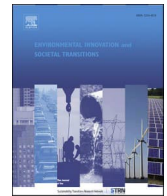




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From niche support to system building—Perceptions of the transformation potential of policy measures on packaging reuse

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ABSTRACT

Reuse is suggested as a strategy to reduce mounting single-use packaging consumption and the related pollution. In this exploratory study, we investigated how governance can create conditions for the uptake of reusable food packaging in Finland when phasing out the existing single use system is not viable. We identified policy instruments addressing packaging reuse and analyzed how key stakeholders perceive the ability of these instruments to induce systemic change. The results indicate that the current policy mix entails mainly niche support measures and that its transformational power is relatively weak; to strengthen it, further measures on single use regime destabilization should be jointly implemented with reuse system building and niche support. However, addressing all three simultaneously may create tensions between different instruments within a policy mix or between policy mixes targeting separate goals. This requires paying more attention to directionality, policy coherence, consistence, and congruence when designing transformative policy mixes.

1. Introduction

The role of single-use food packaging in plastics pollution has become increasingly and alarmingly evident. Many countries now apply both regulatory and voluntary approaches, building mainly on circular economy (CE) principles, to address this global challenge (Sundqvist-Andberg and Åkerman, 2021; Tenhunen-Lunkka et al., 2023). In Europe, the main approach has relied more on improving waste recycling and less on reducing packaging consumption. It is estimated that at the current rate of consumption growth, there will be a 19 % rise in packaging waste and a 46 % rise in plastic packaging waste in Europe by 2030 (European Commission, 2022a). Hence, the European Commission (EC) has highlighted the role of reuse alongside recycling in tackling the mounting packaging consumption and related pollution (European Commission, 2022b.).

Besides public policies and governance, innovations are seen as critical in advancing sustainability transitions (Kivimaa and Kern, 2016; Rogge et al., 2020). Hence, reusable packaging and niche business model innovations provide a topical starting point to study policy mixes within the transition towards sustainable food packaging. Given the low cost and convenience of single-use packages and their ability to protect food and reduce food loss (Simoens et al., 2022; Sundqvist-Andberg and Åkerman, 2021), it is unlikely that reuse

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could fully replace single use in food systems. This might not even be desirable from a sustainability perspective (Bradley and Corsini, 2023; UNEP, 2022; 2020). For example, reusable packaging could be environmentally beneficial for foods with a lower environmental production impact (UNEP, 2022) and for takeaway foods (UNEP, 2020). Therefore, identifying applications where packaging reuse may have the most potential in advancing sustainability is important (Pålsson and Olsson, 2023).

Packaging reuse presents a particular case in which phasing out is not a viable option and keeping parts of the existing system may be necessary to ensure food safety and performance of the food system. Implementing packaging reuse in modern food systems can thus be arduous, and there are several path dependencies and challenges hindering the uptake such as consumer acceptance, increased logistic complexity, lack of infrastructure, and concerns on sustainability implications (Coelho et al., 2020; Bradley and Corsini, 2023; Simoens et al., 2022; Tenhunen-Lunkka et al., 2023). Scaling up packaging reuse requires systemic change and affects many actors in the food, retail, and waste sectors (Bradley and Corsini, 2023; Greenwood et al., 2021; Mahmoudi and Parviziomran, 2020; Muranko et al., 2021; Pålsson and Ohlsson, 2023; Tenhunen-Lunkka et al., 2023, UNEP, 2022). Systemic change is required as the uptake of reusable packaging calls for major changes in existing production, consumption and waste systems that are now based on single-use and recycling. Thus, in this context, systemic change refers to changes required in not only business models, but also how takeaway food is sold, consumer behavior, regulation, logistics systems and infrastructure to facilitate reuse, including return, collection and washing of reusable packaging (Tenhunen-Lunkka et al., 2023).

Our aim is to shed light on the means of public policymaking to foster packaging reuse. Our research is based on an empirical study on the experiences and perceptions of the key actors relevant for innovating and accelerating packaging reuse particularly in takeaway food applications in Finland. To collect experiences on the transformative potential of diverse policy instruments used in countries more advanced in packaging reuse, we also interviewed startups active in Europe. The actor perspective on the transformative power of policy measures can contribute to understanding of how policies can be designed and implemented to create favorable conditions for change among those influenced by the policies (Kivimaa et al., 2017). In this article, we thus study *how public governance can create conditions that foster the uptake of reusable takeaway food packaging* through following research questions:

1. How do key stakeholders perceive the ability of current policy instruments to advance packaging reuse?
2. What future policies are perceived as necessary to ensure systemic change towards reuse?

The paper is structured as follows: Section 2 reviews the literature on transformative policy mixes for sustainability transitions. Section 3 describes the research case and methodology. The findings of our qualitative study are presented in Section 4, followed by the discussion and conclusions in Sections 5 and 6.

2. Transformative policy mixes: from fostering niche innovations to accelerating wider systemic change within sustainability transitions

Sustainability transitions refer to long-term systemic shifts in socio-technical systems to overcome anthropogenic environmental problems originating from unsustainable consumption and production patterns (Köhler et al., 2019). Thus, fostering transitions is inherently political, characterized by contested goals and interest conflicts (Eckersley, 2021; Meadowcroft, 2009; Patterson et al., 2017). The role of governance and policies is vital in negotiating the goals, means to achieve them and mitigating the impacts of transition (Kanger et al., 2020; Köhler et al., 2019; Rogge et al., 2020). Therefore, advancing complex transitions is suggested to require the use of different approaches, combinations of instruments and interventions to reach the goals (Kanger et al., 2020; Markard et al., 2020). In this article, the concept of policy mixes is applied to study the combinations of different and complementary instruments needed to tackle multifaceted societal problems (Borrás and Edquist, 2013; Kivimaa and Kern, 2016) related to food packaging transition. In the narrow sense, policy mixes are seen as instrument mixes, but they can also cover diverse policy goals, rationales, and policymaking processes (Rogge et al., 2017). Research on transformative policy mixes builds strongly on policy mix and transformative innovation policy literatures. According to Rogge et al. (2020), the key features of transformative policy mixes entail 1) directionality required for long-term transition processes, for example through inclusive anticipatory deliberation, 2) design and use of instrument mixes addressing both innovation and creative destruction, and 3) establishing new institutional arrangements and governance structures. Besides directionality, which is defined as an ability to steer the actions toward the aimed direction of change (Weber and Rohracher, 2012), also consistence, coherence and congruence are claimed to be vital (Howlett and Rayner, 2013). By consistence Howlett and Rayner (2013) refer to the ability of a policy instruments to reinforce each other, while coherence refers to ability of multiple policy goals to co-exist, and congruence to multiple goals and instruments to work together in a supportive manner.

Purposive policy design, including transformative policy mixes, has been identified to play an important role in advancing sustainability transitions, but there is also criticism against such intentional design logics in actual policy making (Howlett and Rayner, 2013). In an ideal situation, policy design and related instrument mixes are suggested to be built on the above-mentioned principles. In practice, due to the evolving nature of policy making and policy makers' desire to prioritize acceptance over effectiveness (Capano and Lippi, 2017), the formulation of policies is more likely to be policy patching than policy packaging (Howlett and Rayner, 2013; Kern and Howlett, 2009). Unlike policy packaging, which involves deliberate designing of policy mixes through the introduction of new policy goals and related measures, policy patching refers to the process of reconstructing policy mixes (Howlett and Rayner, 2013; Kern and Howlett, 2009). In practice, this involves adding new measures or goals without abandoning existing ones (known as layering), replacing goals without modifying the measures (referred to as drift), or introducing new measures without altering the original goals (known as conversion) (Kern and Howlett, 2009).

Despite the limitations in applying purposive policy design in practice, governance and steering of transitions can still benefit from

Table 1
Transition governance, targets of interventions, and examples of instruments.

