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Article

Mission cocreation or domination? Explorative and exploitative forces in shaping the Dutch circular agriculture mission

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One largely neglected focus in the analysis of mission-oriented innovation policies is mission cocreation between stakeholder groups advocating different solution directions. In this paper, we introduce the innovation management concept of ambidexterity to study how mission cocreation in different mission arenas is influenced by actors aiming to continue existing innovation pathways (exploitative innovation) and actors advocating alternative pathways (explorative innovation). Our case study on the Dutch circular agriculture mission highlights how an initial top-down strategy development was dominated by exploitative forces, despite ambitions to secure broad stakeholder participation. Government-led efforts to still engage exploration-minded actors, and restore ambidexterity, were hampered by potential contributors feeling excluded from the policy process. These findings underline the risk that openness of missions, required for broad stakeholder involvement, might also reinforce pre-existing contestation and innovation pathways. Overall, our findings demonstrate a trade-off between maximizing efficiency and speed versus obtaining novel perspectives and wide societal legitimacy.

Keywords: organizational ambidexterity; food systems transformation; transformative innovation policy; policy mix; mission arenas.

1. Introduction

To tackle some of the grand societal challenges of our time, such as climate change, biodiversity loss, and ageing societies, mission-oriented innovation policy (MOIP) is gaining attention as an innovation policy model for directing innovation activities toward desired futures (Boon and Edler 2018; Schot and Steinmueller 2018a; Diercks 2019; Hekkert et al. 2020; OECD 2023). Influenced by the work of Mazzucato (2016, 2018a), MOIP has emerged in response to frustration about the lacking ability of innovation policies to tackle the complex problems that impact our societies (Martin 2016; Borrás and Edler 2020). Where earlier innovation policies were aimed at counteracting market and innovation system failure, and principally focused on economic growth with a laissez-faire governance, the ambition of MOIP is to identify and articulate challenge-led missions and to create new markets based on the active entrepreneurial role of the state and strong buy-in and engagement of the private sector (Boon and Edler 2018; Johnstone and Newell 2018; Kuhlmann and Rip 2018; Alves, Vonortas, and Zawislak 2021).

Contemporary missions differ from earlier missions (e.g. putting a man on the moon in the 1960s), as they aim to tackle persistent societal problems that come with complexity, diverse sets of actors, and unruly practices (Mazzucato 2018b). Instead of being mainly a controllable top-down intervention, the current MOIP seeks to create co-ownership of the problem, legitimacy for the directionality the mission provides, and enactment of the solution space that is defined by including diverse stakeholders in the mission policy process (Mazzucato 2018a; Polt 2019; Wanzenböck et al. 2020; OECD 2023). Such mission cocreation takes place in four interconnected policy arenas—i.e. the strategic, programmatic, implementation, and performance arena (Janssen et al. 2023—see also Section 2.2) —and involves a strong and early involvement of heterogenous stakeholders (Janssen et al. 2021).

So far, with some exceptions (Brown 2020; Alves, Vonortas, and Zawislak 2021: Nylén, Johanson, and Vakkuri 2023), there is little empirical analysis on the policy process of mission cocreation, e.g. how missions are negotiated in a national context, what is prioritized, by whom, and how this crystallizes in missions and their practices and how transformative these (potentially) are. Understanding this process can increase awareness to policymakers of how mission policy can best be designed to enable participation across different actors and sectors; combine top-down steering and bottom-up experimentation; and support system-wide innovation and transformation (Bergek, Hellsmark, and Karltorp 2023; Cappellano, Molica, and Makkonen 2024).

The aim of this paper is thus to empirically scrutinize practices of mission cocreation by studying the interplay between different groups of actors in different mission arenas, i.e. the

spaces in which actors deliberately formulate, operationalize, and govern efforts to support a mission (Elzinga et al. 2023), in order to extend the limited evidence base on how such processes unfold. We used the Dutch circular agriculture mission as a case study [part of the new Dutch Mission-oriented Top sector and Innovation Policy (MTIP)], which started from 2018 onwards (Janssen 2020), aiming for the Dutch agricultural sector to become circular by 2030. This case lends itself well for such analysis, as the new Dutch MTIP had an elaborate participatory structure to include the whole Dutch agricultural sector in articulating and implementing the mission.

To research the influence of incumbents such as large companies and new entrants such as grassroots organizations during the MOIP process and to advance theoretical perspectives on MOIP, we used the conceptual lens of ambidexterity.[1] Ambidexterity concerns the ability of an innovation context within an organization or broader innovation system to simultaneously exploit existing strengths and explore new opportunities (Gupta, Smith, and Shalley 2006). The concept of ambidexterity has emerged from and is influential in business and management literature (Alcalde Heras, Estensoro, and Larrea 2020). Turner et al. (2017) have shown that the ambidexterity concept can also be applied to a broader innovation system, and Kattel and Mazzucato (2018) have also referred to the principle of ambidexterity when arguing how current innovation policy is dealing with changing environments while tackling societal challenges. This requires different ways of operating on the part of the government and private parties to respond to new markets and technological trends, such as new knowledge, skills, working methods, and routines (exploration), while simultaneously taking advantage of existing practices and policy instruments to remain competitive in their core businesses (exploitation) (Kattel and Mazzucato 2018). However, the concept of ambidexterity has not yet been used to empirically study MOIP implementation and mission cocreation. Hence, in view of the aim of the paper and the conceptual lens that we apply, the main question that guides our enquiry is as follows: By whom and how was the Dutch circular agriculture mission articulated and realized in the different mission arenas, and how was ambidexterity enacted in this mission-oriented innovation policy structure?

As we will show, this case revolves around exploitative continuation of industrialized scale-intensive agricultural practices versus exploration of alternative practices based on, e.g., regenerative and nature-inclusive principles. All of the mission arenas offered space for proponents of both views to contribute to shaping and pursuing the circular agriculture mission. Due to the openness of the underlying vision, however, the mission implicitly offered more room for the exploitative force to dominate the explorative force. Exploration-oriented actors were formally part of the mission cocreation process, but felt neglected in terms of how they interpreted the problem, what they could offer, and what they needed. Ultimately, their disengagement from the arenas in which the mission was getting its form led the ambidexterity balance to become increasingly tilted to exploitation—thereby undermining the mission's transformative potential.

We continue this paper with a brief outline of the theoretical framework in which we look at challenges of MOIP governance and how this relates to the process of ambidextrous policy-making. Then, we demonstrate the use of this framework for the case of the circular agriculture mission in the Netherlands. We end the paper with a discussion and conclusion of our findings. For the most prominent challenges, we use recent advancements in MOIP and transition literature to suggest possible policy responses.

2. Theoretical framework

In what follows, we will go deeper into the literature studies on MOIP, ambidexterity, and mission cocreation in mission arenas. Selected elements of these literature studies provide input to the framework that guides the analysis of our case study of the Dutch circular agriculture mission, exploring the potential for and challenges of ambidexterity in MOIP governance.

2.1 Mission directionality

The literature on MOIP has denoted the process of joint policy decision-making and mission cocreation between diverse stakeholders as a messy affair (Wanzenböck et al. 2020). How to best organize MOIP in a systematic and democratic manner is still a question, especially when missions ought to contribute to transformative innovation (Hekkert et al. 2020; Wittmann et al. 2021; Wiarda et al. 2024). A key issue concerns establishing mission directionality, which can refer to both the process and the outcome of efforts to guide innovation capacities in a particular challenge-based direction (Diercks, Larsen, and Steward 2019; Haddad et al. 2022; Parks 2022; Elzinga et al. 2023). Providing such guidance may be achieved by imposing a top-down prioritization of problems and/or solutions or by facilitating negotiation and contestation processes that lead societies to discover and adapt possible courses of action for achieving a mission goal (Janssen et al. 2021, 2023). It has been argued that what sets MOIP apart from earlier innovation policies is this focus on defining concrete goals and providing corresponding perspectives via, e.g., the creation of new markets (Mazzucato 2016, 2018b; Boon and Edler 2018; Larrue 2019)—thereby serving as a policy approach for overcoming the "directionality failures" that hamper transformative system change (Schot and Steinmueller 2018a). However, in terms of policy processes, they have different stages in which political processes play out, including visions and targets, priority setting, and instrument mixes, which are highly political processes (de Graaff, Wanzenböck, and Frenken 2023).

Typically, missions involve grand challenges or goals set by public policy, but this is just the initial phase in the process. MOIP exists in subsequent policy phases, referred to in the literature as mission arenas (Janssen et al. 2021, 2023), i.e. mission strategy, programming, implementation, and performance arenas (see further Section 2.3). The actual elaboration and enactment happen in these mission arenas through cocreation in what have been called hybrid constellations of public, private, and third sector actors (Nylén, Johanson, and Vakkuri 2023). The literature indicates that there are tensions emerging around (1) whom to include (the breadth of the range of stakeholders) (Grillitsch et al. 2019; Wanzenböck et al. 2020); (2) at which stage and in which mission arena (Janssen et al. 2023); (3) how this impacts on mission directionality. Wanzenböck et al. (2020), e.g., raised concerns around missions turning into "one size fits all approaches" to wicked

problems when failing to unpack problems and their potential solutions early on in the policy process. Parks (2022) underpins these concerns by showing how the direction and rate of transformative change depend on which actors get to "give directions," and argues for more inclusion of stakeholders responsible for mission implementation and performance. In addition, Grillitsch et al. (2019) and Brown (2020) warn of "watered down catch all agendas" and missions "at drift" when too many stakeholders are involved in the policy process, risking MOIP to lose directionality.

