Design Journeys through Complex Systems

Practice Tools for Systemic Design

Peter Jones & Kristel Van Ael

Design Journeys through Complex Systems
Practice Tools for Systemic Design

By Peter Jones & Kristel Van Ael

BIS Publishers
Borneostraat 80-A
1094 CP Amsterdam
The Netherlands
T +31 (0)20 515 02 30
bis@bispublishers.com
www.bispublishers.com

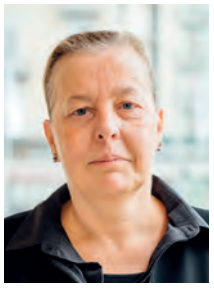
ISBN 978 90 6369 634 4

Contents

The tool templates presented in this book can be downloaded from systemicdesigntoolkit.org/journeys

About the Authors

Dr. Peter Jones teaches systemic design and health service design in the MDes programmes at Toronto's OCAD University, and is a co-founder of the Systemic Design Association (systemic.design) and the RSD Symposia series. Peter is managing partner of the Redesign Network, an innovation research firm, leading systemic and platform design and research in healthcare, informatics, economic, and public sectors. He has published three other books, including *Design for Care* (2013), as well as a plethora of related research articles that can be found at designdialogues.com.



Kristel Van Ael is a business partner at Namahn, a humanity-centered design agency based in Brussels. She is the lead author of the Service Design (servicedesigntoolkit.org) and Systemic Design (systemicdesigntoolkit.org) toolkits. Kristel is also co-teacher in product-service-system design and lead teacher in systemic design at the University of Antwerp (Faculty of Design Sciences).

Acknowledgements

We gratefully thank our many contributors, reviewers and advisors that helped cocreate the Systemic Design Toolkit and contributed directly to the book.

Tools

- Christiaan Baelus, University of Antwerp alumnus
- Ivo Dewit, University of Antwerp
- Alexis Jacoby, University of Antwerp
- Stefanos Monastiridis, Namahn
- Sabrina Tarquini, Namahn alumnus

Illustrations

- Alessandra Rodilosso, Namahn

Photography

- Ulla Maria Lisa Van Ael
- Jean Van Driessche
- Peter Vermaercke, Namahn alumnus

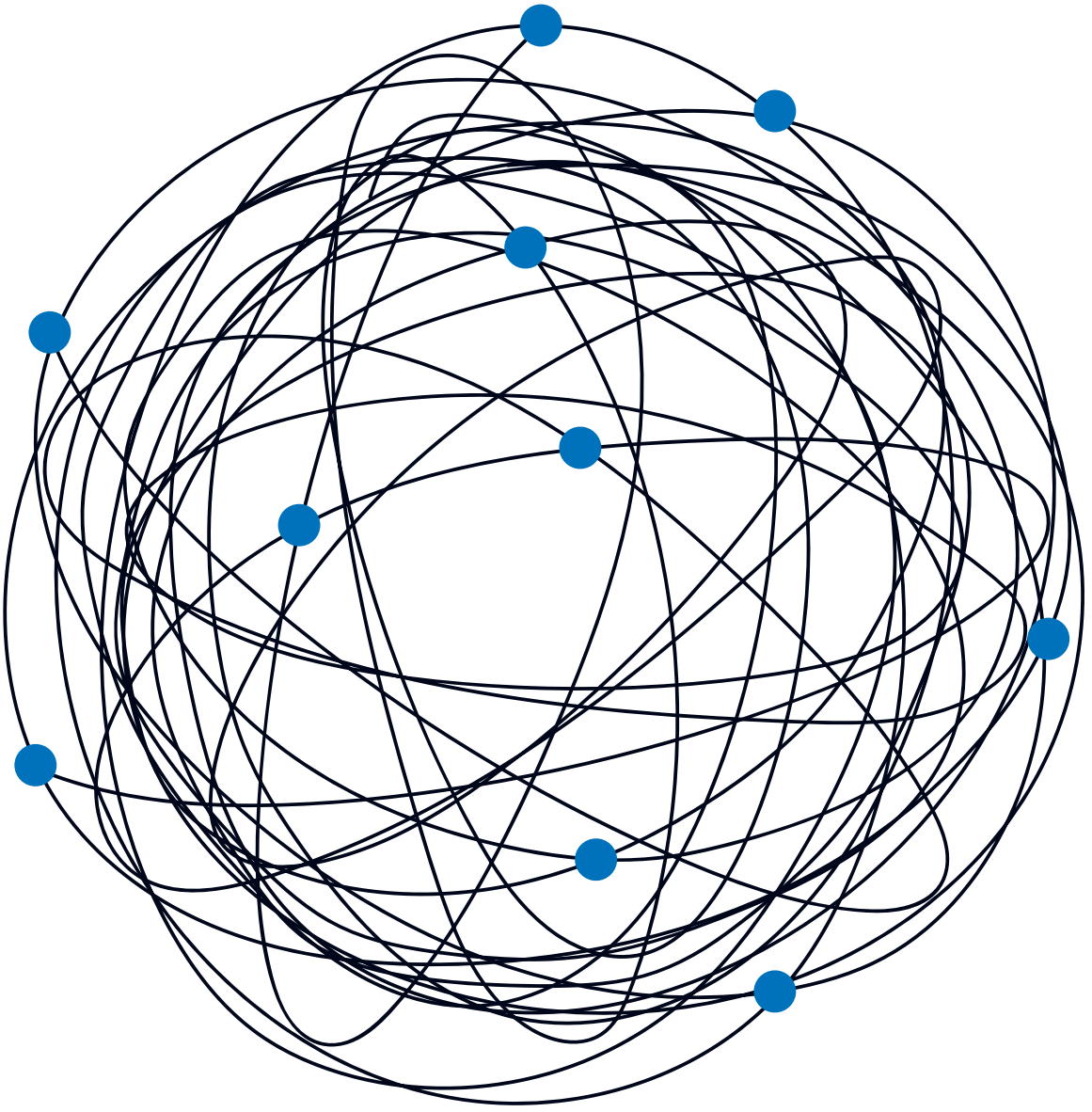
Inspiration

- Alex Ryan, MaRS
- Philippe Vandenbroeck, shiftN

- Peter's graduate students at OCAD University
- Kristel's graduate students at the University of Antwerp

Cases

Last, but not least, we thank all of our clients and colleagues willing to dive into uncertainty and complexity.



