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2022-12-15

Lazarevic , D , Salo , H & Kautto , P 2022 , ' Circular economy policies and their transformative outcomes : The transformative intent of Finland's strategic policy programme ' , Journal of Cleaner Production , vol. 379 , no. Part 2 , 134892 . <https://doi.org/10.1016/j.jclepro.2022.134892>

<http://hdl.handle.net/10138/356153>

<https://doi.org/10.1016/j.jclepro.2022.134892>

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Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

Circular economy policies and their transformative outcomes: The transformative intent of Finland's strategic policy programme

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ABSTRACT

This paper analyses how Finland's circular economy policy attends not only to the promotion and acceleration of innovation, but also the reconfiguration of resource intensive systems. Socio-technical transitions research has historically focused on niche innovation processes. Yet recently, increasing attention has been placed on policy processes that seek to destabilise and disrupt incumbent systems and practices. Furthermore, the social justice aspects of system phase out policies have been brought to the fore. Our qualitative analysis of Finland's circular economy policy programme draws upon the transformative innovation policy and sustainability transitions policy-mix literatures, extending the transformative outcome framework to include outcomes related to the repercussions of regime destabilisation, coordination and tilting the socio-technical landscape. Our analysis shows that Finland's circular economy policy programme aims predominantly at niche stimulation and acceleration, with little emphasis on the regime destabilisation or coordination. Overall, the policy proposals aim toward a strategy of progressive system change, an orientation shaped by the country's corporatist approach to policy making and pre-existing plans.

1. Introduction

Resource extraction and processing exert growing pressure on planetary boundaries (see Steffen et al., 2015), accounting for more than 90% of global biodiversity and water stress impacts, and approximately half of all greenhouse gas emissions (IRP, 2019). These impacts are a manifestation of the present production and consumption systems that underpin mankind's current state of wellbeing and development. As a response, the circular economy has emerged as an increasingly popular policy concept (Domenech and Bahn-Walkowiak, 2019; Kovacic et al., 2020; Luo and Leipold, 2022), especially in Europe (Völker et al., 2019).

Whilst the circular economy's conceptual roots are found in ecological economics, industrial ecology and general systems theory (Ghisellini et al., 2016; Lazarevic and Brandão, 2020), it has been described as an all-encompassing umbrella concept (Blomsma and Brennan, 2017). In broad terms, it relates to 'the set of practices that aim at the minimisation, in view of total elimination, of resource extraction and waste generation' (Lazarevic and Brandão, 2020, p. 7). Two prominent discourses within the circular economy literature have been identified (Reike et al., 2018). First, a *reformist* approach that draws from ecological modernist orientations seeking win-win outcomes that neither significantly disrupt or modify the incumbent economic order,

nor critically engage with the trade-offs between sustainability dimensions. Second, a *transformationist* approach that takes a strong sustainability¹ perspective, advocating for fundamental changes to production and consumption systems that decouple resource use and environmental impact from economic growth in absolute terms.

There has been relatively little analysis of circular economy policies when compared to engineering-oriented analysis (see Ghisellini et al., 2016); despite the fact that the circular economy has been mostly driven by intermediary (e.g., the Ellen MacArthur Foundation) and public sector actors (Kovacic et al., 2020). The policy analysis literature related to resource efficiency and the circular economy (whose scope extends beyond single domains such as waste or product policy), exhibits several distinct trends. First, there is strand on policy design addressing the influence of principles (van den Bergh, 2020), life cycles (Hartley et al., 2020), coordination in policy mixes (Bahn-Walkowiak and Wilts, 2017; Milios, 2021, 2018; Wilts and O'Brien, 2019) and institutional settings (Bahn-Walkowiak and Wilts, 2017). Second, are the qualitative ex ante analyses of policy mix designs with different analytical scopes and governance levels, assessing potential environmental impacts (Watkins et al., 2016), EU and member state policy frameworks and policy mixes (Domenech and Bahn-Walkowiak, 2019; Fitch-Roy et al., 2019) and comparing circular economy policies across the globe (Fitch-Roy et al.,

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¹ See Cabeza Gutiérrez (1996) for the differentiation between strong and weak sustainability.

<https://doi.org/10.1016/j.jclepro.2022.134892>

Received 22 July 2022; Received in revised form 1 October 2022; Accepted 24 October 2022

Available online 27 October 2022

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2021).

This growing policy analysis literature, however, exhibits several blind spots. First, whilst many policy programmes and instruments proclaim a transformative ambition (Borrás and Schwaag Serger, 2022), few policy analyses investigate how policies seek to contribute to the mechanisms of socio-technical transformation. This applies more broadly to research, development and innovation policy, but is also true of circular economy policy. The emerging literature on transformative innovation policy and experimentation (e.g., Ghosh et al., 2021; Kivimaa and Rogge, 2022; Schot and Steinmueller, 2018) argues for a new orientation and approach to policy analysis which pays attention to directionality, addressing societal challenges, multi-faceted policy intervention, a broad involvement and representation of actors and multi-level governance (Diercks et al., 2019; Haddad et al., 2022). Transformative innovation policy also focuses attention on the *transformative outcomes* that public agencies should aim toward when developing projects, programmes, and policies (Ghosh et al., 2021). We suggest this latest generation of transformation-orientation innovation policy is also relevant for horizontal policy programmes, such as the circular economy, where there is a need to ‘design, evaluate, and implement appropriate policy mixes to shape the directionality of socio-technical systems’ (cf. Kanger et al., 2020, p. 1).

Second, following the circular economy’s dominant win-win framing (Lazarevic and Valve, 2017), policy analysis has tended to focus on the policy principles for, and design of, new production and consumption systems. Consequently, the extant analytical focus overlooks the deliberate policy actions the public sector can take to destabilise and discontinue current resource intensive systems and practices (cf. Hebinck et al., 2022; Kivimaa and Kern, 2016). Whilst attention in sustainability transitions research is being reoriented toward the processes that destabilise, disrupt and reconfigure incumbent socio-technical systems (e.g., Kivimaa et al., 2021; Kivimaa and Kern, 2016; Laakso et al., 2021)—especially in the fields of energy (e.g. Kivimaa et al., 2017), transport (e.g. Kivimaa and Virkamäki, 2014) and the built-environment (e.g. Lazarevic et al., 2020)—there is relatively little comparable research in the circular economy domain. This is rather concerning, considering any transition to a circular economy will significantly disrupt present production and consumption systems (Kirchherr et al., 2022) and will likely to have wide ranging economic and social implications, which require addressing in policy design (Pitkänen et al., 2020).