The question becomes whether missions are indeed capable of becoming effective (in terms of providing clear perspectives and being transformative) and keep their effectiveness when managing diverse stakeholder interests. It can especially be challenging to balance the innovation interests of incumbents with the innovation interests of new entrants in different mission arenas. Incumbents are actors representing the *status quo* of a sociotechnical system or regime,[2] which are typically well-connected industry representatives (directly from incumbent companies or represented via sector organizations), strongly institutionalized Non Governmental Organisations (NGOs), and formal policy actors leaning toward dominant technologies or market systems. New entrants are actors challenging the *status quo* of the sociotechnical system and may include public actors like consumers and civil society organizations (Wiarda et al. 2023), as well as start-up companies and grassroots organizations presenting alternative views to production and consumption, and field practitioners that are typically not present in formalized policy arenas (Polt 2019). Several conceptual studies have expressed the expectation that when missions fail to ensure a plurality of approaches and experimentation, they risk becoming "old wine in new bottles" (Janssen et al. 2021; Wittmann et al. 2021) in terms of reproducing the current system and innovation dynamics. Particularly complicating is that the distinction between the above-mentioned two groups, with opposing interests, is typically not clear-cut: while some mature organizations might act as incumbents seeking to exploit the existing system, others might in fact belong to the group that challenges this system and explores new transformation options (Turnheim and Sovacool 2020).

This brings us to the literature on ambidexterity and ambidextrous policy-making, in which—as we will discuss in the next section—the balancing of exploitation and exploration is central.

2.2 Ambidexterity and its implications for MOIP

In business and management literature, ambidexterity describes the ability of firms to pursue both an exploratory and exploitative innovation mode (Tushman and O'Reilly 1996; Gupta, Smith, and Shalley 2006; O'Reilly and Tushman 2008; Doblinger, Wales, and Zimmermann 2022). Exploration is defined by "terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation," whereas exploitation is defined by "terms such as refinement, choice, production, efficiency, selection, implementation, execution" (March 1991: 71). Exploratory innovations challenge existing technological trends, as they rely on firms' search for new market opportunities and knowledge within and across industries (Gupta, Smith, and Shalley 2006; Doblinger, Wales, and Zimmermann 2022). This includes the collaboration with various individuals, firms, and partners, via whom new information is acquired to stimulate creativity, possibly resulting in breakthrough innovation (O'Reilly and Tushman 2008). In contrast, exploitative innovation is meant to refine existing technology and increase its efficiency in order to improve the satisfaction of existing market needs and is more associated with incremental innovation. Rather than establishing a broad set of knowledge skills in diverse fields, it focuses on the creation of profound knowledge in a few domains. The advantage of ambidexterity as innovating strategy, i.e. combining and balancing both innovation modes, is that it enables strategic renewal and adaptability while maintaining performance stability (Gupta, Smith, and Shalley 2006; Doblinger, Wales, and Zimmermann 2022).

But it is not only firms who need to come up with exploratory innovations in this era of "Grand Challenges" that need to be addressed. Society as a whole is under pressure to craft innovative plans and policies that are capable to tackle complex social, economic, and environmental problems (Nowacki and Monk 2020). This requires broader innovation systems to embrace ambidexterity (Turner et al. 2017) and appropriate innovation policy that moves beyond "exploitative" approaches, mainly organized around combining resources and capabilities to improve existing production-consumption systems. Instead, it should also spur genuine "exploration" of new resource and capability combinations that give rise to original problem solutions and system transformation (Nowacki and Monk 2020). Transformative innovation capacity therefore needs to be built in sectors and sociotechnical systems (e.g. agriculture, energy, and mobility), which implies for actors of the incumbent sociotechnical regime to balance optimization of current systems, with converting to new systems and phasing out existing activities, which involves interacting, experimenting, and learning with a variety of actors (Grillitsch et al. 2019; Turnheim and Sovacool 2020). MOIP and missions might play a prominent role here, as they have been associated both with strengthening current innovation systems and competitiveness (Bloom, Van Reenen, and Williams 2019; Deleidi and Mazzucato 2019; Foray 2019) and with transforming them (Hekkert et al. 2020; Klerkx and Begemann 2020; Wittmann et al. 2021).

Yet, studies have shown that the application of ambidexterity can be difficult due to several factors (Peters and Buijs 2022). A major challenge of exploratory activities is that it is highly uncertain if and to what extent these activities will pay off (Clauss et al. 2021). Moreover, uncertain explorative activities are almost by definition more likely to result in failure, which increases the investment risks. In contrast, the likelihood of profiting from exploitative activities is quite high (at least in the short run), as they mostly focus on the further development of existing practices and markets. Incremental improvements may result in increasing resource efficiency, more predictable outcomes, while saving costs. As a result, firms sometimes end up in having to choose between uncertain, risky alternatives or to stick with more conservative but also less transformative strategies based on exploitation (Clauss et al. 2021). Similarly, in a policy context, policymakers can feel a pressure to show results in their terms, which might reinforce exploitation activities (Alcalde Heras, Estensoro, and Larrea 2020). These tensions can pose considerable managerial problems, which could negatively affect organizational outcomes (Peters and Buijs 2022). Implementing ambidexterity as an innovation strategy is as such not a

straightforward process and needs careful preparation, consideration, and follow-up when adopted.

The risks of relying on an "exploitative" innovation policy have also been raised in transition literature. It is argued that networks of incumbents, such as established industries and their sector organizations, parts of the government, and users and civil society do not always perceive the need to change (Schot and Steinmueller 2018b). The resistance to change by incumbents can be very strong in order to protect existing business models and assets and to maintain positions in the sociotechnical system (Pel 2016; Johnstone, Stirling, and Sovacool 2017; Schot and Steinmueller 2018b), and innovative activities can become polarized between those advocating exploratory strategies and those supporting the *status quo* (Bui et al. 2016). However, following Turnheim and Sovacool (2020), we do not limit the possibility of transformative change (via explorative innovation) to new entrants, but situate change as well in incumbent groups, whom we consider having both exploitative and explorative innovation capacity. The lens of ambidexterity helps us to examine which actors are exerting exploitative and explorative forces in mission cocreation, and how the balance between these forces translates into the scope and ambition level of the mission, the instruments to support it, and ultimately a mission's legitimacy and capacity to enact incremental or transformative change. We will discuss next how we understand this process of mission cocreation in four mission arenas.

2.3 Ambidexterity in mission cocreation in four mission arenas

Based on the above, it can be argued that managing mission cocreation represents a tension, in terms of finding a balance between different stakeholder groups (Mazzucato 2016; Kattel and Mazzucato 2018; Mazzucato, Kattel, and Ryan-Collins 2020). Aligning different groups of actors at different levels will likely fuel the emergence of conflicts between different actors, who have distinct own preferences (Wittmann et al. 2021). Missions moreover emerge in pre-existing policy contexts with policy histories sedimented in institutes, policies, and practices (Kern and Howlett 2009). This means that missions are subject to existing lines of power, interests, and contestations about innovation pathways as both the process of building up new systems and phasing out of existing systems (Alkemade et al., 2011; Turnheim and Geels 2013).

To understand how this plays out, it is useful to analyze the process of mission cocreation in different mission arenas (Elzinga et al. 2023; Janssen et al. 2023; Wesseling, Meijerhof, and Delicado 2023). Following Barré et al. (2013) and Larrue (2019), Janssen et al. (2023) argue that stakeholders interpret and negotiate missions in four interrelated mission arenas: strategy, programming, implementation, and performance arena. Together, the arenas represent subsequent stages in the process of taking pre-existing visions (including those of incumbents and new entrants) and translating them into MOIP strategy, policy instrumentation, and actual impact. In this paper, we use this framework and introduce the scheme shown in Fig. 1 to examine how ambidexterity plays out in different mission arenas.

