To assess, the individual in relation to the environment may serve ecological system theory by Uri Bronfenbrenner (Bronfenbrenner, 1986). It explains the levels of environmental dependency that can be categorised into distinct strata: micro-, meso-, exo-, and macro-systems that interact and evolve over time – the chronosystem. Some individuals are either exposed or predisposed to biological dysfunctions such as damage to the structure of the frontal lobe (Yang & Raine, 2009) or an uneven level of some neurotransmitters that can contribute to

the emergence of antisocial or criminal behaviour; however, they do not inherently ensure negative outcomes (Karalis, 2019). External stimuli stemming from micro-system, including family, friends, or neighbours, and relationships between them, referred to as the meso-system, can catalyse such changes. Stressors such as childhood maltreatment or instability can trigger neurodevelopmental alteration, potentially leading to aggressive responses when confronted with new stressors or challenges (Teicher et al., 2003; Tottenham et al., 2011).

In the chronosystem, colonialism and historical segregation have shaped macrosystem policies, laws, and practices, leading to systemic and structural racism (Cunneen & Tauri, 2019). This has marginalised disadvantaged groups, relegating them to areas with socioeconomic challenges, thereby contributing to crime rate disparities between people of colour and White individuals (Sampson et al., 2018). Therefore, discussing personal choices without considering systemic inequalities leads to an incomplete analysis (Najdowski & Stevenson, 2022).

Thus, the concept of criminality lacks a stable and consistent definition, making it challenging to assess saliency due to its inherent complexity. This is illustrated by the principle of equifinality, where diverse factors like family dysfunction, educational challenges, or substance abuse may lead to criminal behaviour. Similarly, the principle of multifinality suggests that a single factor, such as a traumatic experience, can result in varied outcomes like post-traumatic stress disorder, substance addiction, or criminal activity (Cicchetti & Rogosch, 1996). These principles demonstrate that the paths leading to and from criminal behaviour are influenced by multiple, intersecting aspects, raising the question of how to identify the root causes that lead an individual to commit a crime.

2.1.2   Social plurality

As outlined above, brain development influences cognitive processes, thus affecting actions. These experiences with environmental responses can, in turn, impact or alter the way neuronal pathways develop. These interactions shape schemas that form mental representations in our brains, influenced by factors ranging from early childhood through processes such as socialisation, semantic learning, media, and law, leading to the creation of stereotypes, social roles, scripts, heuristics, and archetypes (Georgeon & Ritter, 2012; Piaget, 1975; Vygotsky, 1978). Additionally, each individual possesses unique mental and emotional predispositions, and ability to cope with and adapt to change, and their recovery to pre-crisis status (Corrigan et al., 2011). All these elements shape their perspectives and responses, fostering a diversity of viewpoints known as social plurality (van Bueren et al., 2003). This complexity can affect our perception and approach to crime.

Consequently, within the social plurality system, each entity may interpret the same event differently. For example, consider a child who bullies another as a coping mechanism (Mishna, 2012). This behaviour could stem from family values and behaviour models that shape social conduct (Bowes et al., 2009). Conversely, the

child being bullied may acquiesce to the bullying due to psychological and social factors, such as learned helplessness, which lead them to feel powerless (Pryce et al., 2011). Thus, it raises the question: Who is the offender, and who is the victim? Additionally, resolving these issues depends on individuals who bring diverse perspectives to bear, as they compete, cooperate, and change their views (Rittel & Webber, 1973), and therefore everyone carries a different narrative of the event. It prompts another question – who should participate in solving these problems?

2.1.3   Institutional complexity

As detailed earlier, individuals operate under distinct logics shaped by cultural beliefs, social identities, political ideologies, and economic principles (Glaser et al., 2016). This pattern can be extended to governmental institutions, leading to institutional complexity (Askeland et al., 2020) due to challenges in coordination, collaboration, and information sharing (Folke et al., 2005).

Contemporary governance models tend to deconstruct problems into smaller sub-problems but then isolate them into separate units. Yet, this approach often results in specialised silos without horizontal information flow (Bertalanffy, 2009). Despite the intention of organisations to collaborate effectively, they often lack a multidimensional perspective. Consequently, information stays confined within each system, blurring the understanding of concepts across agencies and disciplines. For instance, a person who did not receive payment could not pay taxes, prioritising their workers instead. To keep the business afloat and pay salaries to the workers, the individual, under significant financial stress, sold company assets without proper authorisation. This situation involving conflicts of interest between tax obligations, law enforcement, and employment responsibilities reflects broader systemic tensions, where each institution runs its own parallel investigation.

Addressing criminality thus involves challenges in defining the concept, and identifying root causes, thereby, distinguishing between offender and victim. Hence, social plurality leads to varied interpretations and responses to criminal acts, while institutional complexity underscores the difficulties in coordinating efforts among diverse institutions. These issues raise questions about who is adequate to participate in problem-solving and how to effectively coordinate efforts.

2.2   Prevention challenge in Norway

These complexities highlight the need for improved coordination and more comprehensive prevention strategies. In Norway, numerous programmes are designed to prevent crime. In 2020, researchers examined the effectiveness of prevention and treatment methods to prevent at-risk children and youth from entering or continuing a criminal trajectory. Aase et al. (2020) noted that although such methods exist in Norway, their implementation is not sufficiently widespread. They highlighted the critical need for effective coordination among various agencies and

sectors involved in a child's life and underlined the importance of comprehensive mapping to understand the prevalence and nature of these issues. Other research-ers also noted the importance of information flow and exchange across sectors. Further, they pointed out that the police have stressed the need to gather informa-tion from sources other than police records to gain a more comprehensive under-standing of issues and consider various perspectives (Nøkleberg et al., 2022). By comparison, another report introduced an innovative approach to crime prevention, emphasising the need for foresight in addressing future challenges in crime devel-opment, as they observed that in Norway, there is still an emphasis on short-term analyses. However, they stressed that achieving this would require clear goals, a better understanding of concepts across agencies and disciplines, a varied selection of experts, and good routines for safe information sharing (Larsson et al., 2022).

Hence, the Ministry of Justice and Public Security in Norway states that the main goal is to prevent crimes and recidivism, especially among youth (Sammen mot barne-, ungdoms- og gjengkriminalitet, 2021). The police clarify the need for cooperation and interaction to strengthen preventive work both internally within the police and with external actors (I forkant av kriminaliteten, 2020).

To address these goals requires better coordination among agencies, an under-standing of diverse expertise, and improved cross-sector information flow. It also necessitates comprehensive mapping of the type and prevalence of issues, as well as long-term analysis.

2.3   Service design and systemic design

Prevention systems would benefit from the integration of service and systemic design principles. Service design is an interdisciplinary approach that results in designing new processes or optimising existing ones to provide a holistic experi-ence to the user. According to Suoheimo et al. (2023), service design has evolved significantly over the years, adapting to the shifting needs of societies and tech-nologies. It initially utilised tools like service blueprints to emphasise the intan-gible nature of services, distinguishing them from goods (Shostack, 1984). Over time, it shifted from a goods-dominant to a service-dominant logic, as proposed by Vargo and Lusch (2004). This new perspective reframed service as a funda-mental basis of exchange, focusing on value co-creation through the integration of actors' resources and perspectives (Yu & Sangiorgi, 2018). Today's service design includes various approaches such as traditional service design, product-service system design (PSSD), design for service, and service ecosystem design, each uniquely addressing user needs (Suoheimo et al., 2023). In particular, the concept of service ecosystems – complex, self-regulating systems where actors collaborate to create mutual value – has shifted the focus in service-dominant logic towards a systems-oriented approach (Vink et al., 2021). Consequently, service design is guided by principles that include a focus on both human needs and the broader ecological context, co-creation, sequencing, evidencing, and holism (Penin, 2018;

Stickdorn et al., 2018). These principles, especially co-creation and holism, are crucial when addressing the interdependencies of complex systems (Vargo & Lusch, 2004).

Systemic design is an interdisciplinary field (Sevaldson & Jones, 2019) that integrates systems thinking and design practices (Pourdehnad et al., 2011). It is not a specific design discipline, but rather an orientation or practice that combines the principles and methods of both systems theory and design theory (Jones, 2014; Pourdehnad et al., 2011; Sevaldson, 2022). It thus offers a holistic approach, recognising that systems are composed of interconnected parts and that understanding the relationships and interactions between these parts is crucial for effective problem-solving. This approach emphasises creativity, iteration, and co-creation as values of uniting diverse perspectives and backgrounds and giving priority to affected and marginalised people. It focuses on both human and non-human entities, recognising that design decisions impact wider ecological and systemic components. The practice of zooming in and out across multiple system levels allows for a broader view of problems, emphasising the importance of temporal context and the anticipation of future outcomes and consequences (Design Council, 2021; Jones, 2014). As a variant of systemic design, systems-oriented design (SOD) represents a more design-focused methodology (Sevaldson, 2022). An integrated tool of SOD is Gigamapping, which can assist in visualising a system's complexity and mitigating communication barriers (Sevaldson, 2011).

Despite originating from diverse backgrounds, both service design and systemic design focus on humans and the broader context of planetary sustainability, addressing complex problems through a holistic approach. They both recognise the interconnectedness and interdependencies of elements within the system. In the design process, they each emphasise iteration, participation, and co-creation, acknowledging the values and logics of different stakeholders. They also support the process with various visual tools, such as user journeys, blueprints, stakeholder mappings (Stickdorn et al., 2018), systems mappings (Jones & Van Ael, 2022), and Gigamapping (Sevaldson, 2011).

2.4   *Design frameworks*

Design tackles complex social matters and several frameworks have been proposed to address social complexities. Examples include a framework by Sarantou and Miettinen (2018), identified through the analysis of PhD theses from researchers in the World Design research group, and another by Elia and Margherita (2018). However, despite shared focus on participatory and co-creation, the frameworks target different objectives. Miettinen's and Sarantou's framework is primarily dedicated to the development of local communities, assisting them in facing challenges to achieve sustainable economic growth. It involves analysing user feedback, with methods like service blueprints or journey mapping. While it does address complex social challenges, the approach is more directly focused on service enhancement rather than

transforming underlying systemic structures. In contrast, the framework by Gianluca and Alessandro aims at addressing WP with specific tools and methods for problem resolution, although it originates from a different premise of collecting and analysing the data. It utilises both quantitative and qualitative methods to gather diverse data, which is then analysed with systems mapping and collective intelligence.

3 Methods

This section presents a few methods which will eventually lead to the emergence of a new framework. Firstly, the research employs qualitative methods. To uncover unknown unknowns (Luft & Ingham, 1961), the data for this study were acquired through semi-structured interviews with former and present offenders and participant observation with unstructured interviews. This "unknown unknowns" refers to the issues that we are unaware of and therefore do not realise we need to explore. Due to the flexible and open-ended nature of semi-structured and unstructured interviews, it was possible to reveal the thoughts, experiences, and perspectives of the interviewees. If a need or opportunity arose, we created process Gigamaps (Sevaldson, 2022, p. 231) that assisted in visualising and analysis of the narratives. Occasionally, we conducted preliminary ZIP analysis (Sevaldson, 2022). The interview transcripts were then subjected to thematic analysis by the researcher to identify patterns in individual behaviours and environmental influences.

To minimise the risk of observer bias and validate the findings from the thematic analysis, data triangulation was employed through theme validation task and a participatory focus group. Table 11.1 shows the total number of participants and the time that form the basis for the analysis.

3.1 Semi-structured interviews and participant observation with unstructured interviews

The data was acquired in places frequented by offenders, but due to the anonymity of the participants, this research will not expose them more closely. The selection of candidates did not follow a rigid set of specific criteria. Instead, the objective

TABLE 11.1 Total number of participants and time that form the basis for the analysis

Data collection	Participants	Hours of recording
Semi-structured interviews	7	≈16 hours
Participant observation with unstructured interviews	≈20	≈200 hours (≈3months)
Theme validation task	8	≈2 hours
1 participatory focus group	4 out of 8 from theme validation task +1	≈2 hours
Total	≈36	≈220 hours

was to gather a representative sample including a diverse range of backgrounds, various types of crimes, and reasons for committing these crimes. This approach aimed to capture a wide spectrum of experiences and perspectives within the criminal landscape. The data was collected from men aged approximately 20–60 years. Some were leaders of gangs, others were gang members, and the rest were acting individually. Their active periods ranged from around the year 2000 to the present. They had either served sentences, or had not been caught. The participants included both Norwegian natives and those of foreign origin.

The script of questions for the semi-structured interview (Appendix A) was based on initial conversations with offenders and the literature review presented in Section 2. Seven interviews were audio-recorded with the participants' prior informed consent. The recordings were deleted when they had been transcribed and the interviewee checked the transcription. During the unstructured interviews, notes were taken to capture the essence of the participants' stories. These were both direct quotes and observational notes. During the process, Recognising social desirability bias, I ensured that I paid attention to my body language and approval or disapproval cues.

Participants were provided with and asked to sign an informed consent form before partaking in the study. It informed about the study's purpose, the secure handling of data, and assured them that their participation was voluntary with the option to withdraw at any time without any consequences. To safeguard the participants' vulnerability and the sensitive nature of the data, all data have been anonymised by removing proper names or other identifiers that could reveal a person's identity. The challenge laid in preserving the richness of the interview material while also protecting participants' privacy. The project was submitted to and approved by the Norwegian Agency for Shared Services in Education and Research (SIKT), ensuring compliance with their ethical standards.

As a result, the dataset consists of seven complete interview transcripts, supplemented by assorted excerpts of unstructured interviews. These were randomly selected to provide additional context and depth to the primary data. The collected notes and transcripts formed the basis for a subsequent detailed analysis in the following step.

3.1.1   Thematic analysis

Thematic analysis was conducted on the interview transcripts and selected extracts to explore existing patterns, aiming to identify the core reason behind the transition to a criminal path. At first, I formed initial ideas through in vivo coding of direct quotations and making interpretive observations (Yin, 2016). I recognise my own limitations, shaped by my background and values, acknowledging that they could have influenced my approach and that multiple methods of conducting thematic analysis are possible (Braun & Clarke, 2006).

In the second cycle, I started by labelling phenomena with keywords or short descriptions to create extensive codes, which were then organised into cohesive

groups using mind maps to visualise relationships and thematic layers (Braun & Clarke, 2006). Grouping them was challenging as each issue was unique, deeply contextual, and influenced by various aspects. Over time, the narrative's evolving events introduced new complexities, complicating the isolation of clear themes and often shifting the core aspects of the problems, highlighting their inherent wickedness. For instance, the seemingly straightforward theme of *need for excitement* is a broader term for codes like *curiosity about a different lifestyle*, *challenging rules*, *testing limits*, *hyperactivity*, and *a lack of stimuli*. These, in turn, result in codes like *the need for adrenaline and dopamine rushes* or *from insufficient parental or public institutions care*.

In the fourth stage, I reviewed the themes, identifying their interdependencies and the ripple effects of changes within one area on others. This led to restructuring the themes according to their overarching goals they serve. I also considered the concept of stable dynamic factors, which are relatively consistent over time, such as lifestyle habits, and acute dynamic factors that can change rapidly (Ward & Beech, 2004), like peer group influences. Therefore, I elevated the themes to a higher level of abstraction to formulate universal themes applicable across all interviews.

