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What Got Us Here, Won't Get Us There

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CoDesign for sustainability transitions: How a long-term research agenda can instil social impact and provide an envelope for doctoral education.

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Abstract: Climate change, biodiversity loss, pollution, and resource scarcity are exerting growing pressure to make thorough changes in several sociotechnical systems, such as changes in energy, transport, and water use. The research programme on codesign for sustainability transitions contributes to restructuring of consumption and production through orchestrating diverse change making actors into envisioning mid-range goals and transition pathways how to get there. The tools designed to support the process have been used in several sectors and noticeable social impacts have emerged through some of the processes. At the same time the design and application of the tools has provided rich ground for research and doctoral education.

Keywords: design for transitions, social change, codesign, climate change, energy, biodiversity

What if design contributed to sustainability with more than "less bad" products and services? Half a century ago, Victor Papanek famously lamented about design being one of the most harmful professions to nature through fueling over-consumption and creating diversions from real-world problems. Sustainable designers have since been busy creating more environmentally benign alternatives. Yet, it has not proven easy to make a real difference by doing so. All too often the new circular product-service systems and the potentially revolutionary new sustainable design concepts and initiatives for behavioral change have become incrementalized or trampled over by the inert logic of consumption and production in the sectors they seek to transform. Indeed, it has become evident that in many key societal sectors, single alternative design solutions simply cannot compete against the inertia created by path dependencies. This leads to "sociotechnical regimes" being built over the decades by interlinkages in industry structures and production technologies, investment patterns, scientific bases, institutions and policies, market mechanisms, and cultures of consumption (Köhler et al., 2019).

But what if design could be used for the long-term transformation of those logics? Climate change, biodiversity loss, pollution, and resource scarcity are exerting growing pressure to make thorough changes in several sociotechnical systems, such as changes in energy, transport, and water use. And while the unsustainable patterns of production and consumption within these systems cannot be remedied by single designs, the orchestration of hundreds of complementary actions presents an avenue for doing so. The idea of contributing to long-term societal transitions is promising for sustainable designers who seek more encompassing intervention strategies beyond industrial and service design that appear ineffective and too limited in both scope and temporal orientation. Consequently, several authors have put forward program proposals such as designing for transitions (Ceschin & Gaziulusoy, 2020) and transition design (Irwin, Kossoff, Tonkinwise, & Scupelli, 2015).

To be clear, society-wide long-term changes are not "designable" per se as they result from intertwined actions that span regulation, technology development, altered consumer practices, taxation, and new business creation (and so on) that require different types of actions by different types of actors. At the same time, there is a heightened need to better connect the relevant actors that are needed for bringing about such wide-cast societal changes in liberal democracies: decision makers, experts, civil servants, citizens, NGOs, and business leaders (to name but a few).

Catalyzing long-term sociotechnical change among participants is, however, easier said than done, and globally, there remain few realized projects and tested approaches. This kind of projects require a substantial investment of time and resources, and new ways of design engagement that all go beyond just rebranding existing design approaches, drawing armchair models, or pursuing pedagogical programs (Ceschin & Gaziulusoy, 2020).

Our solution in Aalto University, Finland, has been to crossbreed codesign with social science intervention approaches, particularly transition management that seeks to foster vision building, guidance, and sustained experimentation beyond the political cycle of elections (see, e.g., Frantzeskaki et al., 2017). Transition management has been practiced for close to two decades and, together with transitions research, it provides a much needed "big picture" with which to address wide-scale sociotechnical change related to sustainability issues (Köhler et al., 2019). Meanwhile, participatory design and codesign offer means to move transition management from its standard 30–50-year, long-term envisioning timespan to a more detailed and contested mid-range span of the next 10–15 years. Participatory design offers a repertoire of principles, procedures, and tools for democratizing multiparty envisioning and negotiation processes that can be adapted for the transitions' context (Hyysalo et al., 2019a, 2019c).

Our work is best exemplified by the Mid-Range Transition Pathway Creation Toolset (MTPT) and associated workshop procedures (Hyysalo et al., 2019a, 2019b). It has thus far been used to run envisioning processes in facets of the Finnish energy transition, in urban mobility, in the management of aquatic resources as well as in commission by the Finnish ministry of environment to support the preparation of Finnish biodiversity strategy and in commission by Finnish Prime Minister's Office (PMO) to support the national implementation of UN sustainable development goals (SDGs). It has been successfully used on national, regional, and urban scales. Our approach has had observable social impact. For instance, our report on Finnish energy transition was quoted in the previous Finnish government program and several actions identified in the report can now be found in the program (of course, these were also

lobbied for by others as well, but this is very much the point: to raise the ambition level and create societal convergence on the needed actions).

