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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.
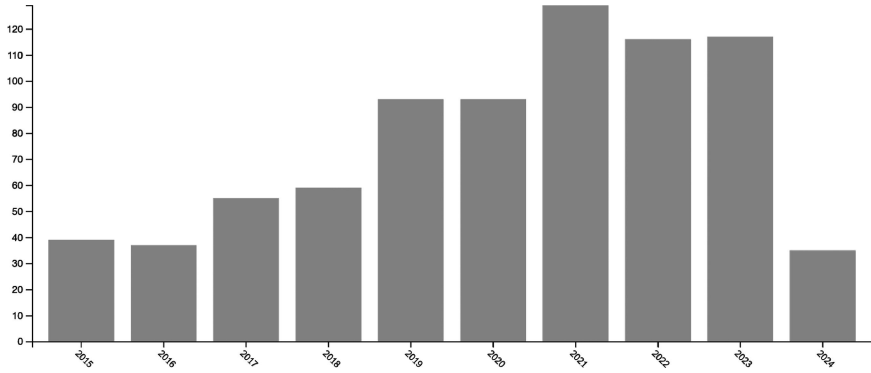
FIGURE 1.1A   Number of publications per year containing search terms "service design" and "system*" from Web of Science in May 2024.
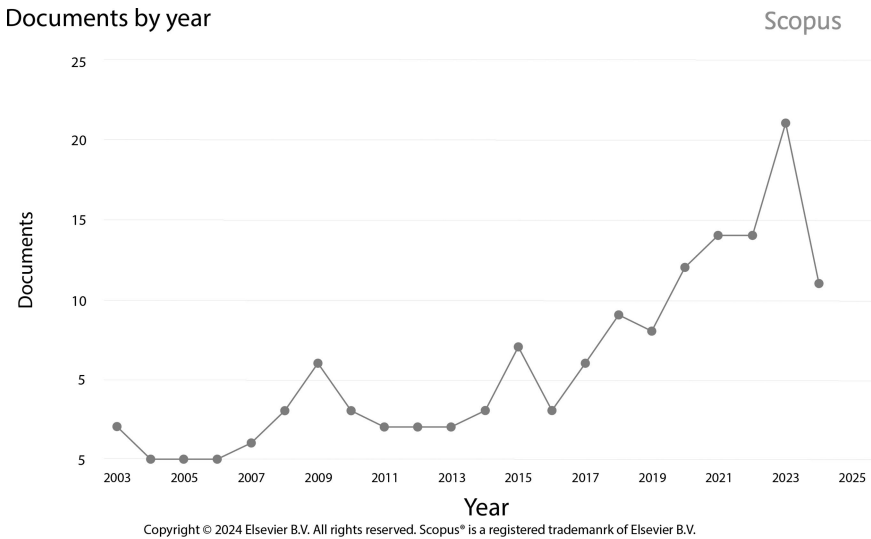
FIGURE 1.1B   Publications per year containing search terms "service design" and "systemic*" from Scopus, July 2024.