Hence, I created five broader themes. The main subject of analysis – *object* whose actions are catalysed by various triggers and motivations – referred to here as *stimulators*, and influenced by aspects such as gender, age, or natural disasters, collectively termed *factors*. Additionally, the influence of rules and laws on an *object*'s behaviour is referred to as *regulators*. I also considered the influence of private and public *actors*.

3.2   *Theme validation task*

To test, validate and assess coherence of the researcher-created categories a theme validation task was employed. One interview transcript was intentionally selected to highlight them. The criteria for selecting this transcript were based on three key parameters: firstly, it did not exhibit signs of stereotypical stigmatisation; secondly, there was accessible contact with significant people; and thirdly, it was fully embedded in the Norwegian context.

All together eight *actors* were invited for this task. At first, six *actors* referenced by the *object* within this transcript, who then suggested two additional *actors* believed to have played significant roles in the narrative. The participants represented state *actors* who were not the exact individuals from the interviews, but they held similar roles and responsibilities, providing an accurate professional perspective, such as policeman, a former tax officer, a nurse, a teacher, and a property agent. While the non-state *actors* were the actual people who participated in the narrative. Such as a "good" and a "bad" friend, and father. The non-state *actors* were, therefore, anonymised due to their vulnerability. However, the anonymity of state *actors* is maintained because they represent state opinions and are bound by internal procedures and regulations, with which they may not always comply or agree.

The task had two integrated steps and was individually oriented. To make it accessible it was conducted with the use of MS Office. Participants were given the autonomy to handle the task according to their own judgement. This was estimated to take two hours; however, participants were given a week to send back completed assignments. Participants were sent the interview transcript via email to highlight the categories as a first step. As a second step, along with the transcript, they received a table to complete. This table required them to fill in extracts from the interview transcript corresponding to each category, thereby helping to sort out the findings from the first step. It also included a section dedicated to expressing one's views on the *object*'s criminal behaviour.

3.3   Participatory focus group

In April 2023, participants were invited to the collaboratively oriented task on the Miro board to exchange and discuss the materials from the individual task. The session was designed to last two hours, but participants had a week to revise their work. The discussion used post-its, allowing non-intrusive contributions and creating a visual record for later reference**.**

Four out of the previous eight *actors* were invited solely based on their availability. They included state *actors* such as a policeman, a former tax officer, and a nurse, along with one non-state *actor*, a "bad" friend. Since the task was held online and therefore was anonymous, it was possible for the *object* to participate as a fifth stakeholder and provide additional explanations of experience and knowledge. The researcher served as a facilitator.

To ensure a collective comprehension of the diverse perspectives within the group, participants were initially given the opportunity to review and familiarise themselves with the results from others previously filled-out tables, which were displayed on the side of the board. The discussion then moved towards creating a timeline that detailed the *object's* narrative, employing previously defined categories to examine potential interdependencies among various elements.

In summary, the thematic analysis of interview transcripts provided the basis for creating five meta categories to analyse qualitative data, which were then validated with state and non-state *actors*. They independently analysed and interpreted one transcript. Subsequently, these *actors* engaged in a co-creative process to discuss their findings and mapped out the narrative for common understanding.

4   Insights

4.1   Insights from the thematic analysis of semi-structured interviews and participant observation with unstructured interviews

The analysed data revealed that the spectrum of events and the relationships among them are multidimensional, offering diverse perspectives on each narrative.

Therefore, the aim was not to quantify the codes but to create distinct meta-themes that serve as categories for analysing all transcripts. Consequently, this thematic analysis resulted in the creation of five main overarching categories, which are as follows:

O – Object/s – an individual or group of individuals with destructive behaviours that are the subject of the analysis;

A – Actor/s – an individual, a group of individuals (including other people with destructive behaviours that are not the subject to analysing), institution/s, public or private entities that are related to the subject of the analysis (*object*);

R – Regulator/s – a common law based on law acts, executive acts, standards, or any other public regulations on state, district, or local level that are related to the subject of the analysis (*object*);

S – Stimulator/s – set of social rules, triggers, common reactions, and any other informal indicators related to the *object/s'* behaviour/performance;

F – Factor/s – unconditional aspects: coincidental, natural disaster, historical accretions, gender, age etc. and conditional aspects: indicated by the *object* her/him/itself or others: *actor/s, regulator/s, stimulator/s* that influence the *object/s'* behaviour/performance.

4.2 Insights from the theme validation task

While testing and validating the categories, participants used different approaches. In the first step, participants either highlighted entire text sections or key words corresponding to a category, while some also copied and pasted transcript excerpts, assigning each the appropriate category letter: *A*, *R*, *S*, or *F*. The interpretation of the given categories also varied, as evidenced by the differences in the participants' highlights. They were the most diversified in terms of *stimulator* and *factor* categories, for example, the role of *money*. Another phenomenon like *downtown Oslo* was marked as a *stimulator, factor,* or *actor*. Hence, it was crucial to discuss individual results in a further group task. The participants indicated also that it was not necessary to highlight the *object* every time, as the story focuses on the *object* by default.

In the second step, they inserted to the table full quotations directly from the transcript under the respective categories or included only the key words, interpreting their findings (see Figure 11.1). In a section dedicated to appointing actors, participants listed approximately the same *actors* from the transcript. However, the identification of implied *actors* varied, reflecting the diverse professional fields of the participants. The non-state *actors* faced challenges in listing the *regulator*s, as these were mostly implied in the transcript and not directly mentioned by the *object*. While the state *actors* concentrated on listing the *regulators* in their respective fields, it ultimately offered a broad spectrum of viewpoints for the collaborative task. In the section dedicated to subjective opinions, five participants offered their personal views on the causes of criminality. Four out of these five participants'

Related Stimulator(s):	
*Please, insert all stimulator which - **according to you** - are crucial for this process - **they do not have to occur in the text**. If possible, please state why certain stimulator is important.*	
no:	Stimulator's name:
1	Adventure
	skip school without my parents knowing
2	Gambling - interest
	I discovered gambling - and it was the door to hell to me.
3	No judgment
	I basically lost myself,
4	Adventure
	was boring to be with good friends,

FIGURE 11.1   Example of an extract of the table (stimulator) filled by one of the participants (Fidos, 2023, p. 255).

responses overlapped, suggesting a failure in school-parent cooperation. There were also four suggestions about the system's interventions that could have prevented certain events in the *object* lifetime.

4.3   Insights from participatory focus group

During the co-creation workshop, participants developed a collective Gigamap, in a form of narrative timeline (Figure 11.2). In this task, participants had the opportunity to discuss their differing views on labelling certain categories as *factors* or *stimulators*. For example, there was a discussion about the role of *money*, which can either serve as a *stimulator*, granting power and respect, or as a *factor* that either provides or denies the opportunity to take certain actions, depending on the context. These discussions were instrumental in shaping the map, where categories were visually represented by colourful fields. These fields are interconnected with arrows and lines illustrating the cause-and-effect relationships between personal decisions and environmental influences. Therefore, it presents in detail how the individual's actions and the external environment evolve over time and contribute to the lifecycle of criminal behaviour.

Based on the collective understanding, participants identified specific areas and marked them as P-points. These points highlighted fields where issues such as lacking interactions, legal frameworks, or physical assets were identified, providing opportunities for deeper analysis and suggesting potential improvements. For example, the *object* in the narrative was asked to perform a seemingly meaningless task. The participants figured out that such a method is used to check loyalty and build a "codex", which is vital in building solidarity among criminals. They identified this as the P-point, noting that breaking it would result in insecurity among criminals. They also labelled "service to talk when you get in trouble" as the P-point. Therefore, as interventions, they proposed "considering increased punishment for recruiting young people into gang groups" and suggested a "helpline to build trust that it is never too late to ask help". The *object* confirmed that "both would work against codex solidarity".

The Gigamap served as a visual and integrative tool to summarise the complexity of the issues discussed and facilitated the introduction of interventions. Most interventions were proposed at the beginning of the timeline, indicating a focus on early prevention. As the *object* advanced further into criminal behaviour, fewer interventions were suggested, reflecting the challenges of altering established paths. Figure 11.2 presents the Gigamap, which was redrawn without the discussion and comment sections for clarity.

In summary, thematic analysis of interview transcripts established five overarching categories. Participants confirmed the use of these categories in data analysis, noting that skipping in highlighting the category *O-object* is convenient. The individual interpretation of the transcript varied depending on the field of competency of the *actors*; however, they discussed their findings during a co-creative process, which resulted in the creation of a Gigamap as a tool to visualise the timeline of the narrative with interdependencies and entanglements of events. This assisted them in leveraging these insights to address the root causes through a portfolio of interventions.

5   Discussion and further studies

5.1   *Framework development*

The process presented above has culminated in the emergence of a framework designed to enable stakeholders to identify the root causes of issues, thereby addressing the complexities inherent in criminality. Below I will open more closely the framework components: the *dimensions*, *cards*, and *space*.

5.1.1   Dimensions

The thematic analysis resulted in the creation of colour-coded categories, which are broader concepts that can be used for analysing qualitative data. These categories function as abstract or conceptual features of the situation within a broader context; thus, I propose referring to them as *dimensions*. These *dimensions* are interwoven and interdependent, each playing a crucial role in the holistic understanding of the qualitative data, and they are as follows: *object/s, actor/s, regulator/s, stimulator/s, factor/s.*

5.1.2   Cards

The tables used in the theme validation task served as templates and I suggest referring to them as *cards*. Although they require iteration in terms of layout design due to navigation issues, these *cards* are to help in sorting the *dimensions*, systematically organising the qualitative data, and enabling more effective communication, thereby supporting a common understanding among participants (see Figure 11.3).
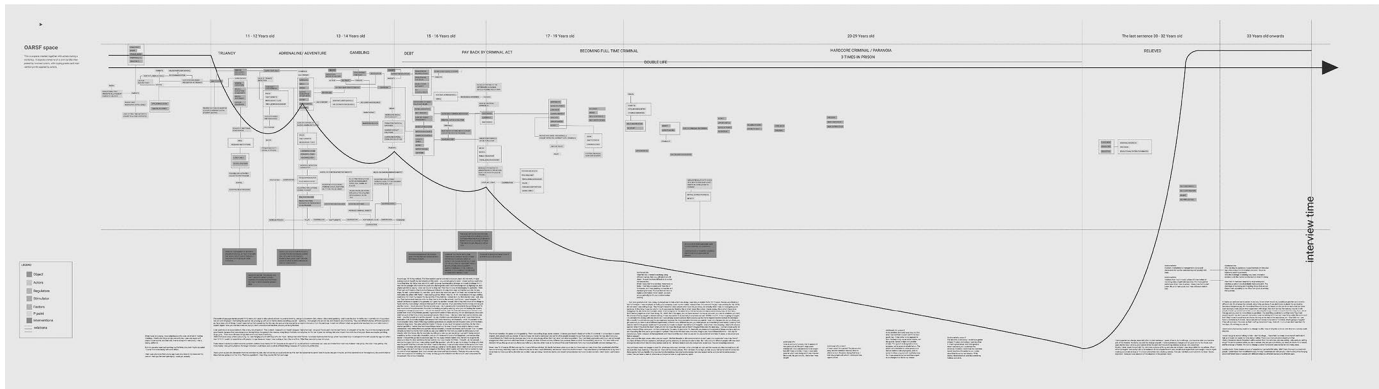
FIGURE 11.2 The final Gigamap resulted from collaborative work (Fidos, 2023, pp. 150–151). Full-size image available: https://bit.ly/collab_gigamap.

Research no:	Workshop 1		
Date:	01.01.2023	Revision:	1
Actor data:	Institution – position		
	Actor's name and surname		

Related Actors:
*Please, insert all actors who - **according to you** - are crucial for this process - **they do not have to occur in the text**. If possible, please state why certain actor is important.*

no:	Actor name:
	Add additional row if needed

Related Regulator(s):
*Please, insert all regulators which - **according to you** - are crucial for this process - **they do not have to occur in the text**. If possible, please state why certain regulator is important.*

no:	Regulator name:
	Add additional row if needed

Related Stimulator:
*Please, insert all stimulator which - **according to you** - are crucial for this process - **they do not have to occur in the text**. If possible, please state why certain stimulator is important.*

no:	Stimulator name:
	Add additional row if needed

Factor(s):
*Please, insert all factor which - **according to you** - are crucial for this process - **they do not have to occur in the text**. If possible, please state why certain factor is important.*

no:	Factor name:
	Add additional row if needed

Summary:
*Please write what - **in your opinion** - could be a core reason for Object's criminal behaviour. Please write any other comment / opinion you have.*

FIGURE 11.3 Example of the card.

5.1.3 Space

The co-creation approach used in the focus group was aimed at gaining a common understanding and facilitating the exchange of insights. This involved creating a shared Gigamap and engaging in joint data analysis, which collectively led to the development of a unified perspective on the subject matter and the introduction of interventions. Thus, the approach serves as a common *space* for collective analysis to introduce a portfolio of interventions, and therefore I suggest referring to it simply as *space*.

5.1.4 OARSF framework

Hence, from the steps of thematic analysis, theme validation task, and participatory focus group, I identified an analytical framework, which I have named *OARSF* (see Table 11.2).

The framework tends to overcome the hidden profile phenomenon in group decision-making that refers to the tendency of a group to focus more on shared information, or information that everyone is already aware of. Consequently, unshared information held by only a few team members often remains hidden and is not shared with the entire group. This can lead to undervaluing the crucial insights held by individual members, which are vital for making better and more effective decisions (Sohrab et al., 2015). Therefore, the tasks in the *OARSF framework* are broken down into several steps. The *OARSF dimensions,* along with the qualitative data, are specifically designed to establish a common language and unify information for all involved parties. The *OARSF cards* allow everyone to contribute their unique knowledge and perspectives, so-called unshared information. On the other hand, the *OARSF space* (physical / virtual) is intended to facilitate collaborative

TABLE 11.2 Name of the framework is an abbreviation derived from the dimensions names

OARSF				
Object/s	Actor/s	Regulator/s	Stimulator/s	Factor/s

interactions, share unshared information, and enable the unification of multiple perspectives. Consequently, this allows for the introduction of a portfolio of interventions by every *actor* involved in the analysis.

5.2 OARSF framework applying service and systemic design principles to address the wickedness of crime prevention

Using semi-structured interviews as a service design tool (Segelström et al., 2009) emphasises placing users at the centre. By focusing on users and including them in the decision-making process, the project fosters the inclusion of marginalised voices and provides them with equal power in collaborative workshops. Involving non-state *actors* helps ground interventions in real-world contexts and ensures responsiveness to community needs and dynamics. Therefore, by adhering to the principles of inclusion, participation, and co-creation inherent in service and systemic design, this approach considers various perspectives in the analysis and introduction of interventions, thereby meeting the collaboration requirements across different agencies as a challenge of crime prevention in Norway. This, in turn, by embracing diverse perspectives and coordinating various entities, could address the institutional complexity and social plurality. And by this, it specifically tackles the 9th and 10th WP points (please refer to Appendix B to see all ten points).

It also addresses the challenge in the prevention system in Norway by responding to the need for coherent mapping of the type and prevalence of problems while facilitating long-term and acute analysis. With mapping as a tool in service and systemic design, it becomes possible to visualise the complexity and collectively understand the multiple problems being studied. This approach helps identify and address blind spots in the maps, thereby tackling the 6th WP point. Consequently, with problems clearly charted, it becomes feasible to address them within specific context, at every stage of their occurrence and development, through both long-term and immediate interventions, thus responding to the 2nd, 3rd, and 5th WP points.