Taking the four mission arenas as a starting point, we examine how ambidextrous policy-making unfolds as a function of interacting explorative and exploitative forces. In the mission strategy arena, we identify what visions and narratives circulated regarding the issue of concern—in our case agricultural system change. This helps to understand what existing power dynamics were present and what convergence or divergence tendencies affected the framing of the issue of concern. The framing influences strategic considerations, like why to adopt an MOIP approach (i.e. the policy rationale) and what problems and knowledge questions to prioritize. In the mission programming arena, we examine how the identified narratives became translated into agendas for supporting the development and application of solutions. As there is not necessarily convergence on which problems and solutions to prioritize, there might be multiple parallel agendas rather than one comprehensive one. The mission implementation arena is concerned with designing and using policy instruments for enacting the programmed agenda(s). This involves looking into the specifications, constraints, and actual utilization of the policy instruments that have been mobilized and adapted. In the performance arena, we look at which actions actors undertake in service of the mission goal and how they "cope" with the policies that have been implemented (Janssen et al. 2023). Depending on how different stakeholders have influenced the framing and instrumentation of the mission, the performance arena can give rise to innovation continuing existing solution pathways ("acceleration") or result in the reconfiguration of socioeconomic systems ("transformation") (Wittmann et al. 2021; van de Burgwal et al. 2023).

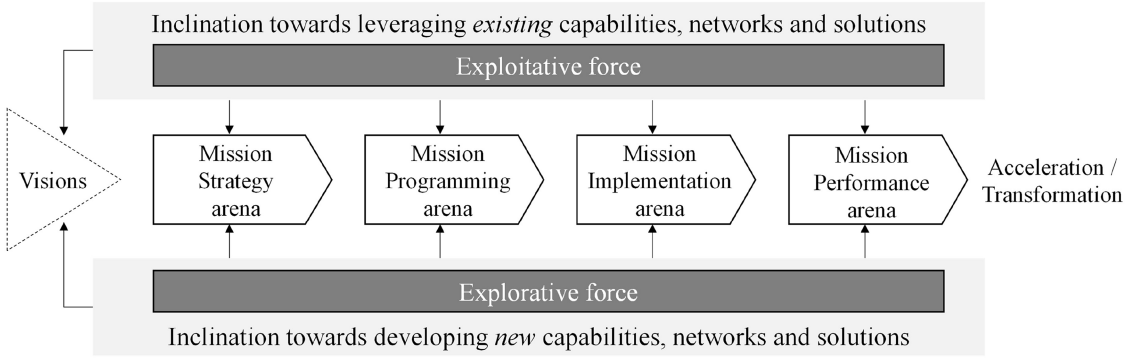

Figure 1. Ambidextrous policy-making in MOIP.

3. Research design

3.1 Case study: Dutch mission-oriented policy and the circular agriculture mission

We used the mission arenas connected to the Dutch circular agriculture mission between 2018 and 2020 as a case study to examine how mission cocreation was managed. The case fits our research interests as it concerns a mission that envisions radical system transformation, requiring and affecting a broad variety of Dutch agri-food system actors. The question we pose is what exploitative and explorative forces these actors exerted in the shaping and pursuit of this ambitious mission and how the balance between these forces affected the eventual scope of actual innovation efforts. To put the case analysis in perspective, we first provide some historical background on both the circular agriculture vision itself and its place in Dutch MOIP.

3.1.1 The development of a circular agriculture vision. Since the 1980s already, the Dutch agricultural sector became under pressure because of its high emission rates and negative impact on soil and water quality and biodiversity, as a result of a high external input system based on intensive production, both in animal and plant production systems. Furthermore, animal and plant production became increasingly decoupled from each other in separate specialized systems, which broke nutrient flows that used to exist in mixed agricultural systems. Initially, these problems were addressed by trying to mitigate negative impacts through stricter regulation and damage reduction technologies (e.g. nutrient flow management, more precise fertilization technologies, and emission reduction technologies in stables) (Ondersteijn et al. 2002; Oenema, van Ittersum, and van Keulen 2012), but this did not fundamentally change the premise that the system was based on high external input agriculture with limited nutrient recycling and based on a maximum carrying capacity related to the amount of agricultural land surface available.

Between 2017 and 2018, circular agriculture was introduced in the Dutch policy arena as a potential food system transition pathway toward a more fundamental systems change. This was a response to rising societal discussions and concerns around sustainable agricultural futures, the strengthening of farmer positions, trust in food production systems, synergy between agriculture and biodiversity, climate change challenges, reduction of food waste, reduction of emissions, animal welfare, and efficient use of raw materials (Termeer 2019). It also came in a period of ministerial rearrangements, in which the Ministry of Agriculture, Nature and Food Quality (LNV by its acronym in Dutch) was reinstated in 2017 as an independent ministry after it had merged in 2010 with the Ministry of Economic Affairs and Innovation. Being again an independent Ministry, it was in search of a new vision and agenda to approach the challenges the Dutch agricultural sector was facing at the time and is still facing today. At the request of the new Ministry of LNV, Wageningen University and Research (WUR) produced a technical briefing on circular agriculture as a transition pathway (Termeer 2019). The proposed strategy was based on a recoupling of animal and plant production, production based on the carrying capacity of the agricultural land surface available, and also a change in diets of consumers toward more plant-based diets (Van Zanten, Van Ittersum, and De Boer 2019; van Selm et al. 2023; Hoogstra et al. 2024).

Inspired by the technical briefing, the responsible minister of LNV in 2018 launched her vision, called "Valued and connected – the Netherlands as frontrunner in circular agriculture by 2030" (LNV 2018). In this vision, circular agriculture was presented as the *only* way forward to secure the food system's future. The goal was to become circular by 2030—with which all sectoral and local policy efforts need to become aligned (LNV 2018)—and the vision represented a break with previous agricultural innovation governance by the Dutch government that mainly focused on economic growth.

Key targets of the strategy involve the recovery of biodiversity, improving the economic model of farmers, recovery of soil quality, reduction of climate impact, and improving the environment by tackling emission-related issues. The execution of the envisaged targets requires collaboration between different agricultural sectors and different supply chain actors (Muscat et al. 2021). The strategy kept relatively open how circular agriculture should be interpreted (Ploegmakers et al. 2020) and accommodated different types of farming models, ranging from high-tech digital farming to agroecology—see Klerkx and Rose (2020) and Wojtynia et al. (2021). Circularity was also broadly interpreted to go beyond agriculture, in concepts such as "circular bioeconomy," but nonetheless "circular agriculture" remained the main guiding concept and discourse (LNV 2018).

3.1.2 A circular agriculture mission in Dutch MTIP. LNV's development of a vision on circular agriculture ran in parallel with a major shift in the "directed" (as opposed to generic) part of the Dutch national research and innovation policy strategy. This strategy used to be the Top sector enterprise policy (i.e. sector-driven innovation policy) launched in 2011, which was motivated by the ambition of the Dutch government to increase its research and development (R&D) expenses to 2.5 per cent of GDP by supporting the coordination between science and industry in nine focal domains (Janssen 2019).[3] As of 2018, this policy started to shift toward MTIP, as the Ministry of Economic Affairs and Climate Policy (EZK) took up the ambition of enhancing the relevance of Dutch innovation policy for addressing major societal challenges (Ministry of EZK 2019). Instead of merely tackling specific problems with technical solutions and/or optimizing systems functioning, the missions as proposed by the Dutch government in 2018 became the stimulus to change existing (large-scale) sociotechnical systems, involving social, technological, organizational, and institutional innovations (Polt 2019; Janssen 2020).

Focusing on four broadly defined societal domains called "mission themes," a total of twenty-five missions was proposed, with each mission theme and underlying set of missions being the responsibility of at least one ministry (Fig. 2). The Ministry of LNV took ownership of the mission theme on Agriculture, Water, and Food (AWF). This theme comprised six missions, one of them being the mission to achieve a circular agriculture mission. The formulated mission goal was "Reduction of the use of raw and auxiliary materials in agriculture and horticulture by 2030 and creating the maximum possible value from all end products and residuals by utilising them as fully as possible" (Ministry of EZK 2019). Indeed, the mission drew directly on the circular agriculture vision LNV just produced. As argued in an LNV strategy document

