University Library



A gateway to Melbourne's research publications

Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:
Hill, D;Melander, A

Title:
Strategic Design for Public Purpose: Enriched and Expanded Practices for Human-Technology Interaction

Date:
2025

Citation:
Hill, D. & Melander, A. (2025). Strategic Design for Public Purpose: Enriched and Expanded Practices for Human-Technology Interaction. Malakhatka, E (Ed.). Wiberg, M (Ed.). Human-Technology Interaction: Interdisciplinary Approaches and Perspectives, (1), pp.23-80. Springer Nature.

Persistent Link:
https://hdl.handle.net/11343/356470

Chapter 2
Strategic Design for Public Purpose: Enriched and Expanded Practices for Human-Technology Interaction



Dan Hill and Anja Melander

Abstract In this chapter, we explore the emergent practices of strategic and systemic design within and across a landscape usually dominated by technology-led design and development traditions. Describing the shifting relationships within and around these technology-oriented design practices, and the systemic challenges they are embedded within, we explore how their relatively narrow perspectives might be enriched and expanded by recognising the social, cultural and environmental contexts of technology. In particular, we draw on questions of urban technology and design for living environments. We use 'the city' and its interconnected systems, and requirements for civic common good outcomes, to open up and extend the idea of 'human-technology interaction' (HTI), via a new systemic design concept of 'Place Layers'. We consider the interplay between public, private and third sector actors in shaping the trajectory of technological progress, as well as the corollary: the impact of technologies on governance, organisation, policies and practices. This broader context of HTI moves the field beyond reductive understandings of 'human', 'technology' and 'interaction': an expanded practice of HTI must include the more-than-human, a diversified reading of *what technology is*, and *systemic relationships* rather than merely individual interactions. We argue that strategic design is one example of such an extended practice in its ambit and ambition, helping to navigate the complex, interconnected relationships between evolving technologies, infrastructures and living environments, and our shared societal and environmental systemic challenges, and that this offers a pivotal and necessary set of emerging relationships with human-technology interaction accordingly.

D. Hill (✉)
The University of Melbourne, Melbourne, Australia
e-mail: dan.hill@unimelb.edu.au

A. Melander
SALLY Future Manifestation Lab, EY Doberman, Stockholm, Sweden

© The Author(s), under exclusive license to Springer Nature Switzerland AG 2025

E. Malakhatka and M. Wiberg (eds.), *Human-Technology Interaction*, Springer Series in Adaptive Environments, https://doi.org/10.1007/978-3-031-78357-9_2

2.1 Ambit, Ambition: Strategic Design and Everyday Technologies

Over the last decade, the concept of strategic design has emerged as a way of binding together numerous disparate design disciplines, perspectives, and positions, in order to meaningfully address the complex systemic challenges that define our age (Hill 2019).

This evolving practice recognises that the nature and dynamic of those shared challenges are markedly different to those of previous ages. We might reflect that we are facing distinctly *twenty-first century* challenges—like the climate and biodiversity crisis or emergence of artificial intelligences, for example—but we are trying to respond with twentieth century policy frameworks and societal ideas, nineteenth century governance models, based on eighteenth century institutions (a variation on a thought variously attributed to Madeleine Albright (2019), Marco Steinberg (2010), amongst others.) This is the context of strategic design, then: can we rethink and rework the tools, and framing ideas and ideologies, with which to approach contemporary challenges? This broader ambit allows for a critical perspective of the objects, subjects, and context of design practice, whether commerce or economy, politics or technologies, environments or communities.

To some extent, this perspective builds upon earlier debates within design practice, perhaps most clearly and prominently stated half a century ago by Papanek (1971), concerning design's 'real-world' impact. As such, it recognises the range, diversity and shifting perspectives of design and designers—recognising that 'everybody designs' (Manzini 2015), whilst also finding room for professionalised forms of design—and explores how to affect, influence, and indeed transition societal systems at scale. This emphasis on producing system change moves strategic design beyond the traditional ambit of design and into the 'dark matter' (Hill 2012) of policy, regulation, code(s), organisational, and place-based cultures which shape and comprise societal 'structures of feeling' (Williams 1961).

There are two key aspects to this repositioning: **ambit and ambition**. Firstly, shifting the *ambit* and object of design, broadening out from simple products and services to instead address the diverse and complex conditions and relationships that produce the infrastructures of everyday life, and secondly, emphasising the *ambition* and direction, moving design practice beyond a simplistic commercial service function into engaging with its ethical and societal dimensions. These differing emphases make clear an alternate trajectory for this form of strategic design, beyond the narrower definition sometimes located within the discourse of strategic management. This latter was often drawn from the traditions of strategy and planning within advertising, from within the service design field (Meroni and Sangiorgi 2011; Stickdorn and Schneider 2011), or from within business consulting (Martin 2009). Equally, it sidesteps the problems inherent in the narrow and problematic notion of 'design thinking', as critiqued by Nussbaum (2011) and Hill (2012) a decade ago, and more recently by Ackerman (2023). This version of strategic design is concerned with **'design doing' rather than design thinking**.

The 'design doing' of strategic design, then, aligns with adjacent design theories, often co-evolving, such as *design for social innovation* (Manzini 2015; Amatullo et al. 2021), *transition design* (Irwin et al. 2015), *socially responsible design* (Margolin and Margolin 2002), *speculative design* (Dunne and Raby 2003), *adversarial design* (DiSalvo 2015), aspects of *participative system design* (Hill 2022a), and so on.

As Valtonen (2020) points out, these broadening movements and shifting directions for design have usefully complicated Herbert Simon's much-quoted definition, in which design simply *'devises courses of action aimed at changing existing situations into preferred ones'* (Simon 1969).

Indeed, if this form of strategic design is concerned with framing questions as much as delivering answers, we must ask what do we mean by *'situations'*, *'preferred'* by whom or what, exactly, and what our possible *'courses of action'* might be. This fundamental shift of emphasis means different questions of more diverse constituents and environments, richer toolkits approached with greater care, and open minds about what possible futures courses of action might lead to. Again, Valtonen notes the long history of this form of enquiry in and around design, whether *reflective* (Schön 1983), *relational* (Potter 1968), or indeed the *political* of Papanek (1971)—though it remains instructive that Cross's influential 'designerly ways of knowing' (Cross 1982) has little or nothing to say on the societal or environmental impact or context of design. Yet now, as Valtonen notes, design's products and processes have substantially changed, shifting from material to immaterial, from objects to systems, to strategy, to speculative design, and to sustainability. Similarly, Ken Friedman and Erik Stolterman, in their foreword to Kees Doorst's 'Frame Innovation' (Doorst 2015), note that design now works within a context characterised by (1) increasingly ambiguous boundaries between artefacts, structure and process; (2) increasingly large-scale social, economic, and industrial frames; (3) an increasingly complex environment of needs, requirements, and constraints; and with (4) information content that often exceeds the value of the physical substance.

Beyond theoretical reflection, a clear example of this wider ambit, and the cross-disciplinary, multi-scalar, and systemic change ambitions of this strain of strategic design, can be found in the work of SITRA's Strategic Design Unit, and our Helsinki Design Lab project (Boyer et al. 2011, 2013; Hill 2012; Boyer 2020).

When helping to set up the *Master of Public Administration (MPA) in Innovation, Public Policy and Public Value*, at University College London in 2018–19—in which strategic design was the subject of the last quarter of the course—I attempted to summarise the approach we had been taking in Finland, which drew from the ethical imperatives of Papanek and others and aligned them with aspects of architecture, alongside the sophisticated array of techniques from contemporary design practices and technologies:

> Strategic design takes the core principles of contemporary design practice—user research and ethnography, agile development, iterative prototyping, participation and co-design, stewardship, working across networks, scales, and timeframes—and then it points this toolkit at ethical concerns, addressing systemic change within complex systems, and broader societal outcomes. Design's 'real-world' task at this point must involve balancing individual needs with wider societal outcomes, applying itself to 'big picture' systemic challenges like health,

> education, inequality, and climate change, helping redefine how problems are approached or how questions are framed, before identifying and conveying multiple opportunities for action. It can then stay on-board to help deliver more complete and resilient solutions. (Hill 2019)

Reflecting on this definition, it clearly draws from HTI-oriented practices (*'user research … agile development'*), which reflected Boyer's background as well as my own, but also from architectural practice, reflecting that of Steinberg, Cook, and Boyer, as well as many built environment projects I'd been involved with at global multidisciplinary design consultancy Arup. As such, strategic design straddles several of these disciplines, as if a kind of meta-design discipline, and, reflecting the context of SITRA, directs them at societal challenges, and public purpose.

SITRA's Strategic Design Unit worked amidst a set of other adjacent and contemporaneous practices at the time with similar agendas and approaches, such as the Danish government's Mindlab, Canada's MaRS Solutions Lab, Mexico City's Laboratorio para la Ciudad, and individual design practices working strategically across systems, such as the UK's Architecture 00 (from which would Dark Matter Labs would subsequently emerge).

Aside from Mexico City's 'Labaratorio', this particular through-line drawn in strategic design's story, from 2010–2020 at least, was largely located in Global North contexts—and the North of the North at that. Importantly, there were and are more diverse and appropriately complex strains of design developed and developing alongside: for example, an increased awareness of the cultural and ethical context of design's drive towards '*preferred futures*' (Mazé 2016), or approaches to *pluriversal design* (Escobar 2018) or *nature-based infrastructures* which usefully complicate and enrich otherwise limited understandings of technological progress (Watson 2019) or introduce greater awareness of *indigenous knowledge systems*, and appropriate technologies (Kennedy et al. 2016; Page and Memmott 2021; Robertson 2023; Robertson et al. 2023).

Equally, to some extent, by virtue of locating strategic design within governance contexts, this constellation of related activities also includes the design and delivery of contemporary public services via digital technologies, most prominently those of the UK's Government Digital Services (Downe 2020; Greenaway et al. 2018). Noting the elision of design and technology here, it is worth reflecting on the broader, critical diverse approaches to the latter that have emerged contemporaneously to these shifts in design. This is no accident, noting Cross's assertion that *'the "material culture" of design is, after all, the culture of the technologist'* (Cross 1982). In this sense, design and technology are entwined, immersed in their cultural, and political context. When strategic design constructs its toolkit from the advances in design for digital technologies, augmenting earlier practice traditions, yet points this toolkit at social, cultural and political challenges, it cannot help but incorporate a critical politics of technology. This indicates that, as with design, decision-making about the design and implementation of technology is not neutral or apolitical.

André Gorz described how technologies can be *'open'* or *'locking'* (Gorz 2007), echoing Ivan Illich's earlier *'convivial'* or *'heteronomous'* technologies (Illich 1973).

Here, convivial and open variously allows for autonomous, interactive, interdependent, environmentally, and ethically grounded relational approaches to technology. This framing of technology sits well alongside strategic design's emphasis on *'ethical concerns, addressing systemic change within complex systems, and broader societal outcome'*, as well as *'balancing individual needs with wider societal outcomes'* (Hill 2019).

Reflecting on Gorz's definitions in relation to differing low-carbon energy generation technologies—solar renewable energy versus nuclear energy—Saito (2024) states that *'technology and politics cannot be separated. Specific technologies demand specific forms of politics'*. Again, this reinforces strategic design's extension of the field, directly addressing the social and political contexts and conditions of technologies as part of the design challenge. The writer Ursula K. Le Guin's expansive and generative definition of technology—*"the active human interface with the material world"* (Le Guin 2005)— allows us to further deepen these questions of its broader social, political, and environmental relationships.

Finally, these critical views have developed in line with the technology sector's scale and influence (Lessig 1999; Morozov 2013; Zuboff 2019) and particularly as contemporary digital technologies have begun to direct everyday physical infrastructures, systems, urban planning, and governance cultures (Hill 2013; Greenfield 2013, 2017; Townsend 2013; O'Kane 2022).

So strategic design's concern for social, cultural, and economic conditions, and the technologies that produce them, requires it to recognise and engage with systems that produce common good outcomes, moving well beyond design's traditional commercial ambit. These might include questions of public and shared value (Mazzucato 2018a, b), infrastructures for culture (O'Connor 2024), or the core infrastructures of everyday life (Foundational Economy Collective 2022). Thus, strategic design's role, remit and responsibility, *vis-á-vis* technologyes broadly defined, cannot be separated from the question of its cultures of decision-making, of organisation, of ownership, as we will see in the next section. This reinforces the perspective that, far from being a simple technical pursuit, design brings form to societal ideas. Those societal ideas are, in turn, shaped by the way that we interpret, use, and adapt those forms, those 'things', those technologies. As Kieron Long has it: *'It is architecture and design's task to give form to a societal idea (like justice) through the creation of a setting for people to encounter that idea (like a courthouse). We see in our public buildings and spaces (our park benches and metro trains; a hot dog kiosk and a monument to the dead) what we are made of. Design can not avoid this assignment — it either embraces the task, or it unwittingly displays, or even conceals, society's prejudices and weaknesses.'* (Long 2019)

The ethical dimension of design is clear here, with its emphasis on *'societal ideas (like justice)'* being expressed and articulated through settings *'like a courthouse'*. In this case, we see clear interplays between the building, as a particular form of technology, and the ideas that it represents and articulates: what a society might *think* of justice; what it might *mean* by justice. Clearly, the same fundamental inferences might be made about the design of the numerous and various other touchpoints of a criminal justice system, for example. This both enriches and extends the

ideas, and responsibilities, pertaining to human-technology interaction well beyond its perceived ambit, at least in recent decades, positioning it closer to a related design discipline that consciously elides technical and social questions, such as architecture, as well as the earlier critiques of Papanek et al.

This suggests a broader context for human-technology interaction (HTI), and a strategic design that addresses not only 'things' but also the conditions and environments that produce 'things' (design's *ambit*), whilst positioning this technical agenda firmly and directly within the ethical dimension of our complex systemic and societal challenges (design's *ambition*). This context of public purpose moves strategic design practices across a highly complex set of spatial and temporal relationships, shifting webs of interactions that are embodied in our technologies and infrastructures of everyday life, in our politics, cultures, communities, and environments. The next section will describe and reflect upon approaches to this kind of 'design doing'.

2.2 Strategic Design and Systemic Change

As the 'material culture' of design is technology, after Cross, and with Le Guin's broader definition of technology in mind (Le Guin 2005), and as technology and design entwined have *'real world'* impact, how might strategic design offer new ways of thinking and doing about human-technology interaction (HTI), for such common good outcomes?

SITRA's Helsinki Design Lab project sketches a particular history of strategic design's evolution in the context of working ethically, responsibly and sustainably (Boyer et al. 2011, 2013; Hill 2012; Boyer 2020).

SITRA's Low2No project had indicated how a low-carbon energy programme might create new patterns of urban development and city living, which could in turn created more valuable trajectories for both the forestry industry and the construction sector. This tying together of systems, at the scale of a locality (a new building in Jätkäsaari in Helsinki) and a region (the global systems of forestry and built environment industry) involved creatively engaging with the opaque or invisible 'dark matter' of law and regulation (Hill 2012) as if it were a material—or form of technology, after Cross and Le Guin—to be designed with. In this case, helping to modify Finland's building code in order to enable previously prohibited sustainable building materials, like mass timber, to be used on large buildings unlocked not only the particular Low2No buildings but potentially all subsequent buildings in Finland (Indeed, numerous other mass timber buildings have emerged since.) Equally, the motive force of having to produce an actual building—the Low2No block, in this case—provided impetus to actually change the code, rather than simply dwelling in speculative design. The building code is the code that writes the city, after all, and is thus a powerful element of what Easterling calls a place's 'disposition' (Easterling 2021).

Helsinki Design Lab's Open Kitchen and Brickstarter projects (Boyer and Hill 2013) demonstrated ways of working with citizen-led (including activist-led), participative innovation processes in the context of the public sector. The former addressed culturally diverse, healthy, and sustainable local food, whilst the latter was placed in the then-burgeoning civic crowdfunding scene. The goal was to learn from, and absorb elements of, these citizen-produced activities such that the municipal government's practices and policies might evolve in line with the future of the city, rather than being held back by its legacy 'ways of doing'. Unlike a typical service design project, these strategic design processes do not design actual services—although both Open Kitchen and Brickstarter did involve designing many 'real things', from events to places to websites to processes to books—but rather try to influence a broader environment, context, and wider set of systems, from street scale interventions and movements through to policy and governance, eliding public, private and third sectors. The particular public purpose or 'common good' challenge of strategic design is to ensure that these diverse 'spikes' of innovation can also become equitable and broadly accessible (Hill 2012).

Indeed both Open Kitchen and Brickstarter successfully shifted those contexts to some degree—the latter directly influenced the development of the Mayor of London's crowdfunding programme, the largest in the world at that point (Bone et al. 2019), whilst the former contributed to substantive changes in Helsinki's food policies, culture, and offerings. These approaches, and those of many others since, rely on the ability to 'zoom back and forth' from the detail of a project, involving specific people, places, processes, and products, back into broader systems and cultures of decision-making at the level of policymaking, politics (governmental or community-led), or larger-scale organisation[1]. Strategic design's mode can engage the wide-angle and macro lenses simultaneously. Our challenge now is to ensure that these lenses are angled towards societal outcomes. We will explore these possibilities for the practice through a series of five diagrams pivoting around these ideas of lenses, zooming, and scales.

2.2.1 The Steinberg Funnel

This core idea of zooming back and forth from specific instance to broader system—or macro to wide-angle—is captured in what we at Helsinki Design Lab (HDL) called the 'Steinberg funnel' (Boyer 2020), after one of Marco Steinberg's early diagrams (Fig. 2.1). This describes a shifting of scale and complexity from the near-infinite number of decisions required for challenges at planetary scale, such as climate action, to the finite and narrow number required at the scale of a park bench, for instance. It also suggests the relatively short durations for the latter versus the long-term duration of the former. Yet placing even these two apparently disparate objects of design—climate action and a park bench—on the same diagram, within the same 'funnel',

[1] This 'zooming back and forth' requires a form of practice I describe as 'soft eyes' (Hill 2018).

intrinsically recognises that these clusters of decisions are, in fact, connected, no matter how loosely.

A related thought had been drawn from a quote by Finnish architect Eliel Saarinen: *'Always design a thing by considering it in its next larger context—a chair in a room, a room in a house, a house in an environment, an environment in a city plan'*. At HDL, we so frequently invoked this sensibility that we began to call it **the Saarinen Principle** (Fig. 2.2).