Transition governance aims	Targets of interventions	Examples of instruments
Niche creation and support (Kivimaa and Kern, 2016; Kivimaa and Virkamäki, 2014)	<p>Knowledge creation, development, and diffusion</p> <p>Market formation</p> <p>Price-performance improvements</p> <p>Entrepreneurial experimentation, resource mobilization</p> <p>Support from powerful groups</p> <p>Influencing goal setting</p>	<p>Regulatory</p> <p>Introducing new regulations or amending existing ones</p> <p>Economic</p> <p>RDI funding; Demonstration and deployment subsidies; Tax exemptions; Public procurement; Low-interest company loans; Venture capital</p> <p>Soft</p> <p>Incubator programs; Innovation platforms; Startup support; Foresight activities; Voluntary agreements;</p>
Regime destabilization (Kivimaa and Kern, 2016; Rosenbloom et al., 2020; Rosenbloom and Rinscheid, 2020; Rinscheid et al., 2023)	<p>Setting control policies</p> <p>Phasing out unsustainable technologies and practices</p> <p>Driving changes in social networks</p> <p>Replacing key regime actors</p>	<p>Regulatory</p> <p>Introducing new regulations or amending existing ones; Bans</p> <p>Economic</p> <p>Posing taxes; Cutting RDI funding; Removing subsidies and tax deductions, Carbon pricing; Divestment</p> <p>Soft</p> <p>Balancing involvement of incumbents with niche actors in e.g., policy advisory councils; Formation of new networks or organizations; Standardization; Voluntary agreements, Capacity building</p>
Acceleration and systems building (Kanger et al., 2020; Markard et al., 2020; Spencer et al., 2018; Rosenbloom and Meadowcroft, 2022)	<p>Market shaping</p> <p>Regulating businesses</p> <p>Stimulating complementary innovation and building infrastructure</p> <p>Coordination of multi-regime interactions</p> <p>Creating social acceptance</p> <p>Anticipating and mitigating unintended consequences</p> <p>Just transition</p>	<p>Regulatory</p> <p>Introducing new regulations or amending existing ones</p> <p>Economic</p> <p>Financial compensation to those losing out due to transition; Taxes and subsidies (e.g., emission or consumption taxes); RDI funding; Investment funding for infrastructure; (Regional) support to establish innovation parks and new industries</p> <p>Soft</p> <p>Standardization; Providing consumer information (e.g., through labels); Improving policy coordination; Campaigns against dominant cultural framings; Providing educational support for skills mismatch; Establishing intermediary organizations</p>

the concept of policy mixes, as it allows identifying a variety of instruments and their interactions. Particularly, as transitions have different phases which may require different set of instruments for different policy focuses (Kanger et al., 2020; Kivimaa and Kern, 2016; Markard et al., 2020). Next, we describe in greater detail the three main policy focuses of niche support, regime destabilization, and system building and related policy instruments as part of transformative policy mixes.

2.1. Supporting niches

Niches are seen as protective spaces for shielding, nurturing, and empowering radical, path-breaking innovations (Smith and Raven, 2012). In their seminal work, Kivimaa and Kern (2016) developed an analytical frame building on technological innovation systems and strategic niche management literatures to analyze innovation policy mixes for sustainability transitions. The authors suggested that for an innovation policy mix to be transformative, it should support not only innovation through niche creation but also exnovation through regime destabilization. Policy interventions for niche creation aim at enabling and supporting 1) knowledge creation, development, and diffusion, 2) market formation, 3) price-performance improvements, 4) entrepreneurial experimentation, 5) resource mobilization, 6) support from powerful groups, and 7) influencing the goal setting, i.e., directionality (ibid.).

In sustainability transitions research, the concept of innovation has been broadening from merely technological to other types of innovation, such as business and social innovations (Bidmon and Knab, 2018; Havas et al., 2023; Hernández-Chea et al., 2021; Rogge and Stadler, 2023). Business model innovation is seen to contribute to transitions in several ways, like facilitating the breakthrough of technological innovations from a niche to the regime level, but also as fostering transition without technological innovation (Bidmon and Knab, 2018) by making regulatory, governance, and market opportunities accessible (Bolton and Hannon, 2016). However, when business model innovations are developed by niche actors, these innovations may need shielding and support for acceleration and scale-up, as do other types of niche innovations, and require or benefit from changing the existing regime rules (Ruggiero et al., 2021).

2.2. Regime destabilization

Regime destabilization and deliberate decline aim at weakening the incumbent regime (Kivimaa and Kern, 2016; Turnheim and Geels, 2012; Turnheim, 2023) and are prone to significant challenges, such as political contestation and hurdles related to resistance from actors dependent on practices, technologies, and related institutions of incumbent regimes (Koretsky et al., 2023). Deliberative decline can be achieved by setting control policies, such as phase-out policies, and regulation that change the regime rules by reducing support for existing industries or technologies (Kivimaa and Kern, 2016; Turnheim and Geels, 2012). Here, also discursive destabilization and delegitimization of harmful practices play a role (Markard et al., 2023; Turnheim, 2023). Measures include banning or phasing out unsustainable technologies, practices, and related narratives (Kivimaa and Kern, 2016; Rinscheid et al., 2021, 2023; Rogge and Stadler, 2023; Rosenbloom et al., 2020; Turnheim and Geels, 2012). While bans and phase-out can target the same goals, the difference between the concepts is the time span of implementation. Phase-out is viewed as more gradual, giving actors time to adjust to changes, whereas bans are considered as sudden measures (Rinscheid et al., 2023).

Suggested economic instruments focus on cutting research, development and innovation (RDI) funding and reducing harmful subsidies, imposing new taxes (Kivimaa and Kern, 2016), and divestments (Rosenbloom and Rinscheid, 2020). Soft measures range from interventions to driving changes in social networks and replacing key actors (Kivimaa and Kern, 2016), introducing new environmental standards, and voluntary agreements like those for phasing out hazardous chemicals to capacity building (Rinscheid et al., 2023).

2.3. Acceleration and system building

During the acceleration phase, the policy focus needs to be on managing broader change, such as developing infrastructure to avoid potential bottlenecks that slow transition. These challenges entail, for example, resistance from declining industries (Turnheim, 2023), existing consumer cultures and practices (Dütschke et al., 2022; Markard et al., 2020) and potential policy coordination challenges also across different governance levels (Andersen and Geels, 2023; Markard et al., 2020). The acceleration and system building phase, as do transitions in general, is likely to result in contestations. At this stage, the focus of contestations revolves typically on how to advance the transition instead of whether to foster it as in earlier phases (Andersen and Geels, 2023). Markard et al. (2020) have identified several policy approaches to overcome acceleration challenges like creating social acceptance and compensate those at risk of losing out due to the transformation. Kanger et al. (2020) also highlight the need to address the wider implications of regime destabilization by anticipating and, when necessary, mitigating unintended consequences.

To overcome some of these challenges more integrative governance is suggested, including better policy coordination and directionality through mission orientation (Markard et al., 2020). Policymakers are seen to have a significant role in market shaping, stimulating innovation activities, building infrastructure, and supporting system building as well as regulating businesses (Kivimaa and Kern, 2016; Markard et al., 2020; Rosenbloom et al., 2020). Besides supporting individual innovation, creating complementary innovations that support infrastructure building are considered vital (Andersen et al., 2023; Markard et al., 2020). As systemic change likely affects several regimes, policy actions are needed to coordinate these multi-regime interactions (Kanger et al., 2020). Table 1 summarizes the targets of interventions and exemplifies key policy instruments.

During the recent years, there has been a growing interest in research on transition governance, transformative policies, and policy mixes (Ghosh et al., 2021; Haddad et al., 2022; Jacob and Ekins, 2020; Loorbach et al., 2011; Rogge et al., 2020). In the field of transition research, much of it has focused on the early stages of transitions, i.e., how to support (technological) niche innovations

(Kivimaa and Kern, 2016; Rogge et al., 2020) and concurrently destabilize incumbent regimes (Kivimaa and Kern, 2016; Rodríguez-Barillas et al., 2024) through policy mixes. Until recently there has been less focus on acceleration and system building, or on the interplay of different policies addressing sometimes overlapping goals of niche support, regime destabilization and system building in different transition stages (Rosenbloom and Meadowcroft, 2022).

Although the number of empirical studies on transformative policy mixes has been rising (e.g., Scordato et al., 2018; Rodríguez-Barillas et al., 2024), the existing literature is still highly conceptual (Kanger et al., 2020; Kivimaa and Kern, 2016; Markard et al., 2020). Empirical work on policy mixes has received criticism, especially studies based on individual cases or small N strategies (Kanger et al., 2020). We argue, in line with Mavrot et al. (2019), that the transformative potential of a policy mix is highly dependent on the implementation context. Therefore, qualitative single-case studies can provide new understanding on context-specific issues, for example by shedding much needed light to how key actors perceive different policies and instruments (Kivimaa and Kern, 2016) and the issues affecting their perception (Rogge and Dütschke, 2018). Furthermore, due to the emerging nature of packaging reuse, academic research on policies and governance on this specific issue is still limited (Bradley and Corsini, 2023; Coelho et al., 2020).