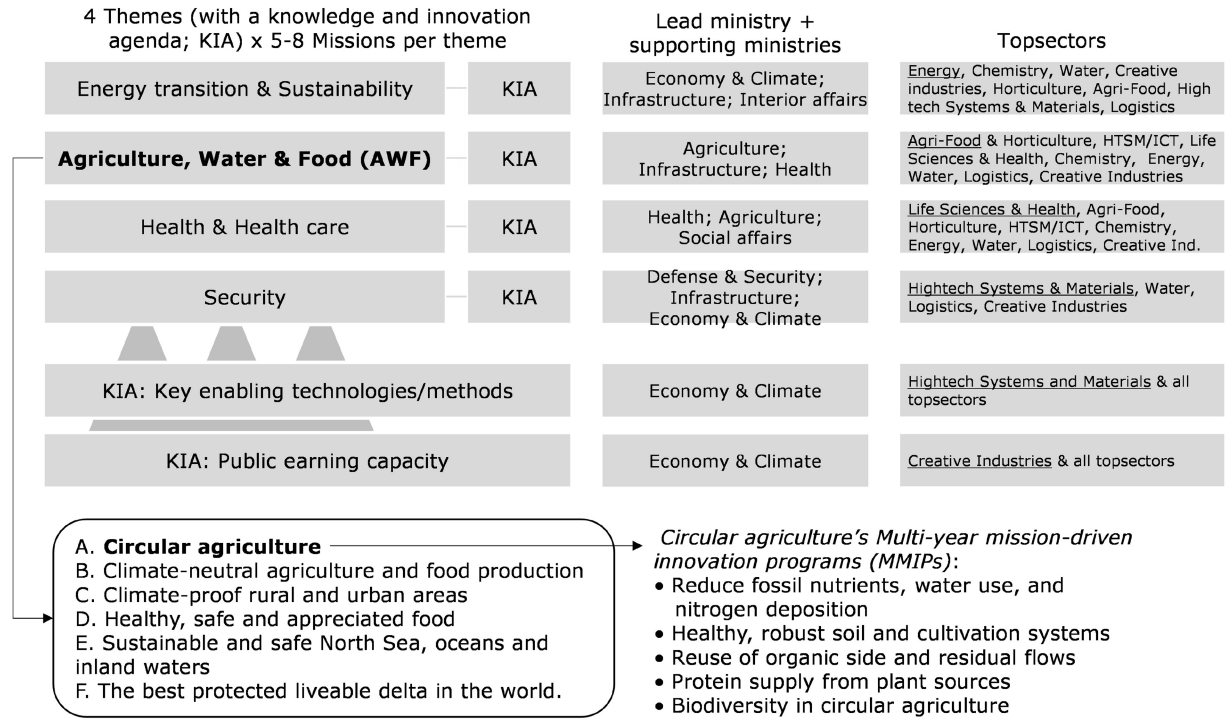

Figure 2. Set-up of the Dutch MTIP and the place of the circular agriculture mission within it

Source: own elaboration, based on Janssen (2020) and Knowledge and Innovation Agenda Agriculture, Water, Food 2020–3. https://topsectoragrifood.nl/wp-content/uploads/2020/03/TOAF1910-Kennisagenda-A5-landscape-English-1.pdf.

of 2019, missions were considered as the "engine block" in order to transition to circular agriculture (LNV 2019).

EZK, in collaboration with the participating domain-specific ministries, appointed the existing Top sectors to design and program Knowledge and Innovation Agendas (KIAs) for directing research and innovation efforts toward the missions. Aligning the public–private infrastructure of the Top sectors with missions was framed by EZK as a condition to achieve the "maximum societal and economic effect from every euro, idea and solution" (Ministry of EZK 2019: 4). The Top sectors as such needed to define over the course of the year of 2018 what new knowledge and innovations had to be developed in the next 4 years (2019–23) to contribute to achieving the missions.

Much of the development of the original KIA AWF was done by program teams, consisting of two members of the responsible ministries (these are LNV members in most of the teams), one business representative, and one university representative. The primary task of the currently fourteen program teams involves the governance of so-called multi-year mission-driven innovation programs, by articulating content and monitoring and evaluating progress. Program teams use different channels to obtain content-related input: team members first consult their own networks during their programming activities; secondly, they work with public advisory boards (government, enterprises, research institutes, NGOs, and higher education lecturers) in order to include their views and priorities in the actualization of the KIA and the different calls and portfolio of existing projects; and thirdly, they include external experts to assess project proposals.[4] An additional important role involves an advisory role toward Top sector management and ministries. During these collaborating moments, they inform the partners what type of expertise and instruments are necessary to achieve goals and priorities of the multi-year mission-driven innovation programs.

Figure 2 provides an illustration of the overall set-up and circular agriculture-specific parts of the MTIP.

3.2 Methods and data analysis

Following a qualitative research design, the case study comprised a collection and analysis of secondary and primary data (Green and Thorogood 2004; Savin-Baden and Howell Major 2013). We used a variety of methods from document analysis to semistructured interviews with various stakeholders. Data were collected between April 2020 and December 2021, using desktop review (reviewing newspaper articles, policy and industry reports, and legislation) and in-depth interviews with policymakers, industry representatives, farmers, and representatives of knowledge institutes. During the desktop review, we first studied the policy context of MOIP in the Netherlands to understand how the new MOIP paradigm emerged, who was involved, and what new governance arrangements emerged. We next zoomed in on the emergence of the circular agriculture mission, its ambition in transforming the Dutch agricultural system from a linear to a circular system by 2030, and how it was interpreted and framed by stakeholders (Ploegmakers et al. 2020).

Then, primary data were generated primarily through twenty-three semistructured face-to-face interviews with the sampled actors (Appendix). The participants were selected via the snowball method and had been involved integrally or tangentially with the circular agriculture mission. The interviews, which lasted between 45 and 90 min, were intended to identify and describe how respondents saw the articulation and implementation of the mission. In this light, interviewees

were first asked specific questions on circular agriculture as a mission, such as how their interpretation of circular agriculture aligned with the circular agriculture mission; their matters of concern around circular agriculture as a mission; and what and who they believe they need in order to execute the circular agriculture mission within and across their fields of expertise. Secondly, we focused on how participants experienced the mission arenas (Fig. 1); what actors they believed were included or excluded from the mission's articulation and implementation process; how their positions changed (or not) during the evolving policy process; and their expectations of the mission. In order not to influence interviewees via leading questions, they were not literally asked about their views on dominance of exploitative or explorative forces. Instead, the semistructured interview focused on their general view on which values, actor groups, solution pathways, and support measures were most prominent throughout the process in which the mission was formulated and implemented. Interviewees autonomously tended to bring up issues related to the prevalence and (dis)advantages of either new or existing capabilities, networks, and solutions in the pursuit of mission success.

All interviews and discussions were tape-recorded and fully transcribed for analysis. The interviews were recorded, transcribed verbatim, and coded by hand following an axial coding approach (Bryman 2016). The latter was informed by relevant (but not pre-coded) theoretical concepts, such as inclusion and influence of stakeholders, incumbents, and newcomers, dynamics in mission arenas, and ambidexterity-related concepts such as explorative and exploitative innovation. We thus used an abductive approach (Bryman 2016; Awuzie and McDermott 2017) to study how the circular agriculture mission became set in terms of the interplay between different incumbents and new entrants and how this reflects the principle of ambidextrous policy-making (Fig. 1). Below we will discuss the results of this analysis. Direct quotations from participants are included in this paper but maintain anonymity.

4. Findings

4.1 A vision on circular agriculture

By promising changes on multiple fronts, the LNV's 2019 vision on circular agriculture was initially well received across stakeholder worlds (from banks to nature organizations, farmer organizations, and NGOs such as Greenpeace). Also, for the first time in agricultural governance, different agricultural departments (united in the Ministry of LNV) had to align their activities around the vision and its subsequent agenda, instead of working independently on sectoral dossiers. The Ministry of LNV's vision on circular agriculture as ultimate target by 2030 thereby induced social and institutional rearrangements around circular agriculture as a vision.

However, although the presented concept of circular agriculture promised a response to many pressing issues in the Dutch agricultural industry, there was still much uncertainty in the agricultural society on *how* to actually unite forces around circular agriculture in order to make this transition happening by 2030. An analysis of discourse around circular agriculture in Dutch society shows how the openness of the concept of circular agriculture resulted, on the one hand, in legitimacy of the concept, but, on the other hand, in goals that are eventually irreconcilable (Ploegmakers et al. 2020). Some interview respondents argued this was done on purpose to create legitimacy of the concept to diverse stakeholders, on the one hand, and to avoid the articulation of radical targets and solution pathways, on the other hand, to reduce early commitments. The LNV vision did, e.g., not address some of the tensions related to material path dependencies of the existing system, such as the role of technology (low tech versus high tech); the Netherlands as second biggest agricultural export country in the world versus self-sufficiency; scale (global versus local); reducing the livestock population; working with nature or excluding nature; how to change the use of pesticides; and how to operationalize circular business models (Dagevos et al. 2020; Ploegmakers et al. 2020; Dagevos and de Lauwere 2021).

Additionally, sector representatives who were interviewed discussed that the subsequent policy agenda was designed without proper consultation of diverse stakeholder groups, risking to develop into a top-down governance approach instead of democratic governance. This becomes clear from the following quote, coming from a farmer organization representative:

> There was all of a sudden the LNV vision and realization plan on circular agriculture. Yet, there has never been a discussion between LNV and our sector, which probably was also not the intention of the Ministry. I mean, it is strange that you have a vision you want to execute without any discussion with the responsible sectors. We said from the beginning that we agree with the vision, we think it is a good route, with the next step in the process how we will actually perform the vision and what does this mean exactly, but we actually really liked the idea. My thought would be to get all the stakeholders together around the table and to discuss the content, because you can work in circular systems, but the question is what does this mean, what do we need to do or what do we need to do differently, and this discussion is not taking place. And I find that a pity, I wouldn't approach it like this. (Respondent 12)

4.1.1 Exploitative and explorative forces. The LNV (2019) vision on circular agriculture—resulting mostly from an expert-led, top-down organized agenda-setting process—served as a blueprint for the further articulation and pursuit of the circular agriculture mission. By staying away from taking a clear stance on how to complete the goal of achieving circular agriculture, it gave room to multiple mission directions. Abstracting from minor variations, interviewees repeatedly grouped these directions into two main groups: a reactionary one and a revolutionary one. This distinction neatly matches our interest in exploitative and explorative forces.