Taken together, these ideas helped initially push out the conceptual and practical boundaries of strategic design, recognising both systems thinking and the nature of our shared challenges. As Boyer notes, the designer's role is often to expand and sometimes rework the frame of the problem. This can be confronting for other disciplines and perspectives to work alongside, not unreasonably. Yet therein lies design's potential. Strategic design's possibility is in imagining, specifying and refining the brief—where the brief is a vision, policy, or strategic intent. This is not straightforward. It means constantly attempting to reframe a brief handed down from above,

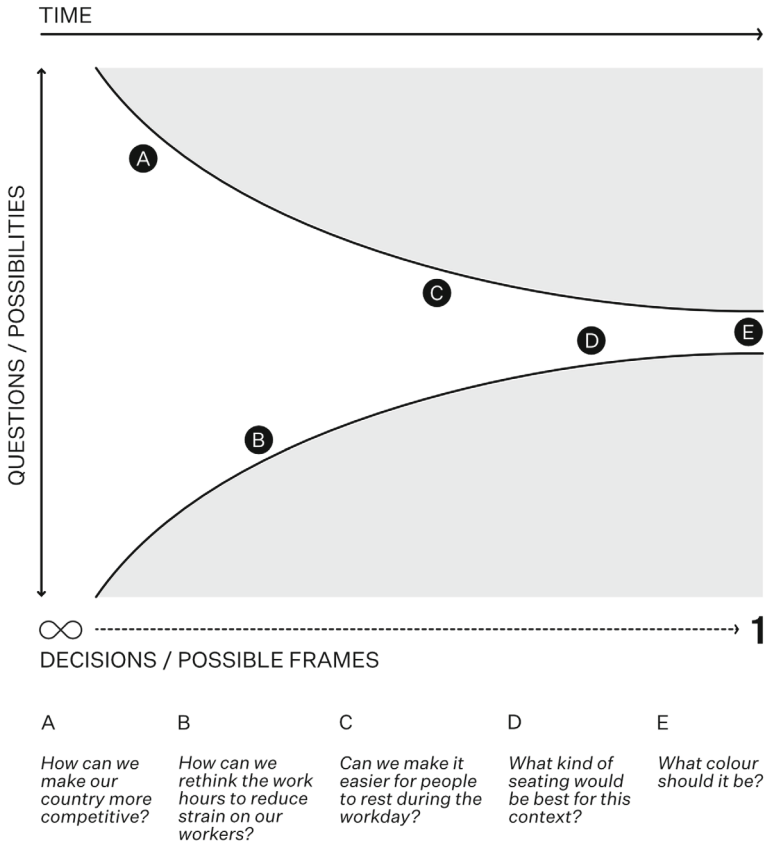


Fig. 2.1 Diagram by Bryan Boyer based on original from Marco Steinberg, from Boyer (2020)

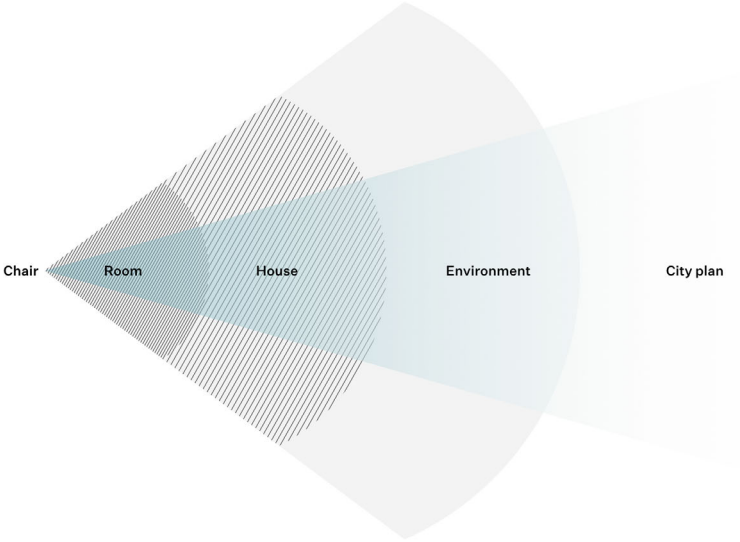


Fig. 2.2 Saarinen principle

whilst simultaneously remaining connected to the detailed engagements with interventions, experiences, technologies, and places 'on the ground'. In other words, this means manoeuvring '**upstream**' (Heath 2020), to get to the organisation or political arenas where briefs are typically set—the boardroom or council chamber, metaphorical or otherwise, as a notional shorthand—whilst also engaging with the design and delivery of particular touchpoints. In doing so, we must pause for a constructive critique of the potential for reframing techniques, given much current design practice, noting that it is difficult to *get at* 'upstream' from 'downstream', after all, and it can be argued that user-centred design takes an overly anthropocentric, even individualistic, perspective.

2.2.2 The User-Centred Trap

Judging as interaction design, a practice that draws largely on user-centred design principles, a contemporary urban technology like Uber is, mostly, an exemplary user experience. The integration of interaction design at the scale of the app, and service design at the scale of the Uber service—including business model, organisational principles, and legal positioning—clearly works from an individual's point of view. Leaving aside their business practices momentarily, for we will return to these shortly, ride-sharing services like Uber and Lyft have quickly become a feature of the early twenty-first century urban mobility landscape. Yet judged from a wider urban systems

point of view—or perhaps an urban design and urban planning perspective—ride-sharing companies like Uber and Lyft's generated interactions are doing something else: in short, incentivising large, additional numbers of motor vehicles to continually drive around the middle of crowded cities. Researchers have documented the impact of these wider system effects as leading to increased congestion, reduced public transport use, increased greenhouse gas emissions, and even increased road traffic accidents and deaths (Anair et al. 2020; Diao et al. 2021; Barrios et al. 2020). 'Seeing like a system', ride-sharing services are technologies designed to produce quantities of drivers nearby to users of their apps, at the expense of far more sustainable, healthier and safer options. This is how they supply an effective service to individual users, by ignoring the inherent geometry and dynamic of cities, and instead serving individuals. This outcome is the opposite of what many, if not most, city governments are trying to achieve at this point, in terms of their climate transition policies, or broader mobility strategies.

In effect, we might say that the reason that ride-sharing services like Uber and Lyft can provide an effective service is precisely because they do not try to solve mobility for the city at all. Perhaps individually focused interaction design can produce Uber, but not a good city with Uber in it. Or, user-centred design works for individuals, yet not for people living together in cities (Hill 2018). Such companies have a tendency to pick away at the 'easy' end of a systemic challenge, rather than trying to solve a truly difficult problem, like making public transport work equitably, for everyone, at the scale of the city, with its shifting densities and highly diverse cultural and socio-economic conditions. Instead, in the memorable words of George Packer in 2013, services like Uber are *'solving all the problems of being 20 years old, with cash on hand'*. (Packer 2013). As in, the easy ones. Tech startups, for all that their 'innovation' is frequently lauded and rewarded, tend to gravitate towards the low-hanging fruit rather than the truly complex problems that the public sector, like city governments, must take on (Fig. 2.3).

This general critique of user-centred design could be dated back to Papanek (1971), as noted previously—not that it could be framed precisely in that way at the time—but also more recently to John Wood's 'meta-design' (2012). Wood reminds us that *'most designers are paid to deliver specialist solutions to narrow, profit-seeking problems, rather than as holistic thinkers who work for society as a whole'*. Yet the shift from 'user-centred' to 'human-centred', and now beyond, to 'more-than-human' (Akama et al. 2020; Poikolainen Rosén et al. 2022; Tironi et al. 2023) recognises the need for the ever-widening, inclusive scope Wood's critique implies. This more-than-human design has parallels in theories that attempt to incorporate, for example, variations on 'otherness' such as Schmeer's *'xenodesign'* (Schmeer 2019), or the systemic approaches in relation to object-oriented ontologies and 'hyperobjects' (Morton 2013), or indigenous knowledge systems (Tarcan et al. 2022; Yunkaporta 2020) or anti-colonial perspectives (Escobar 2018; Liboiron 2021).

At Melbourne School of Design as elsewhere, design researchers are exploring what it means to, for instance, ask whether *'animals, plants, and bacteria be the clients of design? Can these and other non-human beings act as collaborators in design processes? What conceptual reframing, political empowerment, and technical*

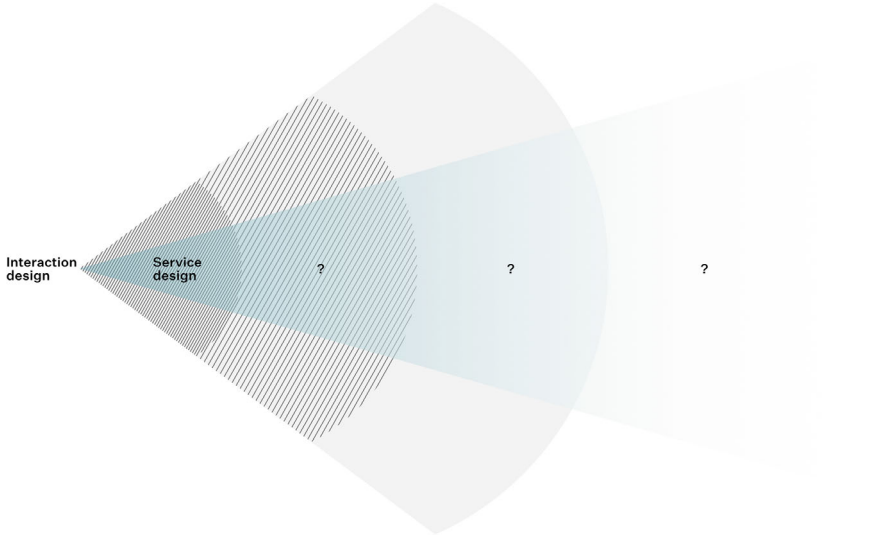


Fig. 2.3 A typical urban mobility startup's 'design without strategic design' works at the scale of interaction design but not at the scale of urban design

capabilities will be necessary for the resulting interspecies design?' (Roudavski 2022; Roudavski et al. 2023). Drawing this necessary critique of the *human*-centring in the phrase *human*-technology interaction into this urban context reminds us that the city is a site of many living things, most of whom are not human but all of whom interact with the technologies of humans. This further 'widens the lens' beyond the individual user, requiring design as a process to have 'more of the world' in it.

In the context of public purpose work generally, such as public sector design or social design—or indeed most architecture and urbanism, recalling Long (2019) earlier—'user-centred' is clearly insufficient. Janzer and Weinstein (2014) describe the scope-widening as moving towards 'situation-centred design', describing an interplay between object and situation, as well as foregrounding the positioning of the designer, situated 'inside' or 'outside' the context of design work. Echoing Wood's words, Janzer and Weinstein note that *'"end-user" in situation-centred design is the social milieu, which is composed of many, often varied, "end-users" as well as the delicate systems and structures in which these "users" interact'*. So the recognition, as if after Albright and Steinberg, that design's toolkit itself needs reframing for the challenges of our time is now widespread. As we can see, various theoretical frameworks are being pursued, each pushing out the edges of the canvas further. Yet how to bring this together in practice?

2.2.3 Nested Scales

For an example that, to some extent at least, illustrates a tangible step forward beyond this user-centred bind that these ride-sharing companies quickly foregrounded, we might consider the alternative approach to shared mobility exemplified by the initial iteration of the Oslo municipality bike-sharing network in the late 2010s.

As described in more detail elsewhere (Hill 2018), the Oslo, Bergen and Trondheim public bike-sharing networks, coordinated at the time by Oslo-based startup Urban Sharing working with and for the municipalities in each city, exemplified how to combine common good outcomes at the scale of citizen[2] and city simultaneously. As compared with the nagging question mark hovering over the city left by the ride-sharing programmes described previously, these services balanced individual outcomes with operational and urban outcomes, reinforcing public good and building public value.

Various means were deployed here, up and down the scales illustrated above. Careful interface design, industrial design, and citizen- and city-oriented branding, all exerted at the scale of interaction design, is complemented by digital service design, open data sharing, and integration into other forms of public transport at the service scale and city scale. The thoughtful employment of recently released former inmates from Norwegian jails as the bike service's on-street maintenance crews indicates a care taken at societal scale, binding across systems of systems, indicating strategic design's capability to produce co-benefits by integrating artificially-separated systems and sectors. This case demonstrates that the design of a humble everyday infrastructure can actively suture across the gap between a bike-sharing network (public/shared transport and urban planning) and social justice (criminal justice system). To do so recognises the possibility, and imperative, for common good outcomes within a systems-oriented view, rather than leaving the opportunity caught between existing 'silos' of current organisational and bureaucratic logics. It manages to balance a pragmatic approach to service design with a clear agenda to produce wider social and environmental common good outcomes.

From a design perspective, it provides flexibility for the individual at the scale of interaction and efficiency for the operator at the scale of service. This is as per ride-sharing startups. Yet unlike the Ubers and Lyfts, the design approach taken by Urban Sharing and the partner municipalities also achieves social, civic, and environmental outcomes for the city, at the scale of systems-of-systems. This requires a coherent, trusting partnership between public and private sectors, drawn together by orienting around citizens and city, almost forming a kind of mutual aid relationship. Urban Sharing was a private company working for public and civic outcomes, partly by foregrounding the service as fundamentally 'Oslo's system'—and thus belonging to the people of Oslo, and the environment of Oslo—rather than being pitched as a

[2] By 'citizen' here we mean resident of Oslo, for example, as in the original meaning of an 'inhabitant of the city', rather than its alternate meaning of a legally recognized subject or national of a state.

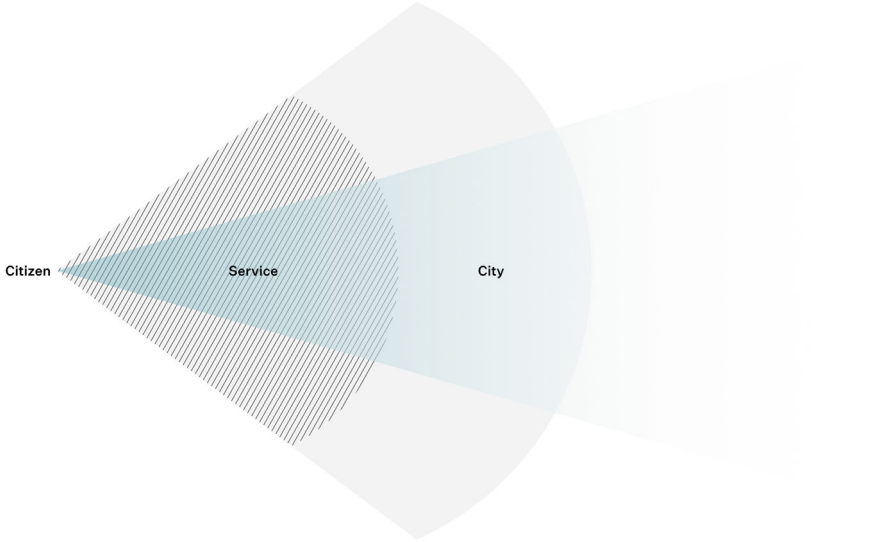


Fig. 2.4 Oslo bike-sharing scheme's strategic design

broader global 'blitzscaling' play (Hoffman and Yeh 2018) by a private company[3] (Fig. 2.4). By moving up and down the diagram, we can see that citizen, service, and city are all 'in play', largely connected into a coherent whole, each supporting the other, even potentially delivering broadly at the societal scale beyond the city (noting, in reality, 'society' is immersed in all these scales).

To return to the 'user-centred trap' and the ride-sharing companies of Silicon Valley, it is perhaps unfair to ask these ethical questions *individually* of, say, the ride-sharing service designers who are working on the interaction design of the app. They are constrained to working at the front line of such user touchpoints; they are effectively caught in the 'user-centred trap' too. No matter how much 'reframing' they might want to undertake from their positioning within the organisation—and note that their personal and professional motives are entirely unclear, given how opaque private companies, at least in 'Silicon Valley mode', are both incentivised and allowed to be, despite their public infrastructural impacts—they are often unable to 'swim upstream' into these broader design questions: of business model; urban life and organisation; environmental pollution; public health; regulations and policy, and so on. Hence, the need for a design function that can move up and down the diagram, attempting to weave together decisions into a more coherent whole—perhaps as per the aforementioned Urban Sharing example, which indicates this wider view is entirely possible even from the perspective of a privately-owned tech startup, as

[3] By way of comparison, London's equivalent civic bike sharing network at the time was called 'Santander Cycles', as it was sponsored by the Spanish bank Santander. This confuses the potential relationships between place, identity, and service.

well as for their counterparts and collaborators at Ruter, the municipality's well-equipped mobility design and tech teams[4]. Strategic design can take on the imperative, and responsibility, to address these kinds of balancing acts more completely and explicitly, working across all aspects of city-making and running, public service and technology provision, and environmental stewardship, with an explicit agenda for supporting and enabling decision-making to produce common good outcomes within complex societal problems and opportunities. As the Urban Sharing example indicates, such designers do not have to exclusively reside in the public sector at all; in fact, design, as an activity, is present within public, private, and third sector, and a strategic approach is possible when designers are distributed and working together across systems, rather than the fiction that is a 'sector'. A more balanced distribution of designers across all contexts, particularly rebuilding a public sector which has largely been denuded of such capabilities (Hill 2019), is likely to create more broadly beneficial outcomes. In HTI-oriented projects, it is necessary for designer leaders to explicitly raise this imperative and responsibility; as we have seen, a tech sector context will not naturally do so. For example, when working as a designer at Arup, the global multidisciplinary design and engineering consultancy, my 'Digital Studio' team and I were engaged by Alphabet's Sidewalk Labs to help define and direct design activities across much of the project. Whilst this included imagining and scoping the suite of urban technologies, from sensing infrastructure to smart home interfaces to shared autonomous shuttles, and initially at the interaction and service design scale, the project's context of *'cities reimagined from the internet up'* forced the agenda not only to questions of urban design but of wider challenges of social justice and urban governance. Such questions zoom back and forth between the mundane but necessary interactions *('How do I call a shared, on-demand vehicle towards me (in a logical place to pick-up and drop-off passengers)?'*) to the personal and social (*'Will someone trust getting into an autonomous shuttle with strangers'*) to the architectural and urban design (*'What is a street when a city neighbourhood has no private cars in it?'*) to the societal (*'How do private services interact with public infrastructures, and who benefits?'*).

These questions might be pinned at various points of that modified Saarinen Principle diagram. As documented in Josh O'Kane's retelling of the Sidewalk Labs story (O'Kane, J. 2022), it is precisely in the wider ambit of societal questions that such projects become problematic—just as with ride-sharing services and the balance of public and private infrastructures, or the interplay between personal privacy versus civic value and public trust (John et al. 2018). These problems are lurking in the scales beyond variations on the 'user-centred trap' and yet must be picked up by the lens of the strategic designer. Piecing together personal testimonies from others in the Sidewalk team (as I was bound by tight non-disclosure agreements) O'Kane inferred that I saw my role as not only helping develop novel urban technologies but also

[4] Note the importance of having broadly 'symmetrical' capabilities across both public and private capacity in this example; Ruter's teams can also design and code, as well as procure more effectively. This in turn allows Urban Sharing to perform at a higher level. The UK's government digital services story provides another example of this (as described in Boyer et al 2013 and Greenaway, A et al 2018).

as exploring how *'Sidewalk could build relationships with governments to reinforce democracy'* (O'Kane, ibid.). Strategic design must include and indeed foreground that form of enquiry, in the context of HTI and cities. This ability to think and act at different scales and paces simultaneously, weaving together the externalities and spillovers that leak from one to another, requires these new forms of design practice, albeit built from the foundations of design's past and present. Strategic design's remit is not to single-handedly *do* all this 'weaving', however. Rather, the task is more akin to curation, coordination, collaboration, arrangement, orchestration, as we will see.