Our empirical study thus addresses these gaps in the literature and aims to provide insight on how stakeholders perceive the ability of policies to initiate and accelerate uptake of reusable food packaging. Here, perceptions refer to stakeholders' views and opinions on legitimacy and instrumentality of policies. With legitimacy we refer to acceptance of instruments, whereas instrumentality refers to effectiveness to reach the goals (Capano and Lippi, 2017). While stakeholder-based approaches for assessing policy mixes have inherent limitations, they have been found useful in complementing top-down policy evaluations (Kivimaa et al., 2017). These approaches can shed light on the complexities of policy implementation processes, providing insights from those directly affected by policy mixes (ibid.). Gaining such understanding is important as the stakeholders are needed in implementing the policy measures and advancing transitions in practice.

3. Materials and methods

3.1. Case description

In this explorative study, we applied a qualitative case study approach (Yin, 2014). A single case study approach was chosen as it allows in-depth investigation of a contemporary phenomenon (Yin, 2014) and exploration of context dependent social dynamics (Flyvbjerg 2001). Here, the case is a systemic change required for the uptake of reusable takeaway food packaging in Finland. The empirical case selection was guided by considerations related to expected information accessibility and information content (Flyvbjerg, 2001) enabled by the authors' existing stakeholder networks and ongoing research projects in the field of food packaging governance.

While Finland is strategically committed to a climate-neutral circular economy (Ministry of the Environment, 2021, packaging reuse is contested by incumbent industry actors. So far, the main circular economy approach has been based on recycling, while reuse is still marginal. Furthermore, contrarily to many other EU member states, forest industries and fiber-based sector, specialized on producing single-use packaging, have a longstanding stronghold in Finland. Here, the forest industry has traditionally held a more

Table 2
Data sources.

Data set	Description (Number of organizations)	Year (Number of interviews / workshops)	Number of participants	Type of data
Interviews (19)	European companies offering reusable packaging-as-a-service models (7)	2022 (6), 2024 (1)	8	Interview recordings and transcripts
	European Commission departments (2)	2021 (2)	2	
	Finnish ministry (1)	2019 (1), 2022 (1)	2	
	Finnish authorities (2)	2023 (1), 2024 (2)	3	
	Finnish industry organizations (5)	2022 (5)	6	
Workshops (7)	Finnish producer responsibility organization (1)	2020 (1)	1	Workshop recordings, photos, notes
	Workshop series A with six workshops focusing on sustainable food packaging, including 2 policy officials, 1 city official, 11 company representatives, 2 representatives of producer responsibility organizations, 1 researcher, 1 representative of funding organization, 2 NGO representatives	2022 (1), 2023 (5)	20	
	Workshop B on futures of reusable packaging: a roadmap workshop including 7 company representatives and 5 researchers	2023 (1)	12	
Policy documents (40) and websites (10)	Online documents in written format, including: - EU policies and regulations - Finnish policies, regulations, and laws - Finnish voluntary agreements and websites on voluntary commitments on food packaging - Reports and policy recommendations (voluntary agreements, packaging reuse) - Websites of companies offering reusable takeaway packaging	2019–2024		Online documents, webpages

prominent position compared to the plastics industry. As much of the recent debate revolves around the use of plastics and their negative environmental impacts, fiber-based packaging is often depicted in Finland as a sustainable alternative to single-use plastics (Sundqvist-Andberg and Åkerman, 2022). Against this backdrop, packaging reuse is seen by the regime actors to challenge the fiber-based packaging industry, and some of the companies have been more active than those from the plastics industry in lobbying against packaging reuse during the revision of the EU legislation on Packaging and Packaging Waste (EPPA, 2023). Also, the national government has taken a stance to protect the position of fiber-based packaging producers during the regulatory revision (Ministry of the Environment, 2024).

In Finland, packaging waste is a key (municipal) waste stream, managed through extended producer responsibility (EPR) schemes, in which producers of packaging — among them food companies, retailers, and hotel, restaurant and catering companies — are key actors. In 2021, 94.6 % of packaging waste was recovered (Eurostat, 2024a), of which 72.5 % was recycled (Eurostat, 2024b). However, the recycling rate for plastic packaging was only 42.9 % (ibid.). Another feature, that differentiates Finland from most EU countries, is that the country has a well-established and efficient deposit-based beverage packaging return system with the return rate ranging from 90 % to 99 % depending on the packaging type (PALPA, 2024).

Currently, reusable packaging is actively used in certain business-to-business (B2B) applications in the food and retail sectors but is still in its infancy in business-to-consumer (B2C) applications. Business models for reusable packaging vary depending on the implementation context, and these models can be based on either return or refill models and usually entail different incentives for return, such as deposits (Ellen MacArthur Foundation, 2019; Muranko et al., 2021). In the context of takeaway food, the reuse model is currently based on return. In practice, the service provider, usually a startup, provides the reusable packaging to outlets selling takeaway food and takes care of the collection, washing, and redistribution of packages. Since 2011 there have been five companies in Finland offering packaging reuse, of which three have focused on takeaway food.

3.2. Data collection

The paper relied on qualitative data collection methods. The key data sources were policy documents and online sources, expert interviews, and participatory workshops (see Table 2). The data collection began by identifying the key policies and instruments from the European Union and Finland relevant to packaging reuse. In addition, reuse related reports and web pages of companies offering reusable takeaway food packaging were used as data sources. Policy documents were collected 2019–2024, starting from the introduction of the European Green Deal. The documentary material was accessed in English, Swedish, and Finnish and is presented in Appendix A. (Table A1)

The interviewed experts included representatives of companies offering reusable takeaway food packaging in Europe, policy officials in Finland and the EC, national authorities, industry organizations, and producer responsibility organizations (PROs) with expertise on packaging, waste, and reuse (Appendix B) (Table B1). We applied purposive and iterative sampling (Drisko and Maschi, 2015) to identify and select relevant interviewees. During data collection, there were only three companies in Finland offering consumers reusable packaging for takeaway food. To gain a deeper understanding on the transformative potential of instruments addressing packaging reuse, representatives from startups of different maturity levels were contacted from other European countries more advanced in reuse. All interviews followed a semi-structured, thematic interview protocol. The objective with company interviews was to gain understanding of the current policy environment affecting reuse business and to gain understanding of future policy needs as perceived by these niche actors. The key themes for company representatives included 1) reuse business models, 2) the role of public policies and collaboration (current approaches, future needs), and 3) key business challenges and solutions. The interviews with policy officials, authorities, representatives of industry organizations and PROs aimed at providing understanding of the role of packaging reuse and related policy measures within wider sustainability transformation addressing food packaging, as perceived by these stakeholders. The key themes were 1) sustainability (goals, sustainability challenges, transformation), 2) food packaging governance (public policies, instruments, and processes, including regulatory, collaborative, and voluntary measures), and 3) packaging reuse. The subthemes varied depending on the interviewee's expertise. The data was gleaned from 19 semi-structured interviews with 22 interviewees conducted between 2019 and 2024 through videoconferencing (see Table 2). The interviews were recorded and transcribed.

The third source of data was participatory workshops including 1) workshops series (A) focusing on sustainable food packaging and 2) a workshop (B) on the future of reusable packaging. Participatory workshops were used as they allowed a) co-creation of future oriented data on policy measures and instruments needed to promote packaging reuse and b) gathering stakeholders' perceptions of these measures. Furthermore, as a systemic change, the uptake of packaging reuse would require collaboration and joint efforts from several stakeholders from different organizations, such as companies, ministries, municipalities, producer responsibility organizations and academia. In the workshop series A, one of the three participant groups focused on reducing packaging consumption. Packaging reuse was identified as the main approach to achieving this goal. Six full day workshops were carried out between December 2022 and May 2023 and focused on the following themes: 1) current situation, barriers and drivers regarding food packaging in Finland, 2) visions and goals, 3) transition pathways, and 4) recommendations. The workshops followed a transition arena process elaborated by Hyysalo et al. (2019) from the original transition arena approach (cf. Loorbach, 2010). The approach was found useful, as the process enabled creation of transition pathways. As pointed out by Hyysalo et al. (2019), these pathways, which are 'based on concrete, immediate and mid-range actions by policymakers and other stakeholders help ensure consistency between current and planned policy measures and identify which actions are needed immediately, and in the near future, to achieve long-term radical change'. The workshop process and outcomes are described in detail by Varho et al. (2023, in Finnish). In addition, data from a workshop B on the futures of reusable packaging was used as a source. This workshop was arranged as a side event of the World Circular Economy Forum held in Finland in

June 2023. Participants included Finnish organizations interested in packaging reuse, companies offering reusable packaging, and researchers. In accordance with the Chatham House rule adopted for the workshops (A and B), the affiliation of participants cannot be revealed in the results section.