The exploitative force sticks to the post-World War II dominant paradigm of industrialized agriculture. Characteristic is the export-driven focus on reducing costs by improving efficiency, e.g. via scale effects and technology adoption. According to this paradigm, circular agriculture is important as a concept for addressing negative externalities caused by massively industrialized agri-food systems so rather based on optimization of the current system by creating higher efficiencies and reducing undesired losses. Promising solutions include drone-based precision agriculture or high-tech low-emission stable

systems. Key actors embodying this exploitative force are scientists and a diversity of (large) agricultural firms invested in large-scale and intensive farming. Since the beginning, they have been relatively influential in scoping the KIAs of the Top sector Agri & Food and in executing the research and innovation projects supported through the corresponding funding schemes.

The explorative force, on the other hand, comprises several alternative approaches to circular agriculture. These approaches include agroecological, biodynamic, organic, regenerative, or nature-inclusive agriculture (Rigolot and Quantin 2022; Verburg, Verberne, and Negro 2022; Vermunt et al. 2022; Bless, Davila, and Plant 2023), which are positioned as opposites of extractive methods of industrialized agriculture. This force is not necessarily against technological solutions for achieving circular agriculture, as in fact concepts like "pixel farming" using small-scale robotics (Ditzler and Driessen 2022) find their origin here (Respondent 18, research university). However, there is also abundant attention to other kinds of solutions beyond the farm scale. These include business models or social innovation-like solutions such as closing loops by relocating crops to other regions or integrating agricultural activities with broader waste streams from industry and post-consumption leftovers. The explorative force is embodied by scientists, farmer organizations, community initiatives, and NGOs that traditionally had a smaller role in the original Top sector policy. Concrete examples include communities of farmers and citizens involved in social initiatives around regenerative farming, including community-based agriculture initiatives such as "Herenboerderij" and permaculture initiatives such as "Voedselbossen." Outside of the particular context of collective research and innovation efforts, some of the "Top sector-outsiders" are experienced in engaging with policymakers and in agenda-setting processes. This holds for instance for farmer organizations, NGOs, and intermediaries promoting nature-inclusive agriculture. Of key interest to our analysis is how and why these actors could (not) exert their explorative force during the mission cocreation processes.

Table 1 provides a summary of conductive and obstructive issues encountered by actors representing the exploitative and explorative forces in the different mission arenas. Below we elaborate on these findings, as well as the overall ambidexterity balance, per arena.

4.2 Mission strategy arena

4.2.1 Exploitative forces. As the circular agriculture mission followed on the "open" LNV circular agriculture vision, also the mission's knowledge questions and challenges were heavily influenced by LNV's own views on the matter. These views result from a long history of interacting closely with predominantly the scale-intensive and extractive parts of the agricultural sector. Although policymakers of the Ministry of LNV argued how they negotiated "back and forth" with various stakeholders on the content of the mission, some of them perceived the mission articulation process still to be a top-down process:

> We were told somewhere last year that mission-oriented policy was gaining momentum, or at least that they were defining mission agendas, and that this time, it really was the plan to include the triple helix, so government/enterprises/science – so that we could take a more active role. And that is what I did, but what I noticed, was that the ministries were setting up the agenda's and that they were very happy that they were gaining more control on the Top sector policy. On the other hand, they weren't too interested in our help, and they argued they had enough knowledge on how to set up the agendas and that we could follow up at a later stage, and the same was more or less happening to the Top sectors. So my impression was that the first phase, the articulation of the mission agendas, was mainly done by the ministries, without lots of collaboration with the triple helix. (Respondent 6)

The only network that had some say over the mission was the Top sector Agri & Food, with whom the Ministry of LNV has a close working relation (Respondent 2, Ministry of LNV). Representatives of this Top sector supported the Ministry of LNV to help "clean" the missions from details and make them overarching instead (Respondent 9, Agri & Food). This networks of incumbents from the old policy regime (i.e. the original Top sector approach) entered as such back into the mission strategy.

4.2.2 Explorative forces. In an early phase of prioritizing problems and associated knowledge questions, a broad range of enterprises, research institutes, and societal actors were consulted by LNV—also the ones promoting alternative solutions, and thus representing an explorative force. This was in line with the observation by Ploegmakers et al. (2020) that different interpretations of circular agriculture existed. However, as this was more of an *ad hoc* rather than a continuous engagement, it hardly influenced the mission's scope and urgency. A difficulty brought up by stakeholders that wished to contribute to the mission goal is the limited angle of LNV's circular agriculture concept and vision. For them, circular agriculture is only one element of a set of interrelated challenges the agri-food system is currently facing. Legal obligations to reduce nitrogen emissions and reduce manure surpluses are other pressing issues, which are now left out of the picture. Taking a genuine problem-based approach to driving innovation would require more attention to the interlinkages between these issues in order to tackle them all at once and avoid problem-shifting (Respondent 12, farmer organization).

At the same time, exploration-inclined stakeholders also criticize the CA mission for lacking clear views on how to move forward. They argue that activating the sector only works if there are clear perspectives that address the problems and incentives experienced "in the field." This does not even need to be one single perspective, as multiple interviewees see room for both exploitative and explorative stories. What matters more is that actors recognize themselves in at least one story, so they feel compelled to engage:

> It is imperative to create clear perspectives. If you do this, and actors feel genuinely addressed by it, everyone in the chain will be encouraged to think along. You can create awareness and open minds. If you impose something actors don't identify with, they might just put their heels in the sand. (Respondent 13)

Table 1. A summary of issues encountered by the exploitative and explorative forces, per arena.

Arena	Exploitative force	Explorative force
Vision: what is the mission about?	LNV presented its top-down "*open*" *vision* on circular agriculture, without prioritizing specific targets or solutions (but neither addressing salient tensions).	
Strategy arena: prioritizing problems and associated knowledge questions	Knowledge questions were based on LNV's *existing viewpoint*, which in turn was influenced by *conservative forces* from science and industry. Their dominance was reinforced by engaging the Top sector Agri & Food.	The various consulted societal stakeholders criticized it for focusing on only *one specific part* of achieving sustainable and healthy agri-food systems. It also lacked *perspectives* stakeholders can *identify* and want to engage with. Some actors experienced a *missed opportunity* for obtaining explicit support or felt *excluded* altogether (e.g. due to a lack of *trust*).
Programming arena: formulating agenda(s) for supporting the development and application of solutions	Tops sectors relied on *existing KIA road maps and (R&D) policy instruments* to steer activities toward advancing a particular set of scalable technological solutions. Committed industry actors *guaranteed* participation in realizing road maps.	Scientists and societal stakeholders not firmly represented in Top sectors articulated alternative solutions but had to *fight for attention*. *Heterogeneity*, *context-specificity*, and perceived *contestation* of alternatives seemed difficult to deal with in programming. Some "outsiders" felt that the biased knowledge questions *ignored the expertise and creativity* of agri-food professionals familiar with alternative practices.
Implementation arena: designing and using policy instruments for enacting the programmed agenda(s)	"Triple helix" program teams *consulted the networks they built* for programming tenders and for supporting the development of R&D project consortia. Consortia slightly broadened up to other actors.	New entrants working on alternative solutions are *unaware* of the available instruments, which served *narrow* rather than system-wide solutions. They seek *recognition*, rather than resources, and consider subsidies to be for laggards. This led to "*negative energy*" instead of flywheel-like acceleration.
Performance arena: conducting activities that contribute to mission goal completion	Technology-oriented public–private R&D projects benefit from *fitting existing policy logics and instruments*.	Non-R&D-based problem-solving initiatives required more *labor-intensive customized policy support* for scaling/replicating solutions.

The lack of a systemic view and corresponding perspective were both reasons for some stakeholders to refrain from participating intensively in mission strategy articulation. An additional explanation is that interviewees point at a missed opportunity for LNV to obtain explicit support for causes LNV is sympathetic to. Actors representing the explorative force fail to understand how, on the one hand, LNV is continuously interacting with them to promote topics like biological and regenerative agriculture, while, on the other hand, the CA mission is not used as an opportunity to accelerate this. The claim that the CA mission also provides room for such approaches is seen as insufficient, as not using a possibility to give an advantage is experienced as actually disadvantaging nature-inclusive agriculture.

Finally, some exploration-oriented stakeholders felt excluded from the strategic arena. One suspicion is that they were not welcome, as they might raise critical questions regarding, e.g., long-term policy versus short-term policy; export versus local supply chains; or the role of technology. The impression is that LNV, carrying ultimate responsibility over the mission, is overwhelmed and consequently paralyzed by the complexity of weighing all these fundamental and often political issues. It would explain why the ministry was reluctant to open up more to, e.g., intermediary organizations promoting regenerative farming and instead stuck to the governance structure it was familiar with and had control over (the Top sectors, with its Top teams and Top-consortia for Knowledge and Innovation or TKIs). Relevant in this respect also is that LNV is believed to operate from a distrust-based approach. Due to prominent fraud cases in the agricultural sector, e.g. around the administration of calves, the ministry tends to keep its distance from the field. In response, also some field-level organizations gave up on trying to collaborate intensively—even if it concerns shared causes—as there is also distrust toward the ministry from farmers due to years of continuously changing policies and shifting regulatory frameworks.