2.2.4 Nested Disciplines Across Scales

In the case of design practice for the common good, a strategic design approach means connecting decisions at the scale of things to those at the scale of systems. In tangible terms, it means recognising that the ride-sharing app—a 'thing'—has an impact on the city—a system-of-systems—and our job as strategic designers at least, is to understand that, and resolve it as best we can, in order to produce ethically responsible, common good outcomes. This perspective means design's core contributions, in terms of practice, is a form of orchestration that strives for, and organises, a holistic approach.

Building on the previous articulation of design's expanding ambit, a strategic design 'playbook' like *'Designing Missions'* (Hill 2022a) suggests we might summarise design's particular capabilities as follows, at least in this context of public purpose or common good outcomes:

1. **Integration**: Design's diverse research methods discover and describe the needs of people and place in systemic and synthetic fashion, fusing technology and culture, politics and budget, human and non-human life.
2. **Invention**: Design is a practice of cultural imagination. It embraces uncertainty, ambiguity, and complexity in order to sketch alternative trajectories, each articulating broader values and ethics, dynamics, and aesthetics.
3. **Prototyping**: Building models and prototypes to test in public unlocks design as an ongoing social process, managing risk whilst generating insights, and opening up a participative, responsive, and iterative approach.
4. **Stewardship**: Design as an ongoing process ensures that key ideas maintain their integrity and evolve through learning, as projects emerge in context, positively buffeted by reality.

This can, in theory, provide a powerful array: connecting theory and research to practices and contexts; moving back and forth from analysis to synthesis; balancing the 'upstream' functions of invention, vision and strategy with downstream stewardship functions of change, participation, delivery and iteration; conjuring new and old forms of value from technology, nature, and culture combined. *Strategic* design as framed here asks two things of this set. First, that they are given a direction (Mazzucato 2021) or ambition in terms of common good outcomes. Second,

that they are handled as an integrated set to match the wider ambit of integrated challenges. Without this integration, we end up with variations on the bind articulated above, where an emphasis on inventive and polished interaction design (at the scale of things and spaces), without responsibility for what happens when 'the product' hits the ground across multiple loosely coupled systems, creates uneven and sometimes destructive outcomes. Equally, a function over-focused on service design and delivery within existing systems and frameworks (or even contracts) can end up frozen in the face of changing circumstances, iterating with ever-diminishing returns and unable to step back, reframe or more fundamentally shift core questions and assumptions at societal scale. Conversely, a well-crafted vision and strategy is destined to remain only a well-crafted PDF in a distant folder, without an equally well-crafted execution of touchpoints in terms of interaction and service design. So, all these design disciplines must interrelate, and the previous diagrams can evolve to indicate how they might. The following sketch loosely elides scale, timeframe, and complexity together, across a horizontal scale, moving from 'things', or discrete interactions, on the left, up through an ever-widening sphere until the scale, to the right-hand side, indicates systems-of-systems are 'in play'. The diagram's intent is not to lock-in disciplines to these scales. Indeed, in drawing these diagrams, the emphasis is placed on moving freely between these scales and ambits. The diagram merely suggests where disciplines usually reside, or their perceived 'natural habitats' as situated by others (Fig. 2.5).

As discussed, the digital design disciplines of interaction design and service design, refined powerfully by the so-called tech sector in recent decades, can produce

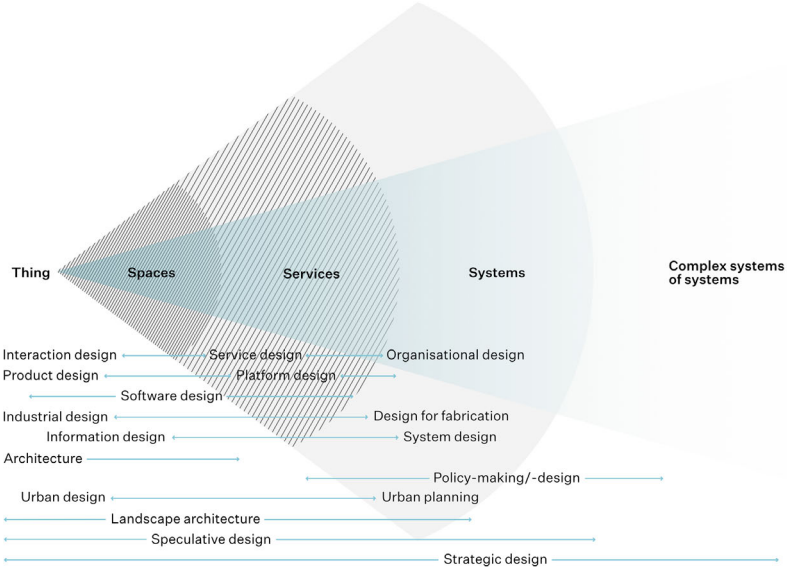


Fig. 2.5 Design disciplines, nested over scales

user experiences of high technical quality. This is clear in the soaring financial valuation of said sector, at least. Again, its issue is that it often excludes, diminishes, or obliterates wider forms of value at urban, societal, or environmental scale. Remaining at this scale, architecture could be seen as an equally productive starting point as interaction design. Its toolkit might orient around spatial intelligence (Van Schaik 2008), and unlike most digital design disciplines, its differing sense of materiality and duration can intrinsically embody and enable complexity over time, rather than looking to reduce it. Whilst its flaws and futures have been explored many times (for example, Hyde 2012; Harriss et al. 2021), in this context architecture has an almost unparalleled set of useful capabilities in terms of thinking in scales and systems, context and content. (Whilst it is no more than a single data-point, I note that my colleagues at Helsinki Design Lab—Boyer, Cook and Steinberg—were all trained as architects, and the discipline's immense potential value in strategic design practice seems clear, if it can loosen its moorings somewhat from built form.) Yet the discipline's focus is still drawn by the 'gravitational pull' of the building, barely moving beyond Banham's (1955) critique that *'Architects are by training, aesthetics and psychological predisposition, narrowly committed to the design of big permanent single structures… unrepeatable works of art'*. (Banham 1955). So architecture sits towards the left-hand side of the diagram, its wider capabilities largely curtailed accordingly.

Numerous other design disciplines can be aligned around this diagram, although note that this is no attempt to capture and plot an exhaustive set of disciplines, given design's constant shape-shifting and deliberately blurry overlaps between subdisciplines. The more relational disciplines, such as urban design and landscape design, might move around the diagram a little more freely than is implied here, for instance. Yet these traditionally built environment-focused practices tend to sit adjacent, rather than integrated, with the tech- or product-oriented practices, such as service design, or even aspects of organisational change management. This middle section is interestingly fluid, as if implicitly recognising the need to pull together work at either end.

The diagram at this point is eliding various aspects in this distribution, including scale—a smartphone or building versus a district, city or bioregion—as well as time or duration of change, such as updating an app versus 'updating' a watershed. It might even suggest physical characteristics such as mass, linked to adaptability, as well as openness, malleability, and so on.

As described (Hill 2018), this elision draws heavily from the idea of 'pace layers', adapted from Frank Duffy's original conception of 'shearing layers' (Duffy 1992). Subsequently popularised and extended by Stewart Brand (1994), seeing systems as composed of layers of change enables us to understand how differing dynamics work with and against each other, within different assemblages of materials, technologies, infrastructures, organisations, cultures, environments—or 'structures of feeling', after Raymond Williams (1961). Layers provide powerful abstractions, sorting different aspects of otherwise opaque systems, providing seams for us to work at, or work with. Originally applied to buildings by Duffy, the concept allows for both a way of seeing how buildings move, adapt (or 'learn', after Brand) as well

as suggesting design strategies to enable 'seamful' adaptive design (Chalmers and Galani 2004; Hill 2006).

Brand's subsequent application to societal and environmental aspects, as summarised and adapted in the following diagram, may be overly simplistic in many ways. For example, culture can 'move' rapidly as well as slowly, clearly. But this wider framing beyond the spatial elements of a building at least suggests these broader interlinked and nested relationships (Fig. 2.6a). It conveys an adumbrated set of perspectives and scales in which 'things' are not only subject to materiality but also the shifting sands of fashion and commerce, the connecting and supporting elements that constitute infrastructure and governance, and the broader ambits of culture and nature that these elements or layers sit within and are composed from.

Back to the design disciplines diagram, and moving the other end of the scale of systems, and systems-of-systems, we might plot urban planning. Malmö city architect Finn Williams has described planning's value in terms of enabling generative

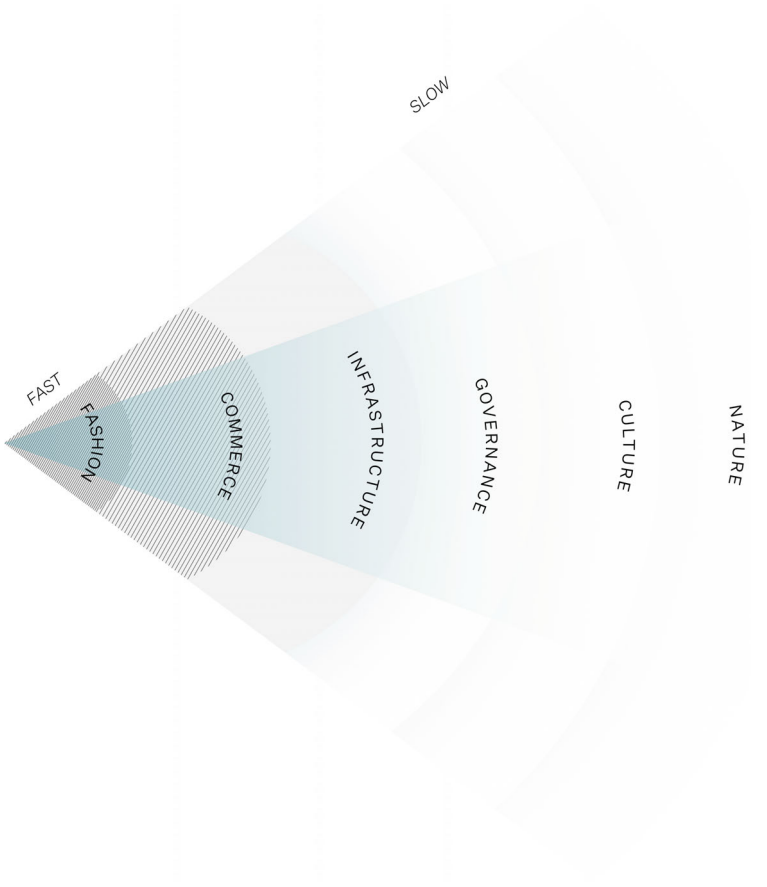


Fig. 2.6a Modified version of Stewart Brand's pace layers diagram applied to society

systems (Williams 2018), articulating how planning's focus on frameworks, policies, and guidelines could enable a form of creative and participative co-design to emerge within a city, whilst also positioning the practice inside governance, and thus connected to fundamentally strategic and political city-shaping dynamics. Planning's value is here, ensuring that these broader challenges—at once technical and political, cultural, and environmental—do not remain solely within the province of those disciplines organised towards the left-hand side of the diagram. As Mouffe (2013) states: '*Political questions are not mere technical issues to be solved by experts. Proper political questions always involve decisions that require making a choice between conflicting alternatives*'. Yet, as if drawn gravitationally in that opposite direction to architecture—towards politics and policy rather than the details of place—planning can often end up abstracting upwards a step too far. In avoiding contact with 'the street', figuratively speaking, it does not have the sensibility to understand urban processes as they emerge, or meaningfully engage the complexity of place or environment, in terms of cultures or systems: their lived experience, or conditions 'on the ground'. As Donald Appleyard (1976) put it long ago, *'the planner sees his model of the projected city as a totality, from above; the inhabitant sees the present reality, from street level'*. In this, it reminds us of the philosopher Graham Harman's statement that *'philosophers ought not to legislate foolproof procedures for surmounting emotion and belief, but should recall instead that no theory survives its first contact with reality'*. (Harman 2018). In this case, Harman's 'theory' is the urban plan, frequently failing to survive such contacts, on and in the ground.

Thus, planning remains stuck on the right-hand side of the diagram unable to connect coherently to the left, largely addressing the slow layers of change in a city, rarely present in the 'rooms' where the experience-led and transformative services of urban technologies—which are implicitly positioned at the left of the diagram—are framed. In other words, urban planning is looking at high-level mobility goals for parcels of land whilst the everyday urban technologies of 'SUVs', ride-sharing services, e-bikes and e-scooters are already transforming the city in real-time for better or worse, right under the planner's nose.

As the Danish social scientist Bent Flyvbjerg has shown in his work addressing the planning cultures behind so-called megaprojects, at worst this can lead to major projects with hugely *underestimated* financial costs, timelines and negative social and environmental impacts alongside *overestimated* revenues and positive economic development impacts (Flyvbjerg et al. 2003). Those ideals of distanced objectivity, drawn to some extent from those of Enlightenment-era scientific rationality (Cook and Pagh 2023a, b) cannot easily engage with embedded contextual knowledge. Planning simply cannot react to the reality of delivery, as if by definition (Flyvbjerg et al. 2003; Flyvbjerg and Gardener 2023).

Flyvbjerg and Gardner's critiques land in the gap between 'left and right' here. They suggest that *'Planning is a safe harbour. Delivery is venturing across the storm-tossed seas'* (Flyvbjerg and Gardener 2023). It is an evocative analogy. In *'Designing Missions'* (Hill 2022a), when addressing alternatives to planning which might retain goal-setting yet allow for agility en-route, I frequently used the metaphor of a small boat in the Stockholm archipelago, balancing the ability set a destination

with the ability to tack, bob, and weave across local weather conditions in real time. Strategic design attempts to bridge across this channel between planning and delivery, connecting the goal-setting functions of vision and strategy with the ability to enrich and adapt informed by the generative, local feedback loops derived from the acts of doing, with thinking through making. Indeed, this suggests strategic design is often a form of research-led practice. Anthropologist Tim Ingold has pointed out that the word *'research'* implies an ongoing pursuit: to *'search, and then search again'*, also suggesting this iterative, looping, constantly engaged dynamic (Ingold 2020). In this public purpose and common good context, these ideas of grounded, applied research—searching and searching again—are increasingly cropping up as a side-effect of advancing interaction and service design practices seen in digital government work.

As Andrew Greenaway of Public Digital, a public sector transformation consultancy, describes, the practice of policymaking itself might be transformed by user research-driven service design in a 'digital government context'. Policy in this world could be increasingly derived directly from the design, development, and delivery practices of digital services, built around the feedback loops of insights generated by prototyping. As with the planning described above, this might reverse the ordering of such activities, with policy following prototyping, just as with a design process. *'As part of a multidisciplinary team, policy-makers are no longer only shaping delivery according to policy. They are also shaping policy according to delivery, drawing insights from tangible experiments rather than abstract theories'*. (Greenaway 2019).

Finally, strategic design is drawn as a line running along at the bottom of this diagram partly to reinforce it is not some 'master discipline', arcing over all others—implicitly recalling Tom Moran's comment that *'design is a humble trade'* (quoted in Hill 2006)—but to reinforce that its role is coordination and connection, support and gap-filling, as much as direction, *'drawing together'* (after Latour 2008) other activities, connecting across these scales. We might imagine the connecting, advocating role of midfielder rather than striker, in football. Or the architect on the building site, who is, at that point in the process, less instrumental than the builders—and yet still part of the team. Or in music, the conductor rather than lead violinist, for example. With the latter analogy in mind, the conductor Benjamin Zander has said that *'The conductor depends for his power on his ability to make other people powerful'*, and that his *'job as a conductor was to awaken possibility in other people'*. This mode reinforces the humble positioning and collaborative practices of this form of design leadership.

So strategic design, in this context at least, must act as a curator and then conductor across other design disciplines, drawing aspects of them into collaborative environments, in which we might make more sense of these complex entanglements of systems. Further, those integrative and collaborative capabilities can draw in related perspectives beyond design, whether disciplinary (economics, engineering, anthropology, etc.), societal (citizens, politicians, media, etc.) or environmental (natural, material, more-than-human, etc.) Note that there are other forms of design which attempt to be equally fluid, relational, and multiperspectival, though emerging from

adjacent, if highly related, discourses such as pluriversal design (Escobar 2018) and equivalent.

Strategic design can comprise both a way of thinking—continually reconceptualising the frame of the work—as well as a diverse toolkit that might help with this orchestration, including the ability to work coherently across scales and timeframes, including understanding and articulating context in terms of 'layers of change' that combine both. Design's ability to discover, arrange and embody far-reaching patterns and flows in the making of 'a thing'—such as building, software, vehicle, landscape, etc.—allows it to not only work with systems but also culture. This latter is important: 'systems' can imply an overly technical, almost cybernetic, ontology; yet 'culture' exists at all points of this 'diagram', and works upon, and is exerted by, design. Equally, complexity can be present across the diagram. Without wishing to pull on an open-ended philosophical thread, a 'thing'—such as a tree, for example—can be a complex system, or at least part of one. The Eames's *Powers of Ten* (Eames and Eames 1977) makes this fractal-like condition of systems brilliantly clear. So complex systems do not *merely* reside at the right-hand side of the diagram. And yet the diagram recognises that the sheer accumulation of entanglements towards the right—the shift from a single tree to recognising the interconnected existence of the mycorrhiza fungi networks at vast scale (Simard 2021)—has a quality of all its own. As design must exist usefully within public, private and societal sectors in order to connect across this 'diagram', this multi-scalar, multi-actor capability also compels design to take its ethical responsibility seriously: including otherwise-externalised environmental outcomes, most obviously, or wider political and economic concepts such as the city as a collective, shared common good. The core ideas of strategic design—of integrative thinking and practice; of framing questions and challenges appropriately; of working at multiple scales, paces and vehicles; of taking on complexity and making it legible and malleable via synthesis; of stewardship through delivery; of integration into political and other organisation; of addressing systemic change around shared societal and environmental challenges—mean encompassing an expanded field of design, as suggested by this deliberately incomplete diagram.