In this paper, we analyse how a circular economy policy programme intends to implement transformative change through its policy instruments. To this extent, we mobilise the transformative outcome framework (Ghosh et al., 2021) and propose its extension to cover the socio-economic repercussions of system change and the coordination required for a cross-sectoral policy programme. We do this by analysing the transformative intent of Finland’s *Strategic Programme to Promote a Circular Economy* (Finnish Government, 2021a), hereafter referred to as ‘the Programme’. Based on our analysis, we discuss the benefits and challenges of applying the framework to circular economy policy in the context of a national cross-sectoral policy programme. The remainder of the paper is structured as follows. Section 2 develops our analytical framework and Section 3 describes the research design and data. Section 4 analyses the Finnish circular economy programme and Sections 5 and 6 provide our discussion and conclusions.

2. Concepts and analytical framework: how to analyse the transformative intent of policy

2.1. Socio-technical transitions and policy strategies

Socio-technical transitions are long-term (approx. 25–50 years), co-evolutionary processes that engage multiple actors to reconfigure the institutional, organizational and material structures of societal systems (Grin et al., 2010). Concepts such as the multi-level perspective (MLP)

(Geels, 2005), strategic niche management (Schot and Geels, 2008) and the ‘S-curve’ of socio-technical transitions (Rotmans et al., 2001) have contributed key insights into socio-technical change processes. Central to these conceptualisations are three analytical and heuristic levels; the niche, regime and landscape. Niches are assigned a pivotal role as they provide protective spaces for alternatives to incumbent socio-technical systems to develop. Niches are juxtaposed against socio-technical regimes which comprise the dominant technologies, institutions, practices, cultures and actor networks, that not only provide stability, but also technological, cognitive and organisational lock-ins, providing resistance to systemic change (Grin et al., 2010). The landscape is the exogenous socio-technical context of cultural norms, values and other broader social and material structures at the societal level, beyond the immediate influence of actors (Geels, 2005).

Much of the science-policy community’s focus to date has been on the support and scaling-up of innovations (Geels, 2011; Trencher et al., 2021). Likewise, sustainability transitions research has predominantly focused on system innovation processes. Emphasis has largely been placed on experimentation with, and scaling-up, sustainable innovations; seeking to explain the conditions in which technological innovations can emerge, diffuse and disrupt existing socio-technical systems. However, more recent attention has shifted to the importance of deliberate attempts by actors (typically public policy-makers) to influence regime level processes, including ideas such as creative destruction (Kivimaa and Kern, 2016), disruption (Kivimaa et al., 2021), decline (Rosenbloom, 2020), reconfiguration (Laakso et al., 2021), destabilisation (van Oers et al., 2021) and phase out (Rinscheid et al., 2021) of incumbent socio-technical systems. To capture these inter-linked processes, the ‘X-curve’ (see Fig. 1) has become a simplified heuristic to illustrate the pattern of niche build-up and regime phase-out (see Hebinck et al., 2022; Loorbach et al., 2017). Hebinck et al. (2022, pp. 2–10) highlight the importance of making “processes of decline, breakdown, and phase-out more explicit in frameworks that describe the dynamics of societal change ... bring[ing] explicit need to understand destabilisation, breakdown, and phase-out of unsustainable regimes to the fore” and demonstrating the need to think beyond traditional innovation policy. The logic is that the destabilisation and breakdown of incumbent, unsustainable systems leads to the faster deployment of more sustainable solutions. However, this also draws attention to the difficult political realities of phase-out policies, the need to ensure replacements for phased-out technologies lead to sustainable system change, and the need to address the broader material and societal (i.e. justice) consequences of phase out (Rinscheid et al., 2021).

Recent literature points to a number of interrelated entry points for policy support which can advance socio-technical system transformation. For instance, analysis shows how policy-mixes can influence

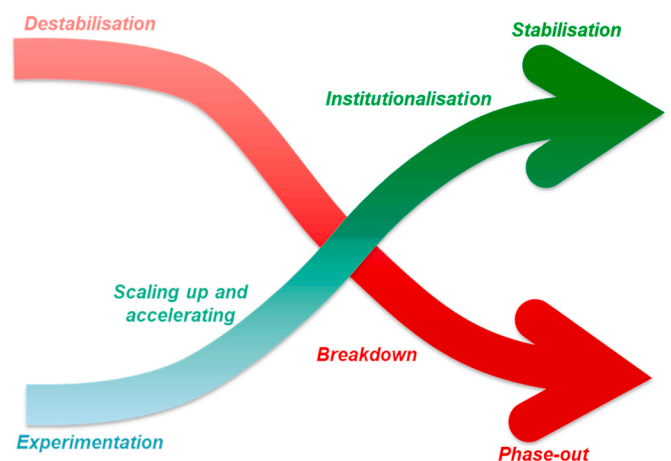


Fig. 1. The X-curve of transition build-up and break-down (adapted from Hebinck et al., 2022).

‘creative destruction’ in terms of the functions that provide both *niche* support and also *regime destabilisation* (see Kivimaa et al., 2017; Kivimaa and Kern, 2016; Lazarevic et al., 2020). Using an MLP logic, Kanger et al. (2020) identify six policy intervention points for transformative systems change (see Table 1), these include: 1) *stimulating niche innovations*, 2) *accelerating niches*, 3) *destabilising regimes*, 4) *addressing the broader repercussions of regime destabilisation*, 5) *providing coordination to multi-regime interaction* and 6) *tilting the landscape*. From an empirical review of the literature, Kanger et al. (2020) note that over 90% of studies focus on niche stimulation and acceleration, 55% on regime destabilisation and less than 6% on regime repercussions, multi-regime coordination and landscape titling. Whilst these intervention points guide us to the areas where policy can have a role in sustainability transformations, a more explicit explication of how policy actors can work to achieve specific outcomes is found in the transformative innovation policy literature.

