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MID-RANGE TRANSITION ARENAS AS CATALYSTS IN A CIRCULAR ECONOMY

*Tatu Marttila, Jani Lukkarinen, Sampsa Hyysalo,
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Introduction

The circular economy (CE) actualises through trajectories that permeate economic sectors, policy institutions, and geographical scales. CE solutions evolve, and are maintained, by multi-layered networks, which have components that do not easily reach the policy agenda, with some needing to be developed from scratch to have a bearing on socio-technical change. Catalysis of CE calls for practical tools to support the identification and linking of critical components for the implementation of CE solutions, and transition management (TM) is one such tool.

TM is developed as a transformative governance approach to identify change dynamics and align interests towards long-term implementation of policies and actions to catalyse various agendas (Frantzeskaki et al., 2012; van de Kerkhof & Wieczorek, 2005; Loorbach & Rotmans, 2010). Its aim is to create deliberative spaces for searching for, learning about, and experimenting towards a desired transformation goal with ‘front-runner’ stakeholders, engaged in innovating novel constellations of technologies and practices (Kemp et al., 2007; Loorbach & Rotmans, 2010; Rip & Kemp, 1998). The methodology connects contextually embedded experiments with global and regional developments, while facilitating broad and iterative strategy-making processes (Beers et al., 2019; Loorbach & Rotmans, 2010). A central facet of TM is the establishment of transition arenas (TAs) that comprise a series of knowledge co-production workshops, in which problem identification, vision building, and the construction of future pathways take place in a facilitated process with diverse and carefully selected stakeholders (Frantzeskaki et al., 2012).

There has been a resurgence of TM-related activities in Finland’s science-policy interface during recent years. The Finnish Strategic Research Council (SRC), established in 2015, has redirected state funding towards transdisciplinary research with strong stakeholder interaction across society (e.g., policy-makers, civil society, and industry actors) and direct policy relevance (topics including digitalisation, sustainable energy, food system, and governance renewal) (Heino & Hautala, 2021). The 78 scientific projects (by May 2022) have been positioned as intermediaries in creating legitimacy and transparency for sustainability agendas (cf. Kivimaa et al., 2019) as well as developing methodological innovations and evaluative perspectives to navigate the transition policies across the sectors and regions (cf. Loorbach et al., 2018). This also reflects the more

general development at the EU level, where transition approaches are becoming increasingly institutionalised at the science-policy interface (EEA, 2019; Turnheim et al., 2020). Many of the projects have also focused on CE topics and policy agendas either explicitly in research designs or implicitly by connections to policy developments.

TM facilitates technical, social, and conceptual learning (Bos & Brown, 2012) that support the operationalisation of transition topics on a longer term. The earlier TA processes have often focused on timescales of 30 years or more (e.g., van de Kerkhof & Wieczorek, 2005); however a mid-range focus, a strategic 5- to 15-year time span, is required to address sustainability challenges in convergence with ongoing policy development (Hyysalo et al., 2019a). To support relevance in future actions and to develop more reflexive strategic processes, Finnish researchers have developed a *mid-range transition pathway design toolset* (MTPT) to enable more structured and direct involvement to TA work (Hyysalo et al., 2019b). In this chapter, we draw on experiences from three recent mid-range TAs in SRC-funded research projects that have had methodological interests in sustainability transition research, a common methodological setting, and also ephemeral connections with CE policy developments. With the analysis, we aim to broaden the understanding of TM as a method to catalyse transitions toward a more CE. Consequently, we pose the following questions:

- How does the mid-range TA methodology support facilitating and navigating changes within, and across, societal sectors and spatial scales?
- What are the practical implications of TA work to cater to transitions towards the CE?

This chapter is structured in six sections. The following two sections clarify the conceptual and methodological basis of TA design. The fourth section outlines an analysis of the three TA cases. The final two sections provide discussion, conclusions, and implications to this book's focus on catalysts for a sustainable CE.

Transition management in the context of the circular economy

The CE is very much a policy-driven concept (Murray et al., 2017) promoted through successful narratives in policy-making, and the concept's ambiguity enables the coexistence of mutually exclusive interpretations (Lazarevic & Valve, 2017). For the CE transitions, TM can help to align interests towards the implementation of policies and actions (Frantzeskaki et al., 2012), and TA as a methodology offers a procedural approach that can be applied by engaging stakeholders in a context-specific and embedded framing, while also including conflicting meanings of implementation.

Applying transition management in a circular economy context

Based on the TM literature, we identify four key levers to consider when experimenting with TM in different contexts relevant for CE. First, according to Frantzeskaki et al. (2018), the TM application can be divided into three categories – *theoretical*, *operational*, and *heuristic* – that emphasise different types of dynamics of societal change. The theoretical focus advocates TM as a novel governance framework for systemic change, the operational focus emphasises application and adoption of TM process tools and designs, and heuristic focus applies TM as a lens in existing governance challenges and processes to increase the understanding of transition dynamics. In the different disciplinary frameworks, perspectives, and agendas in CE research,

these categories become increasingly intertwined, as agendas on different levels, assessment, and practical action connect.

Second, TM has been viewed as a means of systematically “solving” *moderately structured problems*, where active mediators are needed to produce new knowledge and structure ongoing discussions (van Poeck et al., 2017). Too loose problem-framing hinders the meaningful and concrete iteration of future developments, while too strict framing elevates the predefined policy agendas and fixed stakeholder positions. However, the commonly used long-term timescales in TM (30–50 years) include a risk of distancing the discussions from current practices and interests, potentially leaving the conceptual ambiguities and difficult actions and trade-offs insufficiently addressed. Transitions towards a CE call for changes on a relatively short time perspective. A closer connection to policy cycles operating on mid-range timescales is necessary to provide more concrete lessons related to the implementation of policy pathways and critical reflection on stakeholder positions (Hyysalo et al., 2019a).