When the Italian architect Ernesto Nathan Rogers re-introduced the idea that architecture can stretch *'from the spoon to the city' ('dal cucchiaio alla città')*, he may simply have meant that architects—in mid-century *maestri* mode at least—should design everything: spoons, cities, and all points in-between (Rogers 1968). However, we might imagine the words taken more positively, and powerfully, and suggest the possibility in this constant zooming back and forth between scales, paces, and contexts, connecting decisions at *'the spoon end of things'* with those of the wider city, with society, with our immediate environment and those often distant environments, which Australian geographer Val Plumwood described as *'shadow places'* (Plumwood 2008), and whose resources produce things like spoons—and indeed smartphones, buildings, and all points in-between.

Strategic design's goal must be to align all these disciplines and contextual perspectives as best as it can. It might help form plans, polities, projects, and products across an appropriately diverse range of paces and scales. It has the potential to move

design 'upstream' into a more productive position, of business strategy, politics, and societal and environmental responsibility, whilst remaining in touch with decisions on the ground, in context, in the complexity of culture and place. This might allow us to balance desired interactions at the scale of the individual with the systemic outcomes required at the scale of the many—and increasingly including non-human actors in that idea of 'many'.

2.2.5 Nested Cultures of Decision-Making Across Scales

A more recent example of strategic design work in practice, which aligns across these scales of decision-making, can be found in the mission-oriented innovation projects led by Vinnova, the Swedish Government's innovation agency. The following section will reflect on the design practice implications of these pilot projects, but it is worth briefly dwelling on their relationship to this discussion: of scale, pace, materiality, actors, and agency. In particular, a further related diagram helps us understand how decisions at particular scales might now interrelate—or rather, must interrelate—in new ways (Note: the author was Director of Strategic Design at Vinnova for this period, hired to design and deliver these 'mission pilots' for the organisation). In brief, Vinnova pulled together public and private sector actors across Sweden to help devise and deliver a set of missions organised around the broader goal of healthy, sustainable mobility (Hill 2022a.) Under that mission theme, and from a highly collaborative design process, the Street Moves project, produced in collaboration with ArkDes, the Swedish National Centre for Architecture and Design in particular, emerged as a national-scale mission to retrofit all the streets in Sweden, such that they are healthy, sustainable, and full of life (these goals would be defined in detail, but can also usefully remain at this high level.)

In practice, this meant deploying so-called tactical urbanism mechanisms like 'parklets', which are often the province of activism, yet here led as *strategy*, and by the national government. I would later describe this combination of tactical and strategic, of citizen-led and government-led together, as 'strategic prototyping' (Hill 2023a). It attempts to hover the design work within what Thompson and Lorne (2023) describe as the *'creative tensions between control and contingency, between "strategic" and "organic" situated interventions'*. In doing so, the example might offer a trajectory that can situate itself within, and work with, this tension. Thompson and Lorne's critique of participatory urbanism experiments, such as Participatory City Foundation in London's Barking and Dagenham, is clearly important. They suggest such experiments often attempt to sidestep the existing 'legitimate' and democratic structures, such as state and municipal governance, yet end up creating an alternate form of mediating and ultimately self-serving structure, as an experimental 'platform urbanism' reliant on the non-representative and volatile vagaries of philanthropy. (NB: the author was a Trustee of the Participatory City Foundation from 2018 to 2022.) Yet their critique frequently presents 'strategic' and 'organic' as alternate poles, as if magnetically opposed: *'Whilst strategic labs tend to enact*

smart and sustainable urbanisms in controlled and concerted experiments, organic labs intervene within community development and citizen-led place-making through contingent practices that resemble grassroots organising'. Thompson and Lorne (2023) There is a possibility, of course, in attempting to stretch across this chasm, working explicitly from an institutional and governmental perspective ('strategic'), yet carefully and thoughtfully deploying, and learning from, the tools, methods, and dynamics of participatory practices ('organic'). This is no doubt easier, in my experience, in Sweden rather than Thompson and Lorne's case study in East London, due to the former's long tradition of participatory practices, active civic sector, engaged industry and trade unions, and responsive and well-resourced government. Yet the possibility exists in East London too, no matter how difficult the 'ground conditions' may be, and in other similar governance environments. What might we learn, and attempt to adapt, from the Swedish experience?

A detailed account of these approaches can be found in Hill (2022a), but in brief, the mission team assembled by Vinnova began strategic prototyping in public in Stockholm, before moving to Gothenburg and Helsingborg. Modular wooden structures provided a base for different 'applications'—such as greenery, bike-parking, e-scooter sharing, charge points, seating, playgrounds—each describing alternate possibilities for streets (Fig. 2.7). In the first incarnation of the Street Moves prototypes in Stockholm, young children from four local inner-city schools were asked to decide upon the designs of their streets, through actively facilitated co-design sessions (in conjunction with a broader consultation of local residents by the municipality) (Fig. 2.6b and c). Extending Michael Sorkin's (2012) statement that *'the street belongs to the street',* the obvious implication is that the street *designs* the street, too. Whilst the project might run the same methodology across multiple streets, as each street has different people on it each street will be different. This 'street-up' model is clearly a quite different approach to the traditional urban planning model, which tends to occupy the right-hand side of the diagram discussed previously. This emphasis on a super-local participative system that could spread from street to street, and from city to city, allowed for social movement dynamics as well as planning cultures, for designed interventions on the ground at the scale of interaction design, architecture and industrial design, as well as broader implications for planning and policymaking practice, and system design—in other words, it covered the ambit of the diagrams described previously, whilst embodying the ambition of public purpose-led work.

The project became more widely known when it was dubbed 'The One-Minute City', in response to Paris's by then well-known 15-min city model (Moreno et al. 2021). Pulling focus at this scale allowed for an exploration of the more complex interweaving of space, time, materiality, and culture implied above. This 1' City is the immediate environment around your home, very loosely defined by a minute's stroll or roll throughout the shared spaces outside your front door, and that of your neighbours. It immediately suggests blurry, overlapping circles of shared engagement, encompassing not only the street but other aspects of the built and natural environment, as well as the culture of the immediate neighbourhood. It is a space, and set of possibilities, potentially defined by an intimate, participative and engaged relationship, knotted together by proximity—and thus including a sense of timescale



Fig. 2.6b Design workshops with schoolchildren



Fig. 2.6c Design workshops with schoolchildren



Fig. 2.7 Example Street Moves prototypes installed in Stockholm, 2020

linked to physical scale. This makes it rather different to the 15' City, which covers a much wider area and a different set of concerns, even though a 15' City might be thought of as comprising numerous 1' Cities. This intimacy and participation reverses urban dynamics from a question of what the municipality provides within the 15 minute scale towards the specific and complex diversities of particular peoples, places and cultures.

Due to the city being defined by complex adaptive systems, even at this most intimate scale, addressing the 'leverage points' (Meadows 2008) of these 1' City streets means we are also shifting the core infrastructures of everyday life, such as mobility, energy, housing, work, play, learning, systems of democracy, and so on. As noted earlier, Gorz and Illich suggest that the technologies associated with these infrastructures work within specific forms of politics—in other words, different forms of societal 'human-technology interaction'. A street cannot be transformed without profoundly affecting these wider systems, as each 1' City sits within a context of schools, shopping, surgeries, within questions of public ownership and reward sharing, alongside other common good outcomes, or privatisation and inequality (Hill and Mazzucato 2024).

The 1' scale, however, has the potential for quite different forms of politics: in terms of governance, ownership, maintenance, and co-production, such that it works as a leverage point across other scales. Even the choice of wood as material for the kit-of-parts allowed for civic participation, as well as aesthetic and public health outcomes, but it also foregrounded questions of circular biomaterials from regenerative sources in Swedish forests. It thus connected to system-of-systems thinking, at bioregional scale.

Equally, the glulam Swedish timber used has a different 'clock speed' to the traditional materiality of the street (typically, concrete, steel, and asphalt) and would only last in situ for a couple of Swedish winters. Yet this means that it has a kind of inherent timer running, as if the 'use by' date on a bottle of milk, meaning that the mission teams would have to regularly return to back to the street and repair, maintain, or ultimately replace the wooden elements (for re-use elsewhere). In doing so, it allows us to ask the question *'What do you want to be now, Street?'*, again in collaboration with the street's inhabitants, noting that local cultures and mobility cultures might indeed change every few years too (Fig. 2.8a). Traditionally, this requirement would be seen as maintenance 'cost'; but when reframed, strategically, in this way, 'maintenance' becomes 'care', and 'cost' becomes 'investment'. Revisiting the street becomes a chance to ask new questions, to adapt to changing circumstances. Without this clock speed, which is an inherent quality of deliberate material choice by the project team, we are left with a street culture moving at the pace of concrete or asphalt. This explains, in part at least, why we are often stuck with the streetscapes of the 1980s. As noted previously, this small vignette also reveals how urban planning, in tending not to engage with the detail of materiality at this scale—the left-hand side of the diagrams earlier—cannot react to systemic changes at street level. Whereas this integrated strategic design approach, attempting to work systemically at the scale of all the streets in Sweden, can also engage with the detail of materiality at the scale of a bench, and quickly reveal that these scales, paces, spaces, cultures,



Fig. 2.8a Speculative design drawings by Utopia Arkitekter for Street Moves (Hill 2022a)

and systems are intrinsically interdependent. This example also begins to suggest how scale and pace (or timeframes), along with product design, spatial design, and cultures of decision-making, might be elided in these approaches.

Reversing assumptions about maintenance—that it is usually merely a 'cost' to the public purse, to be minimised accordingly—allows us to explore how material choices can create a positive *requirement* for care, a form of 'demand from the environment itself' that we engage with it, and on a regular basis. Such a form of care can be shared between system actors, distributed equitably, which suggests further iterations of existing governance models, new forms of polity (Fig. 2.8b). How might strategic design view and interact with the different cultures of decision-making required at these different scales? Whilst some urban conditions can be imagined and managed at the 1' City scale, with citizens as the lead actors in effectively self-organising forms of 'bottom-up' or emergent urbanism, there are clearly other conditions that cannot be organised like this. It would not be fair or effective to extend the principles of self-organisation to systems at the scale of, say, a metro system or a national football stadium, just as the perturbations in city-scale traffic flows of closing down a single street would ripple through entire transport networks, well beyond the purview of the community of a street. Yet rather than inhibit self-organisation in favour of strategic planning, or equally, neglect planning in favour of purely emergent processes, can we find a subtler way of articulating different cultures of decision-making at different, yet nested and interdependent, scales?



Fig. 2.8b Street Moves prototypes in Stockholm

As discussed, planning, as a practice, tends to hover at the larger scales—neighbourhoods, districts, zones, infrastructures, systems-of-systems—allowing other design disciplines to concern themselves with the building scales (Fig. 2.9). Equally, we know that there are not only effectively infinite scales either side of these arbitrary demarcations in the layers illustrated in the previous diagrams, but that these scales are nested inside each other, interdependent and interconnected. Extending the aforementioned concepts of pace layers, we have devised **Place Layers** diagrams to indicate ways of thinking and acting about these layers of scale, pace, proximity, time and systemic relationships, outside of the binary opposition of top-down or bottom-up. We might imagine a set of urban activities and lay them out across a blurred spectrum of decision-making cultures, seeing the 1' City scale within 15' City scales, and then stretching up to 30', 60' and so on. Such diagrams convey a sense of shifting agency, across these differing scales, paces, social relationships, environments, infrastructures and technologies. Within this, we can play out the idea that a local street could indeed be organised to some large extent at the 1' City scale—in terms of design, construction, and maintenance, if supported by the kind of open systems and municipal cultures Street Moves suggests. These elements are lightweight, adaptable, cheap, and the cost of 'getting them wrong' is negligible in the grand scheme of municipal budgets. They are able to learn from feedback loops and adapt over time. Their decision-making cultures can be highly engaged,

exploratory, deliberative, and diverse, as the technologies and infrastructures used—in this example, imagine planters, seats, a stage, e-bikes, a few shared cars, scooters or a shared cargo bike—are cheap, to-hand, and concern the real use-cases of particular people, rather than abstracted ideas of 'personas' or demographic averages. Their evaluation is real-time, distinct, and highly specific, with an active 'hand on the tiller' quite possible at this scale, given resources in terms of supporting municipal design and delivery teams.

Other mobility environments such as a subway, however, are clearly best organised at a 60' City scale and beyond. They are expensive, slow to build, and difficult to adapt—as Flyvbjerg (2003) pointed out. In terms of political capital and material impact on a city's economy and environment, they must not be allowed to be 'got wrong' (though Flyvbjerg et al. (2003) notes that they often are.) Therefore, the decision-making cultures at this scale will tend to be abstracted away from the

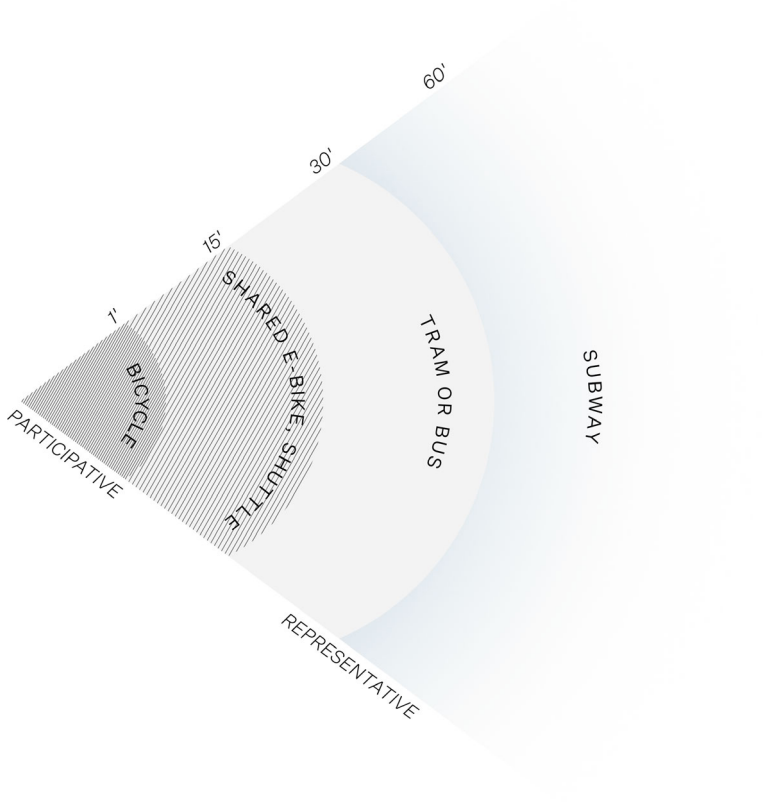


Fig. 2.9 Place layers: Nested cultures of decision-making for mobility, loosely mapped onto scale and proximity

distracting detail of particular environments, and informed by expertise. The deliberation is slower and fundamentally careful, informed by prior research, guided by officials, and governed by politicians managed through representative processes like elections. Its purpose is to produce equitable outcomes at scale across society and environment, ideally learning from experiments at the 1' and 15' scales which often cannot be truly equitable, even when they are participative, due to the way that different neighbourhoods have often been allowed to settle into different economic advantages.

The goal of urban governance here, particularly in the Nordic context of Street Moves, is not simply to trigger particular innovation experiments—a particular district going car-free, say, or a particular neighbourhood supplied with food from a more open school food system—but to spread these ideas and practices *equitably* across a city such that everyone benefits. This makes it a *strategic design* question. Yet our mistake has often been to avoid or occlude these systemic connections. Without a strategic design approach—or equivalent—these different decision-making cultures can often float free of each other or, conversely, be inelegantly and inappropriately applied. In emphasising a just, risk-averse and 'efficient' outcome for all, we inhibit particular experiments that might shift systems to another register altogether. Or put another way, we overlay the decision-making culture of the 60' city scale onto conditions that could be made at the 1' city scale. That reproduces a city bound to either inertia or *'grand projects'*, with little possibility of diverse experimentation. Neighbourhoods withdraw under an urban 'weather system' defined by the leaden grey clouds of risk aversion, sunk capital, stranded assets, outsourced public services, 'efficiency-oriented key performance indicators, and static bureaucracy, and incapable of meaningfully absorbing the insights and possibilities of increased urban diversity. Kattel et al. (2023) describe the need to reimagine such bureaucracies to allow for both long-term stability and grounded, experimental, and engaged innovation.

With the Streets mission, the Street Moves prototype provided a toolkit for everyday experimentation, a platform for asking questions in public. Those questions are open and diverse, technical and cultural. They move across HTI and enrich and expand its questions (Fig. 2.10). They can be *'How might AI-enabled kerbside management systems facilitate sustainable e-commerce logistics?'* or *'How does closing this street to private motor vehicles affect overall urban flows?'*. Or *'How does increased birdsong diversity enhance human well-being?'* and thus *'How do we design with birds and their 'system collaborators' as active participants in the process of reworking living environments?'*. Or *'How much tree canopy is required to reduce urban heat island effect?'* leading to *'How might we reforest Swedish cities?'*. Or *'How could augmented reality interfaces enable more effective citizen ownership of shared public space?' and 'How do we design participative decision-making tools, forums, processes, and treasuries at the scale of a street?'* and so on. These questions, played out on these strategic prototypes, expand 'human' to 'more-than-human', 'technology' to include trees and treasuries as well as traditional ideas of 'tech', and 'interaction' to include the multiple systemic ripple effects up and

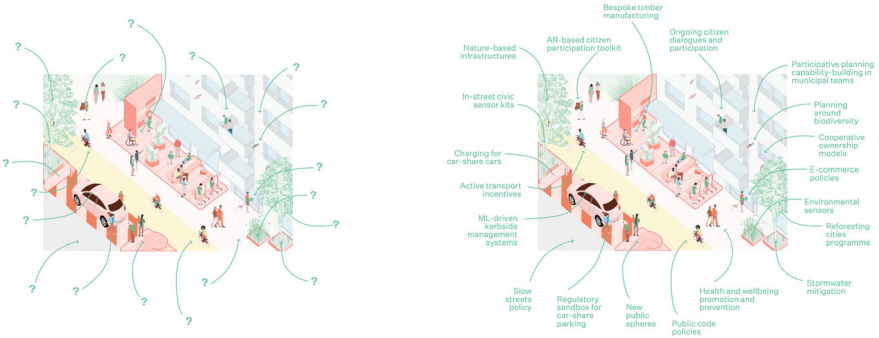


Fig. 2.10 Street Moves as a platform for asking questions in public, balancing questions for everyday technologies, such as machine learning/AI-driven logistics or civic data sensing platforms, with those of a wider societal and environmental context (drawing by Utopia Arkitekter annotated by Hill in 2022a)

down the scales, from individuals to neighbourhood to city to societal, not simply at the scale of the smartphone.

This possibility of seeing a spectrum of interlinked decision-making cultures laid out over scale allows us to explore spaces of participation *and* representation, and the complex overlaps in-between. In practice, strategic prototyping allows us to describe learning from constant experimentation at the self-organising tighter scales—yet the 'strategic' in strategic prototyping requires expanding our decision-making across these various larger scales. These scale diagrams, cutting across the instances of strategic prototypes, can be explored for other everyday urban technologies, infrastructures, and activities. As simple lenses on complex systems, they enable designers to think through how this spectrum of decision-making, interaction modes, and indeed the patterning of hard and soft infrastructures, might play out across different scales and arenas.