3.3. Qualitative data analysis

The qualitative analysis began with data coding. Policy documents, interview transcripts, and workshop notes were read through to gain an overview of the data. A single researcher (first author) conducted the initial coding and thematic categorization. Then, the codes were discussed and agreed upon between two of the authors to ensure reliability of the coding procedure. The initial analysis was also conducted by the first author and the findings were discussed and agreed between the two first authors responsible of the analysis. A theory-driven qualitative content analysis (Hsieh and Shannon, 2005) was applied and the concept of transformative policy mix was used as an analytical approach to focus on the following themes: 1) niche support, 2) regime destabilization, and 3) acceleration and system building. First, policies and instruments addressing packaging reuse were identified in each of the themes as guided by the previous theory and summarized in Table 1. Then, it was analyzed how the interviewed stakeholders perceive the role of these policies and instruments in advancing transition. An inductive, data-driven approach was applied when analyzing the perceptions of stakeholders, and identified concepts of effectiveness, transformation ability, and desirability that guided our analysis. The identified concepts relate closely to instrumentality and legitimacy of policy instruments (cf. Capano and Lippi, 2017). The analysis focused not only on existing actions but also on those mentioned as missing or needed by interviewees and workshop participants.

4. Results

First, we will briefly present identified policy instruments with relevance to packaging reuse. Then, we will describe in detail stakeholders' perceptions on these measures, which address the key governance aims (niche support, regime destabilization and acceleration and system building). Through the qualitative analysis, we were able to identify several regulatory, economic and soft policy instruments with relevance to packaging reuse. The list of these instruments is presented in Table 3. It appears that in Finland, the existing policy mix almost entirely consists of instruments fostering niche building. Although some measures are being taken to destabilize the single use regime, they are still few. Furthermore, acceleration and system building-focused measures are still absent.

Table 3
Policy instruments with relevance for fostering packaging reuse in case country Finland.

Policy instruments	Status in Finland	Niche support	Regime destabilization	Acceleration and system building
Regulatory instruments				
National Waste Act (646/2011, 714/2021), implementing SUPD and PPWD (94/62/EC and EU/2018/852)	Existing	x	x	
Government Decree (771/2021) on certain plastic products, implementation of SUPD	Existing		x	
Decree on Packaging and Packaging Waste (518/2014, 1029/2021), implementing SUPD and PPWD	Existing		x	
Packaging and Packaging Waste Regulation (PPWR)	Upcoming	x	x	x
Bans on single-use packaging	Non-existent		x	
Obligations (restaurants, event organizers) to offer reusable packaging	Non-existent	x	x	x
Regulating reusable packaging (e.g., setting rules on packaging accepted to return systems)	Non-existent			x
Economic instruments				
Business Finland Bio and Circular RDI funding program	Existing	x		x
EU H2020 and Horizon Europe RDI funding	Existing	x		
EU Life program funding	Existing	x	x	
EIT FOOD incubator and accelerator programs	Existing	x		
Muovimiljoona piloting funding (Plastics Roadmap)	Existing	x		
Kokeilunpaikka.fi experimentation support	Ended	x		
Extended producer responsibility schemes	Existing partly		x	x
Single-use (plastic) packaging taxes, levies, or fees	Existing partly		x	
Tax exemptions for packaging reuse	Non-existent			x
Deployment subsidies for restaurants	Non-existent	x		
Subsidies for building infrastructure	Non-existent			x
Public procurement	Non-existent	x		
Soft instruments				
Material efficiency commitment for food industry I and II	Existing	x		
Green Deal Agreement on SUP consumption reduction	Existing	x	x	
Plastics roadmap 1.0 and 2.0	Existing	x	x	
Standardization of packaging reuse	Non-existent			x
Consumer campaigns on reuse	Existing	x	x	x

4.1. Supporting niches: viewpoints on measures and approaches

4.1.1. Regulatory approaches — single-use plastics directive as a key measure

Regulatory measures have a central role in packaging governance. In practice, packaging is governed throughout its lifecycle through a variety of measures mandated by European Union (EU) legislation, such as the Packaging and Packaging Waste Directive (PPWD) (94/62/EC and EU/2018/852) and the directive on reducing the impact of certain plastic products on the environment, also known as the Single-Use Plastics Directive (SUPD) (EU/2019/904). While most policy actions focus on managing packaging waste through recycling, reuse is a topic of growing interest, not only within the EC but also in Finland. In 2022, a revision of the EU legislation on packaging and packaging waste was initiated, where packaging reuse received greater attention and binding targets were proposed for certain packaging types (European Commission, 2022b). During the data collection stage, this highly contested regulatory process was still ongoing.

Regulatory approaches are considered important by several startups in enabling business development and creating market demand. This is the case particularly in countries, where new national legislation implementing the SUPD obliges restaurants to offer reusable packaging solutions to their customers. However, the effectiveness of legislation is considered rather weak, as pointed out by an interviewee:

“I think the only, technically, the only requirement is that reusables have to be made available for no more, you know, no more expensive than single use would be. I try not to be cynical about that, but I think that by itself is still not enough incentive for people to adopt that. Some people certainly will, but I think it’s a relatively small number of people that will.” (Startup 2)

In Finland, the reduction of certain single-use plastic products, as obliged by SUPD, is implemented through a voluntary Green Deal agreement (Ministry of the Environment, 2022b). By early 2024, 23 companies have signed the agreement of which only five have clearly communicated their intentions to explore alternatives to single-use plastic packaging and, where possible, replace them with easily recyclable reusable packaging or have made plans to offer ready-to-eat food and drinks from reusable containers. The current measures were not seen to sufficiently incentivize food companies and restaurants to pilot or commit to takeaway food packaging reuse (Startup 6, Workshop series A). From the perspective of a startup company, the voluntary agreements have been “a total failure” in their ability to push reuse forward, as industry organizations and their company members who have signed the commitment are among the key actors in a single use regime and strongly oppose packaging reuse in Finland. From the perspective of industry organizations, promoting reuse is not in their interest, while protecting single-use packaging use and recycling is.

Besides the abovementioned Green Deal agreement, also other voluntary and collaborative approaches are applied in Finland, such as the Material Efficiency Commitment for the Food Industry (Anon, 2018) and the National Plastics Roadmap, a collaborative process initiated by the Ministry of the Environment in 2018 (Ministry of the Environment, 2022a). Although companies have made voluntary commitments to promote sustainability within voluntary agreements and commitments, concrete actions or real commitment to promoting reuse are still missing. Therefore, without ambitious, quantitative reuse targets, which could even be part of the voluntary agreement or taking more binding regulation into use, takeaway food packaging reuse is not foreseen to advance in Finland (Workshop series A, Startup 6).

Although policies and legislation are considered important by startups, many entrepreneurs are wary of building their business models too strongly on them, as policies may change. Uncertainty related to implementation of the SUPD and a contested policy process amending the PPWD has shown the approach to be beneficial.

“We try and make it our business to keep up with various legislative or regulatory changes. However, we do have, and this has been some advice from some of our investors, to not build our business model around assumptions about how policy is going. So, we’re trying to be very aware of it, but we don’t want to build the business on just this one core policy and then, when there’s a new administration, all of a sudden there’s a new manifesto and then...” (Startup 1)

4.1.2. Economic instruments – supporting business model innovation through RDI funding and startup incubation

Economic instruments were identified relevant as fostering entrepreneurial experimentation. These instruments range from startup incubator and accelerator programs to public funding, such as grants from national ministries, municipalities, and research and piloting funding. These actions also have a direct bearing on supporting market formation.

National and EU research funding and grants are considered beneficial to creating understanding, overcoming identified lock-ins and challenges, and further developing packaging reuse and related business models, particularly by actors involved in developing and offering new reuse solutions. However, in Finland, public RDI funding for packaging reuse has been scarce, with only a few projects supported. This has frustrated and irritated some of the companies offering reusable packages, as indicated by one interviewee: “It [not getting public RDI funding] annoyed us, so we decided to do it on our own, so there’s no need to explain to anyone.”