Third, regarding the real-world impact of TAs, another consideration relevant for CE has been how well TA processes are coordinated in relation to *policy windows* (Harlow et al., 2018). Governance institutions may be ill-equipped to adapt to transformative agendas (Valve et al., 2013). The explicit focus on forerunner actors and experimentation is necessary for the epistemological coherence of transitions thinking but can also be expanded in terms of policy implications (Hyysalo et al., 2019a; Voß et al., 2009). In terms of longer-term intangible outcomes, the TAs are expected to operate in three main domains. In the pragmatic domain, envisioned *new initiatives and projects* can create impulses and nudge transitions in the specific sectoral or spatial contexts (Ernst et al., 2016; Frantzeskaki et al., 2016). In the collaborative domain, *changes in actor-networks* create reflexivity towards roles and help to destabilise existing practices (Wittmayer et al., 2018). Last, in the institutional domain, the *reconfiguration of institutional rules and organisations* can become a long-term outcome cascading with reflexivity created through governance experimentation (Frantzeskaki et al., 2018, p. 3), albeit emerging in a slow and nonlinear way (Schäpke et al., 2017).

Finally, TM aims to *create space for systemic engagement*, where relations between multiple dilemmas and viewpoints can be approached simultaneously to reconstitute the ‘public’ of sustainability policies (Chilvers et al., 2018). The construction of *transition pathways* is a key means for cross-pollinating diverse views on change and supporting engagement, and in the CE context they also allow for improved regional and material assessments. There are always multiple pathways, and depending on the transition topic, they can be oriented towards, for example, *governance transition*, *socio-technical transition*, or *socio-ecological transition* (Frantzeskaki et al., 2016) – acting not only as mere illustrations but also material devices for arranging the potential actions. However, too rigid and straightforward interpretations on core concepts and required actions can have connotations of siding too closely with social engineering (cf. Shove & Walker, 2007; Voß et al., 2009), and in the regional setting they can also induce criticism.

TAs act as transition initiatives that aim at constructing an engaged public around specific topics (Chilvers & Longhurst, 2016). However, transition processes differ with regards to how the initiative for change is defined. For example, engaged stakeholders participating in co-creation processes can directly take initiative, but a wider impact often requires assigning responsibilities and aligning of more complex stakeholder relations beyond the local context. For the purposes of a CE transition, TM can operate *in diverse forms*, for example projects on specific topics (Frantzeskaki et al., 2016), knowledge co-production processes and arenas (Hölscher et al., 2019), or experiments, such as in urban living labs (Nevens et al., 2013). These interpretations differ in emphasising systemic understanding, shared future view, cross-context knowledge, or

Table 17.1 Types of arena work and potential focus in outputs

<i>Type of TA process</i>	<i>Focus of outputs</i>	<i>Reference</i>
Early transition frameworks	Establishing the method; Policy assessment and support	Kemp et al., 2007; van der Brugge et al., 2005
Urban transition labs; living labs	Connecting to pilots, experiments; Networking	Nevens et al., 2013; Baccarne et al., 2014
Local-regional transition initiatives	Long-term visions and strategic insights; Trans-scalar considerations	Frantzeskaki et al., 2012; Poustie et al., 2016
Strategic mid-range transition arenas	Strategic agendas and action points for the near future	Hyysalo et al., 2019a, 2019b; Valve et al., 2022

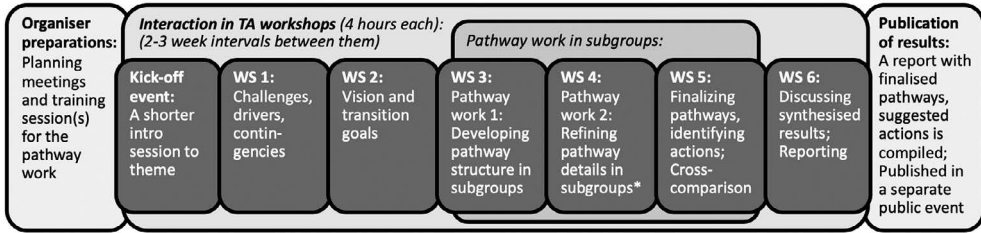
immediate means and actions for change. In connection with the development of the TA method, these different orientations underline the variety in TA-type interactions, and the potential it can tap into (see Table 17.1).

Connecting arena work to a mid-range timeframe

The impacts of TA work can be assessed regarding the resulting propositions for actions and their implementation, or as the emergent outcome of deliberative interactions and processes generated over the long term (Schäpke et al., 2017). There are tangible outputs (e.g., reports, blogs, policy briefs) and intangible outputs (e.g., individual and social learning, network building, novel agendas) that require different evaluative approaches (Schäpke et al., 2017). However, the evaluation of outputs, outcomes, and participant appraisals has proven to be a complex task, as the contextually different arenas produce different kinds of results depending on, for example, timing in relation to policy cycles, institutional embedding, and existence of competing processes (Hölscher et al., 2019).

TAs have traditionally been geared towards a long-term focus of 30–50 years (e.g., van de Kerkhof & Wiczorek, 2005), and the expectations of the output as well as the consequent transition pathways have remained relatively broad (Frantzeskaki et al., 2017; Loorbach & Rotmans, 2010; Roorda et al., 2014). Whereas long and broad pathways may be conducive for achieving convergence among participant views, they are not suited to the identification of difficult societal trade-offs and discussions over fine-grained actions, opportunities, and responsibilities relevant to CE transitions. To better address the strategic 5- to 15-year short- and mid-range actions, the TA process has been iterated towards a mid-range focus; supporting more reflexive strategic processes that are better connected with future action (Hyysalo et al., 2019a, 2019b). The more detailed pathway descriptions and timeframes of action also facilitate making TA outputs relevant for the audiences and connected to existing policy continuums, to create stakeholder integrity both within and outside the process.