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
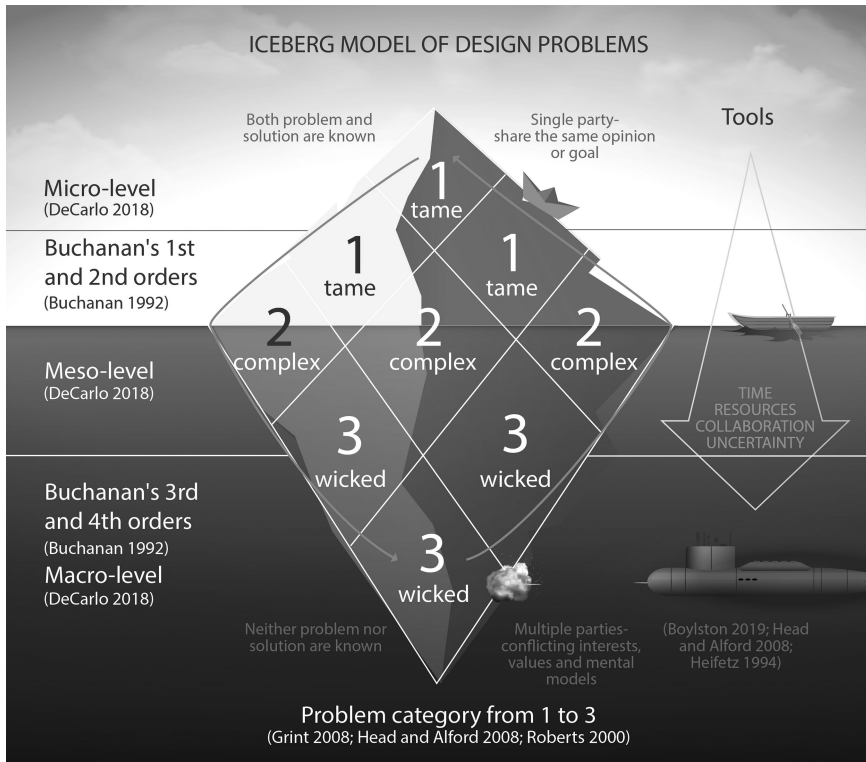
FIGURE 1.2   Iceberg model of design problems (Santos et al., 2025; Suoheimo et al., 2020, p. 243).

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,
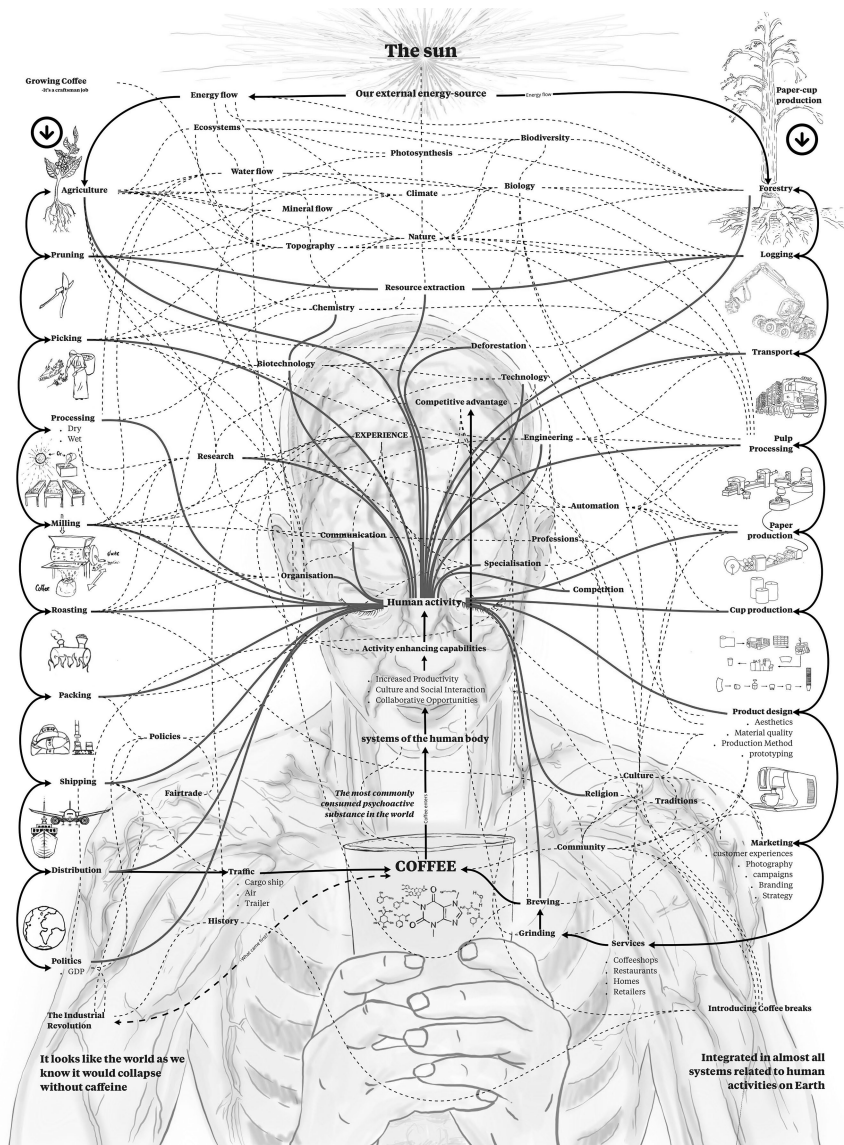
FIGURE 1.3 The complexity of a seemingly simple object, a paper coffee cup, portrayed in a Gigamap (Used by permission, image by Martin Hauge, 2021).