Startup incubator programs were also seen as somewhat useful in the early business stages to develop the business idea and build networks (Startup 5,6), while accelerator programs facilitated, for example, piloting and further business development (Startup 3). Piloting funding was also considered relevant in concept development, which then facilitated acquiring venture capital (Startup 6), a crucial resource for niche actors, as pointed out by an interviewee: “If you get resources, you can hire good people and then you can push the system.” (Startup 3)

Municipalities seem to have taken on a role in fostering niche innovations. For example, some municipalities in certain EU countries like Sweden, Finland, and France have initiated projects to pilot packaging reuse for takeaway food together with a startup. Besides financing or acquiring funding for pilots, a few European municipalities have also offered deployment subsidies for restaurants to

incentivize packaging reuse. However, these incentives are not seen as effective enough to drive the change:

“... so that’s a popular instrument to push reusables. We don’t feel a huge impact from these incentive schemes, because either a restaurant is convinced and they will do it in any case, or the customers ask for it and then they will do it, or they don’t like the hassle, they don’t want the cleaning, they don’t care about it, and then 500 euros is not a big enough incentive to motivate them [restaurant owners].” (Startup 3)

Public procurement is not yet used as an instrument to support market creation in Finland. However, introducing reusable packaging in municipal catering services is seen to have potential not only in creating demand but also in creating new norms and increasing awareness. Yet, the uptake would require piloting to develop the concepts and evaluate their potential benefits (Workshop series A, Startup 4).

4.1.3. Soft instruments – support from powerful actors

As niche actors have limited resources and power, support from powerful actors, such as municipalities and ministries, can be beneficial. The role of municipalities in supporting niche business model innovations is multifaceted. Municipalities can facilitate collaboration, provide piloting platforms and funding for entrepreneurial experimentation that help improve the performance of business model innovations and advance market creation, increase awareness, activate citizens, and help increase credibility and create legitimacy (Startups 1,3,4,5,6, Workshop series A). Cities could also support or compel the use of reusable containers, for example in mass events (Workshop series A). While several startups seem to value collaboration with municipalities, controversies exist. Collaboration and/or piloting “for the joy of piloting” (Startup 6) without clear commitment to further investments frustrated some of the startups, as pointed out by an interviewee:

“We have many requests from municipalities ... The thing is they always organize round tables and it’s always the same. ... And that’s a huge of waste of time, these events. And obviously municipalities always have to be neutral, and I understand that, but it’s cumbersome to participate in these meetings.” (Startup 3)

Existing support from municipalities is also perceived as ineffective and insufficient, particularly as reuse business models are seen to solve municipalities’ waste problems (Startup 1). Also, ministries are considered as powerful actors fostering niche innovations. In Finland, the Ministry of the Environment has provided piloting funding, increased awareness on reuse and related policies, and influenced goal setting within collaborative and voluntary instruments, as highlighted by a startup:

“The Ministry is negotiating on our behalf about this Green Deal for these disposable containers, that is, if there will be a price for them [disposable containers], then it is already a benefit to the customer that they will choose the reusable container.” (Startup 4)

The above-mentioned regulatory, economic, and soft instruments are compiled in Fig. 1. These instruments foster niche business model innovations through knowledge creation, by supporting market formation and facilitating entrepreneurial experimentation that enables price-performance improvements. As a component of collaborative governance, deliberative, collaborative processes influence goal setting and highlight the support from influential groups.

4.2. Perceptions on weakening the conditions for single-use packaging

4.2.1. Regulatory approaches – control policies on single use

Regulatory approaches based on SUPD are seen important in regime destabilization (Workshop series A). Certain countries have gone further than mandated by the SUPD and have implemented legislation to ban not just plastic disposable packaging, but all disposable packaging when food is consumed in fast-food restaurants.

<p>NICHE SUPPORT</p> <p>Targets of interventions:</p> <ul style="list-style-type: none"> • Knowledge creation, development, and diffusion • Market formation • Price-performance improvements • Entrepreneurial experimentation, resource mobilization • Support from powerful groups • Influencing on the goal setting 	<p>Regulatory instruments</p> <ul style="list-style-type: none"> • SUPD (EU 2019/904) and its national implementation: incl. obligations for restaurants to offer reusable packaging • PPWD (EU/2018/852) and its national implementation
	<p>Economic instruments</p> <ul style="list-style-type: none"> • RDI funding • Piloting funding • Startup incubator and acceleration programs • Deployment subsidies for restaurants • Public procurement
	<p>Soft instruments</p> <ul style="list-style-type: none"> • Voluntary agreements • Collaborative roadmapping processes • Municipality-led platforms (piloting, collaboration)

Fig. 1. Summary of instruments identified as relevant for niche support.

“So, the regulation in France is also tightening. McDonalds and Burger King and KFC, they have to use reusable packaging in the restaurants as of next year. Yeah, this is a huge shift in their operations because they had a very linear production process... And it’s just another example of how regulation is tightening in Europe.” (Startup 3)

Stakeholder views on the effectiveness of control and phase-out policies differ. For example, in Finland, several stakeholders participating in the transition arena process emphasized that banning single-use packaging for takeaway food in restaurants and cafes could be one of the key instruments. Bans are not yet a part of the current instrument mix in Finland and they are not well supported by regime actors, nor have they been introduced by recent governments:

“Of course, tougher steering instruments could also be considered. That somewhere you don’t get disposable [packaging]. But it may not be up to our organization to actively promote such a thing. So far, the government has not called for such prohibition.” (Industry organization 5)

Apart from startups, stricter control policies and bans on single-use packaging are not favored in Finland. However, in its recent proposal for a regulation on packaging and packaging waste, the EC (2022b) has proposed such approaches as banning the use of single-use packaging when eating in restaurants. These suggestions have met with strong resistance and lobbying from existing regime actors, particularly in the single-use packaging, food, retail, and restaurant sectors. The effect of bans compared to market-led approaches is also pondered by a startup entrepreneur:

“I don’t know how much of a splash the single-use bans or the requirements for reusables, how much of an impact that’s going to have. I do, of course, think that government support for those kinds of initiatives is very important.” (Startup 2)

4.2.2. Taxes, levies and EPR fees as main economic instruments

Besides regulatory instruments, also economic instruments are considered necessary for restricting the existing regime: “SUPD is not enough; also other measures like taxes are needed.” (Startup 5). Several interviewed startups perceive single-use packaging taxes or levies as effective instruments (Startups 3,5,6), as pointed out here:

“I think a tax is the better way because it directly impacts the consumption choice or the choices of the consumer, because the restaurant owners will not carry the tax themselves, they will forward it to the restaurant guest, so the user has to decide whether to pay the tax or use reusables. And I think this is the most effective way to push reusables.” (Startup 3)

An increasing number of European countries are moving towards taxation of single-use (plastic) packaging. Also, certain municipalities, like in Germany, have set packaging taxes (e.g., 50 cents per disposable takeaway package). Taxation of single-use packaging is not yet applied in Finland, as many ongoing regulatory processes are seen to make introducing a taxation instrument difficult (Ministry). Taxation was recognized as potentially useful, but more research on implementation strategies would be required (Workshop series A).

“Our resources are somewhat limited, which is really unfortunate, and especially if we are still in the depths of SUP even at this moment, if we start to threaten with something new at this point, we have to keep peace in the country, you won’t keep this spirit of development anyway, we are this Finland team here.” (Ministry)

While voluntary levies on single-use packaging are suggested as a measure in the Finnish Green Deal agreement, they are not favored by regime players:

“We haven’t really seriously thought about it. I suspect that some fast food [restaurants] won’t go there easily. ... What we can really do, is to tell [companies] that it’s an option. And then the companies decide...But on some level, this option is also on the table. But I don’t think you’re among the first ones.” (Industry organization 1)

However, since 2024 there has been an EPR fee for single-use plastics packaging as part of the national implementation of the SUPD

<p>REGIME DESTABILIZATION</p> <p>Targets of interventions:</p> <ul style="list-style-type: none"> • Setting control policies • Phasing out unsustainable technologies and practices 	<p>Regulatory instruments</p> <ul style="list-style-type: none"> • SUPD and its national implementation: Bans on single-use packaging for takeaway food or when serving food at restaurants
	<p>Economic instruments</p> <ul style="list-style-type: none"> • Taxes and levies on single-use takeaway food and drinks packaging • Cutting existing subsidies (e.g., in public waste management) • Strengthening polluter pays principle (litter cleanup costs)
	<p>Soft instruments</p> <ul style="list-style-type: none"> • Campaigns on ecologic and economics negative impacts of single-use packaging use

Fig. 2. Instruments identified as relevant for single-use packaging regime destabilisation and weakening the conditions for single-use packaging.

to cover clean-up costs and promote awareness to prevent littering. The effectiveness of such fees on reducing packaging consumption is uncertain and is perceived to depend also on other instruments in the policy mix (*Startup 6*).