The TA processes build on knowledge integration, and this process is also influenced by the quality, frequency, and directness of interactions (Dóci et al., 2022). The mid-range TA approach (Hyysalo et al., 2019a, 2019b, 2019c) introduces a more structured design of TA facilitation with consistent workshop activities, key materials, and external communication. This also enables more rigid analyses of the implementation choices, stakeholder reflections, and produced outputs across topical and spatial contexts (Hyysalo et al., 2017, 2019a). The earlier occasions of TA work have often relied on the facilitator and analyst team ('TA team') to turn results from collaborative work into refined pathway depictions (see e.g., Ferguson et al., 2013; Roorda et al., 2014).



* In national energy arena three new, thematically related topics were taken into pathway work for the second session

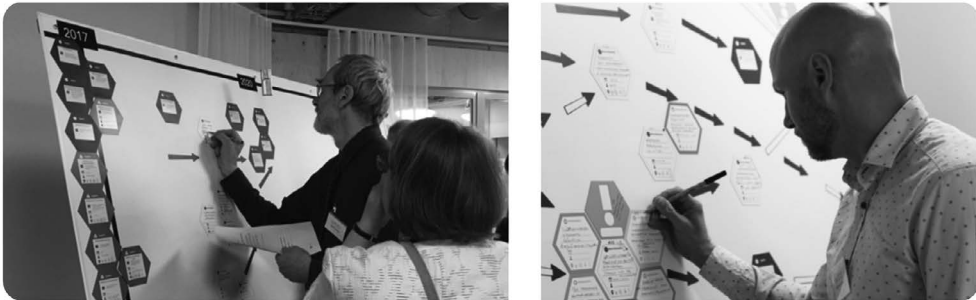


Figure 17.1 The general structure in the mid-range TA workshop series, and photos of actual transition pathway co-creation supported with the MTPT canvas.

However, in the mid-range TA process, the participating experts work on the pathway designs with the help of the MTPT in a strongly facilitated and materially supported process drawing from participatory design (Hyysalo et al., 2019c; see Figure 17.1; see also Botero et al., 2020; Simonsen & Robertson, 2012). This also allows for the reduction in the number of TA workshops prescribed in methodological guidelines (cf. Ferguson et al., 2013; Roorda et al., 2014), for the benefit of enabling better engagement of busy change makers, experts, and policy actors (Hyysalo et al., 2019a, 2019b).

In assessing TA impacts, a focus on outputs and expected outcomes is an effective starting point for analysis (Schäpke et al., 2017). This dynamic between the outputs and outcomes is connected to replicability of governance experimentation and can help to understand the potential of new means of governance and strategy making also relevant to CE.

Method experimentation: Presenting three mid-range transition arenas

Our analysis focuses on three full mid-range TA series that were organised between 2017–2019, focusing on energy transitions on a national scale and blue bioeconomy on a regional scale. At least three of the authors were present in each of the TAs from the early design phases to the communication of the results. The mid-range TA process consists of 6–7 workshop days with 2- to 3-week intervals (see Figure 17.1). In the pathway creation phase, a large metallic pathway board and magnet pads and arrows for notation are utilised. The participants fill in ‘pathway steps’ aiming at a collaboratively developed transition goal. Next, they prioritise these steps and study them in greater detail, attaching ‘determinants’ to them that refer to, for example, policy, technology, and business (see further detail in Hyysalo et al., 2019a, 2019b).

The first mid-range TA series using the MTPT toolset was organised in the *Smart Energy Transition* project in 2017. Besides aiming to develop an energy and climate strategy counter-agenda,

the *national energy (transition) arena* acted also as the starting point to disseminate the MTPT toolset further. The *BlueAdapt* project's *blue bioeconomy (transition) arenas* developed the methodology in a policy area with considerations linked more closely to socio-ecological dynamics. These two TAs were opened in diverging regional contexts of North Savo and Southwest Finland (see Table 17.2).

Each of the three mid-range TAs spanned over several months, during which the operation shifted iteratively between shared sessions, small group work, broader arena reflections, and written commenting. The steps in the process were structured according to the conventional

Table 17.2 Cases in focus

<i>TA series</i>	<i>National energy transition arena (2017)</i>	<i>Blue bioeconomy transition arena North Savo (2018)</i>	<i>Blue bioeconomy transition arena Southwest Finland (2019)</i>
Aim of the TA	National energy and climate strategy counter-agenda 2017–2030	Regional blue bioeconomy agenda for North Savo 2019–2035	Regional blue bioeconomy agenda for Southwest Finland 2019–2035
Organisers and participants	Smart Energy Transition project, Aalto University, Finnish Innovation Fund Sitra; 21 participants across the energy policy field.	BlueAdapt project, Finnish Environment Institute, Savonia University of Applied Sciences; 14 participants with diverse regional expertise.	BlueAdapt project, Finnish Environment Institute, Valonia Service Centre for Sustainable Development; 18 participants with diverse regional expertise.
Produced transition pathways	<ul style="list-style-type: none"> • Coal is phased out by 2030. • Creating 2000 MW demand-response capacity in electricity. • Creating 2000 MW demand-response capacity in heating. • Halving building net-energy use. • Reducing household energy use 15% by behaviour-change. • 750,000 alternatively powered vehicles (electricity, gas) by 2030. • Reducing total mileage driven by 10% through mobility as a service. • Doubling the cleantech exports. 	<ul style="list-style-type: none"> • Positive fish balance • In 2035, the region's sustainable fish production larger than demand. • North Savo presents an active network of water expertise that produces knowledge on water protection and experiments with new solutions. • At least 30–40% of the region's bovine manure is managed by advanced fractionation. • The networking of sustainable lake tourism actors in the region is supported by developing a holistic management approach. 	<ul style="list-style-type: none"> • In 2035, new blue bioeconomy food products from Southwest Finland will reach markets; food-related use of Baltic herring will double to 10 million kg annually. • In 2035, the organic biomass of the region will be effectively turned into resources; half of domestic animal manure is processed with energy content being utilised and nutrients recycled. • Aquaculture output in Southwest Finland will triple by 2035 without increasing nutrient discharge.
Reporting	Hyysalo et al., 2017; Hyysalo et al., 2019a	Valve et al., 2019a; Valve et al., 2022	Valve et al., 2019b; Lukkarinen et al., 2023

TA process leading from vision-building to the development of transition pathways and actions (see Roorda et al., 2014). The pathway development to which participants were directly involved was mainly undertaken in subgroups, followed by cross-referencing to iterate policy messages. Moreover, based on the workshop recordings, the organising team conducted work between the workshop sessions to improve detail, display pathway dynamics, and iterate timing of the actions and steps.