2.2. Transformative innovation policy and transformative outcomes

The need to respond to societal challenges and future proof our societies has led to a new direction in innovation policy (Schot and Steinmueller, 2016, 2018). Transformative innovation policy is an emerging policy paradigm that is layered upon, but does not replace, earlier science and technology policy and innovation systems policy paradigms (Diercks et al., 2019). It adopts a societal policy agenda, rather than a narrow economic framing, and a broader understanding of the innovation process compared to previous approaches (Diercks et al., 2019). Building on sustainability transitions thinking and notions of policy experimentation, Ghosh et al. (2021) and Schot et al. (2019) suggest that public innovation policy should be redirected to achieving *transformative outcomes*. Transformative outcomes are conceptualised as processes or interventions that lead to deep changes in sets of rules that guide actors in their behaviour and are connected to three transformation processes that are seen to underpin socio-technical change through multi-level interaction: (1) building and nurturing niches; (2) expanding and mainstreaming niches; and (3) unlocking and opening up of regimes (Ghosh et al., 2021).

The three macro-processes identified in the transformative innovation policy literature correspond with the first three intervention points and the empirical focus of the literature analysed by Kanger et al. (2020). Whilst innovation policy naturally focuses on the ‘innovative’

side of the coin, planned system phase out and addressing the social and material repercussions of socio-technical change is not captured by the transformative outcome framework. As such, we suggest that transformative outcomes can be expanded to include (4) the processes of repercussions of regime destabilisation, (5) policy coordination and (6) tilting the landscape.

First, with increasing attention focused toward phase out and discontinuation policies in sustainability transitions, policy also needs to address the broader socio-economic implications of such processes. The topic of *just transitions* is increasingly gaining academic and political interest; understood as a process that ‘reconciles sustainable use of natural resources with a pervasive and meaningful commitment to *sufficiency*’, recognising the need to address the trade-offs between competing needs and priorities in an equitable manner (Swilling and Annecke, 2012, p. xviii). Any regime destabilising policy interventions should be understood in terms of their adverse socio-economic impacts and include a mix of policies specifically targeting workers and communities which could be negatively impacted (ETUC, 2016). As justice related aspects of transitions are inherently political (van Oers et al., 2021), it is important to ensure that decision-making procedures allow the participation of those affected parties. Participation in discussions and influence on policy proposals for deliberate destabilisation may give those actors means to effect how trade-offs are resolved. Furthermore, the socio-economic implications of transition processes can be associated with negative security—e.g., in terms of security of supply of critical raw materials and components, increased risk of cyber-attacks, new land-use related conflicts, etc.—which need to be addressed (Kivimaa et al., 2022). We propose two transformative outcomes related to (4) addressing the repercussions of regime destabilisation:

- *Reducing socio-economic impact*, which refers to understanding the impacts of system change and reducing the negative economic, social and security aspects relevant to those who will be affected by the discontinuation of incumbent socio-technical systems.
- *Social deliberation*, which refers to the need for those affected by the discontinuation to be able to participate in and influence the process.

Second, although transitions cannot be planned or controlled, actions can be taken to influence transition pathways; requiring vertical and horizontal *coordination* (Turnheim et al., 2020). Although analytical practice has tended to focus on individual socio-technical systems,

Table 1
Policy intervention points for sustainability transitions (adapted from Kanger et al., 2020).

Policy intervention point	Role of policy	Policy Strategies
1. Stimulate different niches	To support the development of a variety alternatives to incumbent systems	Regulating to trigger innovation; Targeted research, development and innovation (RDI) funding; Stimulating real world experimentation and learning; Creating spaces of experimentation in cities; Supporting grassroots innovations; Improving data generation, information sharing and monitoring in existing resource value chains
2. Accelerate the niches	To scale up promising niches and align niches	Regulation and regulatory incentives; Market adoption strategies; Standard development; Sustainable public procurement; Promoting sustainable finance; Networks and platforms for knowledge exchange; Infrastructure development
3. Destabilise the regime	To destabilise the incumbent regime structures that hinder transformative change	Regulatory intervention for system and practice phase-out; Changing incentive structure; Institutional divestment
4. Address the broader repercussions of regime destabilisation	To mitigate and manage the broader social impacts of phase out and system change	Regional Development Policies; Reskilling and Upskilling Policies; Financial compensation
5. Provide coordination to multi-regime interaction	To facilitate policy coherence between regimes and provide coordination for goals that span across sectoral silos	National strategies and visions; Cross-sectoral policy programmes; Platforms for data service coordination
6. Tilt the landscape	To alter the broader framework conditions enabling a common directionality of change for locally bounded socio-technical systems	International agreement-based mechanisms; Internationally agreed goals

transition processes result from mutually reinforcing developments across multiple systems and policy domains (Kanger et al., 2020). The multi-dimensional nature of transitions means that processes are influenced by a diverse array of policy domains including innovation, fiscal, sectoral, environmental and education policies, which require ever more horizontal coordination to overcome the siloed nature of sectoral policy processes (EEA, 2019). Furthermore, influencing the trajectory of sustainability transitions requires connected change processes across different scales of governance: global, national, regional and local (Turnheim et al., 2015). As political authority is dispersed across multiple levels of governance, coordinating and aligning activities across governance levels requires attention (Ehnert et al., 2018). Furthermore, as socio-technical systems are embedded in their surrounding environment at different scales (i.e., regional, societal, global)—and connected to physical infrastructures, actor networks with existing skills and capabilities (Kanger et al., 2020)—policy processes need to address and coordinate the place-based local economic, social and political dynamics of system change (Johnstone and Hielscher, 2017). We propose transformative outcomes related to (5) coordination:

- *Horizontal coordination*, which refers to coordination and alignment of policy goals, objectives, instruments and activities across policy domains.
- *Vertical coordination*, which refers to coordination and alignment of policy processes across governance levels.

Lastly, a transformative outcome can be extended to creating the “broader framework conditions for changing the directionality and dynamics of a broad range of socio-technical systems” (Kanger et al., 2020, p. 7). Whilst it has generally been assumed that the socio-technical landscape cannot be shaped by purposeful action, activities that target global institution-building, and international and regional agreements can aim to gradually shape cultural norms and values over time (Kanger et al., 2021; Keller et al., 2022). We propose one transformative outcome related to (6) titling the landscape.

- *Common directionality*, which refers to the negotiation of a common direction for change that goes beyond the nation state.

3. Case study and data

Finland is an interesting case to study circular economy policy, as it developed the world’s first circular economy roadmap in 2016 (Sitra, 2016), updated in 2018, and the Finnish Innovation Fund (Sitra) has been an active intermediary organization in the promotion of the circular economy globally (coordinating the World Circular Economy Forum events²). Furthermore, the current governmental programme (2019–2023) has set the goal for Finland to become a pioneer in the circular economy.