Some of the startup representatives also identified that the current single-use packaging regime benefits from existing subsidies (*Startup 1,2*). Even though packaging waste is in practice managed through EPR schemes obliged by the PPWD and SUPD, part of the waste management costs are covered by municipalities and not those perceived as producers within the regulation, as exemplified by an interviewee: “...all these recycling bins are not funded by any companies. It's funded by the cities.” (*Startup 1*)

4.2.3. Soft instruments focus on consumer campaigns

Recently, several campaigns have highlighted the negative effects of littering, which may have decreased the legitimacy of disposable (plastic) packaging. National implementation of the SUPD obliges companies offering certain packages, such as takeaway food packaging, to carry out consumer awareness campaigns to reduce littering. Further campaigns are seen as necessary to increase consumer awareness of the negative impacts, including those on climate and biodiversity (*Workshop B*). However, some of the startups perceive current soft measures like campaigns as too weak:

“Either taxes or regulation or incentives. I think these are the three main measures policymakers have introduced. And from my experience the incentives are very, very weak, monetary incentives or campaigns don't help to convince people. We have to see whether obligations and laws to prohibit, like the single-use ban or the obligation to offer reusables, how big the push will be. And then you have the taxes as the last resort.” (*Startup 3*)

Fig. 2 summarizes the instruments for weakening the single-use packaging regime. Measures for enacting changes in social networks or substituting key regime actors were not present in our data.

4.3. Towards system building: views on acceleration and initiation of wider systemic change

Business model innovations for reusable takeaway food packaging are being developed and offered by startup companies still operating in niches. While scaling up is inherently a part of startup companies' business logic, there are several issues challenging it. Particularly path dependencies and investments in recycling infrastructure are considered as hindrances: “*When we have been going in the other direction for so many years, decades, it's really not easy to turn the direction or cancel or change it.*” (*Ministry*)

Lack of infrastructure such as return kiosks and reverse vending machines, and public support for building such infrastructure (*Startup 1,2,5,6, Workshop series A*), are key institutional challenges, as exemplified by an interviewee:

“...an infrastructure I think would be better, better than money, because that also stabilizes the system. A startup can take in millions of venture capital and still become bankrupt, but if there is public support with an infrastructure then it's much safer, I think.” (*Startup 5*)

While packaging recycling has existing processes and infrastructure, these do not yet exist for reuse. Building such systems comes under the responsibility of startup companies:

“I have to set up a drop-off station, I have to collect it, I have to wash everything, so there I think it would be good if the municipalities and the government actually took some responsibility for some part of the circle.” (*Startup 5*)

4.3.1. Regulatory approaches – need for more ambitious targets and regulating reusable packaging

Regulation is seen as a key instrument in fostering system building. In the PPWR proposal, the EC calls for strengthening member states' responsibility in supporting infrastructure building for packaging reuse. Setting up more ambitious and binding regulatory targets, combined with measures based on voluntary approaches, are seen as crucial for scaling up (*Workshop series A, Startup 6*). In Finland, however, the (political) will is still missing. Investing in reuse is seen primarily as an economic expense, which discourages companies from developing and deploying packaging reuse. One of the main concerns related to scale-up is the emergence of competing reusable packaging services with their unique packages and return systems (*Workshop series A, Ministry*).

“It probably sounds really good, but then a practical obstacle is probably that if there are so many different types of them [reuse systems], how are they organized when there are several producers whose packaging is circulated? How, then, does this happen in practice, and can the city, how would it deal impartially with these newcomers?... So, there's probably still a lot to do.” (*Ministry*)

Regulating businesses by banning packages that do not fit the specifications, and/or setting rules whereby service providers must request approval from the authorities to enter markets and join the system, are suggested as measures to overcome the challenge of competing reuse systems (*Workshop series A*).

4.3.2. RDI and investment funding and extending deposit-based EPR schemes as key economic instruments

While public research is perceived as necessary to provide much needed, unbiased scientific evidence on the anticipated (environmental) impacts of scale-up (*Workshop series A*), its role is seen as less relevant for acceleration and system building: “*Research is important, but research does not bring practices into use,*” (*Startup 6*). However, RDI funding for complementary technological, social, supply chain, and business innovations are identified as relevant for creating systems that are efficient and not just environmentally but also economically sustainable (*Workshop series A, Workshop B*). However, funding instruments for larger pilots and investments are still largely missing (*Startup 6*). These instruments, along with introducing reuse-specific subsidies, are foreseen to foster the creation of reuse infrastructure (*Workshop series A, Startups 1,2,5,6*):

“It sounds selfish when I say it, but if the whole reuse concept were somehow subsidized similarly to what we have in some of our solar power initiatives, or more sustainable energy, those kinds of business models or those products themselves are sometimes subsidized.” (Startup 2)

Benchmarking measures used in green energy transition, such as subsidies and tighter regulation, and lessons learned from other transitions could be used to boost market creation for reusable packaging (Startups 3,6). Tax reforms are also perceived as relevant, including changes in value-added and labor taxation (Startups 1,6). Compared with single use, packaging reuse is more labor intensive, and to become more cost efficient this too would require further effort, as pointed out by an interviewee:

“I mean there’s a need, of course, to change the entire system based on virgin materials and employment taxes and stuff like this. It’s a super expensive solution compared to single use because it’s labor intensive and everything like that. But because now we are competing with single use, which is super cheap.” (Startup 5)

Improving cost efficiency is a key factor in scale-up. Current waste management of reusable takeaway packaging is covered by national EPR schemes, which are designed to serve a single-use packaging regime enabling cost-efficient waste recycling. The EPR schemes and related costs thus cover recycling, not the related circulation of reusable packaging.

Finland has a long tradition of deposit-based beverage packaging. Originally, bottles belonging to this scheme were refillable, but due to a regulatory change driven by material efficiency targets, single-use packaging replaced most of the reusable bottles. A nationwide PALPA system, with reverse vending machines in grocery stores, is seen as a benchmark for deposit-based reusable food packaging, and extending the current system to food packaging has been identified as having potential (Workshop series A, Ministry). While regime actors are seen to have “capacity for development and readiness” (Industry organization 3) in expanding the current packaging reuse, there seems to be a lack of financial incentives and resources to extend deposit system:

“From time to time, the question of expanding the packaging deposit system comes up. I recall that we have been preparing some research ideas, but we ran out of money.” (Ministry)

As the current food packaging EPR schemes have been developed to manage packaging waste and recycling, they do not incentivize developing infrastructure or collaboration models for reuse, contrary to the PALPA return packaging scheme, which offers financial incentives. By joining and financing the EPR scheme, participating companies can avoid the beverage packaging tax. Clarifying the current EPR (Workshop series A, Ministry) and developing deposit schemes are also considered necessary for scaling up (Workshop series A). Furthermore, further (economic) incentives to motivate consumers to use and return reusable packaging also needs to be developed (Industry organization 2, Workshop series A).

4.3.3. Standardization and consumer campaigns as key soft measures

Standardization is seen important in the system building phase, as it can improve compatibility and efficiency and lower environmental impacts (Startups 1,6):

“Reusable packaging needs to be standardized. Absolutely, it helps with transportation, washing efficiency. ... But I think in one country or one city at least there needs to be only one type of package that we use for packaging that will help with efficiency.” (Startup 1)

The role of standardization and the need to update the existing standard on packaging reuse (EN 13429:2004) are also identified in the current regulatory process of amending packaging and packaging waste regulation. Besides standardization, also consumer campaigns that challenge existing consumption patterns are seen to be needed as part of the instrument mix (Workshop series A).

<p>ACCELERATION AND SYSTEM BUILDING</p> <p>Targets of interventions:</p> <ul style="list-style-type: none"> • Market shaping • Regulating businesses • Stimulating complementary innovation and building infrastructure • Coordination of multi-regime interactions • Creating social acceptance • Anticipating and mitigating unintended consequences 	<p>Regulatory instruments</p> <ul style="list-style-type: none"> • SUPD and its national implementation • Proposal of PPWR • Setting binding reuse targets • Setting rules on packaging accepted to return systems
	<p>Economic instruments</p> <ul style="list-style-type: none"> • RDI funding for complementary innovation and evaluating impacts • Funding for piloting • Investments in infrastructure • Subsidies for infrastructure building • Developing extended producer responsibility for reuse, including e.g., tax exemptions for joining the system • Tax reforms
	<p>Soft instruments</p> <ul style="list-style-type: none"> • Standardization • Awareness raising campaigns for consumers • Support from and collaboration with municipalities

Fig. 3. Instruments identified as relevant for acceleration of packaging reuse and system.