Design Journeys through Complex Systems

Systemic Design for Systems Change Designers

A tour guide for system navigators

Creative professionals face unprecedented complexity, increasingly affecting our impact and influence as the 21st century unfolds. Of course, designers are supposed to thrive in such chaotic times, to navigate creative solutions within multiple intersecting complex issues, such as economic delusion, media illusion, technology evolution, information profusion, and cultural confusion. That may just be a story we tell, since designers collaborate with mixed teams on real projects, we are all infused together.

This apparent chaos (that some call supercomplexity) imposes directly consequential demands on the individual and collective cognition as well as performance of decision-makers and implementers. As they are our clients and fellow travellers, we might plan better preparations for the long journeys we face together into complex systems and systems change. The following is a tour guide for both expert Explorers and novice Tourists into systemic design practices, from the testbeds of practice in numerous travels of recent years.

Designers, social innovators, and business leaders are now called to address transformational challenges for which we have no relevant academic or practice training. For those employed in design agencies or creative strategy, for large-scale services or digital platforms, these challenges are fascinating, but not quite welcome. We are not often contracted to directly design solutions for systemic problems such as regional economic rejuvenation, food webs in poverty zones, or educational systems redesign. Systemic contexts in general are problematic because they break defined boundaries that focus our work and limit project scope.

Design teams are rarely project owners; we are service providers with and for larger teams. We have to question when it's responsible to break boundaries that raise system-level problems when given a focused remit. Upselling the sponsor's brief to solve systemic problems can massively impact project scope and cost, and most clients have no organisational on-ramp into complex systems challenges. Disciplined and constructive tools are needed for stepping into systems contexts with an ever-expanding group of fellow travellers.

Design Journeys offers a repertoire of collaborative practice tools for system solutions developed and tested in dozens of projects. The book integrates theory and practices of the Systemic Design Toolkit for cocreation, in a single handbook. As a text, it informs practice and teaches relevant theories to help new system leaders coordinate much better design processes for these challenges. The Journeys methodology anchors powerful system methods from the Toolkit with cases from the two authors' years of experience in systemic design projects and method development.

Systemic Design Journeys through Complex Social Systems

Design Journeys aims to enhance practice across three broad contexts that we regularly tour with actual clients or research cases: public sector (government), systems change (often non-profit or development programmes), and sociotechnical services (private sector, mixed). The journeys travel well in education, as the Toolkit is used in several graduate design programmes. In practice, governments are the most common systemic design sponsor, as they have the budgets and mandate to address problems at the aggregate system level and the access to multistakeholder groups. Corporations, even when leading large consortia, rarely fund efforts beyond their organisational boundary, and corporate cases are largely sociotechnical or complex service systems. Systems change projects have rapidly emerged from foundation-sponsored non-profit programmes, across many sectors, including the United Nations and its Sustainable Development Goals (SDG) programmes and innovation labs.

Systemic challenges often show up after a project has commenced as ambiguous and unbounded issues that expand a service or process design initiative. Sometimes, as in healthcare, the best service design solutions require changes in health policy. At other scales, for example climate change planning, project outcomes might be interdependent with social change movements for which we have no good access to design. Both of these completely different contexts are complex, but in distinct ways. The same tools will not be used in identical ways across these contexts. The practitioner must learn the tools well enough to represent their value and use in each case.

Paradoxes in Design for Transformation

We also find a wide range of definitions and ideas around the prospect of systems change or transformation. To social innovators, systems change may be represented by a near-term positive outcome in programmes such as local food security, as localised impacts are clearly registered when situations improve. For many working with large-scale programmes (such as the UN SDGs), systems change may represent the outcome of many years of socio-economic development. At the level of economic world systems, transformative change might be represented as a definitive increase in population income levels (e.g. new middle class) or the move of a country to sustainable autarky (near self-sufficiency).

The transition from social impact to systems change[1] and transformation has progressed over a decade's evolution of social innovation, yet this emerging position is fraught with dilemmas in evaluation and conceptual definition. We are often dealing with multiple intersecting or entailed systems, as well as many changes and change influences all at once. With the implication of high complexity when working across multiple contexts, we (at least) have to ask 'which system' is being changed? Are we planning to change a service from inside its operations – as in service design, or from outside its boundaries – as in policy design? For what benefits, and for what expected or real outcomes?

A clear definition of system transformation might be simply 'a deep and fundamental change of state observed in a system's structures, processes, or core functions.' Transformational change is a major change of state, and it will result in some desirable and some problematic outcomes, many of which we cannot design for. Design is not control of the system but is a process that can dramatically improve and intervene in the journey of transformation. Even a change in *purpose* or values is not necessarily a system change, as an institution might change its purpose (e.g. an economic system shifts flows to the already wealthy) without changing its core functions.

[1] Zaid Khan & David Ing (2019). Paying attention to where attention is placed in the rise of system(s) change(s) in *Relating Systems Thinking and Design (RSD8) Symposium, Chicago.* https://rsdsymposium.org.

As exciting as the prospect may seem to 'change the world,' the experience of leading systems change projects can be a disorienting journey without a clear destination. There are no standards or preeminent schools of thought in the evolving practices of systems change, as there are in sociotechnical systems. Reaching an agreement on end goals, means and methods, and definitions often requires seemingly endless discussions and meetings. New practitioners of systemic design will find it challenging to find the right balance of leadership and participatory process within the constant ambiguity of complexity.