This paper provides an in-depth qualitative analysis of a national circular economy policy programme. It tests the analytical framework extending the transformative outcomes framework (Ghosh et al., 2021) to include the macro-processes suggested by Kanger et al. (2020) in their intervention points approaches (Table 2). In addition theory testing, a qualitative content analysis was carried out to interpret the complexity of policy documents, describe patterns and understand also the latent content of data (Drisko and Maschi, 2015). The selected documents illustrate the recent circular economy policy developments in Finland. The documents include *New direction – Proposal for a strategic programme for the circular economy* (Finnish Government, 2021a), *Government resolution on the Strategic Programme for the Circular Economy* (Ministry of the Environment and Ministry of Economic Affairs and Employment, 2021) and the *Evaluation of the Strategic Programme for the Circular*

Economy (Hildén et al., 2021).

The analysis proceeded in two rounds. In the first round, a deductive theory-driven content analysis was undertaken using NVivo research software (Drisko and Maschi, 2015). All authors conducted a detailed reading and analysis of the Programme documents.³ To achieve reliability for the findings, two authors coded the data independently, and thereafter compared and discussed the coding (Drisko and Maschi, 2015). In cases of differences, a commonly shared interpretation was achieved by discussion. In the analysis, the text was coded based on its relationship to a primary and secondary transformative outcome. We applied a theory-driven policy evaluation approach assuming that certain factors proven relevant in one situation are likely to be relevant in others as well (Jacob and Ekins, 2020). Hence, we looked for features inherent to the various transformative outcomes, such as subsidies for shielding niches or establishing networks. Many text excerpts were related to several transformative outcomes. For example, a network may simultaneously create an avenue for cooperation as well as support replication of the best practices.

At the end of the first round, the coding was checked to ensure reliability and consistency. Meanwhile, to contribute to the aims of the research, there was a need to understand the nature of the policy excerpts. In the second round, the data was coded based on three inductive categories that were derived from the data (Drisko and Maschi, 2015). First, we coded where the text identified transformative ambitions and goals, such as sustainable use of natural resources. Second, the intent to implement specific measures were coded, as (a) measures proposed and (b) potential measures that required further investigation. Third, implementation challenges were identified in the programme recognising issues that may hamper the realisation of the programme’s objectives. Implementation challenges, arising from the materials, were classified according to the transformative outcomes, for example expanding niches hampered by the lack of cooperation and small domestic markets.

4. Results

4.1. Transformative intent

The Programme established the goal for Finland to become a pioneer in the circular economy. The Programme frames a climate-neutral circular economy as “The solution to the sustainability crisis: a new economic basis in which production and consumption are within the limits of the earth’s carrying capacity” (Finnish Government, 2021a, p. 11). The programme is considered to be a cross-cutting instrument, seeing circular economy policy vital for Finland to simultaneously achieve climate goals, halt biodiversity loss and support economic growth and employment. The Programme establishes a vision where:

“Finland’s economic success in 2035 will be founded on a carbon neutral circular economy where:

- Sustainable products and services are mainstream and the sharing economy is commonplace.
- Our choices are future-proof and they strengthen our fair welfare society.
- More for less: the use of natural resources is sustainable and materials remain in circulation longer and more safely.
- The breakthrough of the circular economy has been achieved through innovations, digital solutions, smart regulation, and responsible investors, businesses and consumers.

² See <https://www.sitra.fi/en/projects/wcef/#events>.

³ The authors HS was involved in the preparation of the *Evaluation of the Strategic Programme for the Circular Economy* (Hildén et al., 2021) and PK was a member of the working group for *New direction – Proposal for a strategic programme for the circular economy* (Finnish Government, 2021a).

Table 2
Transformative outcomes framework depicting how various policies can contribute to transitions.

Macro-process	Transformative Outcome	Contribution	Examples/Strategies
1. Promoting and nurturing niches	Shielding	Offering protection for niche experiments and normalising protection measures across different dimensions (e.g., STI, market, cultural)	R&D subsidies, taxes, purchasing, voluntary agreements, regulation, information campaigns, network-building, activism
	Learning	Inducing first and second order cognitive process of knowing, understanding and reflecting	Incorporating different forms of knowledge and aspects of sustainability. Organising opportunities for challenging assumptions
	Networking	Creating high-quality opportunities for collaboration between actors and strengthen their networks	Joint activities, enhancing mobilizing power, mutual trust and coordination. (e.g., transition arenas)
	Navigating expectations	Creating spaces for articulating expectations around societal challenges and appraising these expectations to enhance their credibility, quality and stability collective perceptions about landscape pressures of diverse groups of regime actors	Allowing a diversity of actors to voice their expectations (e.g., futuring processes). Developing credible expectations (e.g., transition arenas)
2. Expanding and mainstreaming niches	Upscaling	Increasing the adoption by users of the new emerging system, new user preferences, technologies, policy measures, industry strategies and cultural meanings	A user club or marketing campaigns
	Replicating	Facilitating the replication of specific niche experiments in other contexts	Funding programme for regional replication of experiments
	Circulating	Identifying and promoting the circulation of ideas, people, and technologies	Continuous circulation between niches, e.g., via an intermediary actor
	Institutionalizing	Mainstreaming niche practices and rules among existing and new niche actors;	Creating a handbook, a certification scheme or standards
3. Opening up and unlocking regimes	De-aligning and destabilising	Facilitating the development of disruptive policy frameworks and governance arrangements that challenge existing systems	Developing phase-out policies, mobilizing social protests
	Unlearning and deep learning in regimes	Facilitating unlearning and deep learning among regime actors, helping them reassess the regime rules and question existing behaviours, belief, values and norms	Organising a policy lab to discuss policy barriers
	Strengthening regime-niche interactions	Creating linkages between niche and regime actors, and their ideas and resources across multiple niches	Developing new impact investment tools to invest in niche activities
	Changing perceptions of landscape pressures	Facilitating processes to challenge individual and collective perceptions about landscape pressures	Foresight activities with regime actors
4. Repercussions of regime destabilisation	<i>Reducing socio-economic impact</i>	Addressing the socio-economic impacts resulting from systemic change	Payments for industry for the closure of plants, provision of financial and educational support for managing structural unemployment and skill mismatches, regional development policies
	<i>Societal deliberation</i>	Facilitating the participation and inclusion of affected actors in planning and decision-making processes	Coproduction of pathways with affected communities, regions and industries; community consultation
5. Provide coordination to multi regime interaction	<i>Horizontal coordination</i>	Coordinating and aligning policy processes across multiple policy domains and supporting positive reinforcing linkages	Cross-sectoral roadmaps
	<i>Vertical coordination</i>	Coordinating and aligning policy processes across governance levels	Strategies and visions that interact at national, regional and local scales
6. Tilt the landscape	<i>Common directionality</i>	Altering the broader framework conditions by negotiating a common directionality of change for locally bounded socio-technical systems	International agreement-based mechanisms; Internationally agreed goals