Indeed, we might speculate that, using mixed-reality visualisation technologies like augmented reality (AR) or virtual reality (VR)—where the ambit is usually stuck around the narrow 'user-centred-end' of the diagram—we may be able to create interactive experiences for and with citizens too, enabling them to better understand systemic interactions, relationships, flows, and externalities up and down these scales. Exploring these ideas, in relation to this mission-oriented innovation work, Utopia Arkitekter would incorporate Street Moves elements into their AR-based 'Stadslabbet' participation toolkits (Utopia Arkitekter 2021). Similarly, the author's Arup Digital Studio team had earlier produced strategic design work with Ericsson's R&D teams, which helped frame Ericsson's subsequent work for UN-Habitat around citizen participation toolkits for sustainable cities (UN-Habitat/Ericsson 2019) (Fig. 2.11). These continue to pull at threads drawn from the Helsinki-based Brickstarter project (Boyer and Hill 2013), exploring how participative decision-making for cities must move up and down these scales, but here exploring AR/VR rather than web-based civic crowdfunding platforms as the technology in question.



Fig. 2.11 Ericsson augmented reality-based citizen participation interfaces for UN HABITAT, based on design prototyping by Ericsson Strategic Design Lab and Arup Digital Studio (UN-Habitat/Ericsson 2019)

As Jamer Hunt describes in *'Not to Scale'* (Hunt 2020), these participation toolkits and practices are not only ethically motivated and civic-minded—as in, citizens *ought* to be involved in the design and development of the environments they inhabit—but they also provide better-informed, enriched, inventive, and resilient ways of carrying out design processes. Again, this recognises strategic design's potential for pointing the contemporary design toolkit at the complex shared challenges found in an urban context or concerning living environments.

> *We must all be fully engaged in a well-designed process that encourages our participation, draws upon our local wisdom, and defies the distant experts … We must create the conditions for a dexterous application of openness, receptiveness, attunement, new frames of reference, and the dogged persistence to design and design again and again and again. Small, nimble, recursive, and scattershot designing may not necessarily more quickly evolve a complex system in the right direction, but at least its self-correcting tendencies will overcome the temptation to give the system one big push … in the wrong direction.* (Hunt 2020)

As well as mobility, we can see that *energy* at the 1' City scale is now possible thanks to super-local renewable microgrids with battery-storage, whereas the 15' City scale might involve biowaste plants for district heating and cooling systems, and the 60' City scale features large generators connected to regional grids providing backup across a network, ensuring equitable and resilient outcomes overall for an energy system in a way that microgrids cannot.

These can be different parts of the same energy system, yet directly connected and working together, each with its own decision-making, ownership and operational models tuned to that scale. The decisions taken at the 1' City impacts on the required provision at the 60' City scale i.e. a network of linked lightweight microgrids can, depending on local environmental and political conditions, mean that less heavy infrastructure is required at the regional scale. In other words, more emphasis on the microgrid-end of the diagram can mean proportionally less on the nuclear power station or hydropower plant-end, and fewer transmission lines laced across the scales in-between. This opens a key possibility for transitioning away from extractive fossil fuels and highly problematic biodiversity degeneration associated with the systemic impact of traditional energy technologies. These can be different parts of the same energy system, yet directly connected and working together, each with its own decision-making, ownership and operational models tuned to that scale. The decisions taken at the 1' City impact on the required provision at the 60' City scale, i.e. a network of linked lightweight microgrids can, depending on local environmental and political conditions, mean that less heavy infrastructure is required at the regional scale. In other words, more emphasis on 'the microgrid-end of the diagram' can mean proportionally less on the nuclear power station or hydropower plant-end, and fewer transmission lines laced across the scales in between. This opens up a key possibility for transitioning away from extractive fossil fuels and highly problematic biodiversity degeneration associated with the systemic impact of traditional energy technologies.

Crucially, the dynamics of system design at the participative end of the spectrum—the 1' city scale of, say, a system of rooftop solar panels shared by an apartment block—has a tight web of human-technology interactions directly associated with it. Such systems pull energy generation into the ambit of interpersonal relations, perhaps for the first time in centuries at scale (Fig. 2.12). Here, energy might be produced, shared, and consumed in the highly local context of neighbouring apartments, for instance, and there are numerous ways that these energy-related interactions could be designed and the ways in which the system's affordances are articulated could destroy social fabric between neighbours, simply by failing to recognise that energy at

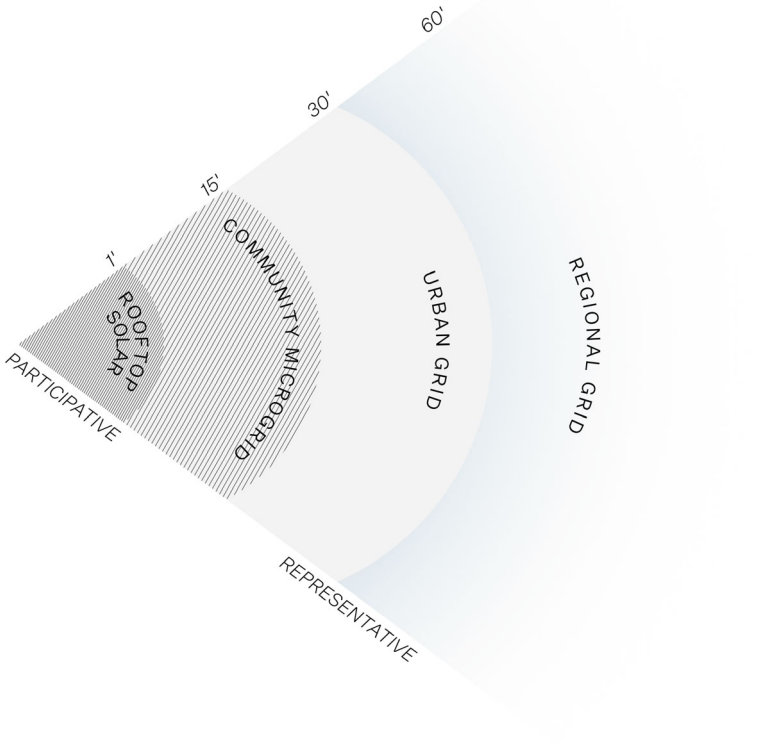


Fig. 2.12 Place layers: Nested cultures of decision-making for energy systems, loosely mapped onto scale and proximity

this scale is not simply a matter of shifting electrons as if solely a science and engineering challenge. Instead, at this scale, energy relates very obviously to discrete personal activities within a shared social context. The interaction and service design deployed at this scale, fixing the nuance of interface design as well as the underlying 'super-local energy economy' framework, must recognise the complexity of these human-energy interactions. Deploying potentially opaque technologies like blockchain-like shared ledgers to efficiently shuttle energy around locally may be counterproductive in this respect. Their computing load is likely to consume more energy than it saves, which these diagrams can highlight by suggesting a spatial and temporal distribution of that load, which is located 'elsewhere' from the perspective of consumption—but clearly still happening within the system. Further, the opacity of technologies like AI and cryptocurrencies does not generally allow for more meaningful interactions like participation, learning, and adaptation, recalling again this distinction between open and convivial technologies (Gorz 2007; Illich

1973), and those designed to work well simply for technology vendors or system engineers. A richer idea of a smart city, defined around a 'good inefficiency' rather than a 'bad efficiency' (Robinson 2020), might make different technology choices by considering these more complex interactions, drawing from a richer set of design principles and practices that incorporate societal and environmental scale outcomes. Further, the super-local solar cells sit nested within the wider systems, as energy potentially moves around this diagram, shifting in and out of local storage. With a circular material-oriented lifecycle lens applied, the materials required to produce solar cells are elsewhere again, just as their after-use destination may be, lying out of sight within further 'shadow places' (Plumwood ibid.) Energy systems at the 1' City scale thus interact with the 15' City scale, 60' City scale, and beyond—and vice versa—allowing us to consider not just the flow of electrons at point of energy generation or consumption, but the material flows that produce the infrastructures required (bringing into view their life beyond momentarily being components of an energy system), as well as the cultural, social and political dynamics that are arrayed across these systems and scales. The diagrams ask us to actively and purposefully choose not only where to deploy such technologies and infrastructures, but also why, how, and with whom. The culture of decision-making is tuned to the scale, and pace, of the technology in question, and the latter is deployed to match the possibility of systems at that scale, framed by common good outcomes.

As both these mobility and energy infrastructures are highly likely to be transformed by artificial intelligence systems, this distributed model also allows us to consider how we might build in what Deepmind co-founder Mustafa Suleyman, and researcher Michael Bhaskar, describe as the 'containment' strategies necessary to ensure safety and resilience (Suleyman and Bhaskar, 2023). For example, autonomous mobility systems at the scale of towns and villages might be best deliberately separated, via data- and code-based 'air gaps', from other autonomous mobility systems across a region or state, and indeed vehicles in other villages, in order to prevent all vehicles in the country being simultaneously activated by 'bad actors', exploiting AI's opacity and integrative potential at-scale. The same applies to energy systems and other forms of infrastructure: what happens when code starts making decisions about core foundational infrastructures like energy and water, say, outside of human intervention or governance? The possibility of connected systems sits on a knife edge in terms of resilience: distributed technologies, with redundancy, provide a form of useful resilience; yet connected systems similarly allow for 'greater than the sum of the parts' outcomes at scale. Suleyman and Bhaskar argue that AI, in potentially taking active and engaged decision-making away from human actors, or traditional forms of governance, and instead 'outsourcing' it to opaque code, could exploit connectivity with highly problematic outcomes, to say the least. The Place Layers diagrams convey a distributed model which asks us where to more carefully deploy technologies, and be very clear about *who*, or *what*, is in charge of their operations, outcomes, and adaptations. One of the key areas to develop here, moving forward, may be in recognising that human intelligences now sit amidst artificial intelligences and 'natural intelligences' (as with Watson's (2019) depiction of nature-based technologies and infrastructures). These 'other' intelligences are forms

of non-human actors, which are traditionally 'hard to read' from legacy bureaucratic perspectives, and perhaps most existing design processes. There may be intriguing, generative parallels in exploring, imagining and working within a world with these plural intelligences: human, natural and artificial intelligences entangled. Clearly, there may equally be challenges and pitfalls lurking in these tangles. Further, as with our expanded definition of technologies, an enriched understanding of infrastructure incorporates social and cultural infrastructures (Latham & Layton, 2019; Klinenberg 2018) like libraries, parks, streets and digital services, enabling practices like football or religion or gardening. An ad hoc game of street football can happen quickly and easily at the 1' City scale—jumpers for goalposts, no additional infrastructure required—without having to bother the municipality for permission. The cost is essentially zero, as is the risk and liability (given a safe street). Perhaps a sprained ankle or a broken window is the worst-case scenario. The game can disappear as quickly as it appeared, often without a trace. Its decision-making culture can be self-organised, predicated on mutual, non-financialised benefit: agile, inventive, flexible and relatively open. It can be enjoyed by a handful of people, drawn from the 1' City around (Fig. 2.13a).

Disputes can be addressed locally, exerting, articulating, and potentially enriching social fabric. It is essentially a participative culture, capable of producing immediate and diverse forms of value. Yet the same theme (football) at the 60' City scale plays out as a large football stadium serving a population of hundreds of thousands of inhabitants, across a regional scale. The capital and operational cost is enormous, the material expensive, and often extractive, the timeframe is long-term, and so the risk is high. Again, the decisions involved in making such a stadium cannot be 'got wrong'. Therefore, the decision-making culture abstracts 'upwards' away from the detail on the ground. It is essentially representative in nature. Similarly, settings for religious practices can exist at the 1' City scale of a tiny shrine tucked into a gap between buildings on a Japanese backstreet, or a local mosque at the 15' City scale, a large church at 30', or a major cathedral at 60'. Designing, making and maintaining these different settings requires quite different decision-making cultures (Fig. 2.13b). Gardens—or more broadly greenery, flora, productive growing, and regenerative biodiversity—can be a simple shared verge of tomato plants at 1' City scale; allotments at 15' City; inner-urban farms at 30' City; or an ecologically significant wetlands at 60' City. Tributaries of river systems long-culverted or denuded due to the practices of top-down abstracted city planning—60' City decision-making cultures played out carelessly, affecting all scales—can now be 'daylighted', revealing the flows between these scales and recognising that they are continuous systems, interwoven with each other (Fig. 2.14). That daylighting perhaps best starts with local 1' City participative processes and prototyping, as community-led regeneration (Bush 2024). The 'strategic' in strategic prototyping, however, has one eye on that broader wetland scale of the 60' City, typically managed by environmental protection agencies or municipal water companies, at the same time (Hill 2023a).

This example indicates that the Place Layers diagram can also be used to foreground questions of agency, responsibility and care. For instance, whilst the multiple forms of value unlocked by enabling and facilitating citizens to take care of their

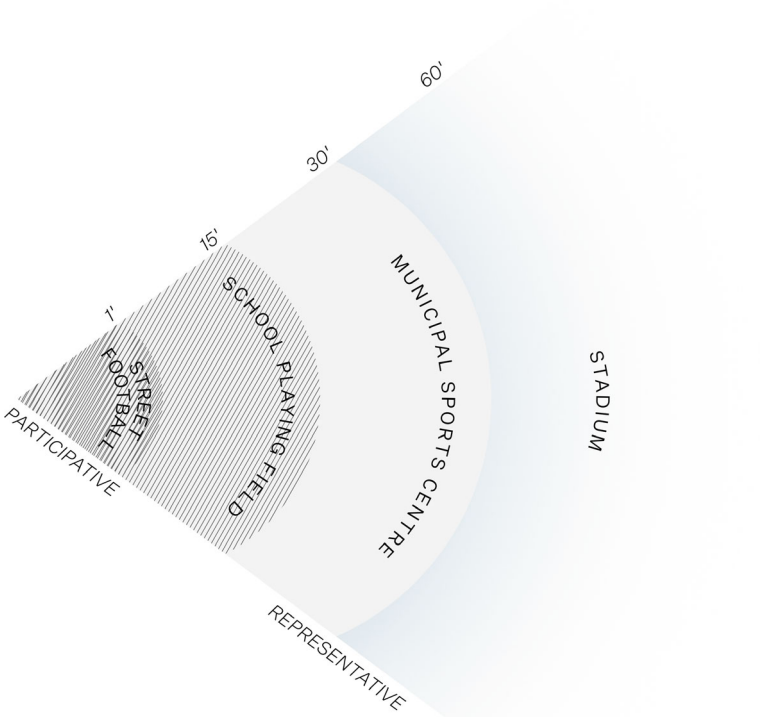


Fig. 2.13a Place layers for culture and systems over time/scale, example of football

immediate environment may be clear, it is also important to ask *'What is reasonable to ask citizens to do, in terms of care?'* Some citizens may not have time, capacity or wherewithal to be involved in looking after their neighbourhood creek, for example. The writer Jenny Odell, in her study of Friends of Sausal Creek in Oakland, California, notes that it is wealthier neighbourhoods that frequently have the resources to instigate community-led regeneration of creek systems, despite the more pressing need for such environments typically being in less-wealthy neighbourhoods (Odell 2019). Similarly, it is reasonable to ask what a municipality's or regional government's responsibility is: *'What can it do, in terms of care and repair, that citizens alone cannot?'* Strategic design of systems must include questions of scale, capacity and public purpose of the entities involved, including their implicit power relationships. HDL's speculative design prototype Brickstarter explored and discussed this complex set of overlapping relationships implied in participative urban projects (Boyer and Hill 2013). The Place Layers diagram might provide ways of sketching out such relationships, scribbling in different actors across its interrelated

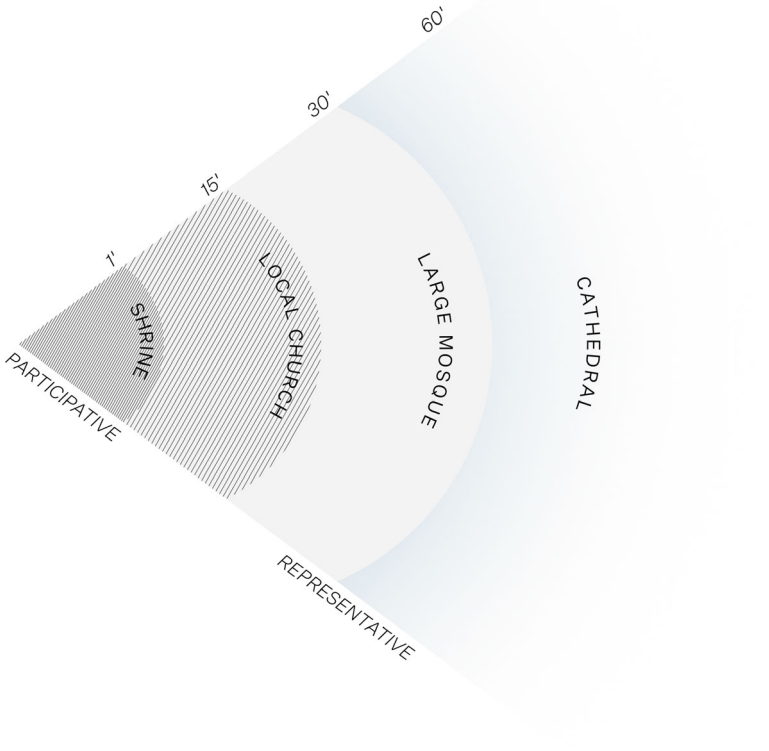


Fig. 2.13b Place layers for culture and systems over time/scale, example of religious practices

scales. Further, forms of expertise could be mapped across the diagram, recognising the embedded place-expertise that citizens have of the 1' City scale (*'the street designs the street'*) versus the different forms of expertise that a professional at an environmental protection agency may have at the watershed scale. Again, the Place Layers diagam's job, via its indication of blurring and nesting, does not situate expertise in hermetically sealed silos of scale—as if *'citizens know nothing of watersheds, and urban ecologists know nothing of backyards'*—but implies the possibility of recognising these different forms of expertise, moving up and down scales in complex, open relationships with each other. But the earlier critique that *60' City decision-making cultures* have been inappropriately applied to *1' City backyards and streets*, for example, might be seen here too; that tendency to professionalise and 'abstract away' from super-local, experiential, vernacular, or indigenous forms of expertise, and undervalue them as a result. Sassen (2013) suggests that formalised, abstracted bodies of knowledge embodied by organisations—like municipalities, environmental