Many of us may show beginner's confidence when applying known design tools for systems change and complex, multi-organisational challenges. However, complex systems (and the prospect of changing them intentionally) only get more challenging as we explore and learn together with system stakeholders. Better guidance is needed – yet a cookbook approach to methods and tools would fall far short of the power and sophistication necessary to engage systems change.

The Promising Potential of Systemic Design

Human-centred (and market-based) design creates products and services to enhance the value of an organisation's offer to customers and users. *Systemic design* advances a holistic design practice that integrates all design, research, and method skills for complex contexts. Systemic design creates no specific artefacts (such as graphic or industrial design) but is known for its systems maps – the Gigamap and synthesis map. These are tools for learning, design, knowledge creation, and action – part of the journey, not end products.

Systemic design is a next-generation practice developed by the necessity for significantly better social systems, complex services, and to lead systems change. It is strongly based in pragmatism, drawing as it does from many ideas and knowledges, integrating across multiple levels and boundaries of systems practices, an active learning, not theoretical, orientation to complexity. The methods enabling systemic design are drawn from many schools of thought, from systems and design thinking, to sociology, cognitive engineering, and management theory. The objective of the systemic design project is to affirmatively integrate systems thinking and systems methods to guide human-centred design for complex, multi-system, and multi-stakeholder services and programmes.

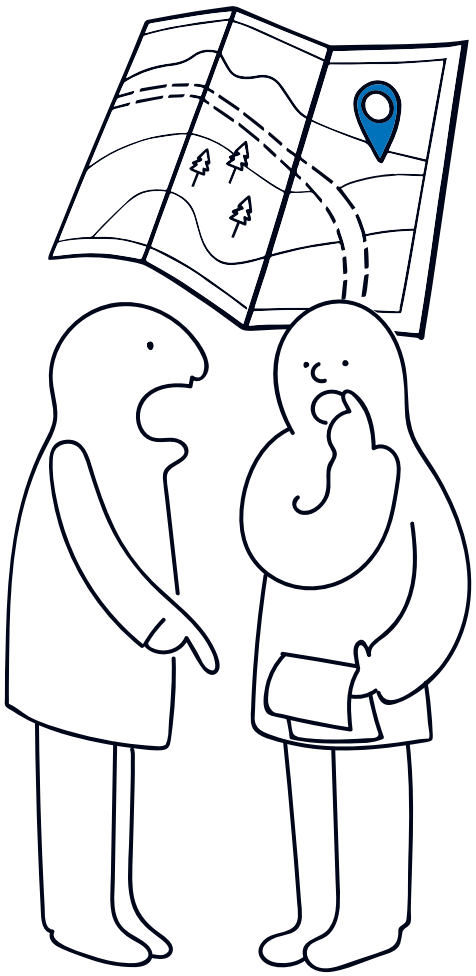
We view systems as highly interconnected social and technological assemblages that function as a whole. Systems are networks of interconnected functions that achieve an intended outcome and can be seen as both emergent and designed. As whole systems are contained within other wholes, we often seek the next higher-order, a nested or containing system, to intervene in a desired context. Today, we can view all systems as social systems, or at least socially implicated systems of systems. Human intervention has intervened in all aspects of the planetary ecology, rendering even natural and ecological systems socially-influenced – not as delivery processes, but often containing many services that provide direct value. Unlike services, systems have no single 'owner.' Nobody owns the climate or traffic, and complex healthcare breaks the boundaries of the hospital.

Systemic design adapts the human-centred design approach to complex, multi-stakeholder service systems. It draws on well-established design competencies – form and process reasoning, social action and generative design research, design methods, and sketching and visualisation practices – to describe, map, propose, and reconfigure complex social systems.

Based on years of work in social and health sectors, we developed the Systemic Design Toolkit as a collection of systems power tools that enable service and strategic designers to bridge design research with stakeholders for complex systems. The Toolkit integrates a comprehensive set of methods in a common visual language for consistent reference across the stages of a full lifecycle systems change project. The canvases run through a complete lifecycle from start to launch over seven stages, which follow in the book. All the tools facilitate participatory engagement with iterative design for complex, multi-level contexts.

Learning by travelling together

The design *journey* is metaphorical, but not only so, as the book and methodology are structured to allow readers meaningful explorations of destinations in each chapter. We have designed the Journeys book to engage all travellers in a series of learning stages, as itineraries associated with the Systemic Design Toolkit. Our objective is to narrate the learning process, anticipating the different entry points of experience and engagement, from our own experience of traversing these pathways over the years with many different fellow travellers.



We imagined the different backgrounds of our engaged readers. Throughout the book, as travel guides, we speak to two different personas, both of which are composites of the expected traveller in the learning journey.

1. **The Tourist**, who may be a first-time or interested traveller, a student, or someone learning enough to share these ideas, and

2. **The Explorer**, an experienced designer or systems consultant who may already know many tools and applications.

Many roles will find value in the design practices the Journeys methodology facilitates, including:

- Experienced designers learning systemic design tools and methods
- Learning designers developing in a field
- Managers and organisational leaders interested in the applications to large-scale problems
- Policymakers and policy labs
- Systems leaders and their organisations

Itineraries – Taking Journeys

As consulting designers and authors, we see several overarching purposes trending: complex design, stakeholder collaboration, tools for social transformation – all by systemic design. There are five major purposes of *Design Journeys*:

1. Design for systems change and systemic policy

2. Team collaboration for learning and designing for complexity

3. Design tools for complex system intervention

4. Stakeholder engagement for large-scale transition (e.g. energy, climate) or transformation strategies

5. Training and education in systems methods, for systems or product/service design

Multiple purposes are often combined in complex change initiatives. Consider the worldwide UN programme for the Sustainable Development Goals, involving hundreds of UN leaders across their agencies and innovation labs; country and field-level leaders and local participants; and hundreds of civil society and NGO projects, and action networks. Dozens of specific applications for systemic design are found across the SDG pluriverse. With the overarching purpose of large-scale 'systems change' in specific cultural and national settings, we find shared systems challenges across all the SDG contexts, irrespective of the goals themselves. Why not use a common methodology across SDG programmes that might fit across many of the anticipated functions?