In each of the studied TAs, a research-driven project organiser took care of the process facilitation and iteration of the main outputs and results, and a context-specific organiser (or ‘host’) took more explicit ownership of the actions. In the *national energy arena*, the Finnish Innovation Fund Sitra operated as the legitimising host under their thematic area *carbon-neutral circular economy*. In the *blue bioeconomy arenas* in North Savo the host was Savonia University of Applied Sciences, a developer of different water management and analysis technologies with networks within blue bioeconomy sectors. In Southwest Finland, the host was the Valonia Service Centre for Sustainable Development, with established connections to key public authorities and role as a knowledge intermediary in sustainability-related topics. In each case, the participants were selected through a careful and iterative process (ref. Roorda et al., 2014; Voß et al., 2009), where the most relevant topics were identified in the ongoing policy and planning developments, interviews, and reflective dialogue with the institutionally and/or regionally embedded host.

Various datasets were collected. First, the documentation of establishing the arenas, implementation of workshop interaction, and external communication provides a paper trail on how transition agendas were formulated and how the TA method has ‘travelled’ to new contexts. Second, the co-created outputs that include the pathway visualisations, narrative documents, action lists, blogs, and press releases form the basis on how the transformative agendas were mobilised. Finally, diverse types of reflections were utilised to understand stakeholder dynamics and perspectives, including a total of 37 participant interviews (between 16–90 minutes), 10 organiser interviews (between 32–87 minutes) and 53 replies to feedback surveys. The interview data was transcribed to be utilised as textual material along with the other documents. Additionally, an estimated 150 hours of non-transcribed workshop recordings were collected during the dialogues as supporting material.

The analysis proceeded in three main steps with at least two of the authors contributing to each step. First, we focused on the emergence of the TAs in an interplay between policy development, contextually embedded stakeholders, and research intermediaries. The aim here was to capture the relational work of the transition experts in establishing the co-productive arena. Second, we identified key similarities and differences between the cases regarding what tangible outputs and longer-term intangible outcomes emerged as relevant in the arena processes and stakeholder reflections. Here, the aim was to better understand the catalysing work of the completed TAs. Finally, we jointly reflected the implications of the TAs from a CE perspective to draw methodological, conceptual, and practical lessons relevant for the book.

Analysis: The mid-range transition arenas as catalysts in the circular economy

The three TA processes were carried out in different CE-related contexts, where socio-technical dynamics, spatial conditions, and stakeholder networks had implications on the process, developed pathways, underlying actions, and means of mobilising the actions in practice. Consequently, the findings help to understand how design variances and contextual shifts shape pathway design

and tangibility of proposed actions, as well as the potentials and limitations of the mid-range TA method to catalyse CE transitions.

Mid-range transition arenas expanding dialogues on the circular economy

In the studied TA series, there were moments when the CE concept was touched on explicitly. Already the work in the *national energy arena* resulted in a pathway on scaling up the Finnish cleantech and bioeconomy sector. In this context, the CE was referred to as a loose ‘go-to’ concept catching focus of diverse participant views. In both *blue bioeconomy arenas*, however, more detailed discussions addressed, for example, nutrient circularity, the integration of recirculating aquaculture facilities, and industrial symbioses through new technological innovations. More circular solutions could increase resource efficiency (e.g., by utilisation of excess heat) and reduce nutrient loading (e.g., using waste nutrients as fertilisers). Here, the circularity was approached as a technical ‘end-of-the-pipe’ solution, which directed the discussion on critical aspects of technology development and commercial profitability. Both *blue bioeconomy arenas* also produced regional transition pathways to serve as catalysts for the nutrient CE in the region (Valve et al., 2020). Since both regions are characterised by intensive livestock farming and manure accumulation poses a risk for water protection, new technological solutions (e.g., local processing) and investments in resource recovery (e.g., manure, biogas, fertilisers) are needed. With farmers as potential investors, and governmental authorities as re-organisers of markets (among others), the pathway dynamics also enabled improved assessment of responsibilities and roles.

In the *blue bioeconomy arena* in North Savo, the transition vision of providing welfare from common clean water and the economisation of water protection was derived from a shared water vision developed a year before (see Koski-Vähälä, 2017). Although the CE was not explicated in the transition vision, it became important in relation to nutrient CE (Valve et al., 2020) and the bioeconomy opportunities around side streams (e.g., animal manure, fisheries). The workshop structure was further revised to give additional emphasis on the cross-pollination of actions, to create a basis for policy discussion. However, there were difficulties in finding regional ownership of the results.

In the *blue bioeconomy arena* in Southwest Finland, the developed transition vision viewed the region as a forerunner in food production combined with efficient nutrient recycling and utilisation of blue bioeconomy innovations. New CE developments, such as emerging markets for recycled fertilisers and regional innovation experimentation with recirculation technologies in fish aquaculture were considered important. There were also further adjustments to the workshop structure. A more open process with a broader stakeholder group was established to enable adaptation during the process. Further, the amount of time spent on constructing transition pathways was extended.

The potentials and limitations of agility in TA methodology was demonstrated in internal variations of facilitator and participant dynamics, connected to transition pathways in focus. In the *national energy arena*, the eight pathways varied in terms of novelty and depth; some built on a large body of existing knowledge introduced by engaged participants and expert facilitation. For example, a pathway on halving building stock net-energy use in a 14-year time span required deep transdisciplinary discussions to devise policy actions supporting systemic change. Yet, ambiguous framing of transition goals or missing expert understanding on an issue led to the pathway exercise operating rather as a space for collective ideation and testing of what steps might be sufficient and feasible (Hyysalo et al., 2019a). A pathway on multiplying national cleantech

exports is a telling example here, as a vague target directed participants to focus on very broad ideas rather than actual transformative policy processes to support change.