Imagine analysing a few maps, where the same problem occurs at different points across three separate timelines, each leading to distinct types of crime. It becomes crucial to understand the problem in context, particularly in relation to what preceded it and the specific type of crime it triggered. Identifying and clustering these problems into a single problem zone is vital, as it enables tailored prevention strategies that are specific to the context. Thereby, it addresses the concepts of equifinality and multifinality of problems, targeting points in the problem's context, hence it refers to the 1st, 7th, and 8th WP points. Therefore, I hope that

with this approach it may become possible to target and address other societal challenges that could potentially lead to, and result from, criminality.

As outlined in Section 2.4 of the literature review, the reviewed frameworks address complex social challenges with a shared emphasis on participatory and co-creation processes. However, the proposed framework, while based on established methods of thematic analysis and co-creation, distinguishes itself by exclusively collecting qualitative data and adopting a more defined and structured approach to data analysis. The primary concept is based on retrospective, semi-structured interviews that are subjected to a fixed method of analysis. It supports collaborative problem definition and approaches to their resolution in complex social contexts. The framework thus addresses the research question: How can we determine, map out, and comprehensively address the primary causes of societal and systemic disorders that lead an individual to commit a crime? Using OARSF *dimensions*, *cards*, and *space* to analyse each narrative individually, we can map out what preceded the problem and what resulted from it in each instance to determine the causes. Grouping and reanalysing these results helps in recognising societal patterns and archetypes of the problems, allowing us to comprehensively address them.

5.3   *Limitations and further studies*

The study's reliance on a small sample size may limit the generalisability of the findings and introduce potential biases (Faber & Fonseca, 2014). Specifically, confirmation bias and investigator bias are concerns, as they may distort data interpretation both in the research process and during the focus group's analysis and interventions (Lehner et al., 2008; Wynder, 1994). Additionally, although the framework has attempted to address WPs, it is not an ultimate solution, as the complexity of social systems suggests that well-intentioned interventions might lead to unintended consequences (Meadows, 2009). Nevertheless, I believe that there is potential to analyse and address complex social matters with the *OARSF framework*.

Future studies should analyse larger datasets to verify if the findings apply universally across different contexts and help reduce biases. They should consider analysing a larger quantity of qualitative data using the *OARSF dimensions* and *cards* and utilise the *OARSF space* to facilitate the collective definition of a problem by creating and analysing maps. Having more maps would support uncovering societal and systemic dysfunctional patterns. Based on these findings, interventions could be implemented in both practice and policy as short- and long-term solutions.

Research should thereby explore the effectiveness of the *OARSF framework* in a diverse context to better understand its potential, capabilities, and limitations, thereby improving the framework. Therefore, I recommend making case studies applying the framework in other complex or WP contexts such as healthcare, migration, mental health, mobility planning, green transition, or sustainable development goals.

6 Conclusion

The literature review revealed that criminality poses significant challenge to systems due to difficulties in defining variables within institutional complexity and social plurality, thus underlining the saliency of the issue. Consequently, addressing such a challenge requires a coherent mapping and analysis of the problem's type and prevalence with a multidimensional approach involving the perspectives of both state and non-state *actors*, including those affected.

To tackle this challenge, this chapter proposes a framework that employs service and systemic design principles. This framework emerged through thematic analysis of retrospective interview transcripts with present and former lawbreakers, placing the user at the centre. This process led to the identification of *dimensions* serving as meta-themes for analysing qualitative data, and unifying the language for all stakeholders involved, forming the basis for creating *cards*. These *cards* facilitate the systematic organisation of data. Furthermore, to foster a common understanding, a co-creation process, in the form of a map, was employed. This process encourages the inclusion of multiple perspectives and helps in visualising the problem, ultimately facilitating the introduction of interventions for immediate action while also enabling the setting of long-term preventive goals.

Despite the framework contributions, acknowledging limitations, including a small testing sample, is crucial. Addressing these, along with exploring diverse societal contexts, would be valuable for determining the framework's potential as a universal tool for addressing complex societal problems. I recommend making case studies applying the framework in other complex or WP contexts. Applying the framework in other WPs could show the framework's potential on how to improve it further.

Appendix A

https://bit.ly/A_interview_guide

Appendix B

https://bit.ly/10_WP

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12

TOWARD THE COCREATION OF DIGITAL REMOTE CARE SERVICE ECOSYSTEMS

Hong Li and Miria Grisot

1   Digital remote care

As our healthcare landscape rapidly evolves in response to advancing technologies, a pivotal transformation is unfolding with the rise of digital remote care. This phenomenon transcends the mere deployment of digital tools to provide health services across distances. Instead, it signifies a profound digital metamorphosis that permeates all facets of healthcare delivery, engaging service providers, healthcare professionals, patients, and their multifaceted interactions. Digital remote care has redefined the conventional roles and interactions between patients and health professionals (Bardram et al., 2005), transitioning patients from traditionally passive roles to active participants in their care (Andersen et al., 2011; Cerna et al., 2020). Patients are engaged in the cocreation of health data, collaborating with health professionals to provide insights and information that enhance the value and relevance of care (Grisot et al., 2019). Health professionals, as healthcare providers, are called upon to embrace and integrate digital technologies within their work practices, extending care services to include more comprehensive health monitoring—encompassing vital signs, mobility, and overall safety—within patients' homes (Barlow et al., 2012). Concurrently, as healthcare recipients, patients need to be trained with the requisite skills to effectively navigate digital interventions, empowering them to take a proactive role in managing their conditions and mitigating the impact of illnesses on their wellbeing (Watson & Wilkinson, 2022). Such a paradigm shift elevates digital remote care from a siloed intervention to a systemic realignment of health services, necessitating an ecosystem perspective that acknowledges the symbiotic and cocreative nature of care in the digital age.

This study probes the intricate tapestry of digital remote care, attempting to untangle the threads that bind it as a service ecosystem. The central inquiry

that guides this exploration is: *How can the (re)design of digital remote care be contextualized through the lens of service ecosystem design at the micro level?*

This research question is addressed through an approach that recognizes the multi-actor dynamics and interdependencies intrinsic to complex service systems (e.g., digital remote care), prompting a cohesive yet heterogeneous orchestration of the system that is attuned to users' needs (Sangiorgi et al., 2017; Vink et al., 2021). Through contextualization, we aim to provide a tangible embodiment of theory translated into practical contexts. This endeavor involves conducting an in-depth investigation through a qualitative case study and shedding light on the complex dynamics of digital remote care as it evolves within a micro-level service ecosystem design process. The ultimate goal is to facilitate the cocreation of desired digital remote care initiatives.

2   Theoretical frameworks

2.1   *The evolution of service design*

Service design has evolved significantly. Sanders (2002) pointed out the transformation from a user-centered design process to one accentuating participatory experiences, placing multi-actor engagement at the forefront. This implies not only that a broader set of actors becomes involved in service design processes but also that inclusion is diverse. The Scandinavian participatory design tradition for system development (Bjerknes et al., 1987; Greenbaum & Kyng, 1991) contributes to the design of innovative services. Holmlid (2009) stressed how participation also has emancipatory implications for those actors that have been traditionally marginalized. Kimbell (2011) noted a shifting emphasis from designing services per se to designing for service. Designing for service is an exploratory process that aims "to create and develop proposals for new kinds of value relation between diverse actors within a socio-material world" (Kimbell, 2011, p. 49). Collectively, these shifts signify a paradigmatic transformation from designing for users toward codesigning with them. Codesign in service design projects has precipitated a diverse array of benefits, including benefiting the project itself, enhancing the experiences of service customers and users, and yielding positive outcomes for the participating organization(s). These benefits are inextricably tied to the improvement of the creative process, the service itself, project management, and longer-term effects (Steen et al., 2011).

This shift toward a systemic approach to service design advocates understanding the complexity of the problem at hand. For instance, in traditional service design, a focal point is often placed on individual interactions. These moments serve as critical touchpoints where users engage with the service, wielding considerable influence on the perception and satisfaction levels (Stickdorn et al., 2018; Stickdorn & Schneider, 2012). However, systemic service design advances to a broader level, endorsing a comprehensive outlook and scrutinizing the

entire service ecosystem. It envisions services as integral elements constituting complex systems, acknowledging the interconnections and latent systemic factors that are instrumental in shaping positive service delivery on a larger scale (Golnam et al., 2010).

In addition, the systemic approach goes beyond an understanding of the service design process as linear and constituted of discrete subsequent phases from ideation to implementation (e.g., Teixeira et al., 2012). Rather, service design should be understood as processual and iterative. One way to concretize this shift is to think in terms of "designing" for services, thus indicating an ongoing iterative explorative process with no preestablished boundaries (Sangiorgi et al., 2017). This emphasizes "the experiential nature of value cocreation" and also that service design requires flexibility, facilitating creativity and innovation (Strokosch & Osborne, 2023).

2.2   *Approaching systemic service design*

Systemic service design is an evolving approach that builds upon traditional service design principles. Leveraging a systems thinking perspective, it delves deeper into the intricate dynamics within the service ecosystem, seeking to understand how these dynamics shape the user experience of service delivery and their broader contextual impacts. While the concepts of "service design" and "systems" are frequently discussed, there is still a limited body of research that comprehensively demonstrate how systemic service design is applied in practice. In particular, the approach is expected to be beneficial when service designers focus on complex societal problems, such as healthcare services, which are multi-actor, multi-level, and take place over time. To address this gap in the literature, this chapter makes use of a systemic service design approach called service ecosystem design. Specifically, we are building on the work of Vink et al. (2021), in which they define service ecosystem design as "the intentional shaping of institutional arrangements and their physical enactments by actor collectives through reflexivity and reformation to facilitate the emergence of desired value cocreation forms" (p. 169). Based on this definition, Vink et al. (2021) developed a multi-level process model for service ecosystem design that delineates the intricate interactions across micro, meso, and macro levels within a service ecosystem. In this study, we concentrate on the micro-level process, which is defined as follows:

> The micro level of the process model zooms into a focal instance of service ecosystem design. Here, the core design processes of reflexivity and reformation present as an embedded feedback loop in the ongoing reproduction of institutional arrangements. This feedback loop enables actors to intentionally shape institutional arrangements and their physical enactments to facilitate the emergence of desired value cocreation forms.
>
> *(Vink et al., 2021, pp. 176–177)*

To address the call for more holistic empirical investigations into service ecosystem design (Vink et al., 2021), our study contextualized the micro-level service ecosystem design process within an empirical case study, involving the implementation of digital remote care for postoperative thoracic surgery patients engaged in home-based rehabilitation. The core process is articulated through three distinct, yet iterative, stages: exploration, reflexivity, and reformation, as delineated in Table 12.1. Additionally, we employed a mixed-methods approach, including service design methodologies, during the micro-level service ecosystem design process.

3 Crafting study structures

The duration of our empirical case study was three years (2020–2023). This undertaking was part of a research project involving two tertiary hospitals located in Shanghai, China, which are referred to as A Hospital and B Hospital, respectively, to ensure anonymity. We aimed to conduct a relatively large-scale implementation, enrolling 1,000 postoperative patients in a randomized control trial (RCT), with the objective of investigating how digital technologies can be scaled, adapted, and evaluated to ensure high-quality remote care in two different settings. A Hospital enrolled 500 postoperative patients who had undergone thoracic surgery and were in the process of home-based rehabilitation. These patients were equally and randomly distributed between an experimental group (N = 250), utilizing digital technologies for remote care, and a control group (N = 250), receiving traditional rehabilitation without the utilization of digital remote care. In parallel, B Hospital replicated this structure, differing only in the enrollment of postoperative cardiac surgery patients. In the case study, we directed our attention toward the experimental group at A Hospital, zooming into this micro-level service ecosystem within the RCT. The demographic composition of the experimental group at A Hospital showed significant age diversity, which reflected various life stages and corresponding health contexts. The eldest participant, aged 78, highlighted the deliberate inclusion of older adults, who are characterized by distinctive health exigencies and considerations inherent to advanced age. In contrast, the youngest participant, aged 33, epitomized a segment likely to be immersed in the zenith of their personal and professional pursuits. The mean age within the experimental group, calculated at 56 years, delineated a pronounced concentration within the middle-to-late adulthood continuum, indicative of a deliberate emphasis on elucidating health dynamics within this demographic stratum. This breadth of age representation serves to underscore the methodological rigor inherent in the study's investigation into the digital remote care service ecosystem across distinct developmental stages of the lifespan.

Following the guidelines for undertaking a qualitative case study (Baskarada, 2014), we contextualized the micro-level service ecosystem design process within three iterative stages: exploration, reflexivity, and reformation. These stages, while

appearing distinct, are interwoven in a manner that fosters iterative progression rather than a strictly linear trajectory. Each stage informs and enriches the others, engendering a dynamic and iterative approach to the overall process. This iterative nature ensures that insights gained from later stages can feed back into earlier ones, facilitating continuous refinement and adaptation to evolving circumstances. Thus, the three stages collectively constitute a framework characterized by its iterative nature, enabling a nuanced and responsive approach to micro-level service ecosystem design.

As shown in Table 12.1, we employed a mixed-methods approach to collect qualitative data during the process. At the stage of exploration, we conducted on-site observations over one month to investigate the implementation of digital remote care in the experimental group at A Hospital. This entailed an exploration of how digital technologies were implemented for delivering and receiving

TABLE 12.1 Overview of the case study

Iterative processes	Exploration		Reflexivity	Reformation
Key objective	Gaining an understanding of the implementation of digital remote care at A Hospital		Capturing a diverse range of perspectives on experiences with digital remote care and fostering reflective insights	Engaging actors in influencing the trajectory of digital remote care
Data collection method	Observation	Document analysis	Semistructured interview	Workshop
Visualization technique	Graphics	Diagrams	Personas	Journey mapping
Duration	One month	–	One hour with each health professional Half an hour with each patient	Two hours
Site	A Hospital	–	At A Hospital with the health professionals Remotely with patients from the experimental group via phone calls	A Hospital
Participants (with numbers)	Doctors, nurses, and patients (N/A)	–	Doctors (N = 3) Nurses (N = 2) Patients (N = 10)	Doctors (N = 2) Nurses (N = 2) Technology specialists (N = 2)
Documentation	Field notes and photos	Internal reports and documents	Audio recording	Audio recording

remote care. These observations were meticulously recorded in field notes and photographs, supplemented by relevant internal reports and documents provided by A Hospital for an insider's perspective. During the reflexivity stage, one-on-one interviews were conducted with 15 participants, including doctors and nurses from the remote care team and randomly selected patients from the experimental group. All interviews were audio-recorded and transcribed verbatim to ensure data precision. At the stage of reformation, we undertook a two-hour participatory workshop involving six participants. Specifically, this comprised doctors and nurses from the remote care team at A Hospital and technology specialists from the vendor organization who were facilitating digital technologies for remote care. Notably, we employed various visualization techniques to facilitate the presentation of complex data in a visual format, with the goal of enhancing the audience's understanding of the intricacy inherent in the data.