One of the common barriers to alignment and engagement between different stakeholders is a lack of common understanding of analysis and problem-solving methods. We find it counterproductive for such projects to require expert advisors and consultants to lead and train teams just to conduct such continuing multi-stakeholder projects. Especially since transformation programmes are commonly faced with ambiguous missions and complex social contexts, there is a real opportunity to employ convivial tools[2] that designers (Explorers) can adopt and adapt quickly. Further, we hope that all travellers might learn (as Tourists at first) and appreciate these tools as a common language and reference model, enabling alignment and coordination between the many levels and players in such systems change projects – projects that may soon become more the norm, not the exception.

Also visit: The BIS book *Convivial Toolbox: Generative research for the front end of design,* by design research professors Liz Sanders and Pieter Jan Stappers, which provides a complete methodology enabling generative research with convivial design tools for designing with, for, and by people.

Design evolution into complexity

Navigating Unprecedented Design Challenges

Design problems have grown in complexity beyond the capabilities of the creative design disciplines, and system problems have grown beyond the linear problem-solving of engineering, management, and policy. For the complex challenges of the 21st century, we require multiple disciplines, collaborating in coordinated learning teams toward a deeper understanding of contexts and social systems. Often, complex challenges will come framed by the sponsor in fuzzy, abstract terms, such as 'a better healthcare system for all,' reducing the threat of cyberattacks, or climate resilience. These are challenges that demand a deep rethinking of policy or programme planning so that meaningful interventions can be discovered through re-framing. New frames are cocreated together, to expand the problem context to include expertise of all kinds, including the lived 'expert experience' of the victims of prior bad decisions, so we might collaborate wisely on systemic solutions and agree on action planning.

For everyone, and anyone, who may be potentially called to collaborate to address these complex social (and political) problem spaces, a significant query arises early on. What process do we agree to use? If we are dealing with complex multicausal 'messes,' or a crisis scenario, the question of process and method is not a trivial issue. If we believed that known, conventional methodologies – even systems or design methods – were sufficient, would we not see successful case studies on this or that method?

How are we then to best contribute our knowledge and perspectives in ways that accelerate learning and maximise the potential for consensus and positive progress? How do we engage an expanding variety of

[2] Convivial tools were named by Ivan Illich (*Tools for Conviviality, 1973*) as a mode of engaged co-production whereby simple, but useful commonly held tools could be advanced for adoption in practical settings, allowing skilled practitioners to recover agency and displace elite professionals in many walks of life.

(potentially) leading experts who are perhaps used to leading entire programmes, as well as generalists, students, and other less experienced but passionate participants and stakeholders who might be vulnerable to a bad decision?

Activating an Integrated Interdiscipline

Systemic design developed from an integration of systems thinking theory with the practical methods of design thinking within an expanding field of research, practice experimentation, new methodologies, and engagement approaches. Academically, it is an interdisciplinary field integrating systems thinking and systems methods to effectively inform human-centred design for complex sociotechnical and multi-stakeholder social systems. As a design discipline, it draws upon theory and knowledge from systems and social sciences, cybernetics, applied research, organisational and management studies, ecology, media studies, and anthropology. With a developing body of applications in strategic planning, urban design, healthcare, public policy, and digital innovation, systemic design has become a professional practice.

We can define a system as a whole assembly of functions and emergent interactions arising from relations of interdependent parts. **Systems thinking** analyses how the parts are recognised and interact with each other. A major goal of systems thinking is to understand the flows, relationships, and behaviour of parts within a system in order to enable the potential for changes or improvements to produce intended behaviours and outcomes effectively. The creation of any 'improvement' is necessarily a design process.

Systems thinking is not something that comes naturally to us, as most (Westerners) are trained to be linear thinkers, to analyse patterns by formula, and to observe systematic sequences as first-order chains of cause-and-effect. We also have ingrained habits of problem-solving, of perceiving situations as problems that must have solutions to be solved by linear, step-by-step processes. Therefore, we mistake complexity for complicatedness, and attempt to break down complexity into individual components in order to investigate the parts separately. When components are observed and reconnected into a system, the dynamics change precisely because they interact with each other. The weakness of the linear approach is that it occludes access to understanding the behaviour of the whole. The relationships between system levels (wholes containing other wholes) and orders of control are necessary to understand a system.

Design thinking refers to the designing process of finding meaningful solutions for human, organisational, and societal challenges. To lead in these challenges, designers listen to, learn from, conceptualise with, as well as make and iterate solutions with stakeholders. The design process always starts with a profound understanding of the needs, perspectives, and interests of the stakeholders. Design workshops are convened with mixed participants. The higher the perceived complexity of the challenge, the more stakeholders are asked to be engaged and own the cocreation of any solution, as they are experts in a lived system experience and leaders of the future model. In this process, the role of the designer is to develop a shared understanding of design context, to reframe goals and challenges, to make solutions visual and concrete, and to foster dialogue among stakeholders.

New Design, New Design Teams

Now let's seriously consider the composition and competencies of contemporary teams convening for complex systems change. Beyond the expected readers of Journeys and users of the Toolkit, depending on the system domain and expected outcome, a project team might draw on social scientists, clinicians, policy experts, engineers, investors, management consultants, or artists. Along with designers, a variety of disciplines and competencies will be necessary to collaborate across stages of work. A real and growing challenge for teams facing complex, indeterminate, wicked problems is the organisational challenge of finding, keeping, and training the right new scientists, consultants, policymakers, and designers.