4.2.3 Ambidexterity balance. What becomes clear is that the Ministry of LNV, together with the policy representatives in the Top sector Agri & Food, dominated the mission strategy arena. There did not seem to be significant amounts of contestation directly between the exploitative and explorative forces. Instead, it was rather the openness of the CA mission and LNV's inertia that provided exploitative established structures the best possibility to push their (techno-economic) interests in the strategy arena. Challengers reasoning from the problem-side struggled with issues like the mission being too narrow and too hollow or even had various other reasons not to participate in defining the strategic aspects of the CA mission, such as feelings of distrust.

4.3 Mission programming arena

4.3.1 Exploitative forces. To tackle the problems and questions prioritized in the strategic arena, the MTIP maintained the original Top sector policy's approach of designing and programming KIAs. This time this should be done per mission (rather than per Top sector) and in close collaboration with relevant ministries. Several interview respondents expressed their concerns on this choice to keep this pre-existing Top sector infrastructure intact, as this would potentially lead to a clash between economic interests and societal priorities and between incremental and transformative ambitions. Nevertheless, it was argued by EZK that Top sectors, in collaboration with relevant partners such as enterprises, ministries,

science, knowledge institutes, the Dutch Organisation for Scientific Research (NWO), and regions, should use their existing knowledge and innovation structure to efficiently articulate and coordinate the KIAs.

In the KIA theme AWF, the three Top sectors Agri & Food, Horticulture & Starting Materials, and Water & Maritime and their relevant ministries and knowledge partners were brought together in brainstorm sessions around knowledge and innovation priorities in the mission strategy (called the Knowledge and Innovation Agenda). Policymakers, Top sector representatives, and respondents from the Dutch Research Council argued how these existing network configurations and operational differences resulted in communication difficulties and fierce contestation. This constrained constructive discussions between the different Top sectors and ministries, as one respondent argued:

> During the development of the KIA AWF, we had a coordination team in which all ministries and Topsectors sat together. What I saw was that people were really fighting to get their interests prioritized and when we were reflecting on this process, we thought well if you use an old structure with old financial lines and old lines of interests to set up a new structure, without reorganizing the structure, because that is what they did, then there are quite some people can maintain their interests. And this as such is not a smooth process; it results in a lot of friction. (Respondent 6)

A consequence of this modus operandi was that the resulting KIA became an only modestly updated version of earlier editions. On the one hand, this is attributed to the earlier KIAs also having a long-term perspective and taking into account societal challenges. On the other hand, interviewees also believe that maintaining the pre-existing policy and governance structures automatically implied maintaining the dominant logic toward what kind of research and innovation to cover with KIA road maps and associated policy instruments. In this case, even though other actors were invited to contribute to programming activities, the KIA AWF effectively continued agendas oriented toward a particular set of scalable technological solutions fitting mostly industrialized agriculture approaches. Moreover, by coprogramming and cosigning the KIA, established industry members guaranteed that there would indeed be consortia willing to participate in the project-funding policies guided by the KIA. The security this brought was important for both EZK and LNV, as they feared that too ambitious or too niche-oriented programming could result in under-utilization of these policies and their budgets.

4.3.2 Explorative forces. One dynamic following from how the programming was organized is that scientists and stakeholders advocating alternative solutions (including farmers and farmer organizations) had to struggle to get continuous attention for their suggestions. Expressing them during networking and programming events was not an issue, but ensuring that these suggestions were considered in higher layers of the governance structure required persistency. A sector respondent argued how industries in the end had little say in the articulation of programming and thus desired directionality of innovation activities: …you can hand in projects, which are approved or rejected, but influencing the articulation of questions, what is it about and how should we look at it, how will you connect things in a smart way, well we as businesses have been cut out of that process. (Respondent 12)

Attempts of explorative actors to influence the agenda were experienced as fruitless due to various characteristics of the alternative solutions for becoming circular. For instance, there is a large heterogeneity of practices that can be deployed, both concerning agricultural production (such as the agroecological, biodynamic, organic, regenerative, or nature inclusive agriculture mentioned earlier) and other novel approaches to food production led by agrifoodtech start-ups, such as cellular protein and vertical farming (Klerkx and Villalobos 2024). The more innovative solutions are not always compatible with industrialized agriculture, and neither with each other. The contestation this brings makes it hard to decide what solutions to incorporate in the agendas, also because stakeholders promoting one option occasionally explain its advantages by disqualifying alternatives (e.g. agroecological versus nonagroecological circular solutions). A major additional issue is that the applicability and success of explorative forces' alternative solutions tend to be context-specific. For example, contrary to industrialized ways of processing waste, nature-inclusive approaches for closing loops are specific to the set of agricultural activities in a certain area. This conflicts with continuing the KIA's linear logic of programming research and innovation at middle-high "technology readiness levels" and subsequently supporting the testing and demonstration of the most promising innovations coming out of KIA-based R&D projects.

Yet another explanation for explorative forces' minor influence on the KIA programming is that actors felt unappreciated. This concerns in particular the expertise and creativity of agri-food professionals working in farming practice (from NGOs, advisory organizations, and farmers themselves). Based on many years of practical experience, these professionals can provide valuable insights on how to realize circular agriculture. Their feeling is that the agenda-setting process was too much based on the epistemological frames of scientists and industrial partners, leaving little room for ideas grounded in professionals' experience, experimentation, and learning from peers. One interviewee summarizes several of the above-mentioned issues as follows:

> Instead of setting up artificial agricultural testing grounds in which innovations are devised that ultimately have to be implemented in the agricultural systems, the various agricultural systems themselves should become a testing ground. Then you would also respect all the expertise in the field. (Respondent 13)

4.3.3 Ambidexterity balance. Although relative outsiders to the Top sector structures were willing to contribute to the formulation of agendas, some of their views and solutions turned out to be incompatible with the preference for scalable innovations. Other outsiders felt discouraged to engage in the first place, as they felt their potential contributions were not valued by LNV and the programming bodies. Exploitative forces thus prevailed again, largely due to explorative forces not believing in the merits of joining in a collective effort to complete the CA mission.

4.4 Mission implementation arena

4.4.1 Exploitative forces. The policy instruments used to finance and coordinate the execution of the KIAs already existed in the original Top sector innovation policy. Of main importance are the allowance scheme for public–private R&D projects and a set of smaller instruments for also engaging small and medium enterprises more intensively in contributing to the (now mission-based) KIAs.

In their capacity as representatives of particular knowledge communities, the actors that were involved in updating the KIA have also been mobilizing their networks to create consortia that would submit project proposals to these policy instruments. One respondent (Respondent 6, Dutch National Research Council) noted how consequently policy support is commonly granted to public–private networks that know the route toward accessing these policy instruments. This impression is confirmed by other interviewees, who especially stress that the allowance scheme tends to create path-dependency in terms of who engages in public–private R&D (thereby generating the allowance) and who then participates in consortia funded by the generated allowance. That having said, there are also indications that the circular mission and other AWF missions are increasingly attracting other types of actors. A recent analysis of the public–private R&D projects shows that for the KIA AWF as such, the number and especially diversity of public stakeholders (e.g. NGOs and municipalities) is relatively high compared to the other mission themes as well as nonmission related projects (Wiarda et al. 2023).

4.4.2 Explorative forces. For actors working on solutions that challenge the exploitative take on circular agriculture, participating in the available policy instruments seemed far from obvious. One recurring comment is that, perhaps due to the image of MTIP policies favoring innovation for export-oriented mainstream agriculture, scientists and agricultural firms working on, e.g., agro-ecological concepts were often not familiar with the possibility of obtaining financial support. This also goes back to some of the explorative innovation actors taking a holistic approach to circular agriculture (also addressing other challenges), which matches poorly with defining a project falling neatly within the KIA's programs and subprograms. Industry members argued how there is a discrepancy between what is written down on the ambitions of the circular agriculture mission and what is actually achievable in terms of obtaining policy support.

An entirely different take on low participation in available instruments is the remark that many of the actors exploring alternative solutions tend to operate from an intrinsic drive. When they are experimenting with a promising practice, they usually seek recognition rather than financial resources. Interviewees claim that if LNV or the Top sectors would recognize achievements of alternative solutions more explicitly, this in itself would have encouraged them to make additional steps and engage in the collective CA endeavor. Now the opposite of such a flywheel effect might be happening. Due to the CA mission being so open, rather than providing clear perspectives (Section 4.2), it is seen as not much more than a money-allocating mechanism benefiting especially actors that are keen to secure subsidies. One advocate of sustainable solutions refers to land managers that started only over the past few decades, arriving in a certain area and using modern efficiency-oriented techniques. Now that the societal and policy landscape is changing, and such techniques are facing pressures, these actors are the first ones to beg for (and receive) support and attention. They might not be the ones that are more committed to an area and its ecosystem (the "diehards") and that keep looking for feasible alternatives. This image of the policy creates "negative energy" that some innovative stakeholders just want to stay away from. It was also noted that farmers who already complied with mission goals now experienced few incentives to keep improving.