All the data obtained were carefully analyzed using qualitative content analysis (Elo & Kyngäs, 2008) to identify prevalent themes, patterns, and commonalities. Through a rigorous synthesis process, the findings were integrated to generate meaningful insights that shed light on the cocreation of a desired digital remote care service ecosystem. To enhance the clear communication of our findings, we utilized persona creation and journey mapping to present the main findings in a tangible and relatable manner (Joseph et al., 2020; Pruitt & Grudin, 2003). These visual representations were derived from the empirical data collected in the case study.

4   Contextualizing the micro-level service ecosystem design process

4.1   *Exploration*

Our micro-level service ecosystem design process began with exploring how digital technologies were utilized for remote care for postoperative thoracic surgery patients undergoing home-based rehabilitation at A Hospital. This was investigated in two dimensions: the personnel composition and the technological configuration.

To facilitate the implementation, a dedicated remote care team was established by the thoracic department at A Hospital, consisting of health professionals, such as surgeons, resident doctors, and nurses. The surgeons on the team contributed to evaluating and addressing a range of chest-related medical issues, formulating surgical plans based on diagnostics, conducting diverse procedures, and overseeing postoperative care. The resident doctors followed patients through their treatment journey. Collaborating with the surgeons, the resident doctors actively participated in patient care and surgical procedures under the surgeons' guidance. The nurses were assigned the responsibility of conducting digital follow-ups with the patients in the experimental group and utilizing the patient monitoring platform to stay informed about their postoperative rehabilitation progress. They collaborated
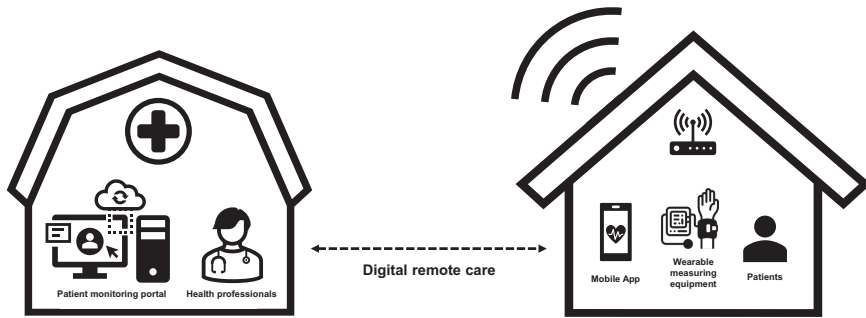
FIGURE 12.1 The basic structure of digital remote care.

closely to ensure the successful execution of the implementation and to deliver expert medical care throughout the study.

Regarding the technological configuration, A Hospital introduced a suite of digital technologies for remote care within the experimental group during the study period. As illustrated in Figure 12.1, this included a web-based patient monitoring platform and a mobile application for patients connected to a range of wearable measuring devices. The patient monitoring platform was developed for healthcare professionals to handle digital home follow-up, incorporating various patient-driven medical devices that support home-based care, such as medical measurements, symptom reporting, and rehabilitation activities. The mobile application for patients was designed to be used in conjunction with relevant measuring equipment, allowing patients to perform various measurements at home, such as blood pressure, pulse, temperature, oxygen saturation, and lung function. The measurement results were automatically recorded and transmitted via Bluetooth to the patient's end device, such as a smartphone. Simultaneously, the results were transferred to the patient-monitoring platform, keeping health professionals updated with the incoming values and allowing for personalized follow-up care. In the mobile application, patients could review the measurement results, respond to clinical questions, and register symptoms and side effects.

4.2   *Reflexivity*

Building upon the insights garnered from the exploration stage, we moved forward to capture a broad spectrum of perspectives regarding experiences with digital remote care to develop reflective insights. By conducting semistructured interviews with the key actors who directly used the digital remote care solution, we discovered that their experiences were crucial in comprehending the intricacies of utilizing digital technologies for providing and receiving remote care. Our selection of the interviewees was deliberate, owing to their direct interactions in the service ecosystem of digital remote care. To present the findings in a visually engaging

manner, we created four personas, representing the key actors (see Figures 12.2–12.5). The persona creation process entailed a methodical synthesis of authentic, firsthand data acquired through the semistructured interviews. These data were then sculpted into fictional characters, each portraying distinctive characteristics, motivations for engaging in digital remote care, and challenges encountered when utilizing digital remote care among key actors within the micro-level service ecosystem of digital remote care.

4.2.1   The doctors

Figure 12.2 depicts the persona representing doctors engaged in delivering digital remote care services, including surgeons and resident doctors in the remote care team. Their engagement with digital remote care entailed managing a web-based patient monitoring portal to track the progress of their patients' postoperative rehabilitation.

In general, the doctors' experiences with digital remote care were positive. They were motivated to use digital technologies to provide remote care services due to their technical benefits, for instance, proactive monitoring of unforeseen postoperative complications, access to up-to-date information on patients' postsurgical health status, and timely alerts for complications. The doctors emphasized the importance of promoting efficient communication between doctors and patients, as well as the engagement of patients in the decision-making process of their treatment.

Notwithstanding their motivations, the doctors experienced a number of challenges during the provision of digital remote care. It was notable that the utilization of digital remote care was a learning process for both the doctors and

Demographics	Background
Name: Doctor Who Age: 35–65 Gender: Male Occupation: Surgeon Expertise: Thoracic surgery Workplace: Tertiary hospital *"Implementing digital remote care for the first time has been a learning journey, not only for our medical team but also for our patients."*	Doctor Who has recently implemented remote care for his postoperative patients. He is enthusiastic about leveraging technology to monitor his patients' progress and providing support beyond the hospital walls. Despite seeing positive results from remote care, he faces challenges balancing his surgical schedule with remote care, resulting in increased workload and time management issues. He also realizes not all patients are equally motivated to participate actively in self-monitoring or to follow their rehabilitation plans.
Utilized devices	**Digital literacy**
Computer, laptop, smartphone	☐ Assistance is required. ☒ Independent work is possible.
Motivations	**Challenges**
• Raise awareness, educate for patient trust in remote care. • Enhance experience, efficiency via monitoring platform. • Enhance patient communication, involve in decisions. • Ensure surgical success, monitor complications. • Stay informed, receive timely alerts post-surgery. • Utilize hospital departments' expertise in implementation.	• Patients unaware, solution compliance low. • Data-centric records management ineffective. • Workload limits learning energy for platform. • Relying on team alone inadequate for outcomes. • Hospital department collaboration key for success. • Lack of standardized process, policy, regulation.

FIGURE 12.2   The persona of doctor WHO.

patients, considering it was their first exposure to such a solution. The doctors sought to educate patients on the importance of digital remote care during postsurgery consultations. However, the doctors expressed concerns about patients' limited awareness of the potential benefits of digital remote care, which could potentially affect their motivation and engagement in using the designated digital technologies for receiving digital remote care services. Despite the doctors' efforts to leverage digital technologies to enhance their work efficiency and improve the remote care experience for their patients, they faced constraints due to their already demanding schedules and a lack of collaboration among different departments within the hospital. Relying solely on the remote care team was insufficient for achieving optimal outcomes in the provision of digital remote care. Concerns were raised regarding the absence of standardized guidelines for the application of digital remote care, along with related policies and regulations, especially in the context of postoperative home-based rehabilitation.

4.2.2   The nurses

The persona illustrated in Figure 12.3 portrays nurses who were responsible for providing digital follow-up care to patients, which is based on the two nurses from the remote care team. The nurses served as a bridge between doctors and patients by relaying information and addressing concerns between both parties. To provide doctors with timely and accurate information on patients' postoperative rehabilitation progress, the nurses employed various digital technologies, including instant messaging on smartphones, along with the provided web-based patient monitoring

Demographics	Background
Name: Nurse Nightingale Age: 40–55 Gender: Female Occupation: Nurse Expertise: Patient follow-up Workplace: Remote *"I utilize digital technology to assist patients in achieving their rehabilitation goals, but it's a joint effort that necessitates cooperation from both parties."*	Nurse Nightingale is a designated nurse in charge of patient follow-up. Her duties include performing routine monitoring of patients' conditions using the remote monitoring platform and promptly addressing any incidents that may arise. However, one of the biggest challenges is poor patient compliance. Some patients are not comfortable with virtual interactions, while others are forgetful when it comes to logging their symptoms or vital signs. She has to find creative ways to motivate patients to actively participate in their remote care, such as sending reminders, providing educational materials, and offering emotional support.

Utilized devices	Digital literacy
Computer, laptop, landline, smartphone	☐ Assistance is required. ✖ Independent work is possible.

Motivations	Challenges
• Optimize care through the adoption of digital technology. • Enhance patient outcomes with high-quality remote care. • Boost satisfaction via personalized, timely remote care. • Streamline workflow with remote care technologies. • Master new tech for improved patient care.	• Patient understanding, motivation, compliance. • Educate tech-limited patients. • Digital remote care may lack the personal touch. • Manage digital remote care efficiently. • Adapt to new care models.

FIGURE 12.3   The persona of nurse nightingale.

platform. This enabled the nurses to engage with patients more frequently and directly, facilitating discussions about any concerns or issues that arose during the rehabilitation process. The nurses not only utilized the web-based monitoring platform to monitor patients' postoperative rehabilitation progress but also provided supplementary education and guidance to help patients navigate the digital technologies for remote care.

Overall, digital remote care was a new and challenging experience for the nurses. They were motivated by a combination of goals, including a patient-centric approach to postoperative remote care, optimization of workflow processes, and their own professional development. They leveraged digital remote care to assist patients in achieving optimal rehabilitation outcomes by monitoring their vital signs, tracking symptoms, and ensuring compliance with prescribed rehabilitation plans. Compared to traditional remote care services that typically rely on phone calls to check on the status of patients, the nurses reflected that digital remote care has the potential to increase patient satisfaction and participation due to the provision of more appropriate care and support beyond the traditional healthcare setting.

On the other hand, the nurses emphasized that the success of digital remote care hinges upon the collaborative efforts of both health professionals and patients, with the former providing adequate patient education and the latter being motivated to proactively participate in self-monitoring and to adhere to prescribed plans. Failure to do so could lead to issues with patient compliance, which was pinpointed as the primary challenge in the study. The nurses noted that the lack of personal connection and emotional support could be another potential reason for poor patient compliance. They highlighted that digital remote care, unlike in-person interactions, might not offer the same level of psychological and emotional support that patients would require during the process of postoperative rehabilitation. Therefore, the nurses stressed the need for new workflows and care delivery models that would further promote patient engagement. This would require additional training and support to effectively integrate remote care into their work practices.

4.2.3 The patients

The last two personas represent patients who utilized the proposed digital technologies to access remote care services within the experimental group. These personas were based on two typical age groups within the data: elderly patients with restricted digital literacy (see Figure 12.4) and patients in the stage spanning early adulthood to early middle age, who have digital skills (see Figure 12.5).

Both patient groups reported experiencing common benefits from utilizing digital remote care. First, it enabled the patients to receive postoperative care and communicate with the remote care team from their own homes, eliminating the need for frequent hospital visits, especially during the COVID-19 pandemic when mobility was restricted. Second, the patients gained reassurance from knowing that their postoperative status was being monitored remotely. They believed that the digital

Demographics	Background
Name: Patient Senior Age: 60–70 Gender: Female Occupation: Retiree Diagnosis: COPD Surgical history: Several	Patient Senior, with a medical background marked by chronic lung issues, recently underwent thoracic surgery. To facilitate her recovery, she was recommended to engage with a digital remote care service for monitoring her rehabilitation from home. However, adapting to this new technological realm proved to be a hurdle, compounded by her lack of familiarity with remote care settings and the physical constraints stemming from her recent surgery. Furthermore, her son, though willing to aid during visits, struggled to provide consistent support due to his demanding schedule.

"I find these new devices a bit overwhelming and I struggle to remember how to use them. I'm more used to simpler things."

Utilized devices	Digital literacy
📱 💗 Smartphone, medical measuring devices	☒ Assistance is required. ☐ Independent work is possible.

Motivations	Challenges
• Home-based follow-up care and support. • Real-time monitoring for timely intervention. • Active patient engagement via teleconsultations. • Improved management of chronic conditions. • Reduced hospital visits with home monitoring. • Reduced healthcare expenses.	• Limited tech familiarity in remote care settings. • Physical limitations hinder device interaction. • Cognitive impairments affect platform usage. • Emotional barriers hinder digital care adoption. • Social support scarcity complicates access. • Coping with information overload for decisions.

FIGURE 12.4 The persona of patient senior.

Demographics	Background
Name: Patient Techie Age: 30–45 Gender: Male Occupation: Engineer Diagnosis: Lung cancer Surgical history: None	Patient Techie, formerly a heavy smoker, received a life-altering diagnosis of lung cancer, prompting a significant shift in his outlook on life and well-being. Committed to reclaiming control over his health, he pursued comprehensive medical attention and was introduced to a digital remote care solution. While initially skeptical of its advantages, his adeptness with technology facilitated a swift adaptation to the devices. He valued the convenience of communicating with his healthcare team and tracking his health status from the comfort of his home. However, he encountered difficulties in interpreting the normalcy of his vital sign monitoring results.

"I'm determined to fight the disease with all my strength and support, but it's frustrating when I don't fully grasp all the medical jargon and numbers."

Utilized devices	Digital literacy
🖥️ 💻 ▭ 📱 💗 Computer, laptop, tablet, smartphone, measuring devices	☐ Assistance is required. ☒ Independent work is possible.

Motivations	Challenges
• Restore presurgery function, quality of life. • Find peace in remote monitoring, reassurance. • Use device data for self-management, control. • Monitor signs, symptoms, follow plans, prevent issues. • Reduce hospital visits, lower postoperative care costs.	• Difficulty with medical terms, data interpretation. • Limited motivation, awareness of remote care benefits. • Privacy, security concerns about health data. • Surgery, health condition causes emotional distress. • Limited disease management knowledge.

FIGURE 12.5 The persona of patient techie.

technologies could help detect potential complications early, thus reducing the risk of delayed treatment. Third, the patients felt empowered by having the opportunity to be actively included in their own care. They could use the measuring devices to monitor their vital signs and the designated mobile application to consult with the remote care team. This was especially beneficial for the elderly patients, who were provided with tools and resources to better manage their chronic conditions.

For the younger patients, gaining a sense of control by utilizing digital remote care to monitor their rehabilitation progress motivated them to maintain their independence and autonomy.

Regarding the challenges, both patient groups expressed concerns that could affect patient compliance. The deficiency of basic digital literacy skills was a substantial hindrance to utilizing digital remote care effectively, especially among the elderly patient group. In the absence of proper technological literacy or adequate training, some patients reported feeling overwhelmed and disengaged when interacting with the designated devices and struggled to make informed decisions based on the information displayed on the mobile application. Even though patients received training before their discharge from the hospital, it remained a concern that those with limited exposure to digital technology or cognitive impairment (e.g., dementia) would frequently require repetitive training. In addition, elderly patients with physical limitations (e.g., arthritis, age-related vision decline, postoperative discomfort) might experience difficulties in using the designated devices for measuring vital signs due to limitations in hand dexterity or vision clarity. It was a further concern that some patients might lack social support from family members or caregivers to assist them in using digital technologies for receiving remote care services during the home-based rehabilitation process. The lack of comfort with digital remote care could result in emotional barriers, particularly for the elderly patient group. An intriguing observation was noted regarding an elderly patient who had become habituated to traditional in-person care over an extended period. The patient expressed concerns that the implementation of digital remote care might lead to a decline in the quality of traditional in-person care. Specifically, the patient worried that digital remote care might replace the human touch and personal relationship they had developed with their healthcare provider.