The MTPT's aim is to clarify mid-range transition's vision and goals and to produce concrete mid-range pathways, as well as to build capacity in groups of 15–30 change makers and problem owners in an area of society with diverse and complementary competencies and perspectives that allow them to develop viable alternatives together. The groups go through a facilitated process to determine change goals and the sociotechnical pathways that will lead to them from the present state. To aid doing so, the MTPT has a set of predefined forms and categories that participants use to add content and arrange the actions to be taken. The forms are usually deployed as magnetic elements on large metallic board so that 3–5 people can simultaneously work on one pathway without flapping post-its and messy ink marks (see Figure 1).
The primary elements of the pathway creation system are the "pathway step" and "pathway-step action" elements that concretize how each pathway step can be supported. The step-action elements are specific to the domain area in question. When working on energy transitions, for instance, such elements included "energy production," "business," "end consumption," "regulation," "investment," "technology," "pilot", and "other". When working on biodiversity preservation elements such as 'land-use', 'financing' and 'conservation' are added. The connections between steps are made with arrows, contingency markers, and alternative pathway markers, and the work typically proceeds both from the present-day forwards and from the time of the mid-range goal backwards (e.g., backwards from 2035). The results are typically comprised of a few key clusters of pathway steps, typically totalling 15–25 steps, and 40–70 identified actions that are needed to support those steps, with identification of both knowledge and action gaps in the road to the envisioned mid-range goal (see Figure 2).

Figure 1: *Pathway formation in progress and an example of a pathway-step element. The choice of the hexagon-shaped elements, descriptive labels, and colour coding was based on their common use in countless board games and ideation systems. (Image: Smart Energy Transition project)*

The MTPT process can vary considerably in length. The use of participatory design techniques (e.g., Bødger et al., 2004; Schuler & Namioka, 1993; Botero, 2013) allowed us to initially shorten the process to maximum of seven half-day workshops and commentary rounds on the digitized pathways in between (in contrast to the 10–15 full days recommended by transition management, e.g., Ferguson et al., 2013). By now the shortest run-throughs have lasted just two full days with a digital commentary follow-on. Such versatility is important as time use is the key to attracting busy people such as civil servants, members of parliament, executives, and activists. The variation in length is also due to how articulated the context is. In many settings, ambitious and widely agreed visions of a sustainable future are no longer in short supply (as was the case when transition management emerged in the last millennium). For instance, when we worked with the Finnish Ministry of Environment, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IBPES) goals formed the background that was shared by the participants. Similarly, UN SDGs and the assessment report of their implementation in Finland laid the table for our work with the Finnish prime minister's office. In the work on energy transition, we could not base goalsetting directly on existing work but also there the Finnish parliamentary long-term climate roadmap for 2050, and mid-range energy and climate strategies provided a backbone on which the participants could build their (more ambitious) visions and goals. Also, many experiments towards change are typically afoot and do not need to be ideated from scratch. Such anchoring to ongoing processes has been observed to foster higher legitimacy for the work whilst giving voice and visibility to civil society, the public sector, policymakers, and business actors who are already active in pushing for change. At best, MTPT transition arena processes provide new ideas and a counterbalance against incumbent actors who tend to dominate policymaking arenas and political lobbying. That said about anchoring, some contexts need an emphasis on visioning and goals, and when this is the case, the process emphasizes this and takes longer.