Similar variation can be identified in the seven transition pathways of the *blue bioeconomy arenas*; quantifiable targets, facilitator expertise on topics, and motivated participant groups translated into coherent pathways. This was visible in the pathways focusing on nutrient-loading from agriculture that were developed in both arenas. Despite operating under the same challenge that requires novel circular solutions, the pathways offered different kinds of cross-spatial dynamics. The North Savo solution would rely more on farmers' agency on building regional manure processing hubs for biogas production, while the Southwest Finland solution anticipates a bigger role for the energy companies. An example of a less iterated pathway is focused on defining opportunities for lake tourism. The pathway starts with a clear challenge of Finnish lake environments being economically and socially underutilised. However, the facilitation of the pathway was directed towards identifying infrastructure needs and innovations around new services rather than tackling persistent problems of lake environment being dominated by industrial resource needs and the recreational use of water environment being culturally a very individualised and privatised tradition.

Overall, the variances in the TA processes reveal three core features for successful pathway work: 1) clear goal explicating a traceable transition from the current situation, 2) deep and varied topical expertise of selected participants, and 3) engaged and critical facilitation to discuss systemic interactions beyond narrow innovations and conflicting perceptions. Moreover, the re-design of the arena process resulted in shifts in two main areas – regarding the process design and outputs, and the intended societal outcomes towards broader aims (see [Table 17.3](#)). These two axes can be considered central, when the mid-range TA methodology travels to new CE contexts.

Table 17.3 Developments in the mid-range TA methodology and the MTPT process

<i>TA series</i>	<i>MTPT process and materials</i>	<i>TA outputs, (intended) societal outcomes, and impacts</i>
Socio-technical transitions in the national energy arena	<ul style="list-style-type: none"> • Mid-range temporal focus until 2030. • Process design of six workshops. • Facilitation guidelines on pathway work. • MTPT toolset with specified action magnets and board. • Six topical background memos. 	<p>Outputs:</p> <ul style="list-style-type: none"> • Eight sectoral transition pathways. • List of 100 immediate policy actions. <p>Outcomes and impacts:</p> <ul style="list-style-type: none"> • A counter-agenda to national energy and climate strategy. • Institutionalising energy transition terminology to Finnish energy policy. • Several actions to the government programme (Marin, 2019).
Socio-ecological transitions in the regional blue bioeconomy arenas	<ul style="list-style-type: none"> • Temporal focus until 2035. • Extended time for pathway creation in process design. • External commentators in the process. • Explicit cross-pathway comparisons. • New action magnets for land use and production. • Single context-oriented memo. 	<p>Outputs:</p> <ul style="list-style-type: none"> • Four (North Savo) and three (Southwest Finland) transition pathways. • Lists of 32 and 28 immediate policy actions. <p>Outcomes and impacts:</p> <ul style="list-style-type: none"> • Stimulating discussion on sectoral blue bioeconomy developments in agriculture nutrient recycling and fish aquaculture. • Improving regional capabilities to engage in sustainable transitions.

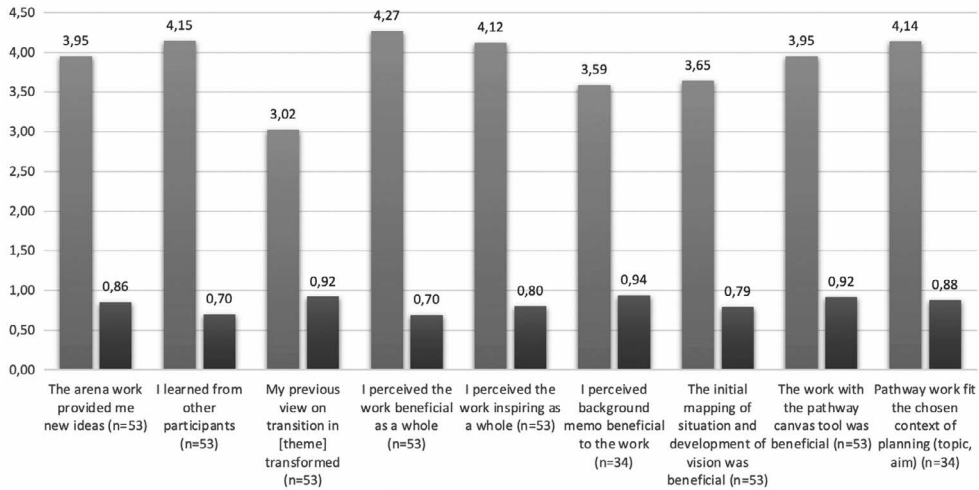


Figure 17.2 Collected answers from the follow-up participant survey (1–5 scale, the dark columns on right marking standard deviations).

Participant and organiser feedback on the arena work

Experiences of the mid-range TA process were collected via follow-up participant surveys, supported with analyses of participant and organiser interviews. The survey results show that overall, the mid-range TA work was perceived as beneficial and inspiring (see Figure 17.2) with broad support also from the supporting interviews. After the workshops, the participants thought they had learnt from others and gained new ideas on various topics. However, the process’s impact on their views on transition was less significant and with the highest standard deviation. This suggests that the process broadened, rather than altered, the participants’ personal views, and learning focused on expanding and linking previous understanding rather than transforming it.

In the follow-up interviews, the participants discussed learning new perspectives in relation to the focus themes, along with reflection on their justifications and reasoning, and the creative collaboration in pathway design as a mode of interaction. These aspects were also mentioned worthy of transporting to other networks and domains of action. The pathway work with the MTPT canvas supported both temporal and material assessment of actions and responsibilities especially relevant for regional CE transitions. According to organiser interviews, the mid-range TA process was also perceived positively; it worked both as a research tool for studying broad cross-sectoral concepts, themes, and transitions, and as a method to interact with contextually relevant networks to produce tangible outputs. From the facilitators’ point of view, the process was perceived to support learning, offer refreshing perspectives, and help to develop a shared understanding regarding the complex whole.