*Transformative outcomes related to the first three macro-processes have been adapted from Ghosh et al. (2021), while the remaining macro-processes draw on Kanger et al. (2020). The authors propose transformative outcomes (*in italics*) related to the three last macro-processes and identify examples based on previous literature.

- With a circular economy, Finland is a player in the global arena and a provider of sustainable solutions on the international market.” (Finnish Government, 2021a, p. 12).

It also outlines three quantitative targets to implement the vision:

- 1) In 2035, the total domestic consumption of primary raw materials will not exceed the 2015 level.⁴
- 2) Resource productivity will double in 2035 compared with 2015.
- 3) Circularity rate of materials will double by 2035. (Finnish Government, 2021a, p. 12).

Whilst the first two quantitative targets aim at progress along the existing trajectory (Savolainen et al., 2019), only the third target (circularity rate of materials will double by 2035) is more ambitious, as Finland has a 6.2% circularity rate, well below the global (8.6%) and the EU (12%) averages (Circle Blue Economy, 2020; Eurostat, 2022). The Programme devotes a great deal of its content to describing the current

situation in the Finnish policy which lays the foundations for the 41 measures analysed in detail below.

4.2. Promoting and nurturing niches

To a large extent, niche promotion and nurturing is supported by traditional RDI instruments that shield circular economy niches from mainstream market pressures. *Shielding* is the second most common outcome, being the target of eight measures (Table 3). RDI investments are expected to help industries to develop and implement new technologies and business models. RDI investments specifically emphasise ‘ecosystem’ activities, as business/innovation ecosystems (see de Vasconcelos Gomes et al., 2018) are envisaged to play a leading role in the emergence of circular economy innovations. The shielding measures target specific fields including low-carbon and resource-efficient production and material technologies; carbon capture and use; data solutions for sharing data across traditional sectoral boundaries, the utilization of industrial by-products; extending the life of buildings; and the utilization of demolition materials.

In addition to traditional RDI instruments, the Programme also builds on the theme of environmental regulation as an enabler of innovation, especially Finland being “a European leader in

⁴ The target does not cover natural resources used to manufacture products for exports (Government Resolution, 2021, p. 3).

Table 3
Transformative outcomes for promoting and nurturing niches.

Macro-process	Transformative Outcome	Proposed measures/Measures to be investigated
Promoting and nurturing niches	Shielding	Fund RDI for firm and ecosystem level activities, demonstration and facility investments; Recommend financial incentives to decrease natural resource use and GHG; Direct national and EU funding to circular economy RDI; Encourage municipalities to provide testbeds and resources to support experimentation; <i>Energy-efficient renovation construction pilots; risk-sharing models in sustainable and innovative procurement; CO₂ emission pricing for building materials; reducing electricity tax for recycling industries</i>
	Learning	Support the use of digital solutions and open data; Foresight activities with education actors and labour market organisations on circular economy knowledge and education needs
	Networking	National knowledge centre to support municipalities and regional ecosystems; accelerate cooperation and partnerships between businesses, authorities, educational institutions and research institutes; develop cooperation between to support the preparation of regional projects
	Navigating expectations	None

competitiveness and in the number of eco-innovations that save the environment in new ways, which are being stretched by our demanding environmental legislation” (Ministry of the Environment and Ministry of Economic Affairs and Employment, 2021). Proposals to investigate lowering energy taxation for recycling industries serve to provide some passive niche protection, whilst revising the Waste Act specifies rules for End of Waste aims to clarify regulation for using waste-based materials.

The Programme highlights the need for broad learning in terms of increasing the level of knowledge and research for a carbon-neutral circular economy, which adds to the educational resources that Sitra has developed. A specific learning outcome is related to digitalisation, by securing and opening different types of data to be used in the analysis of policy choices and assessing the progress of the Programme’s measures. In this respect, the Programme recognises the many issues that still need to be clarified in relation to digitalisation, such as the roles of actors, potential business models and cost-effectiveness. At a more general level, foresight activities to identify circular economy knowledge and education needs are expected to be carried out together with educational actors and labour market organisations.

Networking for niche promoting and nurturing specifically related to broadening and deepening social networks around emerging and existing niches. Whilst many networking activities could be identified, these are broad, and primary concerned with niche expansion and the knowledge exchange among municipalities. One of the main measures, is the establishment of a national knowledge centre for supporting municipalities and regional ecosystems in promoting a carbon-neutral circular society; helping them to find the right actors, channels and funding sources, searching for solutions to bottlenecks, and bringing together research institutes to develop solutions.

Table 4
Transformative outcomes for expanding and mainstreaming niches.

Macro-process	Transformative Outcome	Proposed measures/Measures to be investigated
Expanding and mainstreaming niches	Upscaling	Improve funding effectiveness for circular economy projects; Strengthen existing and launching new innovation ecosystems through international RDI partnerships; Implement development and growth accelerators for circular economy ecosystems; Fund the development and expansion of the Finnish Industrial Symbiosis System (FISS); Develop financial incentives and taxation to support the uptake of service models; Fund digital and modular solutions for built environment digital footprint and information management (focus on technology export); Encourage the efficient use of state facilities through flexible premise sharing; Develop procedures and legislative changes for end-of-waste classification; <i>Investigating means to enhance a market for secondary raw materials; Exploring the potential for a higher and broader tax on waste incineration</i>
	Replicating	Develop an integrator model to boost the export of Finnish circular economy solutions; Establish a ‘national knowledge network’ to support municipalities and regional ecosystems to promote circular economy solutions
	Circulating	Eco-design database and platform to improve companies’ access to information and tools; promotion of circular economy solutions via the Center of Excellence for Sustainable and Innovative Public Procurement (KEINO); Developing new ways to gather information on circular economy services for citizens; established a network of CE change agents in the real estate and construction sector; Municipalities to include the circular economy in their municipal strategies; developing the World Circular Economy (WCEF) collaboration platform into a hub of circular economy excellence to share best practices
	Institutionalizing	Defining, collecting and opening data important for the circular economy; Increasing circular economy education in schools and educational institutions; Prioritising the circular economy as a strategic priority in vocational training institutions and increasing teacher training; Educational institutions and civil society actors to develop, implement and disseminate circular economy programs, policies and communications; Updating the principles of building and land use planning to support the circular economy; Developing public procurement criteria that support circular economy