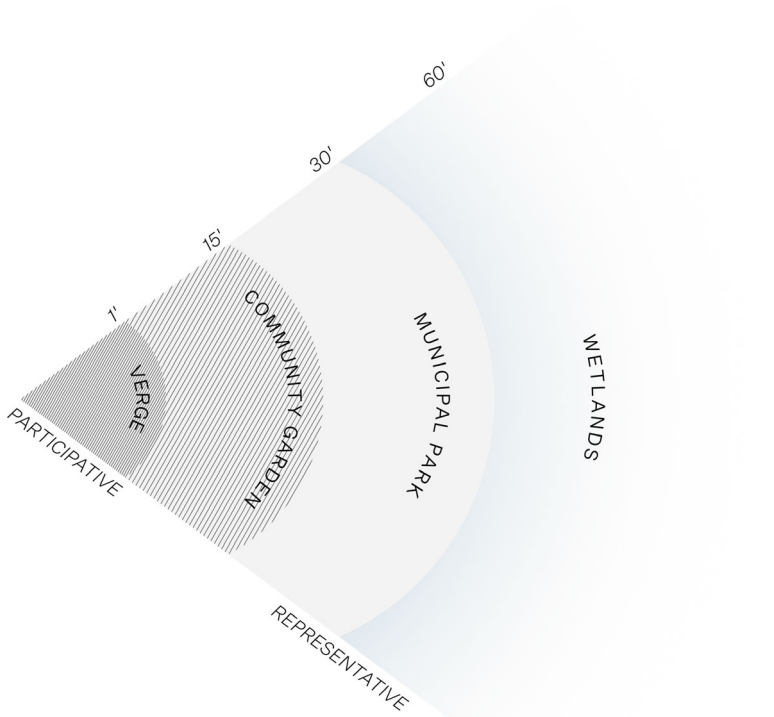


Fig. 2.14 Place layers: Nested cultures of decision-making for biodiversity systems, loosely mapped onto scale and proximity

protection agencies—that hover at that 60' City scale might benefit from meaningfully interacting with these other forms of expertise: *"Bringing these bits of street and neighbourhood knowledge into standard knowledge systems would unsettle such organisations and open them up. Central city government agencies could learn things about the city they simply are not well positioned to access. Eventually this might enable at least some neighbourhood users to develop versions, even if simple, of open-source technologies aimed at incorporating diverse bits of knowledge and diverse knowledge practices from even children, homeless people, or neighbourhood grandmothers. Whilst none of them is an urban expert, each has specific knowledge about their place. All of this in turn might activate additional elements of both knowledge practices and technological practices, generate more engagement by city residents and more cross-neighbourhood comparisons. Ultimately it can scale up to city level, but from the ground up, leading to exchanges and collaborations and on to a fully mobilised neighbourhood and city culture."*

The Place Layers diagram is a simplification, of course. It is generative rather than literal in intent; it is not designed to trap thinking, but free it. Scale is being elided with time, time with pace, time and pace with culture and materiality, culture with community and bureaucracy, and so on. Scale is not necessarily literal, either, with 1' City clearly a deliberately vague and open definition, recognising the value of looser, 'non-Euclidian' perceptions of space and place, folding in urban and natural relationships as layered articulations of social and economic relations across various scales (Froy 2023). In its implied complexity, we might imagine a blurred, shifting gradient between overlapping conditions, rather than formal definitions of space, as it tries to sidestep the 'spatial boundaries' sometimes misconstrued in the 15' City precedent. These scales are nested and overlapping. They ask us to consider the decision-making cultures based on scale and time together, along with activities, infrastructures, materials, and outcomes. Taking the example of the timeframes present at the scale of a street, for example, the brief life of a butterfly fluttering through the verge is thus 'within scope'—part of strategic design's ambit—at the same time as the diurnal rhythm of morning birdsong, seasonal variations, four-year electoral cycles, motor vehicle replacement rates, apartment tenures, and the multi-century lifespan of trees. As all these things *are* related, no matter how loosely, these diagrams allow for these shifting rhythms to be plotted loosely over these scales, to better understand relationships between these interdependent systems. These diagrams represent the increasing ambit, purpose, and responsibility of design, as we recognise this intrinsic interconnectedness. They suggest practices for connecting across these time–space scales, as well as foregrounding the responsibility to address, and ultimately reframe, how various technologies—again, broadly defined—might relate to, interface with, and exchange with each other within these nested spheres of influence and interaction. Technologies might be distributed around and across these diagrams, sketching out how their emergent relationships might interact with each other, and other systems and cultures. As Debbie Chachra has written, they might suggest an extended relationship of care, and of shared resources and relationships, well beyond the myopic 'user-centred-end' of the diagram, working up and down systems and scales from super-local to global and back again: *"We need to have a conception of infrastructural citizenship that includes a responsibility to look after each other, in perpetuity. And with that, we can begin to transform our technological systems into systems of compassion, care, and resource-sharing at all scales, from the individual level, through the level of cities and nations, all the way up to the global."* (Chachra 2021).

Strategic design's job is to move carefully and meaningfully up and down the gradients in these diagrams, drawing multiple perspectives together. Its responsibility is to communicate with, collaborate with, and help align all these discipline. In the diagrams, the strategic designer's view is suggested by a fan-like field or view through a lens, connecting across scales, contracting and widening as it zooms back and forth, engaging 'hard and soft eyes' (Hill 2018). This lens allows strategic design to help form plans, polities, projects, and products across an appropriately diverse range of paces and scales, tangling together systems across interdependent places. It also moves design into a more productive position, of both strategy and responsibility. It might allow for different cultures of decision-making to be deployed holistically,

with positive system impacts that remain culturally attuned, and balancing invention and innovation with societal and environmental common good outcomes.

2.3 Strategic Design and Mission-Oriented Innovation

The mission-oriented innovation techniques that underpin the Street Moves example indicate how strategic design might be deployed in practice. It is worth briefly reflecting on the positioning of mission-oriented innovation, as the context for this work. Mission-oriented innovation has grabbed the attention of many an innovation policy expert over the last decade (Borrás and Edler 2020; Mazzucato et al. 2020), framed as a versatile innovation policy toolkit that can address the urgent challenges and 'wicked problems' implicated in the UN Sustainable Development Goals and related politically agreed policy goals such as the Paris Accord. As a result of its pragmatic yet visionary positioning, missions have also garnered significant attention outside of the relatively niche world of innovation policy. It has been locked into regional approaches, such as Horizon Europe's research and innovation agenda, as well as many local and national government strategies and industrial competitiveness agendas. Practitioners in multiple sectors—industry, government, community—appear to increasingly share the perspective described earlier: that existing policy tools, governance cultures, and innovation practices are not equipped for unprecedented yet necessary and urgent societal systems change.

The emergence of 'missions', with their focus on systemic, delivery-oriented, and ambitious approaches to research and innovation, *'seek(s) to balance overall goal-setting with bottom-up experimentation and open-ended pathways on how to achieve the goals'* (Kattel and Mazzucato 2023) deriving diverse portfolios of actions in order to achieve shared goals from cross-disciplinary and cross-sector collaboration (Kattel and Mazzucato ibid; Larrue 2021; Fisher et al. 2018; Wittmann et al. 2021; Hekkert et al. 2020). Yet despite the academic interest within innovation policy, until recently there were few examples of mission-oriented innovation in practice, documented and dissected. There is little in the way of what SITRA's Strategic Design Unit described as useful *'legible practice'* (Boyer et al. 2013). As a response, from 2019 to 2022 Vinnova, the Swedish government's innovation agency, devised and facilitated a mission-oriented innovation process, from 'blank canvas' through to system prototypes and demonstrators 'on the ground' as a form of trial of mission-oriented innovation in action. In doing so, Vinnova was attempting to build out the 'ground game' around mission-oriented innovation, 'learning-by-doing' on real projects whilst evaluating and discussing the methods being developed. As we were also consciously introducing new techniques into the innovation agency, this learning-by-doing approach was also part of broader organisational transformation, engaging many at Vinnova and other agencies across the Swedish government beyond.

This work is described in detail in Hill (2022a) and so the background context, missions theory, practices, and localisation need not be repeated here. However,

taking a consciously strategic design-led approach allowed us to foreground the conditions—the organisational, cultural and political 'dark matter' (Hill 2012)—that missions, and indeed Vinnova itself, sat within. This meant that a critical agenda was coursing through the work, assessing the validity of the 'moonshot-like' organisational and political dynamics that missions are sometimes associated with. We reflected upon Richard Nelson's essay *'The Moon and the Ghetto'* (Nelson 1977), written at the point that the Apollo programme had become almost mundanely effective. Nelson's point was that getting to the Moon was in fact easy—merely a technical challenge—compared with the much harder challenge of 'fixing the ghetto', to use the essay's 1970s terminology.

As Mazzucato notes in her 'Mission Economy' (2021): *'One could argue that the first generation of mission-oriented policies followed a 'big science meets big problems' maxim that worked spectacularly well in some instances (e.g. the space race). In others, it created inertia or, worse, long-term problems (e.g. nuclear energy.) Applying mission-oriented thinking in our times requires not just adaptation but also institutional innovations that create new markets and reshape the existing ones. And, importantly, it also requires citizen participation'*.

Similarly, Farley et al. (2021) suggest that repeatedly deploying science- and engineering-framed systems thinking into the social and environmental contexts of jails, highways and oceans has produced only ever-diminishing returns. Drawing from these critiques of existing methodologies, the Vinnova approach was fine-tuned to deal with complex adaptive systems, a highly distributed political structure, the social and cultural context of Sweden and the Nordic region, and the need for unprecedented forms of deep collaboration and participation, as described in the 'Designing Missions' playbook (Hill 2022a).

The idea of the 'playbook' recalls sport, to some extent, with its balance of capability-building through practice, planning towards goals, collective teamwork, technology and systems, but which also places an emphasis on individual agency within a team, of improvisation, adaptation, and chance. This is a metaphorical terrain shared by many aspects of design practice, of course, as well other related cultural pursuits, such as cooking, gardening, and music. These analogies suggest that wrangling complex adaptive systems may have characteristics akin to working with food, with natural ecosystems, or with collective cultural production, rather than the typical terrain covered by a Masters of Business Administration (MBA). This indicates that there are different trajectories for leadership cultures that might yet be more fruitfully pursued (Hill 2023c).

The Vinnova playbook included definitions, and description, of techniques for visualising mission portfolios, systems strategies, platform, and participation models. Particular techniques, such as actors workshops, speculative narratives, collective drawing, and reframing exercises (modifying Doorst 2015) were tested and interrogated as to their efficacy. Each of these techniques were constructing 'lenses' through which existing systems might be viewed differently, allowing for assumptions, habitual practices, or unexamined default settings to be revealed—what Steinberg describes as an organisation's *'status quo "way of doing"'* (Boyer 2020)—and thus rethought, replaced or revised.

Vinnova engaged up to 400 different stakeholder organisations in 'actors' workshops' (Hill 2022a), whilst observation techniques and systems thinking were cultivated amongst these 'actors', including diverse ways of reframing policymaking environments drawn from open-source software production cultures. Leverage points (Meadows 2008) in systems were identified and developed in 'design workshops' with further stakeholders, from public, private and third sector working in collaboration. Speculative design techniques—such as open-ended future-oriented narratives, in which participants were prompted to imagine and constructively critique possible futures for these systems—were woven alongside analysis of technological, organisational, and political structures and dynamics, via hands-on facilitated sketching and reframing sessions. These techniques were often drawn from design practice, particularly building on human-centred design and citizen participation practices, but crucially they were reworked for systemic challenge contexts: as per the framing of strategic design posited earlier. Ultimately citizens themselves were heavily involved in mission delivery, and Mazzucato and Kattel (2023) note that Vinnova's participative approach had been produced in response to *'criticism of typical technocratic policy design processes'* instead designing a deliberate approach tuned for deep societal collaboration and place-based engagement.

In doing so, the practice attempts to 'solve for' the limits of distanced and abstracted engagement, of strong but separated silos of technical expertise organised around discrete and compartmentalised science-led forms of knowledge, and of the inability of typically linear 'roadmaps', and broader policy and planning cultures to flex and adapt in the face of complexity and uncertainty. Design's relative comfort with ambiguity is useful here. As Dougald Hine writes in *'At Work In The Ruins'*, the role of art, and arts more broadly, is not to eradicate uncertainty and ambiguity but *'to complicate matters'* (Hine 2023). Design can also encounter and absorb this necessary 'complication', but within the *ambit* of multidisciplinary perspective—roaming across science, engineering, arts, and humanities—as well as a multiperspectival field, by opening up participative processes to human and non-human actors, and with the *ambition* to produce trajectories for possible futures, creating settings—such as these simple yet systemically complex prototypes of the Street mission—in which to encounter these ideas.

The resulting portfolio of initial actions in each mission theme were akin to what UNDP's Milica Begovic describes as *'a mechanism that gradually resolves/explores uncertainties about system dynamics through learning and adaptation and ongoing sense-making, rather than a series of "fixes" to a well identified set of problems'*. (Begovic 2020). The methodological emphasis on using lenses and frames to identify 'levers'—existing pre-installed contexts and types in society, which can be retrofitted for innovation activity—may be an innovative part of the missions strategy here, particularly when combined with a platform strategy which attempts to ensure that interventions scale beyond single prototypes. These techniques are drawn directly from design's engagement and research practices, yet reframed for public policy context (Fig. 2.15a).

This portfolio was developed into system prototypes, for both mobility and food missions. These system prototypes are examples of the 'mechanisms' Begovic refers

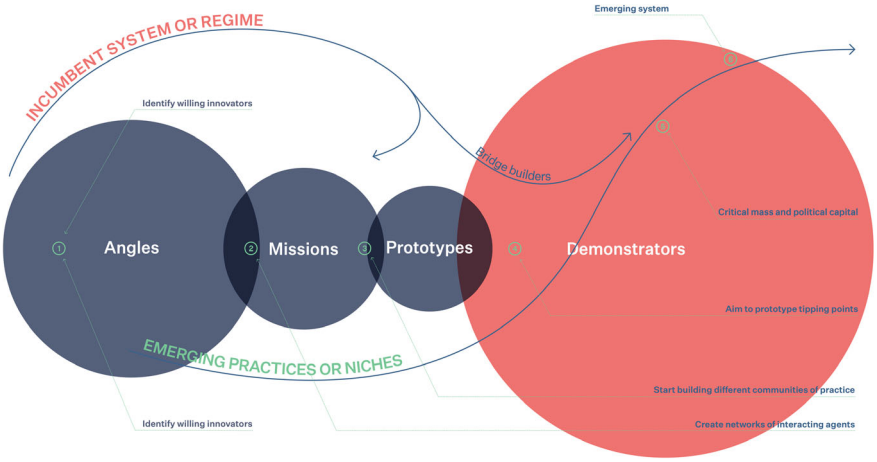


Fig. 2.15a Transition theory mapped onto missions framework (Hill 2022a)

to touching the ground—the Street Moves project described previously gives a sense of how some of these prototypes manifested themselves. The insights generated from their deployment are intended to guide the design and creation of larger-scale system demonstrators, themselves acting as umbrellas sheltering and encompassing the interplay between prototypes. These demonstrators, then, have the potential to be multi-system vehicles for ongoing research in public. Policy labs and regulatory sandboxes were evaluated as part of the mission work, whilst adaptive design principles ensured that highly participative approaches to interventions were produced, enabling prototypes to evolve based on feedback loops. These interventions continued to engage actors within governance and the public sector, as well as private and third sector, to ensure the societal outcomes envisaged by missions could be pursued. In turn, these practices help build, or re-build, public sector capability in highly participative approaches, following the agenda set by Sherry Arnstein's ladder of participation (Arnstein 1969), oriented around local ownership.

The mission pilots played out in two key social infrastructures (Klinenberg 2018) central to Nordic environments: streets and schools. By pulling focus on the infrastructures of everyday life and their potential re-patterning, mission-oriented innovation at the tangible, local scale of neighbourhood 'touchpoints', in the language of service design, might also help shift systems at far larger scales (Hill 2023b). (This emphasis on diverse social infrastructures at neighbourhood scale, from which to orchestrate mission-oriented systemic transformation, was not only the subject of 2023 Oslo Architecture Triennale (Cook and Pagh 2023a, b; Hill 2023b) but also provides much of the impetus for the Oslo School of Architecture and Design (AHO) course 'Strategic Design for Society'.)

Aspects of the Street mission have been described earlier, as the project environment from which the One-Minute City idea emerged. Reframing streets as our largest public space, and understanding that each street in the country is connected to every

other, allowed for national systems-scale potential as well as immediate and palpable change. It could draw the technologies and infrastructures of everyday life together in highly tangible ways, as streets are where many, perhaps most, systems 'collide' in cities. It could move from prototypes in a handful of Stockholm streets to enabling and inspiring similar examples in multiple cities across the country within months (and even travelling overseas). It enabled multiple forms of value, quantitative and qualitative, to be understood as embedded within a system that was previously narrowly understood in traffic engineering terms, leading to subsequent projects on the 'value model of streets' which continue today. It was built on meaningful engagement from all three levels of government, whilst eliding very different 'verticals' in terms of discipline and areas of responsibility, as well as drawing on consistent support from commercial actors like Volvo Cars and Voi, a Swedish micromobility startup. Street Moves, the core prototype, was complemented by several other interventions, from cultural activities like commissioned documentaries through to new tools for policymaking—as described in the visualisations in *Designing Missions*—just as the overall Streets mission was complemented by another mission running alongside: 'REEL', which focused on electrifying the trucks made by Volvo, Scania, and others that comprised much of Sweden's logistics systems. As such, as a mission, it led effectively to systems demonstrator stage, as multiple prototypes could be threaded together, across numerous forms of intervention and enquiry. It continues to run today, some years after the official mission pilots have paused.

The other core mission theme, Healthy Sustainable Food, was most significantly pursued by the School Food mission. As with Streets, this is an example of the 'lever' strategy described in the playbook. The annual budget for school food in Sweden is twice that of the innovation agency's budget, revealing a large-scale system already deployed across the entire country. Some 2.3 million meals a day are served through the public meals system in Sweden, largely by municipalities, for schools and aged care facilities combined. This immediately suggests the school food system is the better 'budget line' to locate innovation projects within, not least as significant existing funds may be reoriented towards the mission's broader 'common good' outcomes, but that the system's infrastructures, touchpoint and activities might be realigned too. It would require innovation projects to work with existing investments, policies, and agencies, rather than trying to sidestep them. This approach also foregrounds the question of legitimacy, by working within Swedish democracy's existing structures, and producing systemic change nonetheless.

The 'lever' strategy reorients an existing system towards different outcomes: in this case, not simply safe, nutritious and cheap school food, but healthy, sustainable, engaging, educative, and tasty school food—which is *also* safe, nutritious and affordable. This opens up the possibility of systems-level financing, offsetting delivery costs against the richer forms of value that might be generated, such as public health, environmental sustainability, and social fabric. It may also overcome a traditional blocker of innovation in public sector contexts: inability to raise additional project funding outside of service delivery (Fig. 2.15b).