Yet, if we catalogued the skill sets and profiles of the high-performance complexity team, exceptions would soon surpass the list of expert qualities. Instead, we might imagine how the new designer will enable these disciplines to learn and collaborate. The new designer is someone who can think in systems, yet speak in stories. Someone who can sketch complex ideas in multiple formats, yet capture the ideas of the contributors with empathy. Someone who can draw on a learned range of design skills, but lends their attention to serve the team and guide its learning toward discovery and tangible outcomes. Someone who can hold images of the future[3] in focus, while working with mixed stakeholder teams on mapping the details of system interactions.

All designers are faced with increasing complications of complex projects, and the practical problem of capturing and specifying complexity to help clients understand the system impacts of product and service design. The systemic designer enters as a type of systems leader, a mixed-methods action researcher, a design facilitator for systems changes. In fact, in any challenge of significant situational complexity, the requisite skills, methods, and dispositions (mindsets) of the new designers might not be listed on any curriculum or swimlanes chart. The systemic designer will be happy to improvise in changing situations as well, to extend their knowledge beyond the expertise when needed, to locate the best-fit method when none exists, and to intuitively draw on prior experience in skilled repertoires.

Design as System Sensemaking

As systemic design grew beyond its original premise of systems thinking approach for advanced design problems, its scope expanded from the *sociotechnical* (technology in social and work practices) to complex social systems and systems change. The field has grown quickly to advise and perform design for applications to complex societal problems, such as national healthcare services and disease management, mega-city urban planning, transition planning for energy and climate resilience, new economics, and other public policy. None of these are isolated 'domains,' as each of these are affected by unknowable dynamics in population and regional demographics, climate and natural ecology effects, political and regulatory influences, and technological impacts. Yet designers are not experts in these domains, neither do we necessary excel as systems analysts. We find the leading competency for design leadership in complexity is a faculty we call 'system sensemaking.'

Typical systemic design challenges are socially organised, large-scale, multi-organisational, with significant emergent properties. In high complexity, design and management decisions cannot be made based on individual or in-group knowledge only. Mixed teams of the requisite mix of disciplines will often be necessary. Systemic design applies sensemaking skills such as visual storytelling and visual analysis, drawing out wisdom through dialogue, and knowledge translation through diagramming. Knowing many methods that can be selected for emerging and complex contexts proves more effective for designers than relying on the availability of deep expertise, such as system modelling.

In previous work, Jones[4] presents the Design Domains model of Design 1.0-4.0 (D1.0-4.0) that reveals how increasing social complexity in design applications beyond products, services, and communications expands the horizon and altitude of design practice (Figure 1). D1.0 (artefactual) and D2.0 (products and services) are well-known domains of skilled design practice for human use, mobilising the values of design quality, aesthetics, and usability to enhance economic value or competitiveness. Organisational processes (D3.0) and social systems (D4.0) represent complex, non-traditional domains that require completely different skill sets for transdisciplinary projects and mixed-stakeholder teams. These design domains are practised more as

[3] From Fred Polak & Elise Boulding (1973). *The Image of the Future*. The future image consists of its *essence*, the dominant trajectory of events, and an *influence*, the human power of agency over destiny. Systems interventions can consider the effect and imagined outcome of any future potential.
[4] Writing with GK Van Patter, Understanding Design 1, 2, 3, 4: The Rise of Visual Sensemaking in Tiiu Poldma (ed.) (2013). *Meanings of Designed Spaces*. Authors in the systemic design corpus have proposed distinct, emerging design practices in these domains (e.g. John Thackara, Birger Sevaldson, Ezio Manzini, Don Norman).

a sensemaking process with system stakeholders (as designers), including but not focused on the creative design of artefacts or for enhancing market value.

Innovation and meaning-making show very different perspectives between the two market-facing domains and the two socially complex design domains. If we posit the definition of innovation as a process that creates meaningful value for people, meaning is disclosed in artefacts and services through differentiation of qualities that reveal value, or 'differencing.' The salience of meaningful differences is represented in a market or to users through enhanced aesthetics, branded identity, and promoted features – these tactics draw on the design skill of 'making the familiar strange,' or *strangemaking*.

Sensemaking distinguishes more the organisational and social worlds, especially as uncertainty and complexity grow when stakeholder perspectives are expanded. Sensemaking can be defined as a collective attempt to form a coherent rationale to explain matters of shared concern. Does this not sound like systems thinking?

Yet, while systems thinking is notoriously difficult to learn or share, the design practices of sensemaking are much more available to elicit ideas and engage participation. While there are several schools of sensemaking, all of which may be useful or valuable in systemic design, here we will focus on how design practices created for specific purposes enable groups to make sense of systems.

The four domains require an evolution of design thinking, practice, research, and education to develop the requisite skills and knowledge necessary to address complexity that increases at each level. Completely different sets of skills and methods apply in each domain, and they are generally transferable *up* the scale (i.e. D4.0 can use skills learned in the other levels), but not *down* levels (i.e. D1.0 would not need complexity facilitation).