4.4.3 Ambidexterity balance. The governance of the CA mission implementation was largely controlled by exploitative forces, embodied by incumbent policy groups and existing clusters of public–private R&D alliances. Together, they heavily influenced the scope of the R&D project tenders and eventually the resulting project portfolio. Formally anyone could submit to these tenders, but challengers pursuing alternative solutions lacked capacity, awareness, and interest to do so. Some of the outsiders also felt like their success chances were lower if they do not belong to the (generally exploitative) Top sector network, even though that network was not clearly delineated in terms of members.

4.5 Mission performance arena

4.5.1 Exploitative forces. For the actors embodying the exploitative force, the activities happening in the performance arena (i.e. the initiatives that might contribute to achieving a mission goal) are a natural outcome of the scoping and instrument design taking place in the previous arenas. This means that these actors sparked a host of activities for which it was generally easy to find policy support, as much of their initiatives were technology-oriented and compatible with the MTIP instruments. Notable examples of funded project topics concern soil disease management, resilient cropping systems, processing techniques of products from side streams, technologies to design meat analogs, plant breeding techniques, roughage management in a circular dairy system, improving nitrogen cycles, and valorization of biomass streams. However, these projects do generally not fundamentally question the dominant production system, but they aim to realize circularity within it without challenging its main sociotechnical premises and paradigms.

4.5.2 Explorative forces. In parallel to this body of public–private projects, actual problem-solving activities in the performance arena also comprise initiatives coming from actors representing the explorative force. This includes, for instance, the nation-wide establishment of local experimental farms such as Farm of the Future. These experimental farms are initiatives among the Ministry of LNV, provinces, and a university such as WUR. They function as explorative sites allowing a diverse range of agricultural stakeholders to experiment with farming technologies and organizational arrangements that may support circular farming, such as the use of precision technology and associated data, or collaborations between arable and dairy farmers. The Farm of the Future aims to strike a balance between more conventional systems and more regenerative and agroecological systems by experimenting with approaches such as strip cropping in which several species are grown in parallel strips in the same field, as opposed to a monoculture.

Policymakers experienced difficulties in synchronizing their circular agriculture experimentation activities with societal partners and "new entrants." One policymaker (Respondent 2) discussed how he believed there was more capacity needed to build a societal coalition around circular agriculture, as they had little awareness of what was going on "on the ground" in circular agriculture and how to engage with the different projects operating from bottom-up. Also, some farmers and farmer organizations themselves stress how their kind of innovations typically requires policymakers "to stand next to them" and provide customized policy support for further rolling out the solutions they were working on. Especially when taking a (eco)systems-based approach to becoming circular, the possibilities for becoming more circular tend to differ from place to place. Finding out how this can be accelerated therefore is a labor-intensive task, for which relatively standardized R&D support seems unsuitable.

4.5.3 Ambidexterity balance. Following from the above, the overall set of solutions that were under development became dominated by technology-based projects from existing clusters, despite attempts to broaden up and encourage new (systemic) solutions. As a result, the mission plays out according to a much more accelerative—and thus less transformative—approach than originally envisaged in the ambitious mission of making the Dutch agricultural industry circular by 2030. We will discuss this in more depth in the next section.

5. Discussion

MOIP is heralded as a way to conduct transformative innovation policy, using clearly defined missions to translate broad societal challenges into "doable" problems (Robinson and Mazzucato 2019; Hekkert et al. 2020). The principle of mission cocreation by various stakeholders, representing exploitative and explorative innovation preferences, is considered as one of the key aspects of MOIP (Kattel and Mazzucato 2018; Mazzucato 2018a). However, empirical insights in this process are still limited and this is where this paper intends to contribute. We used ambidexterity as an analytical lens to study the unfolding process of mission cocreation between different exploitation-oriented incumbent groups and exploration-oriented new entrants in four policy arenas concerned with subsequent stages of translating visions into action.

In the next sections, we first present a deeper analysis of our findings, highlighting some tensions within enacting MOIP. From this, we distill theoretical implications, present suggestions to enhance MOIP, and articulate future research questions.

5.1 Deeper analysis of main findings

5.1.1 The difficulties of enacting MOIP as an ambidextrous process across different mission arenas. Our analysis shows how the Ministry of LNV dealt with explorative and exploitative forces influencing the choices made in different mission arenas concerned with moving toward circular agriculture.

The original LNV vision on which the mission was based stated an ambitious goal—the Netherlands as frontrunner in circular agriculture by 2030—but without specifying how that goal would be met (e.g. which investments and sacrifices would need to be made). This left the vision open to different interpretations, and thus interest representations, when it was turned into an actual mission.

In the strategy arena, institutional elements inherited from the Top sector policy highly influenced the framing and perception of what the mission was about and why it is worth pursuing. Leveraging the already established Top sector structures offered the Ministry of LNV a possibility to mobilize innovation capacities, without having to assume strong leadership over the directions of innovation. However, as the Top sector structures were grounded in a growth-enhancing innovation paradigm, they were biased toward promoting exploitative innovation pathways with evident export potential, instead of explorative innovation with a stronger focus on radically different ways of doing agriculture in order to enhance sustainability.

Although a wide array of public and private stakeholders (including other ministries) achieved consensus on the definition and selection of specific societal challenges of the circular agriculture mission, and in this sense a hybrid constellation as per Nylén, Johanson, and Vakkuri (2023) was created, there was limited involvement of new stakeholders to discuss alternative solutions for addressing those challenges. While in theory such stakeholders could still contribute their views and investments in the mission programming and implementation performance arenas (as program teams and actual policy instruments are open for unconventional solutions), the willingness to do so was limited due to embedding the mission so exclusively in the Top sector policy. Many potential challengers shared the sentiment of not being welcome in a mission that formally was hoping to mobilize also "unusual suspects." The feeling was not so much that incumbent industries and scientists hijacked the policy processes, but rather that the Ministry of LNV followed a top-down approach that *de facto* advantaged incumbent networks and practices (e.g. in relation to defining innovation agendas). The potential new entrants were not excluded, but neither were they included in a way that gave them a position for challenging incumbents on which kinds of solutions to select (or deselect) and how to support them.

Insofar as science-driven exploratory innovation experiments or grassroots-driven solutions emerged in the performance arena, they remained largely disconnected from KIA-based (exploitative) innovation activities, resembling findings from Nylén, Johanson, and Vakkuri (2023) in the case of transforming the national fertilizing system in Finland. Attempts from LNV policymakers to integrate and accelerate those initiatives were largely in vain, partially because initiators of such experiments felt they had to force their activities into policies that were designed to promote technologically already feasible and scalable projects.

The generic impression arising from tracing the policy processes throughout the different mission arenas is that mobilizing the Top sector structure backfired when it came to ensuring broad stakeholder involvement and original solution pathways. Even though in theory the structure could have been used to engage new entrants, or complemented with other structures, it carried over a framing that led potential challengers to disengage from policy processes. This was hard to reverse in later stages of policy implementation, as the mission remains associated with incumbent networks and research-based modes of exploitative innovation.

5.1.2 Key tensions. The case study findings point at tensions of enacting MOIP in current democratic societies employing participatory policy models, navigating top-down steering and participatory involvement of stakeholders from both incumbents (regime actors) and new entrants (niche actors).

Critical in our case analysis was the Ministry of LNV's insufficiently successful endeavor of creating a sense of co-ownership with both incumbents and newcomers playing roles in (and being affected by) the circular agriculture transition. On the one hand, LNV wished to let the field decide which innovation pathways to prioritize, while, on the other hand, it wanted to avoid endless discussions. The result is that it provided relatively broad directions, which still allowed for negotiation and contestation. In practice, however, this negotiation and contestation hardly took place, as the directions were seen as a reflection of pre-existing policy logics. Pluralistic perspectives on the interpretation and enactment of the mission became neglected, with the LNV struggling to organize a transparent and participatory governance process to manage issues of power, conflict, and representation.

The way how the mission unfolded reminds of what Hajer et al. (2015) have called "cockpit-ism": i.e. top-down and expert-led steering taking over in the different mission arenas, instead of working with multiple perspectives on sustainable developments that "respond to the various motives and logics of change of these different actors" (Hajer et al. 2015: 13). This goes directly against the ambidexterity imperative of devising an organizational architecture that allows for both central control and decentralized autonomy (Tushman and O'Reilly, 1996). While formally there were structures through which potentially conflicting exploitative and explorative perspectives could be expressed (e.g. the program teams), these perspectives were not taken on board in the decisive early stages of the circular agriculture mission. This resembles findings elsewhere on that MOIP, despite ambitions to involve different stakeholder groups, is *de facto* led by politico-administrative actors (Nylén, Johanson, and Vakkuri 2023). Taking inspiration from the ambidexterity literature, a solution might have been to first let different groups develop their perspectives (e.g. on strategy formulation and policy programming) before inviting them into processes in which the respective influence of these perspectives is negotiated.