Overall, the interaction was perceived to help strategy work in sectoral policy settings of individual transition pathways, more generally as a counter-agenda for established policies (*national energy arena*) and in regional development and planning (both *blue bioeconomy arenas*). However, due to complex stakeholder dynamics and regional and topical details that were difficult to predict beforehand, the collaborative and iterative process required continuous attention from the TA facilitators. The facilitator workload substantially varied in different process phases, with very intense periods of refining outputs (e.g., working memos, pathway report) and collecting

findings (e.g., digitalisation of pathway work output, facilitating commentaries) (see also Hyysalo et al., 2019b).

Potential and limitations of the arena interaction

The TA series had different connections to their policy settings, directing the operationalisation of outputs, outcomes, and impact. Here, the orientation toward policy cycles is of value, as finding the right opening for policy-impact is not straightforward. In the *national energy arena*, which was an intervention within the science-policy interface on national climate targets timed to follow the publication of the energy and climate strategy (TEM, 2017), the binary positioning towards the newly published official strategy created initial policy interest for knowledge co-production. The main outputs (pathways, final report, the list of 100 actions; see Table 17.3) were supported by the publication of press releases, 10 action-oriented blog posts and meetings with a diverse set of energy sector stakeholders, to impact national policy processes. The dissemination of results benefited from the EU's post-2020 energy governance framework (European Commission, 2017) that brought the TA discussions to mainstream policy-making. Furthermore, the initially 'too early' timing regarding the next election cycle turned out to be beneficial because the arena's key message on increasing the pace of energy transition was eventually appropriated by most political parties.

The *national energy arena* was an experiment demonstrating the potential for a systemic change away from fossil fuels, while identifying opportunities for innovative technology and service developers and citizen participation. The eight co-created pathways connected to several energy policy topics (see Table 17.2 for details), and the core principle in the guiding vision was that more circular solutions combined with novel technologies will not only lead to a carbon neutral energy system but also reduced energy demand. For example, the heat capture technologies at the building scale and at the system scale of district heating networks (based on heat pumps on different scales) would transform the operation of building energy networks and enable disconnection from fossil energy. In essence, the identified energy policy opening enabled methodological experimentation in developing systemic solutions that the stakeholders considered to be overlooked in the energy policy context.

The *blue bioeconomy arenas* were more open-ended processes related to emergent policy topics. The concept of the 'blue bioeconomy' was coined in Finnish policy implementation only in 2016, when the government introduced a development plan on the blue bioeconomy sector combined with an innovation program (MMM, 2016). Consequently, there was little tangible meaning to the concept at the time of the TAs, and the arenas aimed at concretising this through co-created transition pathways. Additionally, the arenas attempted to promote the view of turning environmental protection into a source of economic value. The regional orientation connected the arenas closely to specific forms of resource utilisation, which required a more place-specific orientation. As a result, the stakeholders also had stronger ties (and potential biases) towards the selected topic, making dialogue more sensitive with a less appealing institutional focus. In both *blue bioeconomy arenas*, the introduction of national policy developments contributed to the temporal relevance of the arenas. However, the primary orientation was on local experimentation in the regional contexts to open opportunities for economic renewal and to catalyse innovation activities in the areas. This became evident also in the follow-on actions especially in North Savo, where arena outputs contributed to tackle the shortcomings in the regional lake tourism networks, and to experiment with biogas production from manure to regulate excess nutrients on farms. In Southwest Finland, the arena process was followed with activities to identify systemic

solutions for utilising currently under-valued fish stocks, but the actual experimentation proved complex. Furthermore, the trans-scalar nature of transition policies became evident in this context, as the discussions were focused on politicised targets for good ecological status of waterbodies set in the European Water Framework Directive (Directive 2000/60/EC). Especially the incumbent stakeholders in fish farming questioned the legitimacy of the targets unfairly limiting their economic activities.

All the arenas have proven impactful in their contexts – although not necessarily through the actions explicated in the transition pathways. The *national energy arena* reached the target of normalising the energy transition approach to the national policy forum, and many of the actions have ended up in the government programme (Marin, 2019). Furthermore, in retrospect, the transition goals of phasing out coal and enrolling 750,000 electric vehicles by 2030 seem conservative although other goals, such as reducing household energy consumption by 15 percent with behavioural changes or creating capacity of up to 2,000 MW of heat demand response seem rather challenging. The *blue bioeconomy arenas* succeeded in providing more concrete examples of blue economy sectors and communicating the message that blue bioeconomy is not only about what happens in water. However, the idea of overcoming the opposition between environmental protection and economic value creation remains marginal. More importantly, the pathways, especially regarding the improved agriculture nutrient control in North Savo in central Finland and in coastal Southwestern Finland, and sustainably tripling fish aquaculture output in Southwestern Finland have been important contributions to complex policy developments.

Discussion

The transitions towards CE can be catalysed by opening spaces for explicit interaction to assess systemic links and policy implications. To meet this challenge, TM has been suggested as a model to “bridge the gap between top-down planning and bottom-up incrementalism” in policy and governance for sustainable development (Kemp et al., 2007, p. 3). Furthermore, the mid-range TA process supported with MTPT can help facilitate multi-stakeholder dialogues to the co-design of transition pathways by directly channelling participant action and ideation (Hyysalo et al., 2019b; 2019c). In this chapter, we have reflected upon three TA processes in different policy and spatial contexts to better understand success factors of such an approach. We discussed how the mid-range TA becomes meaningful in approaching changes in the societal systems. Then, we discussed this potential and relevance in a CE context.