The Programme did not include any measure that specifically dealt with navigating expectations. However, the preparation of the Programme has been described as a joint learning process of the key circular economy actors (Finnish Government, 2021a, p. 92). The process included a steering group, a working group, four theme groups, scientific panels, developmental evaluation, citizen panels, a citizen jury and online brainstorming. The citizen panels affected especially the guidelines on the use of natural resources and the role of economic instruments and citizens in the transition.

4.3. Expanding and mainstreaming niches

The majority of the proposed measures in the Programme relate to the expansion and mainstreaming of niches, both domestically and internationally, see Table 4. Public policy, regulatory reform and regulatory cooperation is proposed as a vehicle to support private sector investment, especially regarding the *upscaling* of business ecosystems and industrial symbiosis networks. Whilst the Programme proposes launching ‘growth accelerators for circular economy ecosystems’, it also highlights the challenges niche expansion faces, in terms of lack of cooperation between small and large companies, non-willingness to open digital interfaces and Finland’s small domestic markets.

Digitalisation is highlighted especially in relation to the real-estate and construction sector. Enhancing the use of digital platforms is proposed as means of promoting the re-use and recycling of construction and demolition material. At a more general level, increasing the use of recycled materials in the marketplace through recycling targets and digital marketplaces are mentioned as measure to be investigated. Furthermore, clarifying the end-of-waste regulations (in addition to

niche protection) acts as a measure to enable the emergence of secondary raw material markets, continuing the ongoing end-of-waste implementation work (see Kauppila et al., 2018). Other options briefly mentioned for stimulating market creation include blending obligations, deposits on different materials, and voluntary agreements. Secondary markets targeted include domestic textile, plastic, waste electrical and electronic equipment, and construction waste. Lastly, the Programmes highlights the investigation of financial incentives and taxation to support the uptake of circular economy service models related to repair services, chemical leasing and integrated industrial service models.

The replication of circular economy solutions in other contexts, domestic and international, is also targeted. The programme especially targets the replication of integrated solutions which can only be created with the cooperation of several actors via Business Finland’s existing Ecosystem Integrator funding programme. This is complemented by a ‘national knowledge network’ to support the work of municipalities and regional ecosystems in promoting best practices, facilitating industrial symbiosis, material reviews, and generating information for digital platforms.

The circulation of ideas, people and technologies, is intended for several circular economy areas. The Programme proposes a range of platforms targeting eco-design in companies, the real estate and construction industry, public procurement, and national- and international-level sharing of best-practices. The Programmes also highlights several measures that are intended to deepen the institutionalisation of the circular economy. Here, institutionalisation is not focused on specific niches, but on embedding circular economy principles in courses in secondary and tertiary level educational institutional, building and land use planning and public procurement criteria.

4.4. Opening up and unlocking regimes

The Programme proposes several measures for further investigation aimed at opening up and unlocking regimes, which are modest and incremental in nature (see Table 5). The national agreement on the use of natural resources involves voluntary commitments to reduce resource use, increase the use of renewable materials and promote a carbon-neutral circular economy. Voluntary agreements have a long history in

Finland and have been successful in the energy sector. As such there is some possibility for the national agreement to commit firms and municipalities to dealign their current resource intensive practices to less resource intensive practices. The measures to be investigated relate to financial instruments for increasing the landfill and incineration tax, a CO₂ emissions pricing for construction materials, a land tax to steer the efficient use of gravel and crushed stone, a tax on mining activities and identifying the barriers posed by legislation and taxation. However, these are only investigations and, even though they aim at dealing regime rules they quite modest.

The Programme sets out to strengthening -regime-niche interactions by coordinating the development of digital architectures, based on open standards, that can help material flow monitoring, support the development of digital circular economy solutions. Standard rules on how data is collected, stored, secured and shared are critical challenges that need to be addresses to make progress in this area.

4.5. Repercussions of regime destabilisation

The Government Resolution notes that to achieve a fair transition, measures must be prepared with a focus on equity and empowerment, and that the positive and negative effects on different sectors need to be anticipated (Ministry of the Environment and Ministry of Economic Affairs and Employment, 2021). The repercussions of regime destabilisation are addressed by a sole measure establishing skills, training and continuous learning, through work-oriented training programmes within the private sector, needed to address the new working practices needed in a future circular economy (see Table 6). In this measure, digital skills are highlighted as especially important.

The Programme notes that “participation rather than simply sharing information” strengthens community enthusiasm and trust, especially concerning the introduction of radical solutions. Whilst it details some pervious approaches trialed at the national and municipal level to allow for citizens and community participation and deliberation, such as participatory budgeting and inclusive planning, no concrete steps are suggested to involve a broader range of actors in identifying and addressing any potential negative impacts of system change.

Table 5
Transformative outcomes for opening up and unlocking regimes.

Macro-process	Transformative Outcome	Proposed measures/Measures to be investigated
Opening up and unlocking regimes	De-aligning and destabilising	National agreement on the use of natural resources; Evaluating possibilities for increasing the landfill and incineration tax; Exploring pricing of CO ₂ emissions for construction materials; Exploring the possibility of setting an aggregates levy; Investigating the legislative and taxation barriers for CE services (e.g., patent and copyright regulation, intangible property rights, consumer rights)
	Unlearning and deep learning in regimes	None
	Strengthening regime-niche interactions	Promoting digital infrastructures and related regulation both nationally and internationally, based on open standards; Investigating possibilities to pilot impact investments in energy-efficient reconstruction
	Changing perceptions of landscape pressures	None

Table 6
Transformative outcomes for addressing the repercussions of regime destabilisation.