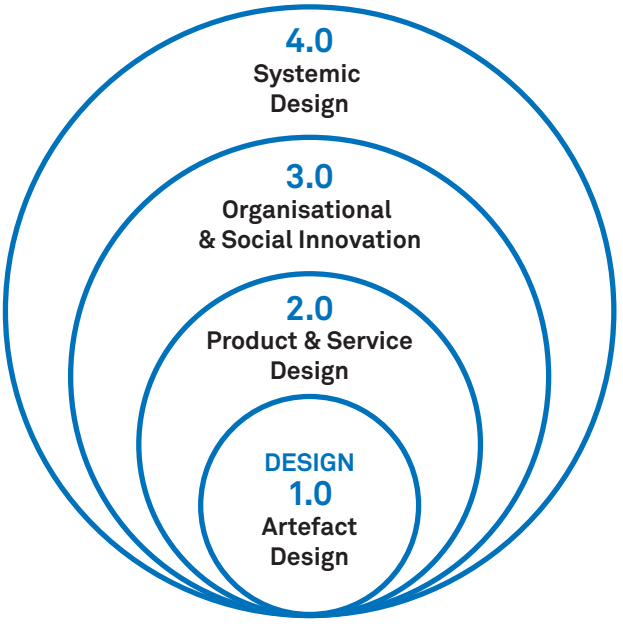


Figure 1
Boundaries of the four Design Domains

The four domains embody design processes for the following contexts:

1. **Artefact design** (D1 - Limited complexity): Skilled practice for a wide range of communications, from artefact creation (graphic, ads, websites, 1-2 designers) to strategic communications as part of systems change.

2. **Product and service design** (D2 – High artefact complexity): Value creation by design and mixed teams (including service design, product innovation, multichannel, and user experience); design for integration across media.

3. **Organisational and social innovation** (D3 – Complex, bounded by business or strategy): Change-oriented, design of work practices, strategies, and organisational structures

4. **Systemic design** (D4 - Complex, unbounded): Design for social transformation, complex social systems, policymaking, ecological and community design.

Major differences in problem and system complexity are found between each level, and the skills in each domain are not interchangeable in practice. In any complex design process, the skills and tools from across all levels might be employed. Each higher domain entails and can leverage the lower ones. For example, an organisational process design (D3.0) can develop a communications design strategy with high-quality D1.0 work, and its processes can be designed following service design methods (D2.0). But a service design engagement does not typically have the skills on board, or the remit, to expand its capability to conduct organisational level sensemaking and design for culture-building.

The four domains differ in their strategy, intention, and outcomes. Each domain requires skill and coordination of distinct methods, design practices, collaboration skills, and stakeholder participation. These are not fixed requirements but merely entry criteria for skilful performance sufficient to meet the demands of that domain's complexity (or variety) in practice. The most salient of these differences is also one of the least noticeable, or recognizable as a skill – this is a skilled practice of sensemaking as facilitation. In the two product-oriented domains (D1.0 and 2.0), the requirement for leading sensemaking in complex situations is much less demanded than the design skill of distinctiveness (or *strangemaking*). Simply put, in design domains where a *product* is to be delivered, a critical performance value is the distinctive novelty the designer might realise – often considered a hallmark of creativity. Strangemaking presents the product as visibly novel, leading to desired sales, adoption, or engagement goals.

However, in D3.0 and 4.0 the desiderata are much different. These systemic contexts can be considered fuzzy situations, upstream contexts, un-briefed, non-parametric, and complex due to structure and organisation. In D4.0 systems change contexts, these problems may show up as messes or 'wicked problems.' The (Rittel) wicked problem framework[5] may be well known to readers as the 10 characteristics of a dynamic problem mix that evades solutions and evaluation. The idea of the *mess* was coined by Russell Ackoff[6] 40 years ago, and technically defined as "large and complex sets of interacting problems, dynamic systems of problems." Ackoff advocated against trying to solve or resolve messes – they could only be *dissolved*, by changing the meaning (framing) and by creative planning, using design idealisation to propose different alternatives.

Such problem systems require sensemaking (in Karl Weick's[7] sense of the interpretation of organisational meaning) not differencing. Everyone attempting to perform systemic work discovers that agreement on goals and actions to press the challenge require facilitated – often extensive – deliberation to elicit the 'requisite' points of view and concerns.

Design Strategies and Boundaries

How are these design strategies relevant to a systems change practice? Each design domain holds a distinct system boundary. There are well-understood differences between a simple design project (D1.0) and a market-facing product or service (D2.0). The social complexity of an organisational boundary (D3.0) entails design literacy and research insight into governance, business strategy, product line and service strategies, customer support, and management systems. The design context for a D3.0 complex system requires different mindsets, value propositions, disciplinary composition, and skills. The boundary and the social system are further expanded with D4.0 systemic design contexts. This domain includes the transformation arena (system change), ecological systems, policy design, and unbounded (messy) community and civic domains.

The primary practices taught in all design schools (D1.0 and 2.0) are premised on 'design as making,' which we do not minimise, as design craft is a foundation skill and a serious reflective practice. D1.0 and 2.0 are characterised by direct service to clients or organisations. The standards of quality for these domains are driven by creative differentiation, for distinctive visual, experiential,

[5] Horst Rittel & Melvin Webber (1973). Dilemmas in a general theory of planning. *Policy Sciences.*
[6] Russell Ackoff (1981). The art and science of mess management. *Interfaces.*
[7] Karl Weick, Sutcliffe & Obstfeld (2005). Organizing and the process of sensemaking. *Organization Science.*

or brand images that satisfy the goals of a business strategy or brief. These are defined as 'differencing' applications of design. We call this *strangemaking*, as opposed to sensemaking – presenting the familiar as strange to enhance the unique value of design to frame ideas and capture attention.

Systemic design requires cocreating, planning, and orchestrating consensus for process or practice change at scales commensurate with the institution itself. D3.0 and 4.0 cross into transdisciplinary territory and systemic design practice. These contexts require facilitation of sensemaking with multiple stakeholders within and between organisations. Sensemaking processes are entailed in designed workshops that creatively convene these mixed stakeholders to collaborate on design proposals and reach an agreement on action in the face of high uncertainty and complexity.

The final chapter in the book (Reflections) discusses more on sensemaking as theory and process, which readers might find helpful after the development of method skills in the following chapters.

Systemic Designers are *Teams*

The strategic intent of design thinking in the organisational and social system domains is to guide teams working within these complex systems toward effective design decisions, strategies, interventions, and mixed services and systems. The Journeys methodology facilitates this process. Each tool teaches the team as much about itself – by reflecting on knowledge, goals, and tensions – as it does about the subject system of interest.