The process, outcomes, and potential framings of the arena interaction

Schäpke et al. (2017) note that the outputs of TA work can contribute directly to policies, but the broader systemic transitions are contingent on indirect changes and learning in actor-networks, which is more difficult to trace. The mid-range adaptation of TA (Hyysalo et al., 2019a) has proven applicable and adaptable to various contexts with diverging power relations and cultures, but the success of pathway work is contingent on several elements – namely, the identification of policy openings, selection of stakeholders and development of contextually embedded ownership, clarity of the process and transition vision, and understanding the impact dynamics. The methodological adaptability between the contexts has required design alterations to maintain policy relevance; the alterations can be illustrated by three distinct framings for TA work – *project*, *strategic*, and *spatial* – that are implemented in the knowledge co-production processes (see [Figure 17.3](#)). The framings are not exclusive and each of them carries implications for the

Mid-range transition arenas as catalysts in a circular economy

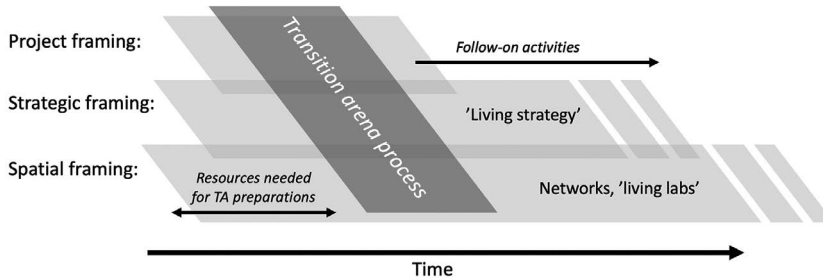


Figure 17.3 The mid-range TA process with different ‘framings’ as the focus, with differences in the necessary resources and time for preparation, and follow-on activity.

stakeholder constellation, the type of generated knowledge, and required effort in the preceding work and follow-on activities. The three framings also carry implications for CE transitions, as project framing is linked to expansion and scale-up pathways for technical and societal innovations, strategic framing to alignment of policy actions, and spatial framing to development of place-based processes and interactions to support circularity.

As understanding on CE solutions mature, often in small niches, the work within a thematic *project framing* is often the starting point of TA action, and it enables the further development of initial strategic thinking into action connecting to an increasing number of stakeholders. While project framing is often evident in research-related arenas, the *national energy arena* and the *blue bioeconomy arenas* extend this towards *strategic framing*, where policy focus is more explicitly on developing, problematising, or challenging the actions or initiatives across the multiple and often contradictory stakeholder interests. The strategic framing implies the politicisation of transition topics, or the formulated future pathways, can take place either within the arena space or in the wider societal communication also relevant for near-future CE transitions. The future actions can take a form of a living strategy that provides space for iterating and reflecting the actions as the change processes unfold. Finally, *spatial framing* is related more closely to the implementation of activities and operationalising of the pathways in the diverse territorial contexts, aligned with lessons from experimentation and stakeholder emancipation in developing grassroots initiatives for more sustainable practices. The implementation of these actions can take the form of, for example, novel networks or living labs that support the reconfiguration and transformation of established practices in production and consumption networks. However, for the CE context the spatial considerations should not be considered as containers of action but rather relational perspectives on the more diverse societal policy developments, which was especially evident in the regional TAs on the blue bioeconomy.

These three framings are crucial, when considering the implications for complex sustainability transitions that require coordination of heterogeneous societal dynamics, and the follow-on activities after the TA process (see [Table 17.4](#)). First, project framing implies a *heuristic orientation*, where the transition dynamics are being tested, deepened, or even sketched out by the specialists to create a more comprehensive understanding of the socio-technical, socio-ecological, and institutional future dynamics around the issue (cf. Frantzeskaki et al., 2018; 2016). Therefore, the emphasis on the follow-on work is less imminent and can be shaped by the created understanding and feedback from the societal actions. Second, strategic framing is connected to *operational orientation* and work on emerging policy openings – such as shifts in power and agendas – to utilise discursive power on the science-policy interface or tease out dormant societal contradictions.

Table 17.4 Potential framings and orientations for mid-range TA exercises, and implications on follow-on action

<i>Framing</i>	<i>Definition and focus</i>	<i>Orientation and implications for follow-on actions</i>
Project framing	Project-based networks and legitimation in the implementation of knowledge co-production.	Knowledge on systemic sustainability dynamics in socio-technical or socio-ecological context [heuristic].
Strategic framing	Strategic openings to unpack societal ‘lock-ins’ on complex issues and legitimate science-policy interventions.	Systemic connections and strategic pathways to uncover societal discrepancies and mobilise systemic change [heuristic-operational].
Spatial framing	Defining regionally or locally specified challenges and opportunities to understand dynamics of change.	Co-producing pragmatic connections and activities to transform sectoral and institutional practices [operational].

The stronger politicisation also emphasises the need to orient follow-on actions to relevant policy processes and institutional contexts to maintain the relevance of the produced transformative policy lessons. Finally, spatial framing builds more on the evidence-based implementation of outcomes by *operational orientation* on distinct initiatives, experiments, and pathway steps. The shelf life of such activities is potentially much longer, but also requires more engaged ownership and management of the follow-on activities within the transition context.

Mid-range transition arenas catalysing changes for the circular economy

Addressing the persistent problems of unsustainable resource governance calls for fundamental, structural transformation of societal systems (e.g., agri-food, housing, energy) and rethinking how resource use and sharing arrangements are tied to economic development and well-being. CE has become a key governance framework to reconfigure how value is extracted from resources (Hobson, 2021). While the CE circulates as an ideal, the practicalities and actual engagements or forging CEs are limited and fragile (Corvellec et al., 2021; Gregson et al., 2015). The actualisation of an economic system that aims at the minimisation, in view of total elimination, of resource extraction and waste generation is often presented in terms of ‘R’ strategies (Lazarevic & Brandão, 2020), such as: refuse, reduce, reuse; repair, remanufacture, repurpose, recycle, and recover (energy) (cf. Reike et al., 2018; see also European Commission, 2015). However, such strategies and circular business models are often presented as acontextual, apolitical, and aspatial solutions that merely need to be implemented, circulated, and scaled up (e.g., Bocken et al., 2014).