Macro-process	Transformative Outcome	Proposed measures/Measures to be investigated
Repercussions of regime destabilisation	Reducing socio-economic impact	Anticipating, developing and renewing skills with labour market organisations, education and training providers, and labour market organisation via company level reskilling and work-oriented training programmes
	Societal deliberation	None

Table 7

Transformative outcomes for horizontal and vertical coordination.

Macro-process	Transformative Outcome	Proposed measures/Measures to be investigated
Provide coordination to multi regime interaction	Strengthening regime-regime interactions (horizontal)	Compile a network of local authorities responsible for permitting and statutory procedures
	Strengthening multi-level governance interactions (vertical)	None

Table 8

Transformative outcomes for tilting the landscape.

Macro-process	Transformative Outcome	Proposed measures/Measures to be investigated
Tilting the landscape	Enabling a common directionality of change	Further develop the World Circular Economy Forum; Active involvement in EU and product policy instruments; Involvement in the establishment of the Intergovernmental Global Circular Economy Alliance; Contribute to the integration of circular economy objectives into EU trade agreements

4.6. Providing horizontal and vertical coordination

The programme itself is considered to be a cross-cutting instrument, providing *horizontal coordination*. It also includes a measure, concerning horizontal coordination, to enhance cooperation between public authorities on circular economy projects by establishing a network to “coordinate schedules, share information and expertise and support the preparation of regional circular economy projects” (Finnish Government, 2021a, p. 40) (see Table 7). The measure specifically highlights building permits, zoning, environmental permits, environmental impact assessments and chemical safety permits, that can benefit from improved coherence between regional authorities.

4.7. Tilting the landscape

In line with the vision of Finland having a global impact, the Programme sets the ambition to have a comprehensive and consistent “circular economy foreign policy” (Finnish Government, 2021a, p. 83); specifically concerning the promotion of Finland’s image, trade policy, development policy, and export promotion in multilateral environmental policy forums. Measures proposed include the continued development of the World Circular Economy Forum, being an active participation in the EU’s Global Alliance on Circular Economy and Resource Efficiency and Promoting the integration of circular economy objectives into EU trade agreements as well as multilateral trade policies (see Table 8). Finland also participates in the One Planet Network and United Nation’s Partnership for Action on Green Economy. Furthermore, the Programme highlights Finland’s active involvement in developing EU legislation and product policy instruments to support the circular economy, which specific actions related to extending the Eco-design Directive to all environmentally significant product groups.

5. Discussion

5.1. The transformative intent of Finland’s circular economy programme

We examined the Finland’s *Strategic Programme to Promote a Circular Economy*, in terms of the transformative outcomes its policy measures aimed at achieving. Our analyses shows that the Programme has a strong orientation towards niche stimulation and niche acceleration—with 12 and 24 measures targeting these transformative outcomes, respectively—and places little emphasis on opening up regimes, the repercussions of regime destabilisation, or coordination.

The niche stimulation and niche acceleration measures adopted illustrate how the country’s context, strategic considerations (e.g., GDP growth, productivity, exports, etc.) and pre-existing policies and plans have shaped its orientation. The Programme draws heavily on a number of existing policy agendas to orient its niche nurturing and expansion measures. For example, *business ecosystem* development is a core

component of the New Partnership Model of Finland’s updated DRI roadmap (Finnish Government, 2021b) and core programme area for Business Finland; *digitalisation and ICT* build on the country’s internationally competitive ICT sector and Climate and Environmental Strategy for the ICT Sector (Ministry of Transport and Communications, 2021); and the strong *export orientation* of the Programme reflects changes to the remit of Business Finland, compared to its former counterpart the Finnish Funding Agency for Technology and Innovation (Tekes).

The transformative innovation policy orientation also emphasises *opening up and unlocking regimes* (Ghosh et al., 2021), besides niche stimulation and acceleration. In this respect, the programme suggested few measures (mostly investigations) with modest aims. Furthermore, their impact in terms of destabilisation is likely to be minimal. For example, the voluntary national agreement on natural resource use, is one concrete example of a policy measure aimed at *dealing* established resource intensive practices. Voluntary agreements are rather popular in Finland⁵ demonstrating the corporatist consensual policy style (negotiated rule-making) in Finnish policy making (see Gronow et al., 2019). However, whilst the logic established in the Programme foresees voluntary agreements to set more ambitious targets than legislation could (and without the need additional regulation), stand-alone voluntary agreements are rather weak in the absence of a credible threat of stronger regulation (Lilja, 2009). Additionally, the impact of any suggested measures is dependent upon their design, and by themselves are likely to place minimal pressure on their respective regimes. This problematic lack of “measures that would restrict or make more expensive activities that are considered problematic for the circular economy” was already highlighted by the ex-ante impact assessment (see Hildén et al., 2021, p. 5).

We suggest two possible explanations for the lack of policy measures aimed at *opening up and unlocking* incumbent production and consumption systems. First, the institutionalised integration of interest groups in policy preparation and implementation, or routine corporatism, is strong in Finland (Vesa et al., 2018), which favours voluntary actions over regulatory intervention. Second, as sectoral policy domains (e.g., chemicals and production policy) and cross cutting domains (e.g., trade and the free movement of goods) are regulated at the EU level, attention is targeted at *tilting the EU policy landscape*. Additionally, as production and consumption systems are global, with a globally shared deeply structured rationality (cf. Fuenfschilling and Binz, 2018), emphasis is placed on ‘circular economy foreign policy’. This is done not only *tilt the landscape* but promote market access for technologies, goods and services that promote the circular economy.

The normative aim of Finland is to become ‘a carbon-neutral circular economy: a new basis for an economy where production and

⁵ There are currently nine voluntary agreements under the Finnish Sustainable Development Commission’s social commitment Green Deal programme that have been made since 2016.

consumption are within the limits of the Earth's carrying capacity' (Finnish Government, 2021a, p. 26). This ambitious aim sees the circular economy as "a strategic priority guiding all social and economic policy" and "new basis of the economy" (Finnish Government, 2021a, p. 36). In line with the current transformative discourse common in research and innovation policy design that seeks to address societal challenges (see Borrás and Schwaag Serger, 2022), this is a truly transformative ambition. However, the Programme is light on policy measures that go beyond traditional policy design heuristics. Progress along existing trajectories and few disruptive policy instruments is what Laatsit et al. (2022) refer to as *progressive system change*. Progressive system change is characterised by many small changes over time which culminate in new configurations, as opposed to disruptive system change which exhibits a large initial change from the existing socio-technical system (Laatsit et al., 2022). Disruptive system change calls for divestment in incumbent infrastructure and the destabilisation of existing institutions, to be replaced by new ones. For example, in 2021, the Dutch government released an unprecedented strategy to reduce nitrogen emissions by 50% by 2030 (Coalitieakkoord, 2021) through means that could result in a one third reduction in the numbers of pigs, cows and chickens, leading to widespread protests documented in the international media. In contrast, due to the interconnected global nature of the production and consumption systems, the Finnish Programme uses, and plans to investigate the use of, rather traditional innovation policy instruments which seek to adapt existing infrastructures and institutions. This is done with the intention that changing different system elements, at an aggregate level, will reinforce each other over time (akin to the small-wins framework, see Salo et al., 2022; Termeer and Metzger, 2019).