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.

References

Buchanan, R. (1992). Wicked problems in design thinking. *Design Issues*, *8*(2), 5–21.

de la Harpe, R., & Ogundaini, O. (2023). A proposed transformation service design research framework for underserved settings. In U. Z. A. Hamid & M. Suoheimo (Eds.), *Service design for emerging technologies product development: Bridging the interdisciplinary knowledge gap* (pp. 73–86). Springer International Publishing.

Design Council. (2021). *Beyond Net Zero: A systemic design approach*. https://www.design-council.org.uk/fileadmin/uploads/dc/Documents/Beyond%2520Net%2520Zero%2520-%2520A%2520Systemic%2520Design%2520Approach.pdf

DOGA. *Trippel Diamant Som Innovativ Metode*. https://doga.no/aktiviteter/design-og-innovasjon/stimulab/arbeidsmetode/

Grint, K. (2010). Wicked problems and clumsy solutions: The role of leadership. *The new public leadership challenge* (pp. 169–186). Palgrave Macmillan UK.

Hall, E. T. (1976). *Beyond culture*. Anchor.

Jones, P., & Van Ael, K. (2021). Design for services in complex system contexts. *Touch-point, 12* (2) pp (30–35).

Junginger, S., & Sangiorgi, D. (2011). Public policy and public management: Contextualizing service design in the public sector. In R. Cooper; S. Junginger, & T. Lockwood (Eds.), *Handbook of design management* (pp. 480–494). Berg Press.

Kim, D. H. (1999) *Introduction to systems thinking, Vol. 16.* Pegasus Communications.

Lurås, S. (2016). Systems intertwined: A systemic view on the design situation. *Design Issues, 32*(3), 30–41.

Murphy, R. J., Rava, N., & Jones, P. (2021). Balancing acceleration and systemic impact: Finding leverage for transformation in SDG change strategies. In *Proceedings of Relating Systems Thinking and Design (RSD10) 2021 Symposium*, 2–6 Nov 2021, Delft, The Netherlands.

Patrício, L., de Pinho, N. F., Teixeira, J. G., & Fisk, R. P. (2018). Service design for value networks: Enabling value cocreation interactions in healthcare. *Service Science, 10*(1), 76–97.

Rittel, H. W., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, *4*(2), 155–169.

Roberts, N. (2000). Wicked problems and network approaches to resolution. *International Public Management Review*, *1*(1), 1–19.

Santos, A., Suoheimo, M., Martins, R., & Joo, J. (2025). Uncertainties in the times of wicked service design problems. In D. Sangiorgi, A. Pendiville, & L. Penin (Eds.), Handbook of Service Design: Plural Perspectives and a Critical Contemporary Agenda. Bloomsbury Publishing Plc.

Sevaldson, B. (2022). *Designing complexity: The methodology and practice of systems oriented design*. Common Ground.

Snowden, D. J., & Boone, M. E. (2007). A leader's framework for decision making. *Harvard Business Review, 8*5(11), 68.

Suoheimo, M., Vasques, R., & Rytilahti, P. (2020). Deep diving into service design problems: Visualizing the iceberg model of design problems through a literature review on the relation and role of service design with wicked problems. *The Design Journal*, *24*(2), 231–251.

Vargo, S. L., & Lusch, R. F. (2016). Institutions and axioms: An extension and update of service-dominant logic. *Journal of the Academy of Marketing Science*, *44*, 5–23.

Wohlgezogen, F., McCabe, A., Osegowitsch, T., & Mol, J. (2020). The wicked problem of climate change and interdisciplinary research: Tracking management scholarship's contribution. *Journal of Management & Organization*, *26*(6), 1048–1072.