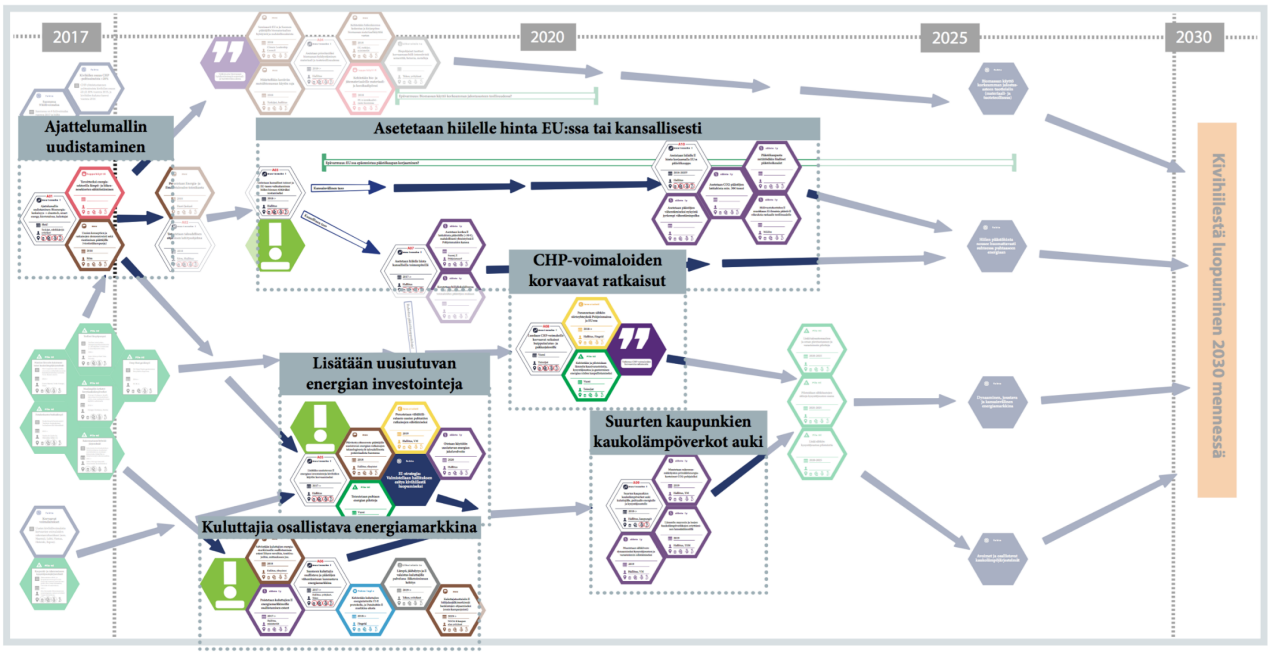

Figure 2. *An example of a completed pathway, with five key clusters of action systemically leading to ending the energy use of black coal in Finland by 2030.*

Codesigning for transformative change also points to new research avenues. For codesign, wide sociotechnical change calls for new sensitivity in managing wider and more diverse participant groups. This includes new criteria and means for attracting and selecting the participants, arrangements for bridging knowledge gaps between participants who peer learn from each other (rather than learning being primarily between participants and designers or organizers) and working with new types of focal issues (such as regulatory changes and subsidy schemes) and interest groups than has been customary. These consequently call for devising adequate "intermediate designs" (Erikssen, 2012)—the means, tools, and procedures that help participants to reach meaningful outcomes—suited for these new contexts. How to arrive at designs that are apt for catalyzing participant actions without affecting the participant's say over the outcomes with different expert and citizen groups is not a trivial issue (Hyysalo et al., 2019c). At the same time, the mid-range transition arena processes open avenues to study further and in more concrete settings learning and coproduction in transitions (e.g., Lähteenoja et al., 2022), agenda formation and impacts from arenas (e.g., Lukkarinen et al., 2023) as well as the nature of such knowledge coproduction as governance experiments (e.g., Marttila et al., 2023; Valve et al., 2023). It also presents an interesting ground for developing design theory further, for instance regarding the context relationships and orders of design involved (Lähteenoja et al., 2023)

The research programme around designing and developing MTPT tools has proven valuable in doctoral education. The multidisciplinary and relatively large organizing and design teams required in transition arenas, ranging between 7-16 people have been highly conductive for hands-on training of many masters and doctoral students. By participating in the arena events, they have gotten a first-hand experience of what it takes to plan, prepare, conduct and analyze professionally ran participatory design events with many important actors. For those doctoral students that have been more closely involved, the long-term programme has provided a natural route to apprentice and deepen design and research competencies. They have

gradually taken more demanding and even leading roles in the multidisciplinary teams that have regularly involved several professors, senior researchers and post-docs. Similarly in the academic analysis and reporting the doctoral students and post-docs have moved from supporting roles to lead authorships and the first PhD theses from the programme are nearing completion. At the same time, the codesign research programme has extended students' networks to stakeholders and partners – albeit most of the closely involved students have been skilled and highly networked sustainability professionals also prior to their doctoral studies. In terms of academic content, MPTP development and deployments have presented instructive grounds to introduce and motivate the careful reading complex theories and how they have been operationalized in different settings and studies. This fostered critical discussion on what issues different design, participation, transitions and science & technology studies theories raise to the foreground as well as what may be their strongholds and shortcomings. This has also been a two-way street as operationalizing these theories into the design of the mid-range arenas as well as using them to analyze the processes and outcomes of the arenas has given valuable revelations about the assumptions and insights that have gone into different theories. In all, moving from the traditional lone hero PhD work to a sustained research programme that blends academic interests with direct societal impact has proven to be a worthy strategy in doctoral education as well.

The work continues, and the MTPT is just one of the many needed design responses for steering and orchestrating sustainable change—it addresses the goal and pathway envisioning, and change maker empowerment whilst, for instance, designing for practice change, designing for in-the-wild experimentation, and anticipatory strategic designing for both corporate and public organizations require their own means and approaches. Just in socioecological transformations there are plenty of designers who can do more than simply be "less bad."

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