While tech-savvy patients did not face challenges related to using digital technologies, some patients reported limited awareness of the importance of postoperative rehabilitation prior to the surgery and of the availability of digital remote care before taking part in the study. This was particularly true for patients who were diagnosed with thoracic disease and underwent thoracic surgery for the first time. Consequently, those patients might find postoperative rehabilitation emotionally distressing and technically challenging. The detailed concerns included how to interpret certain medical data, such as the results obtained from lung function measuring equipment. Therefore, several patients failed to understand the advantages of digital remote care, leading to a lack of engagement at the outset. Some concerns were expressed about the privacy and security of their personal health information, including potential data breaches, unauthorized access, and data misuse. In the study, the patients were advised to use the digital remote care solution for a period of six months. However, several patients implied that the absence of incentives to reward their postoperative rehabilitation progress might potentially result in decreased motivation to adhere to the prescribed rehabilitation plan in the long run.

4.3   Reformation

At the reformation stage, we utilized existing service design methods to engage key actors in leveraging collective reflexivity to influence the trajectory of digital remote care, thus setting the direction toward the cocreation of a desired digital remote care service ecosystem. We undertook a two-hour workshop (N = 6) with doctors, nurses, and technology specialists, where we facilitated the visualization of digital remote care through the use of journey mapping. As illustrated in Figure 12.6, the journey map offers a comprehensive visual narrative depicting the dynamic progression of the remote care team's involvement in delivering digital remote care services. By delineating the key stages and experiences encountered by the health professionals from presurgery to postdischarge, our goal was to unveil latent problems patients might encounter as they discover, engage with, and use digital remote care. Additionally, we aimed to illuminate opportunities for enhancing the digital remote care experience.

4.3.1   Presurgery

During the pre-surgery stage, the doctors within the remote care team started by reviewing the surgery schedule and familiarizing themselves with the patients' information. Their objective was to identify potential candidates suitable for enrollment, which was done during the presurgery evaluation with each patient. The targeted patients were individuals below the age of 70 who had experience using smartphones. However, it was noted that enrolling patients was not a straightforward process, several potential reasons were cited. First, some patients might not have received adequate information regarding the importance of postoperative rehabilitation or might lack awareness of the benefits of digital remote care. This lack of awareness could contribute to a sense of distrust when patients encounter new technologies for the first time. Second, certain patients exhibited less motivation to install and learn a new mobile application, which presented a challenge during the enrollment process.

4.3.2   Postsurgery

After the successful completion of surgery, patients suitable for enrollment were educated about the importance of postoperative rehabilitation. The surgeons who operated on them recommended the proposed solution for postoperative remote care, aiming to enhance the patients' sense of trust. This educational process took place during postsurgery consultations, where patients were provided with information to increase their knowledge about the importance of postoperative rehabilitation. Subsequently, the resident doctors conducted an individual meeting with patients who expressed interest in participating in the RCT. During these meetings, the enrolled patients were provided with detailed explanations about the research

Stages	Presurgery	Postsurgery		Prior to discharge	Postdischarge 1 week–6 months	Postdischarge 6 months–12 months
Goals	Select suitable patients	Educate patients about postoperative rehabilitation	Enroll patients for digital remote care	Provide training and assist patients in setting up the system	Conduct regular follow-ups	Encourage patient self-management
Actors	(Resident) Doctors	Surgeon in charge of the patient	(Resident) Doctors	(Resident) Doctors	Nurses in the remote care team	
Touchpoints	Face-to-face	Face-to-face	Face-to-face	Face-to-face	Web-based monitoring platform, phone calls, text/instant messages	
Behaviors	Select appropriate thoracic surgery patients for digital remote care enrollment.	Enhance patient understanding of postoperative rehabilitation during postsurgery consultations, and recommend digital remote care.	Detail the project to patients, introduce digital remote care, secure their participation, distribute measuring devices, process deposits, and obtain signed informed consents.	Guide patients through system features, assist with mobile application setup, ensure device connections, and provide usage instructions.	Conduct regular follow-ups to prevent postoperative complications, remind patients of daily tasks, review patient data, and offer assistance, feedback or interventions as necessary.	Continue ongoing support remotely, encourage consistent App usage, and facilitate device return to the hospital poststudy.
Moods						
Problems	Patients lack awareness of the importance of postoperative rehabilitation and the benefits of digital remote care.	Even after education, some patients may still not fully grasp the importance of postoperative rehabilitation and the concept of digital remote care, leading to unrealistic expectations.	Patients disinterested in digital technologies may not see the value in digital remote care.	Patients with limited digital literacy may struggle with learning how to use the devices. Moreover, technological barriers, such as compatibility issues, can pose further challenges.	Poor patient compliance and technical issues may arise during the provision of digital remote care.	The lack of comprehensive engagement from other relevant hospital departments, beyond the remote care team, may hinder an optimal digital remote care experience in the long run.
Opportunites	• Offer clear, accessible education on postoperative rehabilitation. • Equip patients with information and resources to optimise their recovery outcomes. • Ensure thorough understanding of digital remote care services. • Use plain language, avoiding confusing jargon or technical terms. • Utilize written materials, visual aids (e.g., infographics or videos) to help reinforce the information. • Foster a positive rapport with patients to build their confidence in digital remote care. • Address any doubts or concerns about the process.			• Enhance patient compliance through reliable digital technologies with a user-friendly interface. • Empower patients to proactively manage their postoperative and long-term health conditions during rehabilitation. • Provide timely feedback and incentivize consistent adherence to daily task completion and postoperative care plan. • Collaborate closely with technical support teams and patients' family members to promptly resolve any technical issues.		• Promote interdepartmental collaboration in the organization. • Incorporate digital remote care services into current work practices and existing systems. • Integrate multidisciplinary care segments and cover various disease categories.

FIGURE 12.6 Journey mapping the process of digital remote care implemented by a hospital.

project and introduced to the proposed solution, and their participation was confirmed. Additionally, the measuring devices were handed out to the patients, deposits were registered, and informed consents were signed. It was through these comprehensive interactions and procedures that patients were fully informed and involved in the implementation, ensuring their understanding and commitment to the digital remote care solution. Nonetheless, it was discovered that patients who did not perceive the value of digital remote care tended to be uninterested in digital health technologies as a whole. Additionally, despite receiving relevant education, some patients still struggled to fully grasp the significance of postoperative rehabilitation, which, in turn, led to unrealistic expectations regarding their rehabilitation process after surgery.

4.3.3   Prior to discharge

Prior to discharge, the resident doctors facilitated a training session to provide instructions on how to use the mobile application and the connected measuring devices for patients. During this training session, the resident doctors explained the functionality of the proposed solution to patients, assisted them in setting up the designated mobile application, ensured proper connection of the measuring devices to their respective end devices, and provided step-by-step guidance on the usage of the mobile application and the connected measuring devices. However, it was observed that patients who lacked basic digital literacy skills might encounter difficulties in learning how to use the devices. Technological barriers, such as compatibility issues, could also pose challenges.

4.3.4   Postdischarge

The postdischarge stage was divided into two periods. From the first week to six months postdischarge, the nurses in the remote care team conducted regular follow-ups through the monitoring platform. These digital follow-ups aimed to proactively prevent postoperative complications, remind patients to complete tasks, review patients' vital signs, and provide assistance, feedback, or interventions as necessary. From 6 months to 12 months postdischarge, the patients were required to return the measuring devices. During this period, the nurses continued to provide ongoing support remotely via phone calls. Within one year postdischarge, the doctors in the remote care team developed rehabilitation plans for patients, which included periodic return visits to the hospital and exercises tailored to different stages of rehabilitation. The nurses conducted phone follow-ups every three months to monitor the patients' progress. Additionally, the patients were encouraged to continue using the designated mobile application for self-management and to stay informed about their condition. By implementing these strategies, the remote care team aimed to ensure continuous support and engagement with patients during the postdischarge stage, to promote their postoperative rehabilitation, and to foster

self-management skills. Nevertheless, as identified in our prior studies (Li et al., 2022, 2023), issues related to patient compliance and technical difficulties might arise during the provision of digital remote care. Such problems had the potential to affect the overall effectiveness of digital remote care. We highlighted the necessity for broad engagement from other relevant hospital departments, extending beyond the remote care team, to ensure an optimal care experience for patients in the foreseeable future.

5   Discussion

5.1   *Revisiting service ecosystem design*

In this chapter, we have taken a service design ecosystem approach at the micro level within an empirical case study involving the implementation of digital remote care for postoperative thoracic surgery patients engaged in home-based rehabilitation. Our research was guided by the aim of understanding how the (re)design of digital remote care can be contextualized through the lens of service ecosystem design at the micro level. In the next section, we discuss the methodological implications of our contextualization effort. Prior to this, we point out the contribution to the literature on service ecosystem design.

As elucidated in the section of Theoretical Frameworks, the service ecosystem design approach endeavors to encompass the contextual complexity inherent in design initiatives, acknowledging how, as per the model proposed by Vink et al. (2021), value cocreation evolves through the reflexivity and reformation of actor collectives. Figure 12.7 outlines how we contextualized the feedback loop of reflexivity and reformation within the framework of our empirical case study. In the case study, we examined the contextual complexity at the micro level where doctors, nurses, and patients interact in the digital remote care process.
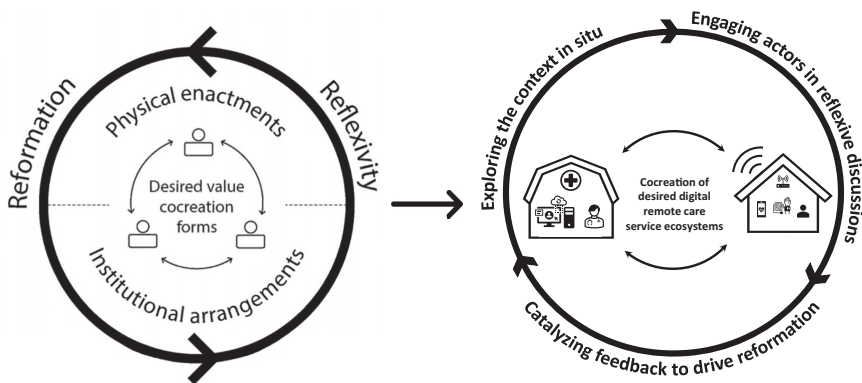
FIGURE 12.7   Contextualizing the feedback loop of reflexivity and reformation proposed by Vink et al. (2021) within the (re)design of digital remote care.

Our micro-level service ecosystem design process was contextualized within three iterative stages: exploration, reflexivity, and reformation. The interplay among these stages is pivotal in creating an embedded feedback loop, facilitating the intentional (re)shaping of invisible institutional arrangements and their physical enactments that dictate how digital remote care services are organized, delivered, and experienced. This intentional shaping is driven by the iterative process of exploring and understanding current statuses, reflecting on experiences, adapting practices, and refining institutional structures to better support value cocreation. This, in turn, evolves into a positive feedback loop that fosters the emergence of desired value cocreation forms by creating a responsive and adaptive environment.

At the micro level, this feedback loop operates within specific interactions among actors within the service ecosystem. As illustrated in our empirical case study, we, as researchers, embarked on an exploration of the implementation of digital remote care at the hospital. Subsequently, we engaged in reflexive discussions with the health professionals and patients to gather feedback on the effectiveness and usability of digital remote care services. This feedback, subsequently translated into persona creation and journey mapping, informed reformation efforts by actor collectives to intentionally influence long-term changes in the cocreation of a desired digital remote care service ecosystem. As multiple actors reflexively engage with the digital remote care ecosystem, the feedback loop ensures that the ecosystem is continuously refined to meet the evolving needs and align with the expectations of all actors involved.

Through the lens of service ecosystem design at the micro level, our study exposes fundamental processes that make it possible for people to work with institutionalized social structures, such as the ones configuring patient-doctor interactions in care practices, serving as integral materials for service design. Our study contributes valuable insights into the application of design methodologies favoring innovation and transformation in complex social contexts, such as digital healthcare. By taking a service ecosystem design perspective and broadening the inclusion of actors, we are contributing to the emancipatory intention in service design. This extension encompasses the study of patients, amplifying their voices in the realms of digital remote care and postoperative rehabilitation. By emphasizing the participatory nature of our approach, we strive to enrich service design practices with a deeper understanding of the nuances present in the digital remote care context. Our contribution extends beyond traditional boundaries, fostering a more inclusive and patient-centric approach to service design in the evolving landscape of digital remote care. In scrutinizing the cocreation of a digital remote care service ecosystem within the framework of service ecosystem design at the micro level, we suggest future research initiatives to broaden our contribution by delving into the dynamics at the meso and macro levels. Such an endeavor mandates continuous interdisciplinary collaboration and the integration of perspectives from diverse actor collectives.

5.2   *Methodological discussion*

Overall, the strength of this study is the combination of observations, document analysis, semistructured interviews, workshops, and design techniques, contributing to the robustness and validity of our findings. Nonetheless, we acknowledge that our study has methodological limitations. On the one hand, the one-month observation at the hospital served as a valuable record, shedding light on the practical aspects and real-life experiences pertaining to the utilization of digital technologies for remote care at A Hospital. On the other hand, it was restricted to activities occurring at A Hospital. These activities were the usage of the digital remote care solution by the remote care team, how it was introduced to patients, and the process of training patients on the devices associated with the solution. Ethical concerns prevented the observation of patients' utilization of digital remote care services at home. Future studies should consider extending the scope of observation beyond the hospital setting to cover the entire process of digital remote care.

By delving into the internal reports and documents provided by the hospital, we were able to acquire crucial information regarding the hospital's decision-making process, stakeholder involvement, resource allocation, and the overall progress of the implementation. Particularly, identifying the key actors involved in the service ecosystem design process was instrumental in guiding the selection of participants for the one-on-one interviews. However, the first author conducted the document analysis in isolation, potentially introducing their own biases, expectations, or preconceptions, which could influence interpretation of the data. Enhancing the quality of document analysis would have involved multiple researchers to minimize potential biases.

The one-on-one interviews were deliberately semistructured, facilitating the collection of targeted data through predetermined questions while allowing for the unexpected insights and experiences of participants to emerge through a natural flow of open-ended conversation. The primary objective of the interviews was to explore the experiences of the key actors involved in the service ecosystem design process. We employed personas as visual representations to provide a tangible and relatable conduit for conveying their intricate insights (Pruitt & Grudin, 2003) gained from the semi-structured interviews. Despite being fictional characters, the four personas were created based on real, firsthand data obtained from the semi-structured interviews. The use of personas played two primary roles in our study. First, they help foster an empathic understanding of the direct actors. By presenting personas based on real data, we sought to enhance the comprehension of the actors being investigated, allowing for a more nuanced and contextualized understanding of the research findings. Second, the personas uphold the privacy and confidentiality of the participants. By deidentifying and aggregating actual patient data into personas, the anonymity of the participants was preserved, in accordance with ethical considerations.