The 'actors workshops' within the food mission design process had included food production companies like Oatly and 'foodtech startps', as well as farmers'

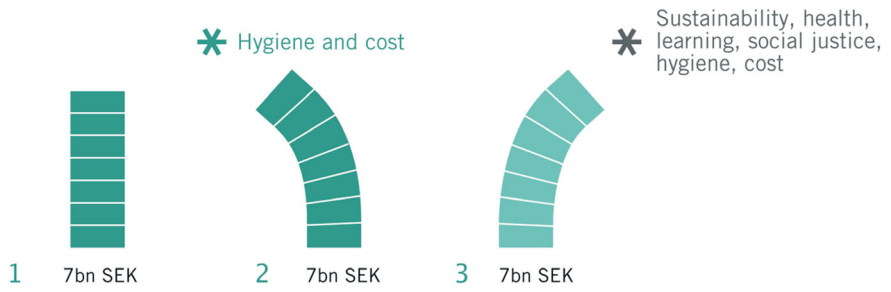


Fig. 2.15b Lever strategy, bending the direction of existing school food funding towards holistic system outcomes

unions, think tanks, teachers and students, and representatives from all three levels of government. Working across existing actor-networks in this way can be seen as in line with contemporary thinking on systems change, such as sustainable transition theory (Geels and Schot 2007) or Two Loops Model, as illustrated by diagrams of Vinnova's strategic design process for mission-oriented innovation (Hill 2022a) overlaid onto these transition techniques. They broadly indicate how some aspects of incumbent 'regime' systems, and their deployed technologies, infrastructures and ideologies, might be 'excavated' and reoriented alongside emerging practices—or 'niche' actors in transition theory—in order to produce different communities of practice. Vinnova's mission-oriented methodology explicitly uses a design process dynamic, of research into prototypes into system demonstrators, in which transition theory might be productively situated.

Subsequently, four different municipalities were engaged in co-designing school food-related system interventions after an open call for expressions of interest from multiple government agencies working together. Service design agencies augmented the Vinnova team, to support these municipalities, yet as with Streets missions, a participative agenda involved schoolchildren leading as key actors in mission design and delivery, enriching the idea of expertise and where—or in whom—it might be found. The role of the strategic designer shifts, reinforcing Manzini's (2015) view that *'the role of design experts is to feed and support these individual and collective projects—and thus the social changes they may give rise to'*.

Both streets and food are instructive and 'usefully complex' choices for systems exploration as they are cultural arenas, first and foremost. As such, they do not easily lend themselves to the narrowing efficiency logics of recent governance cultures (Kattel et al 2022). Culture is slippery, ambiguous, uncertain and incomplete, changing fast and slow, largely unpredictably. These are not qualities that bureaucracies tend to handle terribly well. However, they are, as noted earlier, at least within the *province* of strategic design (Fig. 2.16). As systems, streets and food contain technologies, infrastructures, industries, economies—yet they are not *about* these things. As with cities generally, streets are about conviviality, community, commerce, contestation, culture. Yet an overly-technical approach to streets has led to these aspects being diminished in favour of the easily-manageable metrics

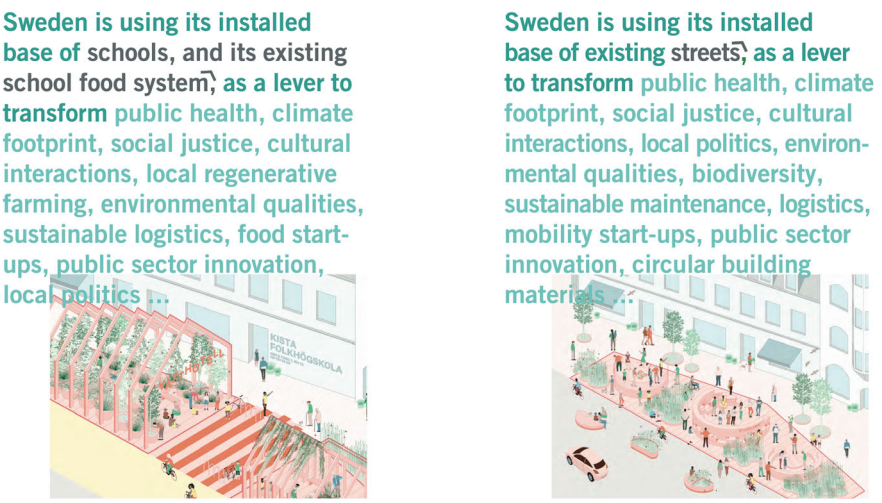


Fig. 2.16 Mission-oriented innovation strategy applied to existing everyday technologies, from Vinnova's missions playbook (Hill 2022a)

(where '*success equals number of cars per hour minus number of deaths per year*'); an engineering- or 'New Public Management' culture (Kattel et al. 2023) rather than culture per se.

So placing streets and food at the centre of mission-oriented approaches to tackle climate breakdown, public health, and social justice simultaneously presents a meaningful challenge for mission-oriented innovation led by the public sector.

In this, the work draws from Angus Deaton's critique of generic approaches to *'finding out what works'*, rather than dealing with context and values (Deaton 2020). Missions, as interpreted by Vinnova at least, provide a way of addressing systems change by approaching culture, values, and community in context, and so strategic design's role—with its emphasis on designing conditions—includes building capability in systems, across public, private and community sectors.

The exploratory nature of Vinnova's strategic design work meant that the role, positioning and activities of the innovation agency itself to be questioned and explored—and ultimately encouraged to evolve. Vinnova now had new tools to work with, but the processes also led to an ongoing series of discussions about *what an innovation agency was*. Again, this is strategic design's emphasis on *conditions*, on the dark matter of organisational culture, capability and context, including that of governance itself.

Similarly, the Vinnova missions allowed the idea of new organisations beyond the innovation agency to be, in effect, informally '*rehearsed*', as the missions brought together a kind of virtual team around the activities. This implicitly suggested a 'Ministry for Streets' as a transdisciplinary organisation capable of moving across challenges of mobility, culture, commerce, environment, politics, and so on, composed of the various actors in the mission team. This multi-perspective approach,

built from diverse capabilities and interests, would clearly be different to the municipal Department of Transport, or equivalent, that typically regulates streets, currently, with its monofocus on traffic. In effect, by organising around the more holistic concept of 'the street as system', the mission could be seen to be roleplaying such an organisation into life. (We would sometimes joke we were 'cosplaying' at such a Ministry of Streets.)

In terms of the food mission, Vinnova colleague Jenny Sjöblum, working on food systems, pointed out that the mission had led to clear organisational and governance shifts: *'Getting government financiers to synchronise their efforts may sound obvious, but it's not. Getting 10 regulators to agree on goals for a sustainable food system, a huge achievement'*. (Sjöblum 2023)

The groundwork produced by the school food mission has developed into a joined-up mission between the national innovation agency Vinnova and regional development agency Tillväxtverket (2023), as well as the national food agency Livsmedelsverket joining forces with the public health agency Folkhälsomyndigheten on national targets for healthy food consumption (Sjöblum 2024). These organisational shifts are highly significant in a governance and administrative tradition (Peters 2021) attuned to strong national agencies engaging across systems. As outcomes, the school food mission progressed from matter (the prototypes) to dark matter (the organisational shifts), setting the table for subsequent systemic change activities. In this spirit of strategic design, ministries, or equivalent, can be designed just as much as streets or schools, as the following section, concerning the speculative design of a 'Ministry of Meaning', will describe. The systems change methods summarised by Farley et al (2021) provide useful insights as to the nature of this organisational reinvention work. In particular, they discuss the implications of emphasising socio-political contexts that are *"diffuse, messy, and ambiguous, entailing multiple pathways" and "possibilities", "subjective realities, hidden power relations", "learning and identifying and building on local knowledge", "adaptive explorations mostly (defying) any single institution's control", "no defined timeline nor pre-defined end-states, with shared visions guiding ongoing learning", "managing risk by making smaller bets", "shaping (locally possible) probabilities (that) can be scaled", improving "local decisions…meaningful progress" and refining "assumptions about social context."*

Whilst design was barely mentioned by Farley et al., these characteristics would seem very much in line with those descriptions of contemporary design methods (Cross 1982; Hill 2022a; Stolterman and Friedman 2015; Valtonen 2020) and were positioned by stark contrast to what might be characterised as engineering- and science-led cultures. This allowed for an evolution of missions practice, too, as Farley et al.'s suggestion of *'no defined timeline nor pre-defined end-states, with shared visions guiding ongoing learning'* was in line with the Vinnova approach.

There has been significant international and national media interest in the tangible outcomes of the Street mission in particular. Some of the toolkits have also helped frame European Commission Horizon Europe missions and their related New European Bauhaus programme, and the work has been frequently discussed as a case study in innovation policy circles, including with UCL IIPP, OECD Observatory on

Public Sector Innovation (OPSI), UN Development Programme (UNDP), Transformative Innovation Policy Consortium (TIPC), and others. Beyond Sweden, it has influenced mission development programmes across the Nordic region in particular, helping develop a shared Nordic mission around food with EIT Climate-KIC and Nordic Council, as well as influencing mission development approaches in Denmark, Norway, and Finland, but also influenced the mission toolkits emerging outside of Europe, from Brazil to Australia.

Finally, Mazzucato and Kattel (2023) have reflected upon the various mission-oriented innovation endeavours of recent years, in order to evaluate overall progress as well as review the various different modes and methods that missions have been pursued with. They note the key role of strategic design within the Vinnova approach: *"Vinnova, established in 2001, can be seen as a relatively standard innovation policy agency, advising the government on innovation policy, and designing and implementing innovation support measures. However, as it turned its attention to mission-oriented innovation policies in the late 2010s, Vinnova did something quite different to standard innovation agencies. It created the director of strategic design position and hired a designer for this post."* Boni et al (2023) reached a similar conclusion, noting that *"Vinnova's leadership recognised that this type of work implied a different approach to policymaking, by experimenting with strategic design methods that integrate upfront complexity and uncertainty in the policy instruments design."* Mazzucato and Kattel (2023) reinforce this sense that strategic design's role includes a reframing of design itself, particularly in the context of governance drawing from practices derived elsewhere, which they describe as *"the adaptation in the public sector of new working practices from (strategic) design, and agile software development practices from private and third sectors."* Mission-oriented innovation, at least in this Swedish case study, provides a further example of the possibility of strategic design in explicitly redirecting design practices for shared societal challenges. Given the similarities and differences in context, the work led by Vinnova's strategic design function provides a usefully illustrative counterpoint to the Finnish case at SITRA's Helsinki Design Lab a decade earlier, two points of a particular arc within contemporary strategic design practice for public purpose.

2.4 The Ministry for Meaning: A Speculative Vision for the Public Sector

In January 2023, the *'Ministry of Meaning'* project emerged as a groundbreaking initiative between the Swedish Public Employment Agency's innovation department and EY Doberman's future manifestation lab SALLY. This collaboration was spurred on by a critical recognition of the lack of visionary and creative approaches within the public sector in Sweden, particularly in the face of increasing budget cuts and growing fears around the possible negative implications of artificial intelligence (AI).

Using speculative design techniques, the team was able to explore multiple extreme and divergent futures, imagining how they might manifest themselves in real-world settings, creating conversations around what kind of society we are creating—again, connecting technologies to broader societal and environmental layers—and discussing how the public sector might reinvent itself to better respond to our shared challenges.

By creating and enacting a fictitious *'Ministry for Meaning'*, the team was able to expand the Public Employment Agency's narrow focus on employment to a more holistic one, focused on helping people find their *Ikigai*—a Japanese concept meaning a sense of purpose, a reason for living—and lead more meaningful lives. Cross-sector collaborations made it possible for people to spend time working on societal missions and the integration of AI into the organisation freed up time for employees to focus on stewardship rather than control (Fig. 2.17). The project was a daring exploration of speculative design's potential to radically rethink how the public sector could evolve to better meet societal needs in the face of rapid technological and social change.

The project unfolded through a meticulously structured three-phase process. The first, 'Signal Scanning', engaged the team in deep research to capture both the strong and weak signals shaping the future of employment and public governance. This involved consulting with various experts and hosting transdisciplinary workshops aimed at identifying and understanding the possible implications of those trends. The second phase, 'Scenario Design', saw the team pushing beyond the boundaries of imagination typically applied to public sector contexts, creating extreme future



Fig. 2.17 A progressive future lab (speculative prototype) from SALLY's ministry for meaning

scenarios that challenged conventional wisdom around work, technology, and societal well-being. These scenarios were then used as a foundation for a third 'Experience Design' phase, which sought to manifest a future scenario into a tangible, immersive installation that could provoke, inspire, and engage the public directly as well as project participants.

The installation, set up at the Swedish Public Employment Agency's headquarters, was a huge success, drawing attention far beyond initial expectations and sparking vibrant discussions amongst visitors on issues like the systemic consequences of a 12 h work-week, whether the state has any role to play in people's inner lives, and why the current political climate in Sweden seems so poor in imagination. In the spirit of strategic design, we wanted to help people zoom out from artefact, oriented around the individual scale of interaction and service design, to the wider circuits and broader ambits of systems and culture at societal scale. This meant asking questions around how decisions are made today, how institutional fear stands in the way of experimentation, and what role future scenarios could play in the boardroom.

Reflecting on the project's achievements, the Ministry for Meaning's legacy has inspired the Public Employment Agency to further integrate speculative design into its strategic planning efforts. The initiative has also stimulated broader interest in the application of speculative design across the public sector, offering a compelling example of how imaginative, interdisciplinary approaches can illuminate new pathways for addressing complex, systemic challenges. Alongside Vinnova's food and mobility mission pilots, the Ministry for Meaning provides an indication of the transformative potential of speculative design in envisioning and catalysing change within the public sector and beyond, emphasising the critical need for creativity, bold thinking, and collaborative exploration in navigating the uncertain terrains of our future.

2.5 Conclusion

The related practices of strategic design and systemic design, in common with many emerging contemporary currents within design practice, increasingly describe a shared landscape for design, moving beyond the traditional HTI approaches within technology-led design and development. As discussed, reflecting design's broader purpose and responsibility in the context of our shared, systemic challenges, design is expanding its practices and perspectives. In terms of *'human-technology interaction',* this means:

- enriching the narrow focus on *'human-'* to now incorporate *more-than-human* pluriversal perspectives, and beyond the *'user'* to consider societal, systemic, and environmental perspectives;

- expanding our idea of *'technology'* by redefining as, after Le Guin, the *'active human interface with the material world'*, allowing in a richer, more diverse history and future of technologies than is usually considered within human-technology interaction*;*
- widening our scope of *'interaction'* to recognise those interactions and relationships between and within systems, beyond the narrow sphere usually defined around product, service, and space.

By taking this context of the emerging practice of strategic design for public purpose, and the widening and systemic scope of its work, the field of human-technology interaction thus takes on a richer, expanded definition. The case studies, prototypes, and practices discussed here all embody aspects of these shifts. Vinnova's mission-oriented innovation pilots—explicitly strategic design-led—indicate how to create civic platforms for ongoing experimentation for public purpose. They provide a fulcrum for bringing together public and private technologies, from electric vehicles, e-scooters, food innovation, and e-commerce logistics through to wooden platforms, playgrounds, gardens, and schools. Building on theories of Brands's pace layers, and the 'Saarinen principle' to create **Place Layers**, they enable systemic integrated responses across multiple layers of change, allowing new technologies (like e-scooters) to be positively absorbed into old ones (like public parking places on streets).

The projects also bring together public, private, and civic organisations, creating new forms of organisational and political logics and practices, whether policy-making or community-led activities. SALLY's *Ministry for Meaning* speculative design case provides an imaginary for these new forms of organisation. Connecting Vinnova's speculative design to SALLY's indicates the potential for design to invent and create conditions and settings in which to encounter possible futures, located in infrastructures of everyday life.

The case examples also begin to suggest that strategic design itself might become a pivotal mode of extended practice within this context, helping reposition and connect human-technology interaction to the wider circuits of systems, cultures, and environments. In doing so, newly hybridised forms of design practice emerge within view, suggesting ways of navigating the complex, ambiguous, and interconnected relationships between evolving technologies, infrastructures and living environments, and our shared societal and environmental challenges.