One of the first necessary design practices is to identify and shape the diversity of perspectives, experience, and knowledge in the design team to form knowledgeable, high-performance collaborations. The diversity (or variety) principle comes into play as a critical method in stakeholder definition for [2] Listening to the System, as the core design team starts to realise they are designing on behalf of stakeholders of the system. The whole design team can see themselves as delegated to perform the systemic and service design on behalf of the whole system.

Because these domains of higher complexity involve significantly more social complexity parts – human stakeholders who must be consulted – system-level design becomes more of a practice of making sense of things with decision-makers and stakeholders. Design activities cannot merely happen in small groups within the studio setting, but must occur in the arenas of organisational activities and planning strategies themselves. We have traditionally faced several real barriers to increased adoption:

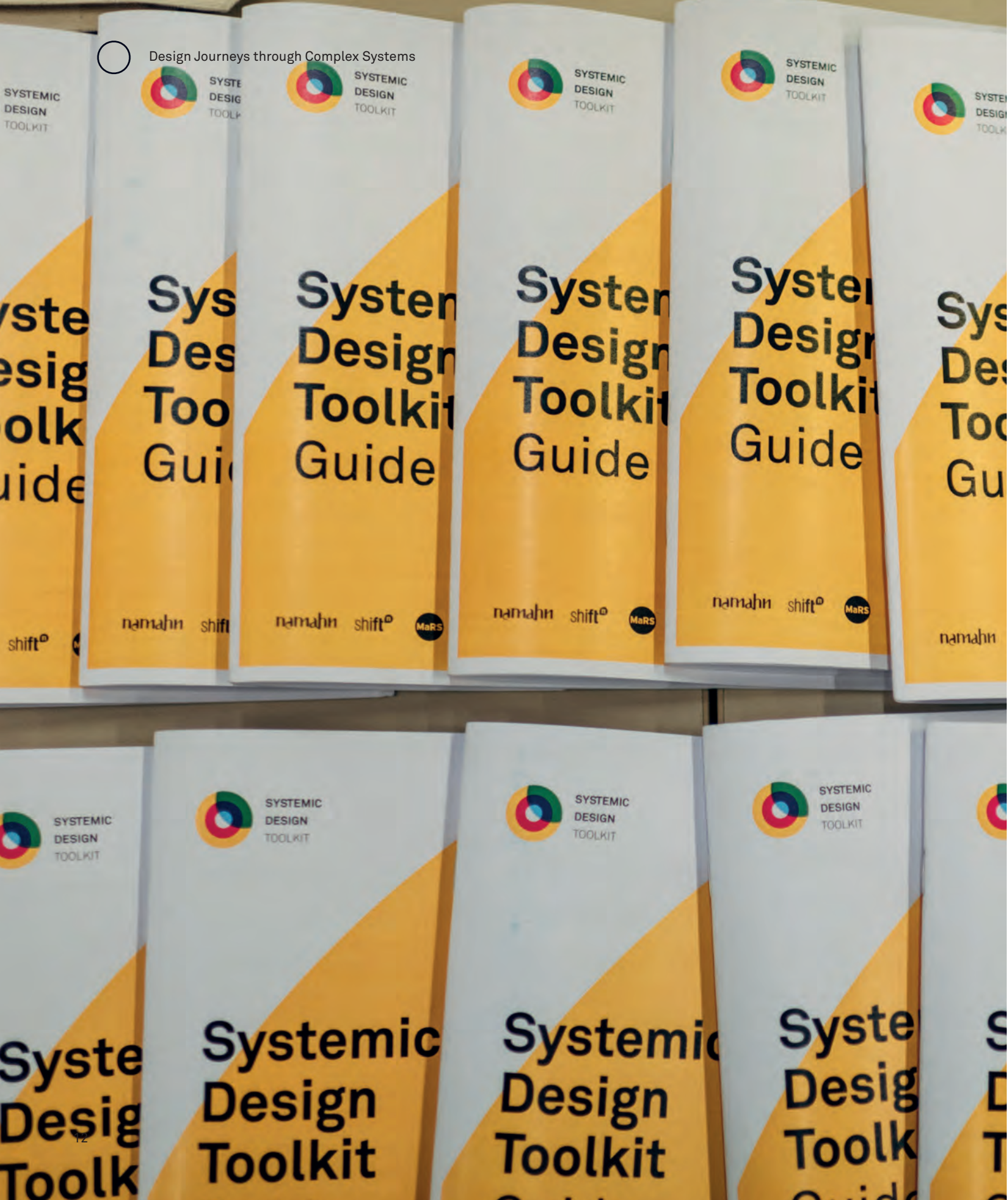
- Designers are not the accepted experts in any of these domains, so we may find ourselves at the edges of social programme and policy contexts.

- Social systems are not markets or customers, that we can study through research and define appropriate services. Policy labs and programmes taking this approach have often failed in projects when they do not have a service delivery level that exists within containing regulatory and governing systems.

- All social systems involve, and so require in design, the participation of a diverse range of stakeholders. The missing factor in earlier applications of design in systems thinking was the necessity of appropriate engagement with 'committed participants.' A fascination with systems methods can lead to system mapping or extremely detailed analyses based solely on external research. Until recently, we had few, if any, systems tools tested for use in stakeholder workshops.

Design Journeys integrates these domains of knowledge, using Systemic Design Toolkit methods appropriate for any stakeholder system of interest, and provides a translation of those methods to a design space for creative intervention.

Figure 2
At Namahn we have a dedicated space for cocreation with magnetic white-board walls that can be used as tabletops. Here we are cocreating for DoucheFLUX, a facility for and with homeless people.