The participatory design nature of the workshop ensured that all participants had an equal opportunity to express their opinions and contribute to the discussions, fostering a collaborative and inclusive environment (Spinuzzi, 2005). The key objective of the workshop was to elucidate the complexity integrated into the micro-level service ecosystem of digital remote care based on the participants' experiences. Journey mapping, recognized for its utility in comprehending and improving complex healthcare processes, is advocated for its increased application in healthcare practices (Joseph et al., 2020). Journey mapping has gained traction in healthcare research and practice, as evidenced by its growing utilization among scholars (Crosier & Handford, 2012; Joseph et al., 2020; McCarthy et al., 2016), especially focusing on patient perspectives to foster empathy. However, we argue that both health professionals and patients should be considered users of the digital technologies embedded in remote care settings.

We found threefold value in utilizing journey mapping in our study. First, the collaborative creation of the journey map facilitated discussions and established a shared vision among the workshop participants. It helped bridge their fragmented understanding, aligning them with a comprehensive view of the flow and sequence of events within digital remote care. Second, the journey map served as a visual tool that effectively communicated the intricacies of the digital remote care service delivery process. Despite limitations on patient participation in the workshop, journey mapping provided the workshop participants with a tangible means to empathetically understand the potential challenges patients might encounter throughout the digital remote care process. Third, by highlighting the areas for improvement at different stages of digital remote care, journey mapping helped pinpoint opportunities to guide the workshop participants' decision making as they worked toward improving patients' experience with digital remote care. This factor contributed to the cocreation of a desired digital remote care service ecosystem.

However, we acknowledge that our sample size was limited, consisting of 15 participants in the semistructured interviews and six participants in the workshop. The determination of this sample size was predicated upon the exploratory nature of our study, where the primary focus was placed on understanding the contextualization of digital remote care design within the framework of service ecosystem design at the micro level. Establishing the sample size required striking a delicate balance between statistical rigor and practical constraints. Service ecosystem design underscores the participation of all actors within and affected by its framework, extending beyond merely professional designers, researchers, or a select group of actors. Nonetheless, achieving comprehensive representation of all these actors proved to be a significant challenge. As a result, we chose to adopt a multi-actor approach in our empirical case study.

Direct involvement of patients in the workshop was not possible due to ethical restrictions. However, the nurses played a dual role in the workshop. They not only shared their perspectives as health professionals but also acted as the voice of patients, leveraging their extensive experience gained through conducting regular

digital follow-ups with patients. Their firsthand knowledge and empathy helped to ensure that the patients' perspective was adequately represented in the workshop discussions and decision-making processes. The doctors contributed their perspectives as users and managers of the web-based patient monitoring platform, providing feedback on its usability and effectiveness. The technology specialists offered suggestions and potential remedies for addressing technology-related issues that surfaced during the implementation. By gaining an empathic understanding of their users, including both patients and health professionals, the technology specialists obtained useful insights to guide the development of the digital remote care system. Despite the relatively small sample size, our study involved a diverse group of actors from the micro-level service ecosystem of digital remote care, including health professionals, patients, and technology specialists.

Such a diverse sample provided a wider range of perspectives, experiences, and attitudes toward the implementation of digital remote care at A Hospital, leading to a richer and more complex data set that reduced the risk of bias. We argue that involving patients in the study was valuable, as it enabled rich and nuanced insights into their experiences and perspectives, ensuring that the study was patient-centered and meaningful to the patient population being studied. Increasing the sample size in future research would allow for the drawing of conclusions that can be generalized for understanding service ecosystems. Determining an adequate sample size necessitates careful consideration of various factors, with Sandelowski (1995) suggesting that it is "ultimately a matter of judgment and experience in evaluating the quality of the information collected against the uses to which it will be put, the particular research method and purposeful sampling strategy employed, and the research product intended" (p. 183).

6   Closing reflections and forward exploration

This chapter has contextualized the (re)design of digital remote care through the lens of the service ecosystem design process at the micro level. We explored the intricate interplay of multiple actors within this framework, utilizing mixed research methods, including service design methodologies, to facilitate the cocreation of a desired digital remote care service ecosystem. Our study exemplifies the practical application of the theoretical concept of service ecosystem design as proposed by Vink et al. (2021), extending the body of knowledge with empirical evidence and nuanced understandings of digital remote care dynamics. The methodological deliberations presented underscore the value of employing mixed-methods research to capture the complexity of service ecosystems.

While our study has laid the groundwork for future research, it acknowledges certain limitations that should be addressed in subsequent inquiries to refine and build upon the service ecosystem design process. As we advance, we encourage the continued intersection of academic research and practical implementation to enrich theoretical frameworks and ensure that the evolving landscapes of digital

health services remain responsive, adaptive, and beneficial to all actors involved. Aligned with the guidance provided by the World Health Organization (WHO) in its "Global Strategy on Digital Health 2020–2025", this necessitates coordination and engagement from stakeholders across all levels (WHO, 2021). Looking ahead, we call for ongoing collaboration across disciplines and broadening multi-actor perspectives to deepen our understanding of service ecosystems. It is through such concerted efforts that we can influence the trajectory of digital innovations, enhance patient experiences, and improve health outcomes in an increasingly digital world.

Acknowledgments

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13

ENHANCING EMPATHY THROUGH AI IN SERVICE SYSTEMS

Titta Jylkäs, Chongbei Song and Satu Miettinen

1   Introduction

The development of advanced technologies is so rapid that it is hard to grasp all the aspects of technology and its effects on human behaviour. One of those topics affected by rapid technology development is empathy. How do machines consider empathy, and how is the humane aspect enforced in new technology solutions? Especially in the field of AI, the creation of new solutions is fast, and the massive number of different tools and the lack of common practices make it difficult for designers to keep up. The scattered AI scene for designers can also risk making the practice of AI-enabled design narrow. There is no comprehensive and cohesive solution for creative teams that would allow a holistic viewpoint and iteration throughout the design process. The current situation of detached tools and a massive amount of manual work results in the deterioration of quality and exhaustion of designers.

Systems thinking in service design can help in understanding the complexity of the systemic service design of AI-enabled services. This can help connect separate clusters of tooling into a system as whole. Systems thinking can strengthen the contribution of service design that tries to communicate and align with its tools (Lee et al., 2023). Service design leads us to consider the connection between humans and machines in design work, and what could be done to bring more empathy in the process of designing service systems towards humans and machines.

The influence of humans in current times is huge. The present geological epoch has been titled the Anthropocene to emphasise the human impact (Lewis & Maslin, 2015). In contrast to human impact, the anthropocentric perspective does not consider the rights and interests of non-humans. However, design for sustainability is enlarging the design perspective on the future of non-human species (Ceschin &

Gaziulusoy, 2016). More-than-human connections between different species can be a new design competence and can create new expertise, tools and opportunities for designers (Forlano, 2017; Romani et al., 2022).

Another aspect of non-humans in design is the increasing use of artificial intelligence (AI). This has created the need for designing for service encounters that include non-human actors such as AI assistants (Jylkäs et al., 2018). Further, this has impacted the design process and how to design when AI is involved in the service system (Jylkäs, 2020).

There is a lack of research that connects the fields of systems thinking, AI, empathy and service design. This chapter responds to the research gap. It focuses on empathy in AI from two perspectives: how AI could help service designers build empathy and how we might make AI-enabled service systems more empathetic. This chapter asks: 'How can systems thinking support understanding the complex systemic service design of AI-enabled service systems and integrating empathy in them?'

2   Theoretical background

This research is based on the service design research practice. It utilises both service design and systemic thinking as the main theories and narrows it down to systemic service design. In addition, the theoretical background consists of the topics of human-centred design (HCD), empathy and AI in service design.

2.1   Systems thinking and service design

Systems thinking is about a holistic understanding of the world. It investigates how different 'systems' or 'wholes' are connected and in relationships with each other. This helps in developing action and understanding its impact. Further, systems thinking contributes to systems theory (Shaked & Schechter, 2017).

Buchanan (2019) has investigated the relationship between systems thinking and design. Design includes the concept of systems. He proposes that a product or a service is always a system of parts working together. One can utilise systems thinking in analysing how these parts work together to form a product. For example, in service design, one needs sequences of planned activities, communications and interactions with humans or non-humans within organisations that include layers of systems to create a service offering. Buchanan argues that systems thinking fails to address the complexities of complex social and environmental issues because it tries to reduce the system into an abstract modelling of its parts. In design, the value of systems thinking is in its capability to reveal interdependencies.

There are several views on discussing systemic service design. It can be understood by looking at complex and large-scale systems such as design within or for service ecosystems in urban contexts design, especially in '*the framework*

for designing sustainable and inclusive solutions' (Villari, 2022, p. 163). Also, Suoheimo et al. (2021) propose that service design can address complex systemic challenges and highlight changes in society, politics or sustainability. Santos and Sustar (2023, p. 1565) approach systems from the perspective of supporting practice-based service design to understand, map and represent complex challenges. Sangiorgi et al. (2017) recognise not only the role of service design in complex service systems but also the need for it to address the dynamics of multiple actors and their interdependencies. Lee and others (2023) also point out a turn in service design for addressing more complex systems that require a new definition of service design as a transdisciplinary domain of knowledge, where design leadership and systems thinking have an important role.

Vink et al. (2021) highlight several aspects of systemic service design. They argue that it aims for value co-creation but needs to be fully controllable and predictable. Physical enactments and institutional arrangements are to be considered in value co-creation. When actors reform or reshape institutional arrangements, it is only possible through reflection and reformation. There are conflicting and aligned designs in ecosystem design, and process design plays no role. Still, this needs to be considered.

Many times, service design addresses the ecosystemic point of view of all levels of the ecosystem holistically: 'micro level': individual service solutions and service journeys from the user perspective; 'meso level': integrated services between service providers and organisations; 'macro level': laws, policies and implementation of structural change and reform levels are addressed (Alhonsuo, 2021).

2.2   Human-centred design

The standard 'ISO 9241-210 Human-centred design for interactive systems'[1] is one of the fundamentals for applying the HCD process. The principles of HCD include the idea of working with stakeholders and users throughout the design process. The core of HCD is understanding and defining user needs. This takes place through understanding users, tasks and environments. The process addresses the whole user experience. One of the fundamentals of HCD design is the iterative process that helps you to ideate, test and evaluate design solutions based on user and stakeholder feedback. At the core of this process is understanding the real-life situation and matching the solution to it (Burns, 2018). HCD is a multi-disciplinary piece of work that includes a variety of different skills and perspectives.

2.3   Empathy

In everyday language, empathy is about putting yourself in someone else's shoes by understanding the realities and situations that others face (Brink et al., 2011). It can stimulate participation as it enables one to distance oneself from one's current situation and be open to someone else's (Ashworth & Lucas, 2000).

In design, this is a valuable capacity to understand emotions and feelings associated with the meanings connected with somebody else's personal encounters, interactions or situations. Gaver, Dunne and Pacenti (1999) used cultural probes that help create empathy and contextualise this with the user experience. Customer interviews, ethnographic research and journey mapping are often used to incorporate empathy in design. These approaches involve direct interaction with customers, observation of their behaviours and deep feedback analysis (Stickdorn & Schneider, 2011). Achieving deep empathy in service design often requires substantial time and resources, and there is a risk of misinterpretation of customer needs. Additionally, cultural and diversity challenges can arise when designers and customers come from different backgrounds (Sanders & Stappers, 2008).

McDonagh and Thomas (2011) discussed empathetic design as an interpretative approach to creating new solutions that solve or respond to the challenges in users' lives. Mattelmäki et al. (2014) have been discussing the concept of empathy over the long term. Their research used human experiences, emotions and meaningful mundane practices to create innovative and human-centred solutions for everyday challenges.

Sarantou and Miettinen (2022, 6) present 'a practical four-step model for organizations to turn from only feeling empathy with or for people to take actions of empathy and compassion and implemented these with and by communities.' In design, especially service design, there is an implicit call for transformation and change (Sangiorgi, 2011). There has been a need to embed empathy in different business areas (New & Kimbell, 2013). The benefits of recognising empathy are discussed in the context of business leadership (Ohren, 2014; New & Kimbell, 2013). Empathy is often seen as a way to respond to the user's needs in service delivery.

Overall, the idea of HCD calls for empathy (Chen et al., 2020). Designers have long worked with it. Kouprie and Visser (2009) have proposed a framework to create empathy. Miettinen, Sarantou and Akimenko (2016, 78–79) have applied this in their model based on cycles of discovery, immersion, connection, detachment and planning. The need for empathy in business development and its role in creating design opportunities has prompted several design tools to create empathy and user insights that can prompt innovation.

There is topical research that studies how to develop artificial empathy. It is a challenge to develop a social robot that would be able to perform dynamic affective exchanges with human partners (Damiano et al., 2015). There are attempts to develop models and frameworks that would simulate natural empathy in robotics development (Asada, 2015).

Empathy is fundamental in service design, enabling designers to understand and address customers' real needs and emotions. It involves putting oneself in the customer's shoes to gain insights into their experiences and expectations (Sheth et al., 2024). Empathy in service design not only helps in creating services that are user-centric but also builds stronger relationships with customers.

2.4   AI in service design

The integration of AI in service design represents a significant paradigm shift in how services are conceptualised, designed and delivered. The integration emphasises systemic thinking across service ecosystems, involving deploying machine intelligence not only to enhance service design processes but also to enable a transdisciplinary approach that integrates insights across the 'micro, meso and macro levels' of service ecosystems. AI technologies, such as natural language processing (NLP), machine learning (ML), and computer vision each play a unique role in systematically analysing user data and organisational interactions, facilitating a comprehensive understanding of complex service networks and their interdependencies.

NLP is a field of AI that focuses on the interaction between computers and humans through natural language, either spoken or written. It enables computers to understand and interpret human language, bridging the gap between human communication and computer understanding (Jurafsky & Martin, 2024). It facilitates systemic thinking in service design by translating the complexities of human language into actionable data. By interpreting customer feedback, NLP enables designers to assess individual '(micro-level) experiences' and expectations systematically. This detailed linguistic analysis enhances the personalisation of services, ensuring that designs respond dynamically to user needs, thus supporting the development of services that are both user-centric and contextually relevant.

At the 'meso level' of service ecosystems, NLP enhances collaboration between providers and organisations by analysing sentiment, user research, and content strategies. Through sentiment and user research data analysis, NLP allows designers to analyse customer feedback to understand users' sentiments, preferences and needs, which is crucial for aligning service offerings with broader organisational goals and user expectations (Liu, 2012), especially in the early stages of service design (Hirschberg & Manning, 2015). In content strategy development, NLP aids in developing effective content strategies by analysing language patterns and user interactions, ensuring communication is user-centric, and that different service components coherently address user needs while fostering synergy among service providers (Liddy, 2001).

Machine learning, a subset of AI, involves algorithms that enable computers to learn from and make decisions based on data without being explicitly programmed for specific tasks (Alpaydin, 2020). In the context of service design, ML algorithms advance systemic thinking in service design by enabling macro-level analysis of user behaviour patterns. By learning from large-scale user interaction data, ML facilitates the delivery of personalised content and services and supports the implementation of structural changes, ensuring services are adapting in real time to evolving user preferences.

For example, ML is applied in the service design process through predictive analytics and service personalisation strategies. Predictive analytics refers to ML algorithms that are useful for analysing past user interactions to predict

future behaviours, crucial for creating anticipatory services (Alpaydin, 2020). This foresight is essential at the 'meso level' for ensuring services are dynamically aligned with organisational objectives, thus maintaining relevance and effectiveness in a competitive landscape.