References

Ackerman R (2023) Design thinking was supposed to fix the world. Where did it go wrong? MIT Technology Review. 9 February 2023. Available at: https://www.technologyreview.com/2023/02/09/1067821/design-thinking-retrospective-what-went-wrong/. Accessed 24 April 2024

Albright M (2019) We need 21st century responses. DFR Lab, Medium. Jun 30, 2017. Available at https://medium.com/dfrlab/we-need-21st-century-responses-6b7eed6750a4. Accessed 24 April 2024

Amatullo M, Boyer B, May J, Shea A (eds) (2021) Design for social innovation: case studies from around the world. Routledge
Anair D, Martin J, de Moura MCP, Goldman J (2020) Ride-hailing's climate risks: steering a growing industry toward a clean transportation future. Union of Concerned Scientists, Cambridge, MA. https://www.ucsusa.org/resources/ride-hailing-climate-risks
Appleyard D (1976) Planning a pluralist city: conflicting realities in Ciudad Guayana. MIT Press
Arnstein SR (1969) A ladder of citizen participation. J Am Plan Asso 35(4):216–224, July 1969
Akama Y, Light A, Kamihira T (2020) Expanding participation to design with more-than-human concerns. In: Proceedings of the 16th participatory design conference 2020—participation(s) otherwise—Volume 1 (PDC '20). Association for Computing Machinery, New York, NY, USA, pp 1–11. https://doi.org/10.1145/3385010.3385016
Banham R (1955) Vehicles of desire. Art
Barrios JM, Hochberg Y, Yi H (2020) The cost of convenience: ridehailing and traffic fatalities. Becker Friedman Institute Working Paper, University of Chicago. February 2020. JEL No. I00, O3, R4
Begovic M (2020) Strategic innovation funding in times of radical uncertainty. Medium, 21 May 2020
Bone J, Baeck P, Cretu C, Old R (2019) Crowdfund London: five years of civic crowdfunding. Nesta/Mayor of London
Boni A, Velasco D, Molas-Gallart J, Schot J (2023) Evaluating transformative innovation policy in a formative way: Insights from Vinnova's food mission experiment. Res Eval 32(3):577–590. https://doi.org/10.1093/reseval/rvad029
Borrás S, Edler J (2020) The roles of the state in the governance of socio-technical systems transformation. Res Policy 49(5)
Boyer B (2020) Helsinki design lab ten years later. She Ji: J Des Econ Inno 6(3):279–300. ISSN 2405-8726. https://doi.org/10.1016/j.sheji.2020.07.001
Boyer B, Hill D (2013) Brickstarter. SITRA, Helsinki
Boyer B, Cook J, Steinberg M (2011) In studio: recipes for systemic change. SITRA, Helsinki
Boyer B, Cook J, Steinberg M (2013) Legible practices. SITRA, Helsinki
Brand S (1994) How buildings learn: what happens after they're built. Viking Press
Bush J (2024) Making merry: how we brought Melbourne's Merri Creek back from pollution, neglect and weeds. The Conversation 6 May 2024. https://theconversation.com/making-merry-how-we-brought-melbournes-merri-creek-back-from-pollution-neglect-and-weeds-226231
Chalmers M, Galani A (2004) Seamful interweaving: heterogeneity in the theory and design of interactive systems. In: Proceedings of the 5th conference on designing interactive systems: processes, practices, methods, and techniques (DIS '04). Association for Computing Machinery, New York, NY, USA, pp 243–252. https://doi.org/10.1145/1013115.1013149
Cook T, Pagh C (2023) Mission neighbourhood—(re)forming communities. Danish Architectural Press
Chachra D (2021) Care at scale: bodies, agency, and infrastructure. Comment. Available at 5 Aug 2021. https://comment.org/care-at-scale/
Cross N (1982) Designerly ways of knowing. Des Stud 3(4):221–227
Deaton A (2020) Randomization in the tropics revisited: a theme and eleven variations. National Bureau of Economic Research, Working Paper 27600, July 2020
Diao M, Kong H, Zhao J (2021) Impacts of transportation network companies on urban mobility. Nat Sustain 4:494–500. https://doi.org/10.1038/s41893-020-00678-z
DiSalvo C (2015) Adversarial design. MIT Press
Doorst K (2015) Frame innovation: create new thinking by design. MIT Press
Downe L (2020) Good services: how to design services that work, 1st ed. BIS
Duffy F (1992) The changing workplace. Phaidon Press, London
Dunne A, Raby F (2003) Speculative everything: design, fiction and social dreaming. MIT Press
Eames C, Eames R (1977) Powers of ten: a film dealing with the relative size of things in the universe and the effect of adding another zero. IBM/Pyramid Films

Easterling K (2021) Medium design: knowing how to work on the world. Verso Books
Escobar A (2018) Designs for the Pluriverse: radical interdependence, autonomy, and the making of worlds. Duke University Press
Farley S, Rose A, Seelos C (2021) The 'Thou Shalt Nots' of systems change. Stanford Soc Innov Rev. https://doi.org/10.48558/0BXX-MP20
Fisher R, Chicot J, Domini A et al (2018) Mission-oriented research and innovation inventory and characterisation of initiatives. European Commission, Directorate-General for Research and Innovation, Publications Office
Flyvbjerg B, Gardener D (2023) How big things get done. Penguin Random House
Flyvbjerg B, Bruzelius N, Rothengatter W (2003) Megaprojects and risk: an anatomy of ambition. Cambridge University Press
Foundational Economy Collective (2022) Foundational economy: the infrastructure of everyday life. Manchester University Press
Froy F (2023) Learning from architectural theory about how cities work as complex and evolving spatial systems. Camb J Reg Econ Soc 16(3):495–510. https://doi.org/10.1093/cjres/rsad024
Geels FW, Schot J (2007) Typology of sociotechnical transition pathways. Res Policy 36:399–417
Gorz A (2007) Ecologica. Seagull Books
Greenfield A (2013) Against the smart city. Verso Books
Greenfield A (2017) Radical technologies: the design of everyday life. Verso Books
Greenaway A (2019) For e-government to flourish, policy-making must change. Policy Options. January 31, 2019. Available at: https://policyoptions.irpp.org/magazines/january-2019/for-e-government-to-flourish-policy-making-must-change/
Greenaway A, Terrett B, Bracken M, Loosemore T (2018) Digital transformation at scale: why the strategy is delivery. London Publishing Partnership
Harman G (2018) Object-oriented ontology: a new theory of everything. Penguin UK
Heath D (2020) Upstream: the quest to solve problems before they happen. Simon Schuste
Hekkert M, Janssen M, Wesseling J, Negro S (2020) Mission-oriented innovation systems. In: Environmental innovation and societal transitions, vol 34, March 2020, pp 76–79
Hill D (2006) Architecture and interaction design, via adaptation and hackability. In: Saffer D (2006) Designing for interaction. New riders. Revised version available at https://medium.com/a-chair-in-a-room/architecture-and-interaction-design-via-adaptation-and-hackability-a51204564a1d. Accessed 24 April 2024
Hill D (2012) Dark matter & Trojan horses. Strelka Press
Hill D (2013) On the smart city: Or, a 'manifesto' for smart citizens instead. Medium, 1 Feb 2013. Available at: https://medium.com/butwhatwasthequestion/on-the-smart-city-or-a-manifesto-for-smart-citizens-instead-7e0c6425f909. Accessed 24 April 2024
Hill D (2018) The city is my homescreen. In: Proceedings of the 2018 ACM international conference on interactive surfaces and spaces (ISS'18). Association for Computing Machinery, NY, USA
Hill D (2019) Strategic design for public purpose. UCL IIPP Blog, at Medium. March 8, 2019. Available at https://medium.com/iipp-blog/strategic-design-for-public-purpose-33c3899dba5e. Accessed 22 Feb 2024
Hill D (2022a) Designing missions. Vinnova, Sweden
Hill D (2022b) Strategic design for society: making the Oslo futures catalogue. Medium, 27 Jan 2022. Available at https://medium.com/digital-urban-living/strategic-design-for-society-making-the-oslo-futures-catalogue-27ae28611c75. Accessed 24 April 2024
Hill D (2023a) Att lära genom att göra. In: Dahl C, Olsson T (eds) Prototypa!: Bygga platser tillsammans. SLU Tankesmedjan Movium, Sweden
Hill D (2023b) Missions x neighbourhoods. In: Cook T, Pagh C (eds) Mission neighbourhood. Danish Architectural Press
Hill D (2023c) Seeds of hope in places. Or, is an Akiya an Akiya? 2 Dec 2023. Circular Design Week conference keynote speech, Kagoshima, Japan

Hill D, Mazzucato M (2024) Modern housing: an environmental common good. Council on Urban Initiatives. Available at https://media.graphassets.com/rJl9iazpS7ni8zAoKY7X. Accessed 24 April 2024
Hine D (2023) At work in the ruins: finding our place in the time of science, climate change, pandemics and all the other emergencies. Chelsea Green Publishing
Hoffman R, Yeh C (2018) Blitzscaling: the lightning-fast path to building massively valuable companies. HarperCollins
Harriss H, Hyde R, Marcaccio R (2021) Architects after architecture: alternative pathways for practice. Routledge
Hunt, J. 2020, Not to scale. Grand Central Publishing.
Hyde R (2012) Future practice: conversations from the edge of architecture. Routledge
Illich I (1973) Tools for conviviality. Harper & Row
Ingold T (2020) On building a university for the common good. philosophy and theory in higher education. 2(1):45–68. Peter Lang Academic Publishing Group. https://doi.org/10.3726/ptihe.2020.01.03
Irwin T, Kossoff G, Tonkinwise C (2015) Transition design provocation. Design Philos Papers 13(1):3–11. https://doi.org/10.1080/14487136.2015.1085688
Janzer CL, Weinstein LS (2014) Social design and neocolonialism. Design Culture 6(3):327–343. https://doi.org/10.2752/175613114X14105155617429
John LK, Weiss M, Kelley J (2018) Sidewalk labs: privacy in a city built from the internet up. Harvard Business School Case 819–024, October 2018 (Revised July 2019)
Kattel R (2022) Dynamic capabilities of the public sector: towards a new synthesis. UCL Institute for Innovation and Public Practice Working Paper Series (IIPP WP 2020–07). Available at: https://www.ucl.ac.uk/bartlett/public-purpose/publications/2022/mar/dynamic-capabilities-public-sector-towards-new-synthesis
Kattel R, Mazzucato M (2018) Mission-oriented innovation policy and dynamic capabilities in the public sector. Ind Corp Chang 27(5):787–801. https://doi.org/10.1093/icc/dty032
Kattel R, Mazzucato M (2023) Mission-oriented innovation policies in Europe: From normative to epistemic turn? UCL Institute for Innovation and Public Purpose, Working Paper Series (IIPP WP 2023–09). Available at: https://www.ucl.ac.uk/bartlett/public-purpose/wp2023-09
Kattel R, Drechsler W, Karo E (2023) How to make an entrepreneurial state—why innovation needs bureaucracy. Yale University Press
Kennedy R, Kelly M, Martin B, Greenway J (2016) Australian indigenous design charter. Design/Architecture, Deakin University. http://indigenousdesigncharter.com.au/
Klinenberg E (2018) Palaces for the people: how social infrastructure can help fight inequality, polarization, and the decline of civic life. Penguin Random House.
Larrue P (2021) The design and implementation of mission-oriented innovation policies: a new systemic policy approach to address societal challenges. OECD Science, Technology and Industry Policy Papers 100, OECD Publishing
Latham A, Layton J (2019) Social infrastructure and the public life of cities: studying urban sociality and public spaces. Geography Compass
Latour B (2008) A cautious prometheus? A few steps toward a philosophy of design. In: Hackne F, Glynne J, Minto V (eds) Proceedings of the 2008 annual international conference of the design history society—Falmouth, 3–6 Sept 2009, e-books, Universal Publishers, pp 2–10
Le Guin U (2005) A rant about technology. Available at: https://www.ursulakleguin.com/a-rant-about-technology. Accessed 18 Mar 2024
Lessig L (1999) Code and Other Laws of Cyberspace. Basic Books
Liboiron M (2021) Pollution is colonialism. Duke University Press
Long K (2019) Public luxury. ArkDes exhibition catalogue. Available at: https://arkdes.se/en/exhibitions/public-luxury-architecture-design-and-the-struggle-for-the-commons/. Accessed 24 April 2024
Margolin V, Margolin S (2002) A "social model" of design: issues of practice and research. Design Issues 18(4):24–30. https://doi.org/10.1162/074793602320827406

Martin R (2009) The design of business: why design thinking is the next competitive advantage. Harvard Business Press, Boston, MA
Manzini E (2015) Design, when everybody designs: an introduction to design for social innovation. MIT Press
Mazé R (2016) Design practices are not neutral. In: Mitrović I, Suran O (curators and eds) Speculative—post-design practice or new Utopia? Republic of Croatia, Zagreb, CR/XXI international exhibition of the Triennale di Milano
Mazzucato M (2018a) The value of everything. Allen Lane
Mazzucato M (2018b) Mission-oriented research & innovation in the European Union: a problem-solving approach to fuel innovation-led growth. European Commission Directorate-General for Research and Innovation, Publications Office of the European Union
Mazzucato M (2019) Governing missions in the European Union. European Commission Directorate-General for Research and Innovation, Publications Office of the European Union
Mazzucato M (2021) Mission economy: a moonshot guide to changing capitalism. Harper Business, New York
Mazzucato M, Kattel R, Ryan-Collins J (2020) Challenge-driven innovation policy: towards a new policy toolkit. J Industry, Compet Trade 20(2):421–437
Meadows D (2008) Thinking in systems. Chelsea Green Publishing
Meroni A, Sangiorgi D (2011) Design for services. Routledge
Moreno C, Allam Z, Chabaud D et al (2021) Introducing the "15-Minute City": sustainability, resilience and place identity in future post-pandemic cities. Smart Cities 4(1):93–111
Morton T (2013) Hyperobjects: philosophy and ecology after the end of the world. University of Minnesota Press, Minneapolis
Morozov E (2013) To save everything, click here: the folly of technological solutionism. Public Affairs
Mouffe C (2013) Agonistics: thinking the world politically. Verso Books
Nelson R (1977) The moon and the ghetto: an essay on public policy analysis. W. W. Norton & Company, 1 Jan 1977
Nussbaum B (2011) Design thinking is a failed experiment. So what's next? Fast Company, 5 April 2011. Available at: https://www.fastcompany.com/1663558/design-thinking-is-a-failed-experiment-so-whats-next. Accessed 24 April 2024.
Odell J (2019) How to do nothing: resisting the attention economy. Melville House
O'Connor J (2024) Culture is not an industry. Manchester University Press
O'Kane J (2022) Sideways: the city google couldn't buy. Penguin Random House Canada
Papanek V (1971) Design for the real world: human ecology and social change. Pantheon Books, New York
Packer G (2013) Change the world. The New Yorker. May 20, 2013
Page A, Memmott P (2021) Design: building on country (first knowledges). Thames & Hudson
Peters G (2021) Administrative traditions. Oxford University Press
Plumwood V (2008) Shadow places and the politics of dwelling. Ecol Human (44), March 2008
Poikolainen Rosén A, Normark M, Wiberg M (2022) Towards more-than-human-centred design: learning from gardening. Int J Des 16(3):21–36. https://doi.org/10.57698/v16i3.02
Potter N (1968) What is a designer? Things, places, messages. Republished by Hyphen Press, 2002
Robertson H (2023) Building on indigenous homelands in arnhem land since the 1980s: harnessing appropriate technology and partnerships as a new procurement vernacular. In: Memmott P, Ting J, O'Rourke T, Vellinga M (eds) Design and the vernacular: interpretations for contemporary architectural practice and theory, 1 ed. Bloomsbury Publishing, pp 117–133
Robertson H, Symonds D, Iraheta M, Hinkel RU, Uncle Mike Ross (2023) Virtual reality is helping Olkola traditional owners get back on country. The Conversation. September 5, 2023. Available at: https://theconversation.com/virtual-reality-is-helping-olkola-traditional-owners-get-back-on-country-211501. Accessed 24 April 2023
Robinson KS (2020) The ministry for the future. Orbit Books
Rogers EN (1968) Editoriali di architettura. Einaud, Torino

Roudavski S, Rutten J, Holland A (2022) The last of their kind. Special interest group in computer graphics (SIGGRAPH), digital arts community (DAC) exhibition the earth, our home: art, technology and critical action, online, opened January 28, 2022
Roudavski S, Parker D, Soames K (2023) Design for (all) life. Pursuit. 24 April 2023
Saito K (2024) Slow down: the degrowth manifesto. Astra House
Sassen S (2013) Open sourcing the neighborhood, Forbes Techonomy. Available at: https://www.forbes.com/sites/techonomy/2013/11/10/open-sourcing-the-neighborhood/
Schmeer J (2019) Xenodesignerly ways of knowing. J Des Sci. Retrieved from https://jods.mitpress.mit.edu/pub/6qb7ohpt
Schon DA (1983) The reflective practitioner: how professionals think in action. Basic Books, New York
Simard S (2021) Finding the mother tree: discovering the wisdom of the forest. Knopf Doubleday Publishing Group
Simon H (1969) The sciences of the artificial. MIT Press
Sjöblum J (2023) LinkedIn post. Available at: https://www.linkedin.com/posts/jenny-sj%C3%B6blom-40269213_fira-fredag-i-den-v%C3%A4rld-vi-lever-i-activity-7128711337286807553-fnfr. Accessed 17 Mar 2024
Sjöblum J (2024) LinkedIn post. Available at https://www.linkedin.com/posts/jenny-sj%C3%B6blom-40269213_s%C3%A5-ska-vi-%C3%A4ta-mer-h%C3%A5llbart-nya-nationella-activity-7164240181636669440-j3TG. Accessed 17 Mar 2024
Sorkin M (2012) The sidewalks of New York. In: Sorkin M (2019) What goes up: the rights and wrongs to the city. Verso Books
Steinberg M (2010) Welcome to HDL global. Helsinki Design Lab blog. SITRA, 24 September 2010. Available at https://www.helsinkidesignlab.org/blog/welcome-to-hdl-global-2010. Accessed 24 April 2024
Stickdorn M, Schneider J (2011) This is service design thinking: basics, tools, cases. Wiley
Suleyman M, Bhaskar M (2023) The coming wave, technology, power and the 21st century's greatest dilemma. Penguin
Tarcan B, Pettersen IN, Edwards F (2022) Making-with the environment through more-than-human design. In: Lockton D, Lenzi S, Hekkert P, Oak A, Sádaba J, Lloyd P (eds) DRS2022: Bilbao, 25 June–3 July, Bilbao, Spain. https://doi.org/10.21606/drs.2022.347
Tillväxtverket (2023) Nu kraftsamlar Tillväxtverket och Vinnova för ökad innovation i livsmedelssystemet. Available at: https://tillvaxtverket.se/tillvaxtverket/omtillvaxtverket/pressochnyheter/aktuelltfrantillvaxtverket/nyhetsarkiv/nukraftsamlartillvaxtverketochvinnovaforokadinnovationilivsmedelssystemet.5733.html. Accessed 20 Feb 2024
Tironi M, Chilet M, Marín CU, Hermansen P (eds) (2023) Design for more-than-human futures: towards post-anthropocentric worlding (1st ed). Routledge. https://doi.org/10.4324/9781003319689
Townsend A (2013) Smart cities: big data, civic hackers, and the quest for a new utopia. WW Norton & Company
Thompson M, Lorne C (2023) Designing a new civic economy? On the emergence and contradictions of participatory experimental urbanism. Antipode 55:1919–1942. https://doi.org/10.1111/anti.12962
UN-HABITAT/Ericsson (2019) Mixed reality for public participation in urban and public space design. Towards a new way of crowdsourcing more inclusive smart cities. Available at: https://unhabitat.org/sites/default/files/2019/06/mixed_reality_2019_0.pdf
Utopia Arkitekter (2021) Stadslabbet—AR i Helsingborg! Utopia Arkitekter website, available at http://www.utopia.se/se/nyheter/stadslabbet-ar-i-helsingborg. Accessed 24 April 2024
Valtonen A (2020) Approaching change with and in design. She Ji: J Des Econ Innov 6(4):505–529. https://doi.org/10.1016/j.sheji.2020.08.004
Van Schaik L (2008) Spatial intelligence: new futures in architecture. In: Architectural design. Wiley
Watson J (2019) Lo-TEK: design by radical indigenism. Taschen, Cologne

Wittmann F, Hufnagl M, Lindner R, Roth F, Edler J (2021) Governing varieties of mission-oriented innovation policies: a new typology. Sci Public Policy 48(5):727–738. https://doi.org/10.1093/scipol/scab044

Williams R (1961) The long revolution. Chatto & Windus

Williams F (2018) Planning for a longer now. UCL Institute for Innovation and Public Purpose Blog, Medium. Available at https://medium.com/iipp-blog/planning-for-a-longer-now-1ec98e4af5dd. Accessed 20 Feb 2024

Wood J (2012) Why user-centered design is not enough. Core77. Available at: https://www.core77.com/posts/23465/Why-User-Centered-Design-is-Not-Enough-by-John-Wood. Accessed 21 Feb 2024

Yunkaporta T (2020) Sand talk: how indigenous thinking can save the world. HarperOne, New York

Zuboff S (2019) The age of surveillance capitalism: the fight for a human future at the new frontier of power. Public Affairs