The policy measures identified as essential for accelerating and scaling up packaging reuse are outlined in Fig. 3. These instruments aim to shape the market, regulate reuse business, encourage the development of infrastructure and complementary innovation, legitimize and foster social acceptance, and also deal with unintended consequences. While developing EPR as part of infrastructure and system building could be seen as facilitating coordination between the food, retail, and waste sectors, other measures focusing on the coordination of multi-regime interactions remain largely absent.

5. Discussion

In this exploratory study, we investigated how governance can create conditions to foster the uptake of reusable food packaging in a case in which phasing out the existing system based on single use may not be a viable option and the uptake of packaging reuse would require setting up a parallel system to that based on single-use. Our research focused on identifying different policy mix instruments and analyzed how key stakeholders perceived the ability of these instruments to support niches, destabilize the single use regime, and foster scale-up and system building. We now discuss in greater depth three issues influencing the transformative potential of policy mixes: directionality, the use of collaborative governance measures, and the interplay of different policies and instruments within and between different policy mixes.

Many scholars consider directionality as crucial for policies to create conditions for transformation (e.g., Weber and Rohracher, 2012). Rogge et al. (2020) suggest deliberation, particularly when carried out in an inclusive and anticipatory manner, as a means to directionality. Regarding packaging reuse, the main goals derive from the EU policies and directives giving national policy makers certain flexibility in implementation. As a result, deliberative processes are favored and applied in Finland. However, as deliberative processes are always arenas of colliding interests, achieving consensus of shared direction is not necessarily easy. This is also the case in packaging reuse in Finland where the forest industry has a strong interest to promote recycling of single-use packaging as an alternative for reuse. Our results indicate that as niche actors are often newcomers in the field and mostly startups and SMEs, they usually have fewer resources in terms of time, economic assets, and political and social networks than do incumbent actors to influence goal setting and decision-making within deliberative arenas. Therefore, in this kind of controversial case with clear power imbalances, it might be necessary for the policy makers to set clear national targets instead of relying on deliberation as a means to directionality. Furthermore, as Kivimaa and Kern (2016) have pointed out, also destabilization policies are usually politically difficult to implement due to contested interests, which has been the case in our study as well. For these two reasons, it appears that broad deliberative policy processes, such Plastic roadmap, applied in Finland to engage stakeholders for the transition are unlikely to foster ambitious target settings for systemic change. Similar results have been also found in recent studies on transformative innovation policies. For example, Grillitsch et al. (2019) claim that deliberative processes tend to create so broad shared visions that they can only provide limited guidance for directionality.

Another challenge relates to the effectiveness of voluntary measures in inducing systemic change. Our earlier research shows that the use of collaborative governance approaches has helped regime actors in navigating the uncertainties of the ongoing change (Sundqvist-Andberg and Åkerman, 2022). However, the current study indicates that these measures have not benefited niche actors promoting packaging reuse. While policymakers are seen to provide support and negotiate on behalf of niche actors in setting goals for voluntary agreements, niche actors are marginalized in the implementation of the agreements, which is steered by the industry associations of established industries. Thus, if the main instrument for fostering the uptake of packaging reuse is a voluntary agreement placed in the hands of single use regime actors, the outcome is stagnation, as our results show — particularly as these actors have vested interests in protecting a single use regime based on recycling. This example illustrates well a case when legitimacy of instrument seems to be prioritized over instrumentality (cf. Capano and Lippi, 2017).

Rogge et al. (2020) suggest that to drive systemic change, a policy mix should include measures to simultaneously weaken the conditions and structures of the existing regime and create more favorable conditions for niches to evolve. In our case, the current measures focus particularly on supporting niches and further measures would be needed to weaken the single use regime by setting stricter control policies and even banning single-use packaging in certain applications to break through the stagnation. Kivimaa and Kern (2016) have suggested that regime destabilization policies are not appropriate before niche innovation has gained enough momentum to be scaled up. According to our results on business model innovation like packaging reuse, it seems necessary to introduce destabilization measures as part of a policy mix already in the early phase to genuinely create momentum. Furthermore,

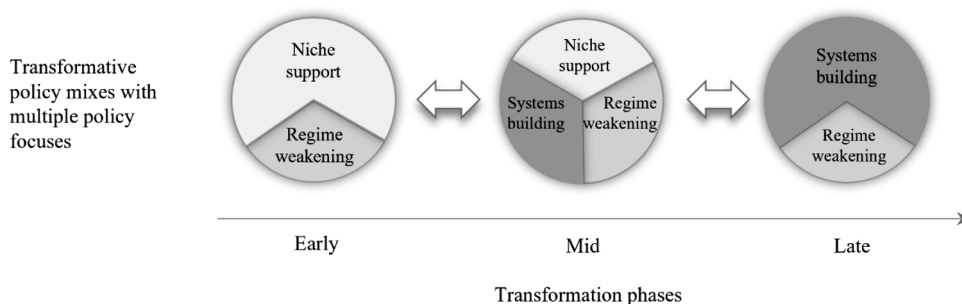
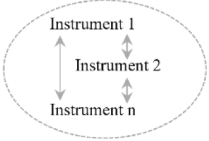
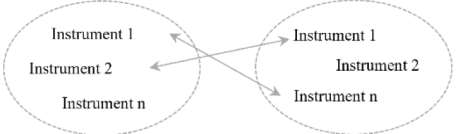
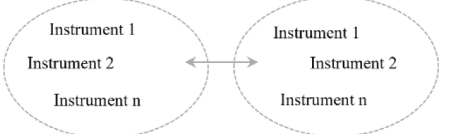
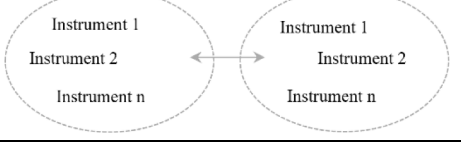


Fig. 4. Transformative policy mixes in different transformation phases.

Table 4
Tensions in the joint implementation of different instruments as part of transformative policy mixes.

Locus of potential tensions	Visualization	Practical examples of joint implementation challenges in a packaging reuse context
Between different instruments within a focus of a policy mix	<p style="text-align: center;">Policy focus (Niche support / Regime destabilization / System building)</p> 	<p>Joint implementation: Measures supporting market shaping for reuse and those aiming at regulating reuse within a system-building phase may be contradictory.</p> <p>Challenges In market shaping, the goal is to grow the market system and invite new interconnected actors with their innovative solutions (cf. Nenonen et al., 2020), while the aim of regulating reusable packaging types is to limit the options available in the market to avoid emergence of competing reuse systems.</p>
Between instruments of different policy focuses within a policy mix.	<p style="text-align: center;">Policy focus 1 within a policy mix (e.g., Niche support)</p> <p style="text-align: center;">Policy focus 2 within a policy mix (e.g., Regime destabilization / System building)</p> 	<p>Joint implementation: Instruments that simultaneously support both early-stage innovation activities while fostering complementary innovation needed for scaling up reuse.</p> <p>Challenges: Creating industry standards without overly restricting innovation activities necessary for improving performance and efficiency.</p>
Between policy mixes within a policy field (e.g., emerging and existing policy mixes)	<p style="text-align: center;">Policy mix 1 within CE (e.g., reuse)</p> <p style="text-align: center;">Policy mix 2 within CE (e.g., recycling)</p> 	<p>Joint implementation: Policy mixes on complementary circular economy approaches, such as packaging reuse and recycling.</p> <p>Challenges: Aligning measures aiming at destabilizing single-use packaging regime to foster packaging reuse and those aiming at improving recycling and recyclability of different packaging wastes fractions.</p>
Between policy fields related to interconnected sustainability challenges	<p style="text-align: center;">Policy mix on CE</p> <p style="text-align: center;">Policy mix on Climate Change</p> 	<p>Joint implementation: Policy mix focusing on packaging reuse within a CE with policy mix on climate change.</p> <p>Challenges: Early-stage packaging reuse based on durable, reusable fossil-based plastic packages may have higher climate impacts than a well-established single use regime based on fiber-based packaging and efficient recycling.</p>

measures fostering complementary innovation necessary to system building might need to be included in the policy mix already in the following phase, as illustrated in Fig. 4.