Computer vision enables computers to interpret and make decisions based on visual data from the real world, allowing them to 'see' and analyse images and videos (Szeliski, 2021). In service design, this translates into the ability to analyse how individuals interact with visual elements in the interface, facilitating the optimisation of these elements for enhanced usability and accessibility (Szeliski, 2021), which provides critical insights into systemic design at the 'micro level.' At the 'meso level,' computer vision significantly contributes to the integration of services by enhancing the prototype testing and refinement stages of service design. In prototype testing and usability studies, computer vision helps in tracking eye movements and user engagement, informing design improvements (Duchowski, 2007). This systematic approach ultimately leads to services that are optimally designed for user engagement and satisfaction.

The integrated use of NLP, ML and computer vision empowers service designers to adopt a systemic and holistic approach to service design. This integration facilitates a deeper and holistic understanding of user preferences and behaviours across all levels of the service ecosystem, from individual user interactions to organisational impacts, which is essential for creating resonant and user-friendly services that are also strategically aligned with broader systemic changes and challenges (Russell & Norvig, 2016).

3   Research design

The overall research design is based on a qualitative research strategy that aims to better understand the phenomena of empathy in the context of AI development. The research design implements research through design (Zimmerman et al., 2007; Stappers & Giaccardi, 2017), where the design process and tools are utilised to gather and analyse research data. The case studies were conducted in the Empathy Business research project context.

The research process included two iterative research design cycles. The first cycle focuses on desktop research on desktop analysis through light literature research and practical example case study analysis, and the second focuses on the design of two service design proofs of concepts as case studies. The case studies were selected for the research due to their complex design challenge and multi-layered nature, both in the design solution and in the meanings that AI can provide to the service design process.

The research cycles were iterative and parallel with each other. Light literature research was conducted through an information search on the pros and cons of utilising AI in the design process (Shaikh & Karjaluoto, 2015). The case study analysis of some well-known examples (IBM Watson, Qualtrics, Google Analytics, Slack,

and Salesforce) was implemented through reflective and evaluative discussions (Sormunen, Juuti & Lavonen, 2020; Cooper, 2014). Participant observation was utilised (Musante & DeWalt, 2010) and the case studies were documented visually with photographs and digital tools (Miro[2]) (Lehmann, 2012). The data from the case studies consists of design process documentation, user research analysis results, digital visual workboards in the Miro tool and project presentation material such as presentations, videos and prototypes. Both research cycles were constructed around processes that included ongoing discussions, reflective practice, and analysis of concept design presentations.

The design process of the case studies utilised an open data set from expert interview research by the Empathy Business project with 20 design practitioners and experts (Miettinen et al., 2024). Additionally, user research was performed in both PoC design projects to further understand user needs and AI possibilities. Both project teams also involved potential users in prototype testing during their design process.

System thinking was used as an analytical tool to understand how it could support an improved AI-enabled service design process.

4   Findings

4.1   Desktop research: overcoming systemic challenges through AI

Our desktop research demonstrated that AI can significantly enhance the service design process from a systems thinking perspective. A literature review was conducted to explore the benefits of AI in service design, with seminal works such as Wagner et al. (2022) providing foundational insights. Additionally, we engaged in rigorous case study analysis, as recommended by Ellet (2007), to evaluate AI's real-world applications within service ecosystems. This analysis involved comparing challenges in both traditional and contemporary design processes, underscoring AI's role in resolving these issues while promoting interconnected service improvements.

AI's capacity to analyse extensive datasets enables a deeper systemic understanding of individual customer behaviours and preferences. For instance, sentiment analysis can provide a broad understanding of customer emotions, and predictive analytics can anticipate future needs (Kumar et al., 2019).

In addition to the analytical capabilities, the evolution of AI in the service design field has seen a growing interest in developing systems that can understand and simulate human emotions, known as affective computing (Picard, 2000). This emerging field seeks to bridge the gap between the analytical capabilities of AI and emotional intelligence, facilitating richer collaborations between service providers and service designers, and making sure the service is empathetically aligned with users' emotional needs.

As we have discussed in previous sections, service design requires a well-orchestrated sequence of activities and interactions within organisational

frameworks to deliver comprehensive service offerings. Traditional challenges, specifically ranging from (1) time and resource constraints, (2) inadequate feedback loops, (3) cultural and diversity challenges, (4) communication gaps and (5) scaling empathetic responses, often obstruct a holistic understanding of user needs and the cultivation of necessary empathy in service designs. Here, AI presents practical solutions that are delineated in Table 13.1, showcasing how various AI tools and solutions address these systemic challenges, supported by industry examples from various industries.

TABLE 13.1 AI solutions and examples for challenges in achieving empathy in the service design process

Challenges	Traditional challenge	AI solution	Examples
Time and resource constraints	Traditional empathy-building methods, like ethnographic research or in-depth interviews, are time-intensive and resource-heavy.	AI can quickly analyse large data sets, including customer interactions and feedback, providing faster insights into customer needs and emotions (Davenport et al., 2017).	AI-powered analytics tools like IBM Watson can rapidly analyse customer data, reducing the time and resources needed compared to traditional methods. For instance, a retail company might use Watson to analyse customer reviews and feedback across multiple channels, gaining quick insights into customer preferences and trends (Miller, 2018).
Inadequate feedback loops	Traditional feedback mechanisms can be slow and may not capture the full spectrum of customer emotions or experiences.	Continuous and real-time feedback analysis using AI, like sentiment analysis, can provide more immediate and comprehensive insights (Kumar et al., 2019).	Platforms like Qualtrics use AI to analyse real-time customer feedback. A hotel chain, for example, could implement this to continuously monitor guest satisfaction through online reviews and surveys, thereby quickly identifying and addressing service issues (Ostrom et al., 2021).

(*Continued*)

TABLE 13.1 (Continued)

Challenges	Traditional challenge	AI solution	Examples
Cultural and diversity challenges	Understanding and empathising with customers from diverse cultural backgrounds can be challenging, leading to potential biases in service design.	AI can help identify and analyse diverse customer patterns and preferences across different cultures, aiding in the development of more inclusive services (Rust & Huang, 2014).	Google's AI-driven analytics in their ad services demonstrate the ability to understand diverse customer patterns. This technology can be employed by global companies to tailor marketing and service strategies to different cultural groups, ensuring inclusivity and relevance in their offerings (Roshanaei, 2024).
Communication gaps	Communication barriers can arise in cross-functional and cross-time zone teams, leading to misalignments in understanding customer needs.	AI-powered collaboration tools can aid in synthesising information from various teams, ensuring a unified understanding of customer data (Bughin et al., 2017).	Slack's AI-driven collaboration tools help service design teams synchronise their understanding of user data. A multinational corporation with teams across different time zones can use Slack to share insights and updates and ensure cohesive service strategies (Stray & Moe, 2020).
Scaling empathetic responses	Scaling personalised and empathetic responses to a large user base is difficult with traditional methods.	AI can scale empathetic interactions through personalised recommendations and responses, maintaining a high level of personalisation even with a large customer base (Peppers & Rogers, 2017).	Salesforce's AI platform, Einstein, offers personalised customer engagement at scale. An e-commerce site could use Einstein to deliver personalised product recommendations to millions of users, maintaining a sense of individual attention and care (Kaliuta, 2023).

While our exploration of AI in service design has focused on overcoming operational challenges and enhancing service efficiency, we also delve into the symbiotic relationship between AI and human designers. Theories in human-AI interaction provide a framework for understanding how this collaboration can be optimised to enhance empathy in service design.

The theory of complementary collaboration suggests that AI systems and human designers should complement each other's strengths. AI excels at processing and analysing large data sets, while human designers bring creativity and empathetic understanding that AI lacks (Dellermann et al., 2019). In service design, AI can be used to handle data-driven tasks, such as customer behaviour analysis, while human designers focus on applying these insights in creative and empathetic ways. There's also a theory that proposes treating AI as a collaborative team member that offers predictive analysis and sentiment analysis, enhancing the team's overall ability to design empathetically (Seeber et al., 2020). This collaborative approach not only enhances the service design but also reinforces the systemic integration of technological and human capacities.

The human-in-the-loop (HITL) approach, also known as the 'learning apprentice' model, positions the AI system as an assistant to the human worker. In this framework, AI learns by observing human decisions, capturing these observations as additional training examples. This approach not only enables AI to assist in real-time but also allows it to accumulate knowledge from multiple human inputs, potentially surpassing the expertise of individual team members. However, the effectiveness of this learning is contingent on the skill level of the human team and the availability of relevant data (Mitchell et al., 1990; Esteva et al., 2017). In this HITL model, AI acts as an apprentice to human service designers, assisting in tasks while learning from the designers' decisions. This AI-human collaboration collaborative approach allows AI to gather insights from human empathy and creativity, enhancing its ability to understand emotional cues, and contributing significantly to creating empathetic user experiences.

These theoretical frameworks underscore the potential of AI to transform service design by creating more responsive, empathetic and user-centred services. By integrating AI in ways that complement human skills and enhance mutual understanding within the design process, we can achieve a more holistic and effective service ecosystem. The collaboration between AI and humans, guided by these theories, ensures that the entire system is robust, adaptive and innovative.

4.2   Case study: Proof of concept designs for empathetic AI tool

4.2.1   Overview of design projects and initial objectives

This case study analyses two student-led design projects from the University of Lapland's advanced service design course, which were part of the broader Empathy

Business research project. These projects were developed as digital proofs of concept (PoCs) to explore and enhance empathy in AI-driven service systems, specifically designed for remote creative teams.

Initiating with identical project briefs, the student groups created unique design solutions. The first concept, 'Design Coach' (Figure 13.1), integrates a comprehensive suite of design tools, including a double-diamond process framework, into a single platform. As AI tools for design are largely scattered at the moment with their individual focus areas, this PoC addresses the fragmentation by offering a unified solution that responds to the growing need for effective and efficient collaboration among remote teams.

The second concept, 'Co-Infinity'[3] (Figure 13.2), models a virtual service ecosystem powered by Rauha, a voice-controlled AI assistant that partners with humans in a VR environment. This system not only automates routine tasks by AI, freeing designers to focus more on creative endeavours, but also leverages VR technology to simulate real-world interactions and emotional experiences. By immersing team members in a virtual environment that mimics physical presence, Co-Infinity enhances understanding, a deeper connection and empathy among remote collaborators.

4.2.2   Application of system thinking in design process

Throughout their projects, students engaged in a holistic service design process that included data collection, analysis, ideation, prototyping and testing. Systems
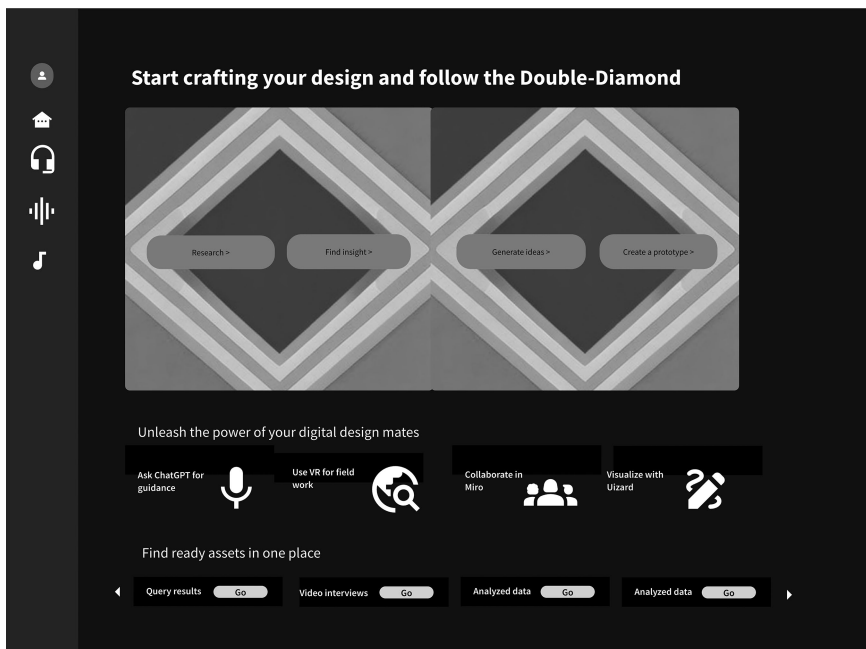
FIGURE 13.1   Screen from Design Coach prototype.
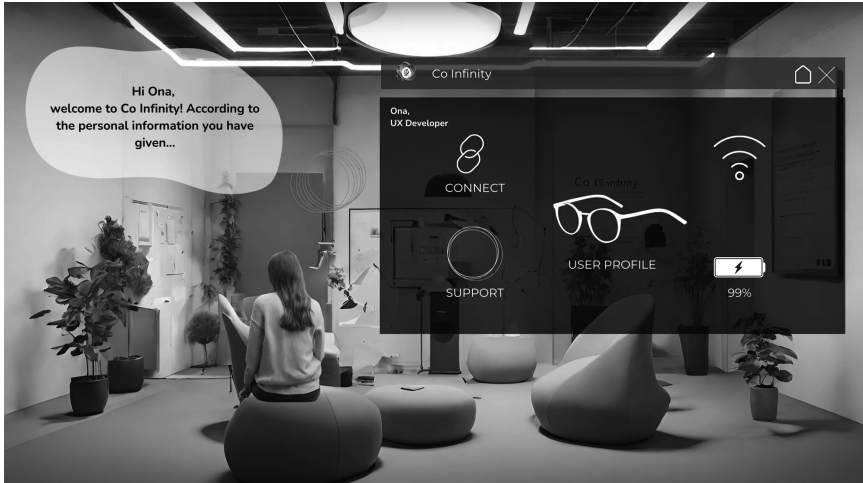
FIGURE 13.2   Screen from Co-Infinity prototype video (colours modified).

thinking was applied to examine AI's role at both micro and meso levels – enhancing individual task efficiency and influencing broader service system outcomes.

AI in these PoC projects was more than a tool. It was a part of a generative system that actively contributed to creating new design artefacts. Following complementary collaboration theory, depending on the role that humans give to AI in the process, its effect on the design outcome may vary. In service design, sequences of planned activities, communications and interactions with humans or non-humans within organisations are required. This is where AI can have a role in suggesting suitable methods and actions.

Systems thinking was manifested in two layers within the PoC projects: at the 'micro level,' an AI platform as a system that helps in navigating complex design challenges; and at the meso level, the outcomes of AI-integrated processes are viewed as components of broader service systems. Design, or an outcome of a design process such as a PoC, is also an outcome of a systems design.

Each project was built on critical assumptions about the future of technology and regulation, particularly the advancement of ethical AI frameworks and data protection laws. These assumptions were essential for framing the potential and limitations of AI within their projects, 'setting a macro-level context' for the use of AI in service design.

4.2.3   Advancing empathetic AI

The case study data analysis revealed that by automating routine tasks such as documenting processes and organising teamwork, AI enables designers to devote more time to the core aspects of design that require human empathy and creativity. This shift from mundane to more empathetic and creative tasks is a direct outcome

of integrating AI into the service design process, aligning with the goal of enhancing empathy within service systems.

To enhance the functionality and empathy of AI within the PoC platforms, it's crucial to develop algorithms that can process unbiased data and incorporate human values. Integrating an HITL approach will ensure that AI not only supports but also learns from its collaboration with designers, fostering a richer integration of AI in the creative process.