5.2. Applying the transformative outcomes framework to the circular economy

The transition to a more circular economy provides a normative direction to policy making, establishing the aim of slow material loops and the shift from consumers to users, which enables the maintenance of economic growth and provides a solution to European renewal (Lazarevic and Valve, 2017). By applying a transformative innovation policy orientation to the analysis of a circular economy policy mix design, our intention was to assess if public policy measures, and the efforts of public sector actors, are configured in a way that can enable such a transformation. However, applying the analytical framework in an ex-ante assessment of such a broad cross-sectoral programme raised some methodological issues.

The circular economy has been described as an umbrella concept (Blomsma and Brennan, 2017), bringing many existing policy domains together under one roof. This fact meant that the policy instruments were described in very broad terms. The first implication of the breadth was that the policy instruments could be considered to contribute to multiple transformative outcomes. To make our analysis workable, we coded the measures to what we considered to be their primary and secondary outcomes. Although the coding was discussed among the authors, it could be seen as a limitation of such an approach when applied to broad cross-sectoral programmes.

The second implication was that, whilst the analysis functioned rather well as an exercise in identifying the transformative outcomes that are not sufficiently covered by the intended policy mix design, it could not delve into much detail concerning individual policy instruments. Whilst this is a limitation, treating the analytical task as a mapping exercise enabled the identification of transformative outcomes not sufficiently covered by existing instruments. Of particular interest to the circular economy is horizontal and vertical policy coordination. In our analysis, one measure addressed coordination in terms of cooperation between authorities, while vertical coordination required between sectors and ministries was largely missing. Cross-sectoral programmes increase the amount of horizontal coordination required between

sectors, ministries and agencies, which is only partially addressed by the Programme. Indeed, the need for horizontal coordination in circular economy policy mixes is highlighted by a number of authors (e.g. Bahn-Walkowiak and Wilts, 2017; Milios, 2021, 2018; Wilts and O'Brien, 2019). Challenges in achieving horizontal policy coherence have largely been attributed to institutional factors (e.g., organizational cultures, pre-existing internal rules creating path-dependencies) and actor-centred explanations (e.g., interest-driven actors engaging in strategic actions) (Lenschow et al., 2018), which require concerted action to encourage reflexivity within government intuitions. Whilst different strategies exist for attempting to achieve better coordination—e.g., through networks, collaboration and hierarchy (see Peters, 2018)—further work is needed to test practical solutions in public administrations for instance, through experimental policy engagements, whilst also recognising the limits of coordination (Peters, 2018).

6. Conclusions

A transformationist approach to the circular economy advocates for fundamental changes in production and consumption systems to decouple resource use and environmental impact from economic growth in absolute terms. Despite the growing policy analysis literature, two evident blind spots require attention. First, how can policies contribute to the mechanisms of socio-technical changes and, second, how can deliberate public policy actions destabilise and discontinue current resource-intensive systems? Our paper contributed to these gaps by proposing an extension of the transformative outcomes approach (Ghosh et al., 2021) with complementary outcomes related to addressing the repercussion of socio-technical change, vertical and horizontal policy and actions to influence the broader global discourse, following Kanger et al. (2020).

We tested the extended framework and analysed a national cross-sectoral programme that aims towards transformative change, namely Finland's *Strategic Programme to Promote a Circular Economy* (Finnish Government, 2021a). The Programme itself represents an example of a horizontal policy programme that highlights coordination between sectors, administrative levels as well as public, private and other actors; which should also be seen as a significant political achievement in its own right. Yet our findings show that the focus of the Programme was clearly on niche promotion and expansion, with few measures targeting the unlocking of regimes and repercussions this may cause, and vertical and horizontal coordination. Furthermore, many of the 41 measures of the Programme are rather weak and uncertain. Only the knowledge network for municipalities and regional ecosystems (*replicating*) and the voluntary national agreement on natural resource use (*dealigning*) can be seen as actual decisions (Hildén et al., 2021). Furthermore, the resources made available, the specificities of implementation plans and other factors that affect its implementation, such as inter firm cooperation (in the case of business ecosystems) and the willingness of firms to open digital data interfaces (Finnish Government, 2021a) are rather uncertain.

Ultimately, the impact of the policy programme is dependent on its implementation. Ghosh et al. (2021) conclude with an assumption that it may be impossible to assess ex-ante which transformative outcomes to prioritise due to their complexities. Our results support this conclusion, as the usability of the framework appeared limited when the measures are at a general level and not yet implemented. However, even at this early stage, a critical analysis of the horizontal policy Programme utilising this broad framework—that includes macro-process niche stimulation and acceleration, regime destabilisation and phase out and coordination—can feed into policy developing that can "lead to the design of a more complete portfolio of policy instruments and strategies, facilitating a change in the directionality of socio-technical systems towards increased sustainability" (Kanger et al., 2020, p. 10). In future, the extended transformative outcomes framework should be tested in other policy mixes, preferably ones that have concrete measures in place or are

open for ex-ante evaluations feeding into to the development of more transformative policies.

Funding

Funding from the Strategic Research Council, operating in connection with the Academy of Finland DECARBON-HOME (335,252) project and the Academy of Finland Urban Symbiosis (46924) project.

CRedit authorship contribution statement

David Lazarevic: Conceptualization, Investigation, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Hanna Salo:** Investigation, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Petrus Kautto:** Investigation, Data curation, Formal analysis, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgements

The authors would like to thank the three anonymous peer-reviewers and Paula Kivimaa for their comments that have improved the paper.

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