How can TAs help support the material circulation and value extraction and the reconfiguration of resource intensive systems? Considering the previous analysis and discussion, we suggest four ways in which TAs may act as catalysts in transformation processes.

First, mid-range TAs may help to render the CE as a governance problem in new and innovative ways, allowing participants to break free from institutional lock-ins and spatial boundaries. The material circuits of production and consumption are deeply embedded in global and national regimes, structured by existing, and path-dependent, sectoral (e.g., chemical product, waste, trade, planning policy) and multi-level governance mechanisms, incumbent actor-networks and material infrastructures. TAs encourage participants to explore visions and pathways beyond the confines of institutionalised policy domains and incumbent power relations, thus providing a space to empower a more diverse array of actors in co-deliberation of contextually relevant CE visions and goals. Consequently, TAs can act as catalysts for the deliberate re-politicisation of

transition goals, questioning of dominant win-win, growth via decoupling, and other ecological modernist narratives of the CE (see also Lazarevic & Valve, 2017).

Second, mid-range TAs can act as a catalyst for CE transitions by bringing experiments, niches, and CE strategies to be explored in new settings. For example, one of the transition pathways in the national energy arena focused on novel mobility services relying on the interplay between economic incentivising and social experimentation with new technologies in an urban space – a development that is currently in full motion. TAs can act as spaces to identify experiments and pilots, immediate actions, and the assignment of responsibilities, protected from mainstream markets and selection pressures (Schot & Geels, 2008). Collective TA pathway building can be a tool in which active and passive shielding policy instruments (see Smith & Raven, 2012) can be identified and linked to experimental interventions to overcome hinders and showcase for CE developments.

Third, mid-range TAs can support the discussion and analysis of niche expansion and mainstreaming. Scaling up CE experiments and niches requires active value creation and the development of business strategies. Transforming waste materials into new raw materials requires economisation and marketisation work (Gregson et al., 2013). These modes of work are carried out in institutional and material circumstances that need to be changed to support reorganisation of production systems and markets. For example, in the studied cases turning waste heat into energy resource requires reconfiguration of heating network technology to enable lower temperatures, while turning waste manure into energy and fertilisers requires new technological intermediaries to restructure markets.

Last, mid-range TAs can act as a catalyst for identifying and addressing collective action problems. Transition pathways open new questions related to the allocation of roles and responsibilities, such as identifying the central role of the public sector in creating demand for locally produced biogas to support excess-nutrient processing from agriculture. Knowledge co-production processes have been shown to empower actors, enhance the legitimacy of actions and stakeholder commitment (Wyborn et al., 2019). CE solutions also call for horizontal and vertical policy coordination to scale up CE solutions and minimise unwanted rebound effects (e.g., Valve et al., 2021).

While the previously mentioned points show the potential value of TAs in catalysing CE transitions, there are limitations. Whether TAs are connected to local, regional, or national objectives, the mid-range solutions are limited to the sphere of influence of arena stakeholders, although many of the challenges are connected to the persistent global sustainability problems and production systems. For example, the sustainable fish aquaculture development in the Southwest Finland region is restrained by Norwegian salmon farming that sets the market price level in global trade. Moreover, while mid-range TAs may be able to identify areas for policy development, the space is not sufficient to provide detailed designs. For instance, the Finnish energy TA formulated emergent ideas on circular energy systems to a coherent narrative that the political interest groups could later pick up and develop to more detailed policy initiatives.

Conclusion

In this chapter, we have studied how TM processes can support CE transitions, and how the mid-range TA can be operationalised within various framings and with different orientations of work and expectations of results. The recent TA projects in Finland offer a fruitful context to study the adaptability of the mid-range methodology, as well as assess connections between the TA interactions, their outputs, and more long-term developments potentially connected to the local context of action. Since the initial use of the methodology, the utilisation has been continued in a range of contexts including citizen energy (Lukkarinen et al., 2020), national biodiversity

strategy (Hyysalo et al., 2022), Agenda 2030 roadmaps (Lähteenoja et al., 2022), regional sustainable mobility (Enell-Nilsson et al., 2019), and low-energy buildings and district planning (Grönroos et al., 2022). The methodology and toolset have also been redesigned to support online use (see <http://murrosareena.fi/english/>).

In pursuing the CE, “there is a need for civil society and consumers, the private sector, as well as the policy framework within which it operates, to align their goals” (Brandão et al., 2020, p. 506). Key actors need to work together on “commonly shared objectives for the circular economy,” and develop means of implementation and become informed about the impacts (Brandão et al., 2020, p. 506). The mid-range TA process offers one window to observe how reflexive processes of collaborative knowledge production can help strategy and policy-making processes for CE developments. On a regional level, mid-range TAs can help to align strategic near-future goals and existing spatially dispersed networks.

Overall, TAs can orientate co-creation of actions in various kinds of transitions, whether in a governance, socio-technical, or socio-ecological systems setting (e.g., Frantzeskaki et al., 2016). As a method to support more reflexive governance for CE transitions, the mid-range TA process adds an iterated orchestration of exchanges between diverse kinds of actors. Furthermore, the MTPT supported pathway co-creation provides an additional interface to assess complex systemic dynamics to speed up the necessary near-future actions.

Educational content

- 1 CE transitions often require assessment and mediation of differing views and interests. The mid-range TA process supports collaborative synthesising of diverse knowledge on complex topics and helps facilitate critical dialogues on future action.
- 2 The mid-range TA process along with the MTPT contributes directly to the toolbox for more deliberative, reflexive governance. It acts as a constructive method to facilitate knowledge co-production, helping to structure understanding and future action in relation to various contexts and areas of interest.
- 3 Mid-range TAs can also act as catalysts for identifying and addressing collective action problems. If properly anchored to the context through relevant materials, participants, and facilitation, they can help shape ideas into action between different actors, organisations, and networks, also helping to bridge temporal and sectoral gaps when seeking new CE collaborations.

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