4.2.4   Challenges and ethical considerations

One of the bigger findings from both teams was that an empathetic approach requires a safe space – technologically and psychologically. Psychological security is not often talked about in technological settings, but it is essential, especially when the aim is to provide an empathetic setting for creativity. Ensuring a secure and supportive digital space allows team members to express feelings freely and engage more deeply in communication and collaboration (Figure 13.3).

The integration of AI raises important questions about the balance of power between humans and machines, especially in decision-making processes. As AI is harnessed to support or lead the direction of the design process in these concepts, it might create questionable situations when decision-making is needed. Users who tested the PoCs were also concerned about whether creativity would be narrowed down through AI suggestions, or if users could expand their creative input through AI. Establishing clear guidelines and roles will help maintain a productive and respectful collaboration where AI supports rather than dominates the creative process.
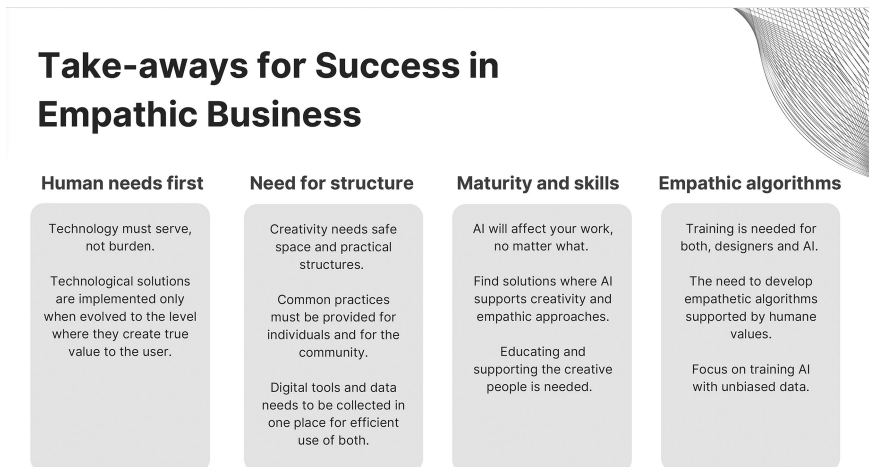
FIGURE 13.3   Takeaways from Co-Infinity project presentation (colours modified).

4.2.5   Summary: systemic impacts of empathetic AI in service design

The student projects have provided significant insights into the role of AI in enhancing systemic service design with a focus on empathy. Key impacts observed include:

1 Enhanced focus on empathy: By automating routine tasks, AI has enabled designers to dedicate more time to empathetically engage with user needs, shifting the focus from operational efficiencies to deeper HCD considerations.
2 AI as collaborative partner rather than a simple tool: AI can support routine work, new ways of enhancing communication, supporting participant engagement and enhancing creativity.
3 Equal setting by saving resources: The PoC designs provide new working methods and opportunities that economise on resources, which is especially beneficial for creative teams with limited access. This creates more equality in the design field in terms of access to tools and resources.
4 Psychological safety in digital environments: It is important to have the design platform that supports transparency and flattens traditional hierarchical structures, enhancing equal and collaborative dynamics.
5 Application of systems thinking: Systems thinking can be critically employed to understand how AI integrates and interacts at 'micro, meso and macro levels' of service ecosystems and how the design process itself can be improved as a design system.

5   Discussion and conclusion

The theory of complementary collaboration suggests that AI systems and human designers should complement each other's strengths. This is also shown in the findings from letting AI take over mundane tasks and affording designers the time to understand human problems better through empathy. AI excels at processing and analysing large data sets, while human designers bring creativity and empathetic understanding that AI lacks (Dellermann et al., 2019). In service design, AI can be used to handle data-driven tasks, such as customer behaviour analysis, while human designers focus on applying these insights in creative and empathetic ways. A theory also proposes treating AI as a collaborative team member that offers predictive analysis and sentiment analysis, enhancing the team's overall ability to design empathetically (Seeber et al., 2020). Systems thinking can be utilised as an approach to help designers navigate the different levels of service systems and gain a holistic outcome through design.

In the HITL model, AI acts as an apprentice to human service designers, assisting in tasks while learning from the designers' decisions. This AI-human collaboration collaborative approach allows AI to gather insights from human empathy and creativity, enhancing its ability to understand emotional cues and contributing

significantly to creating empathetic user experiences. What case studies referred to as developing empathetic algorithms can also be seen as the learning process that is fed with empathetic data and analysis models from which the AI can learn its behaviour. Here, the design team is responsible for how the algorithms are taught and what kind of data is provided for its use.

One user concern during the case studies was about the power structure between humans and AI. Users are concerned about giving up control of the creative process and trusting a machine in its decision-making. With the HITL approach, the algorithm learns from humans and also about their preferred way of working and making decisions. AI acts as an assistant for the human team rather than as the main decision-maker.

Both the literature review and case studies highlight collaboration and communication as essential aspects for enhancing empathy in service design. Collaboration is required both between people involved in a service design process and between humans and AI. The integration of AI in service design is not just about technology; it is about creating a symbiotic relationship between AI and human designers. Theories in human-AI interaction provide a framework for understanding how this collaboration can be optimised to enhance empathy in service design. Furthermore, systems thinking creates more complexity in the collaboration.

This research has presented two case studies, a light literature review, and desk research in the exploration of enhancing empathy in service systems through AI. Through the literature review and desk research, we have identified five potential areas where AI could play a role in enhancing empathy: (1) time and resource constraints, (2) feedback loops, (3) cultural and diversity challenges, (4) communication gaps and (5) scaling empathetic responses.

Even though a typical criticism of AI is related to a lack of empathy, the case study research showed five potential benefits of AI in enhancing empathy in service systems: (1) change focus from mundane to empathetic, (2) AI as a team member rather than a simple tool, (3) equal setting by saving resources, (4) psychological safety in remote platforms and (5) systems thinking as an approach. Therefore, achieving empathetic AI starts from the empathetic practice of designers in their work. The case studies involved a small group of potential users in their feedback sessions, and therefore, further research is required to verify the effectiveness of the concepts created in different fields and work settings. As the designed PoCs are aimed at remote creative teams, this would also be the primary target group for potential follow-up research efforts.

Acknowledgements

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Notes

1 https://www.iso.org/obp/ui/en/#iso:std:77520:en.
2 Miro https://miro.com/.
3 Link to concept video: https://www.youtube.com/watch?v=0qFYsdDXtX4.

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14

CONCLUSIONS

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1   Systemic service design

By investigating the chapters of this book, we see that there is a growing need how to look and approach the services from the systems angle. Depending on what the context is different service design perspectives (Suoheimo et al., 2023) may be applied as "service design", "product service system", "systems-oriented service design", "service ecosystem design" or "person centred service design" to name a few. The service ecosystem design with example Chapters 9 and 12 shows how understanding ecosystems is essential. Chapter 7 shows a theoretical example and Chapter 11 a practical example how to couple systems-oriented design and service design. Chapter 13 uses systems thinking as an approach to understand systems in services.

As in systemic design, there is not a dominant systems theory or common systemic practice, but a variety are presented from soft systems methodology, critical systems thinking, system dynamics, second-order cybernetics, operations research, ecological systems theory, socio-technical systems and others that helped to analyse or make sense of a complex service design challenge. We can conclude that the services that we design are diverse and thus need diverse or plural ways of approaching them. For a product-service system (PSS), for example, the service is itself a system and systems approaches are integrated, where the systems perspective is quite novel in other service design contexts. We were surprised that there were no PSS cases offered in response to this collection. Searches on the trend and literature show the topic has dropped off considerably since 2017, and perhaps there are other processes now emerging.

1.1   Theoretical framework for systemic service design

Buchanan's (1992, 2001) four orders of design are often presented as separate fields, but we see that they all interlap (Figure 14.1). The first order is considered
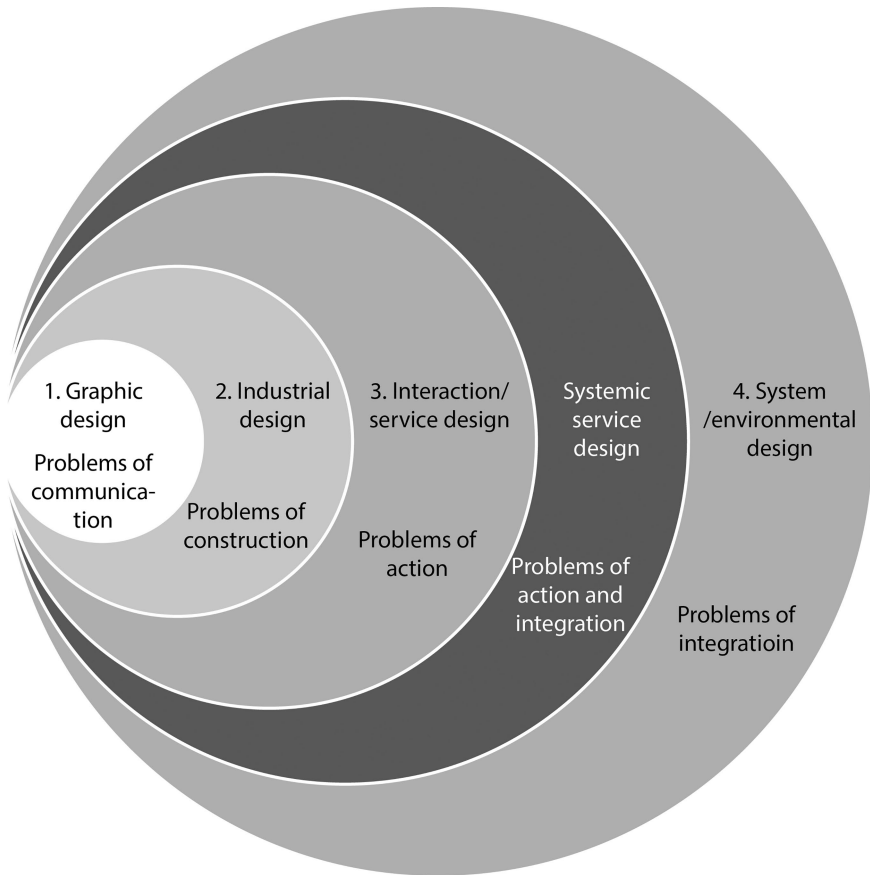
FIGURE 14.1 Four orders of design and how systemic service design is situated in the middle of the third and fourth orders of design, inspired by Buchanan (1992, 2001).

to comprehend the areas of graphic design and similarly tackle problems of communication. The second order is often seen as industrial design and tangible products, thus concerned with problems of construction. The third order can comprehend both service and interaction design and grapples problems of action. In the fourth order, the designers work design systems and environments. Here Buchanan (2001) calls the issues that designers face as problems of integration. There are scholars that go against the thought of using the word "problem", but prefer e.g. challenges since people tend to think that if there is a problem, there would be a solution, but this is not the case, especially if we handle wicked problems (Sevaldson, 2022; Rittel & Webber, 1973). The diagram intends to portray the dominant logics of the different orders. This does not imply that a dominant logic is the only logic.

We think that, in general, separating areas in four orders is artificial but perhaps necessary to provide vocabulary and language to explain what design as a field does. Still it is essential to understand how all are connected. Figure 14.1 aims to illustrate how systemic service design is an overlapping area of the third and fourth orders of design. The overlapping area we wish to call as systemic service design that this book is handling. There is not one way of understanding but rather plural ways of applying systemic service design in theory and practice. This overlapping area of third and fourth orders grapples with problems or challenges of action and integration. According to Cambridge dictionary (n.d.), integration is "the process of combining two or more things into one". As the dictionary explains the integration could be "across sth", "between sth and sth", "into sth", and "with sth". In other words, this could be also understood as connections, which is prominent for systems design.

1.2   *How to practise systemic service design?*

When going to the fourth order of design, mapping tools are quite necessary to illustrate the systems that will be designed. Chapter 3 looks at the Mess Mapping and Gigamapping tools as some possibilities for service designers to apply to better understand how the service is an integral part of a system. Chapter 8 shows a practical case study of Mess Mapping and Chapter 10 Gigamapping. When service designers deal with systems they will also automatically be drawn into the questions of power (Chapter 5) and possibly structures of oppression (Chapter 6).

In this book, we have leading authors from the service and systems field connecting the two areas services and systems via theory and practice. We argue that the two "fields" or "approaches" are non-separable and need more research to investigate on how to bridge both. It is probably due to the wicked nature of the service problems (Suoheimo, 2020) that we need multiple approaches, paradigms, methodologies and methods since no one will be enough to do it alone (Midgley, 2000). Also, Chapter 5 around power in systemic service design discusses the need for holistic and plural ways of understanding service design.

Depending on the perspective we take, we will need the micro, meso or macro understanding. As the iceberg model of design problems from the introduction chapter illustrates, these levels via Buchnans four orders of design. This resonates with the metaphor from Sevaldson (2022) of taking a view of a frog, bird or a telescope is a key. As Chapter 4 discusses, looking at the paradigms in the context is valid and social constructivism seems to continue being a holistic way of making or understanding the world together. The metaphor of the elephant is relevant as not one blind person will understand what the elephant by touching its tail will understand. Listening and involving multiple fields and actors in the design process is essential.

Quite often service design is referenced as second-order design (e.g. Duman & Timur, 2020), that is more concerned with service interactions rather than systemic issues, thus being in between the second and third orders of design. Systemic

service design does not erase that background, but builds above it. Westerlund and Wetter-Edman (2017, p. 17) have written how: "Designers whose mind-set and approach works well considering the impact in Buchanan's first and second orders, may not have the tools, mind-set or approach to create understandings of the impacts in the third and fourth orders of design." Also, Holmlid (2007, p. 7) noted how interaction design, "IxD and service design together could function as integrating disciplines across the orders of design defined by Buchanan (2001)".

Polaine et al. (2013) has used the metaphor of an orchestra, where the service designer is the conductor and tries to make all the instruments play in harmony. This can be possible when the problems are well-defined, but depending on the challenge at hand such as wicked problems, it will be quite impossible to make all the parties play in harmony. Also, in the latter case, the participation of the actors is critical although giving equal opportunities and making all different views being heard is a challenge. One of the editors suggests that in systemic service design, the complexity of the whole is envisioned before the "parts" or service compliments for value, are designed. The designer might be more a composer for the orchestra performing a film score, collaborating with the director and scene producers, to define the moods, tonality and movement of the acoustic action for the whole production. Chapter 10 presents a case of participatory design in the context of systemic interventions in public services.

Systems community has understood that co-creation is needed in the context of systems (Zivkovic, 2018) and looking from that perspective service design is an optimal approach since its essence is to involve the users and stakeholders needed and it is always holistic (Stickdorn et al., 2011). This manner, making better services that are wicked, we will need systems angle but also social, transitions or transformation design, design for policy, to name a few design fields. The plurality of the chapters in this book show how a new paradigm may be emerging in the service design field considering how the service designers have a role in addressing complex, systemic and wicked challenges. Chapter 4 is showing it more evidently by using literature review, interviews and a workshop with experts in the field.

In overall, we hope to see more studies that will be coupling systems approach with service design approach. As we started this book, we saw that there is a growing need for it. We suggest having conference workshops around the theme and other special conference and journal issues let alone academic and development research projects that would apply this angle.

We hope you have enjoyed reading this book.

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