Currently, the instruments for system building are still missing in the policy mix, which is understandable since packaging reuse in consumer applications is still at an early phase in Finland. While introducing several policy focuses simultaneously may strengthen the transformative power of a policy mix, it also increases the complexity and might create tensions between different instruments and challenge not only policy coherence but also congruence and consistency. We identified four loci where tensions may arise when simultaneously implementing different instruments and policies. These tensions can create challenges *within a new policy mix*, for example 1) between instruments of a certain policy focus or 2) between instruments of different focuses. Tensions can also occur *between different policy mixes* (e.g., emerging and existing) 3) within a policy field or 4) between policy fields. In Table 4 we have exemplified these challenges in more detail in the context of packaging reuse.

So far, the interplay of policies and instruments addressing overlapping transition focuses and policy aims has gained limited attention in studies on transformative policy mixes (Rodríguez-Barillas et al., 2024; Rosenbloom and Meadowcroft, 2022). Our findings highlight the growing need for further research on how in practice to improve policy coherence, congruence and consistency in a highly complex, contested, and rapidly evolving operational environment addressing food packaging — a topic that not only revolves around a single regime but also touches upon several regimes (e.g., food, packaging, waste) and policy fields (e.g., CE, food, climate, chemicals and safety, and innovation). In this kind of context, policy patching becomes a more probable option than policy packaging (cf. Howlett and Rayner, 2013). Hence, we claim that to gain a more robust knowledge base for not only designing transformative policy mixes, but also introducing new policy measures on existing mixes, more empirical evidence is needed on how the measures for niche support, destabilization, and system building induce system transformation while implemented simultaneously at different phases of transition.

6. Conclusions

To conclude, from the perspective of niche actors, the current policy mix is insufficient to induce change towards reusability, particularly in Finland. For the policy mix to create better conditions for packaging reuse, further emphasis should be put on destabilizing the single use regime, e.g., by setting more ambitious reuse targets and stricter legislation, combined with economic instruments like imposing taxes or fees, as well as introducing subsidies, investment funding, and soft measures like standardization to foster reuse system building. However, designing transformative policy mixes that acknowledge several policy focuses is difficult and there are potential challenges in applying and aligning diverse new measures with those supporting other CE approaches, such as recycling. While our current study sheds light on creating conditions for packaging reuse in the context of takeaway food, we acknowledge the limitations of this study and identify the need for more in-depth studies on how to align measures supporting reuse not only with those aiming at improving recycling, but also those addressing other major environmental targets like climate change, prevention of chemicalization, and biodiversity protection as part of a wider food packaging sustainability transition.

CRedit authorship contribution statement

Henna Sundqvist: Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Maria Åkerman:** Writing – review & editing, Supervision, Methodology, Investigation, Funding acquisition, Conceptualization. **Päivi Petänen:** Writing – review & editing. **Jussi Lahtinen:** Project administration, Investigation, Funding acquisition. **Erwan Mouazan:** Project administration, Investigation.

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

The authors do not have permission to share data.

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Appendix A

Table A.1

Policy documents and online sources.

EUROPEAN UNION	
EU Communication	COM (2022) 677 Proposal for a regulation on packaging and packaging waste, amending Regulation (EU) 2019/1020 and Directive (EU) 2019/904, and repealing Directive 94/62/EC COM (2020) 98 A new Circular Economy Action Plan: For a cleaner and more competitive COM (2020) 381 A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system COM (2020) 667 Chemicals Strategy for Sustainability Towards a Toxic-Free Environment COM (2018) 28 A European Strategy for Plastics in a Circular Economy COM (2019) 640 The European Green Deal
EU Directives	Directive (EU) 94/62/EC on packaging and packaging waste Directive 2004/12/EC of the European Parliament and of the Council of 11 February 2004 amending Directive 94/62/EC on packaging and packaging waste Directive (EU) 2018/852 amending Directive 94/62/EC on packaging and packaging waste Directive (EU) 2019/904 on the reduction of the impact of certain plastic products on the environment
Reports	European Commission, Directorate-General for Environment, Effectiveness of the essential requirements for packaging and packaging waste and proposals for reinforcement: final report and appendices, European Commission, Review of the requirements for packaging and other measures to prevent packaging waste. Inception impact assessment, Ares (2020)3,041,578 European Commission, Sustainable Products Initiative. Inception impact assessment

(continued on next page)

Table A.1 (continued)

Websites	Commission guidelines on single-use plastic products in accordance with Directive (EU) 2019/904 of the European Parliament and of the Council on the reduction of the impact of certain plastic products on the environment EIT Food Seedbed Incubator programme https://www.eitfood.eu/entrepreneurship/launch-seedbed-incubator EIT Food Accelerator Network https://www.eitfood.eu/entrepreneurship/accelerate-food-accelerator-network Horizon Europe https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes/horizon-europe_en
FINLAND	
Strategies, programmes and plans	National material efficiency programme - sustainable growth through material efficiency. (in Finnish), Ministry of Employment and The economy (MEE) publications. 2013 National material efficiency programme - sustainable growth through material efficiency. (in Finnish), Ministry of Employment and The economy (MEE) publications. 2013 From Recycling to Circular Economy - National Waste Plan to 2027 (in Finnish) Leading the cycle: Finnish road map to a circular economy 2016–2025. Helsinki. Sitra Studies 121 (2016) Reduce and Refuse, Recycle and Replace – The Plastics Roadmap for Finland (2018) Reduce and Refuse, Recycle and Replace – The Plastics Roadmap for Finland 2.0 (2022) Government resolution on the strategic programme for circular economy 30.3.2021 (in Finnish) New directions: The strategic programme to promote a circular economy. Publications of the Finnish Government 2021:1
Legislation and implementation of EU directives	Government proposal (HE 40/2021 vp) to Parliament to amend the Waste Act and certain related laws (in Finnish) Government decree on packaging and packaging waste (518/2014, 1029/2021) (in Finnish) Waste Act (646/2011, 714/2021) (in Finnish) Government Decree (771/2021) on certain plastic products, implementation of SUPD (in Finnish) Decree on Packaging and Packaging Waste (518/2014, 1029/2021) (in Finnish)
Voluntary agreements	Material efficiency commitment for food industry. 2019–2022 (in Finnish) Material efficiency commitment for food industry: Promoting carbon neutrality and circular economy. 2022–2026. (in Finnish) Ministry of the Environment, 2022. Green deal agreement on reducing the consumption of single-use plastic dose packages (in Finnish)
Reports	Finér, A., Merenheimo, T., 2020. Results of the Food Industry's Material Efficiency Commitment 2019. Material efficiency commitment for food industry: First Performance Reporting (in Finnish) Wood-Based Bioeconomy Solving Global Challenges. Ministry of Economic Affairs and Employment of Finland, 2017.
Websites	Business Finland, https://www.businessfinland.fi/ Sitoumus2050 https://sitoumus2050.fi/en/web/sitoumus2050/home#/ Kokeilunpaikka.fi
OTHER	
Reports and policy recommendations	Ellen MacArthur Foundation 2019 . Reuse – rethinking packaging. Rethink plastic. 2021. Realising Reuse. The potential for scaling up reusable packaging, and policy recommendations Sondal, J., de Jong, A., 2022. Policylab for reuseable takeaway packaging (in Swedish), IVL Svenska Miljöinstitutet AB Tenhunen-Lunkka, A., Lahtinen, J. H., Hakola, L., Palmgren, R., Sundqvist, H., Balatsas Lekkas, A., Erwan, M., Luomala, H., Pennanen, K., 2023. Operational environment review for reusable packaging used in fast moving consumer goods: 4everPack. UNEP, 2020 . Single-use plastic take-away food packaging and its alternative. Recommendations from Life Cycle Assessment. UNEP, 2022 . Single-use supermarket food packaging and its alternatives: Recommendations from life cycle Assessments. ZeroWasteEurope, 2022. Creating a policy framework to support the transition to reuse. Policy recommendations

Appendix B

Table B.1

List of interviewees.

Type of organization	Interviewee role
Ministry	Program manager
Ministry	Senior ministerial adviser
Industry organization 1	CEO
Industry organization 2	CEO
Industry organization 3	Expert
Industry organization 4	CEO
Industry organization 5	CEO
Industry organization 5	Director
Producer responsibility organization	Manager
European Commission	Policy officer 1
European Commission	Policy officer 2
Authority 1	Senior officer
Authority 2	Senior officer 1

(continued on next page)

Table B.1 (continued)

Type of organization	Interviewee role
Authority 2	Senior officer 2
Company 1	Founder
Company 2	Co-founder
Company 2	Co-founder
Company 3	Co-founder
Company 4	Co-founder
Company 5	Co-founder
Company 6	Co-founder
Company 7	CEO

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