SYSTEMIC
DESIGN
TOOLKIT
Systemic
Design
Toolkit
Guide
namahn
shift
MaRS

Systemic Design Methodology

Design Journeys and the Toolkit

The Systemic Design Toolkit[1] has been innovated and evaluated continuously for more than five years of development. The Toolkit was designed from its origin as a non-proprietary collection of PDF canvases (licensed as CC BY-NC-ND[2]) with public access to a smaller set of tools in the public version. The Toolkit has been successfully adopted by organisations adopting in the public sector, social innovation, and education, as well as in small and large businesses.

We know that toolkits are a kind of translation of theory to practise by way of method, and they can have gaps and shortcomings. Any "toolkit" carries a promise to relieve the burdens of research and rigorous skill development by packaging guidelines for easier adaptation. While the Systemic Design Toolkit is used in graduate design education, most toolkits are not taught in advanced education. Many aggregations of resources labelled as toolkits are merely a curated set of branded training templates or guidelines provided by a popular practitioner. Also, there are so many toolkits now produced for design and innovation methods that practice leaders can be overwhelmed with choice. This is perhaps exemplified by the lead of the OECD public sector innovation lab declaring that the field has reached "peak toolkit".[3]

Critiques are always helpful, as there are points any new toolkit should address. The material should not be too broad, or too granular. Tools ought to be feasible to learn without extensive training, and training requirements should be explicit. The tools themselves should be aligned to real purposes.

The intent of the Journeys book is to provide the support for learning this powerful portfolio of methods, step-by-step, as well as to learn sufficient theory and application techniques to be able to apply the tools with confidence and credibility. The seven-stage Design Journeys methodology was designed to scaffold and assign a large number of tools that otherwise might be experienced as a *complicated* process, in its search to provide a framework for complexity.

Why the Toolkit

Systems thinking history shows at least four eras of systems education in management that have attempted to integrate systems thinking into management of complex organisations. In the 1960's, operations research approaches were predominant; in the 1980's, Russell Ackoff and IBM were among the systems thinking leaders; and in the 1990's, Peter Senge's *Fifth Discipline* led the management revolution. In the 2000's, we saw the rise of integrated methodologies (e.g. Michael Jackson), the move toward engagement (e.g. Appreciative Inquiry and Open Space), and the schools of design thinking (e.g.

[1] The Toolkit was inspired and developed in workshops at the Relating Systems Thinking and Design Symposia, with the RSD proceedings tracing its development. https://rsdsymposium.org.
[2] The Creative Commons license assigned to all tools is BY-NC-ND Attribution Non-Commercial, No Derivatives https://creativecommons.org/licenses/by-nc-nd/4.0/legalcode.
[3] Angela Hanson (2018). Have we reached Peak Toolkit?. *OECD, Observatory of Public Sector Innovation.*

IDEO and service design). The Systemic Design Toolkit takes the lessons learned into account and offers an array of tools designed for stakeholder engagement that (if chosen appropriately) will support any system design context or organisation.

The methodology has been carefully constructed to address known issues and failures of these prior attempts to adapt systems thinking tools to business and public organisations. In 2009, Fred Collopy, professor at Case Western Reserve University, proposed[4] that design thinking might succeed in organisations where systems thinking had failed because its simpler, more accessible entry points allow people to try out parts, and satisfy short and long-term objectives over time. Dr. Collopy's critique noted:

> "Each of systems thinking's various manifestations demands some degree of subscription to an orthodoxy (a particular view of just what systems thinking is). And each requires that the user master a large number of related ideas and techniques, most of which are not particularly useful on their own."

Peter Jones responded[5] that the rigorous, deliberative tools of systems thinking were never designed to match the enacted and improvisational styles of modern management. Management practice is trained as if it were a quantified, scientific approach to business administration, yet in reality, managing is a mix of communications and decision support skills adapted to organisational settings. The history of systems thinking in business assumed that managers would undergo a period of training, reflection, and long-term adoption of systems methods. Instead, systems thinking – and predictably, design thinking later – became management fads. Systems thinking was popularised for a period but rarely used seriously in mainstream organisations, because of the commitment required to employ its abstract and reflective practices.

It is telling that Peter Senge,[6] the author of the Fifth Discipline methodology that was widely trained in the 1990's, extended 50 years of systems thinking toward a practice of *systems leadership* in our current era of complexity. Systems leadership develops competencies to see and engage the larger system, to collaborate toward the health of the whole system rather than symptomatic fixes, and to lead from one's own place in the system, "shifting the collective focus from reactive problem solving to co-creating the future."

The goal of a systemic design competency might be to amplify the capacities for pragmatic design and action toward change in complex systems by choosing from a powerful set of thinking models adapted for effective collaboration and design action. All of *Design Journeys*' tools are helpful when used in context, but as with any systems model, they can be challenging at first to learn and to train others. The Journeys book has been designed for use in engagements, and to ease that learning curve. In the Systemic Design Toolkit, these thinking-and-doing tools are harmonised and translated as design tools that can be used by practitioners in one to two-hour workshops with modest training. The tools are prepared as visual templates in image formats for virtual workshops, and printable at several sizes for live meetings, with a deliberate balance of design thinking and systems thinking.

Toolkit Value Proposition

The Systemic Design Toolkit is a complete set of systems methods, with over 40 modelling canvases designed for participatory workshops, following the seven-stage Design Journeys methodology. Validated through years of applications, academic training, testing, and workshops, the Toolkit bridges systems thinking, human-centred design, and service design approaches to address complex systems contexts. The Toolkit provides a full stack of powerful resources for systems change and complex design that can be learned and adapted into a personal repertoire.

[4] Fred Collopy (2009). Lessons learned — Why the failure of systems thinking should inform the future of design thinking. *Fast Company.*
[5] Peter Jones (2009). Learning the lessons of systems thinking: Exploring the gap between thinking and leadership. *Integral Leadership Review.*
[6] Peter Senge, Hamilton & Kania (2015). The dawn of system leadership. *Stanford Social Innovation Review.*