The tension in matching top-down steering with responding to bottom-up influences is inherently connected to the degree of contestation between different stakeholder groups. From an ambidexterity perspective, the objective would not be to achieve consensus on a more explorative or exploitative scope, but to have both. Whereas established incumbent networks may lead to myopic views, newcomer networks may have insufficient trust and cohesion to become effective, so engaging both groups can mediate the risk of network failures (Klein-Woolthuis, Lankhuizen, and Gilsing 2005) that may hamper mission articulation and implementation. Although in the Dutch MOIP formally the existing structures were open, participation remained biased toward stakeholders feeling comfortable with the more exploitative scope inherited from the Top sector origins. Our findings on how this played out in the case of the Dutch circular agriculture mission support the reasoning of (Markard 2018), who signal the governance challenge of dealing with strongly lobbied incumbent industries when transforming from a hands-off policy in which government delegates decision-making to private actors (as was the case in the original Top sector structure) toward a more public-sector-led interventionist approach to accelerate sustainability transitions (as in the case of MOIP such as the circular agriculture mission).

Therefore, another key challenge for LNV, as well as for other ministries who have committed themselves to societal missions, was finding a balance between building on available governance structures and the networks they were representing and introducing new structures for obtaining novel perspectives and legitimacy with different stakeholder groups—who now also seem less likely to make use of available policy support. There is an argument to be made for restoring the transformative potential of the circular agriculture mission by "resetting" the governance and decoupling it from the Top sector governance and policy instruments. At the same time, this could undermine the visibility and clout of the mission, especially when research-based innovation actors would lose their prominent position in the overall governance constellation. Policy decisions on relying on existing or new governance structures and policy instruments, and existing or new actor networks, are thus not as independent from each other as they might seem. These findings thereby warn against addressing urgent societal challenges by mobilizing an existing policy set-up and simply changing policy programming.

5.2 Contributions to MOIP theory and further research avenues

The present study adds more detail to earlier work (Grillitsch et al. 2019; Alves, Vonortas, and Zawislak 2021; Parks 2022; Bergek, Hellsmark, and Karltorp 2023) by showing that even when a mission is intended to be transformative, in practice it may not allow for democratic shaping and upholding of high ambitions if ambidexterity is not properly managed along subsequent policy processes in different mission arenas. The transformative potential of a mission depends, on the one hand, on the continued openness toward new entrants to stimulate experimentation and exploration. On the other hand, it should provide stability by incorporating incumbent actors and their networks, but without allowing these to gear the mission process too much toward exploitative innovation (as it may undermine the transformative potential of the mission).

Since this study was a first attempt in applying this ambidexterity lens on MOIP, we need more and deeper empirical studies that engage with the operationalization of MOIP as a paradox in terms of handling ambidexterity, i.e. how to support steering missions, on the one hand, by a directive state while stimulating mission plurality, on the other hand, by including diverse stakeholders in coproduction and experimentation. A particularly relevant avenue for future research on such diversity in stakeholder engagement is whether truly transformative MOIP should mainly rely on new entrants from the beginning and gradually involve specific incumbents with the resources to build momentum for emerging solutions, or instead start out more balanced with new entrants and incumbents with continuous checking that transformative ambition remains high as mission proceeds. Here, MOIP scholarship can engage with work on the negative and positive roles of incumbents in transformative change (Turnheim and Sovacool 2020).

An associated question is then what these two routes would, respectively, require in terms of governance structures. What we argue from our findings is that legacy policy structures (such as the Top sectors in our case) may need to be seen in a more nuanced way. While these may certainly prove unfit to some extent for enacting transformative MOIP (echoing Grillitsch et al. 2019), they also provide a basis to build upon. A key characteristic of MOIP is that it evokes coordinated innovation efforts not so much through financial means, but by aligning policies and by creating perspectives that give different stakeholders confidence to get behind the mission goal (Mazzucato 2018b; Janssen et al. 2021). MOIP's nature of "supra-layer" for policy coordination (OECD 2023) almost by definition requires missions to be tied to existing governance arrangements and policy instruments. While adapting and redirecting those might provide a basis for quickly progressing in mission implementation and performance, our findings suggest this can cause irreversible damage in terms of the limited appeal missions might have for precisely the kind of newcomers the mission is hoping to engage. MOIP thus calls for "structural innovation" (Howells and Edler 2011) of innovation policies and innovation systems more broadly. Studying how such conversion processes or structural innovations take place would be key.

5.3 Practical implications for enacting ambidextrous enactment of MOIP

As literature studies on innovation at the organizational and regional level have shown, a lack of public innovation capacities can be an important reason why policies fail to accomplish broad stakeholder engagement in challenge-oriented innovation endeavors (Gieske et al. 2016; Cappellano et al. 2022). Therefore, to manage the ambidextrous organization of MOIP, it might be relevant to ask what public organizations can do to strengthen such capacities and capabilities (Kattel and Mazzucato 2018; Borrás and Edler 2020; Janssen et al. 2024; van Hout et al. 2024). We also envision a strong role for so-called transition intermediaries. Disconnected from too strong incumbent interests, transition intermediaries can act as brokers between multiple interests and priorities by creating an ambitious shared vision and activities to facilitate transitions (Kivimaa et al. 2019a, 2019b). By successfully negotiating and bringing together diverging organizational cultures and rationales for action, they may help induce a high ambition level and stability of mission directionality. Transition intermediaries can moreover help stimulate policy learning on power inequalities, locked-in scenarios, and conflict management. Moreover, they may help build capacities to enact MOIP among different stakeholders, in order to create an empowered participant especially for the exploratory innovation networks, who can also deal with power dynamics in joint mission articulation and programming (Klerkx and Leeuwis 2008; Spanó et al. 2024).

Furthermore, to support reflexivity on the governance process, we propose for MOIP practitioners to interrogate policy dynamics in different mission arenas which could involve following the actors, institutions, and policy processes over time to unravel how mission goals, rationales, and instruments emerge, evolve, and are institutionalized or fade and how this is determined by the organization design of MOIP and mission arenas. This can be done using interactive methodologies such as "formative evaluation" (Molas-Gallart et al. 2021) or "reflexive monitoring" (Van Mierlo, Arkesteijn, and Leeuwis 2010).

6. Conclusion

Missions for addressing pressing societal problems and challenges require significant and immediate action, but also original solutions and actual diffusion. This poses the challenges to MOIP governance of who to involve in different mission arenas: incumbent actors who are well established but may be locked-in or newcomers who may provide fresh perspectives and represent alternative innovation and transition pathways. To investigate this, we applied ambidexterity as a conceptual lens on the interplay of exploitative and explorative forces in different mission arenas. We highlighted how in the case of the Dutch mission of circular agriculture, the combination of an ill-specified mission vision and a legacy policy structure favored an exploitative strategy, which was then determining mission programming, implementation, and performance. Although the idea was that the governance structure would allow broad stakeholder participation, it offered more room for actors continuing industrialized agriculture rather than those promoting agro-ecological and regenerative alternatives. These findings underline the risk that openness of missions, required for broad stakeholder involvement, might also reinforce pre-existing contestation and innovation pathways. Moreover, we observed how struggles with balancing the interests of different actor groups might lead policymakers to lean toward a top-down approach, thereby avoiding the contestation and negotiation between different perspectives altogether. Finally, our findings demonstrate that ambidextrous mission governance entails making a trade-off between maximizing efficiency and speed on the one hand (by building on existing governance structures and policy instruments) and obtaining novel perspectives and wide societal legitimacy on the other hand.

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Notes

1. In the literature often ambidexterity is referred to as "organizational ambidexterity" (Tushman and O'Reilly 1996; Clauss et al. 2021; Peters and Buijs 2022) or "strategic ambidexterity" (Turner et al. 2017), but in this case, it rather concerns "system ambidexterity." We will use "ambidexterity" as a shorthand throughout the paper.
2. The concept of sociotechnical systems stems from transition literature (Geels 2002; Fuenfschilling and Truffer 2014; Kanger and Schot 2019) and refers to organizational systems—such as food, mobility, health care, energy, security, education, and water—where technologies and society shape each other over time, along with evolution of science, cultures, politics, and ideologies. The sociotechnical regime refers to the semicoherent set of rules that orient and coordinate the activities of the social groups that reproduce the various elements of sociotechnical systems (Geels 2002), despite the presence of many "niches" or alternative choices. What led to the dominance of some choices and marginalization of others is a fundamental question for transitions scholars.
3. The Dutch Top sector policy was designed to improve the match between knowledge demands of innovative industries/sectors and the activities of research institutes (Janssen 2020). Over the course of 2011, firms and research institutes had the opportunity to unite themselves in so-called "Top teams," of which nine Top teams were finally selected to become a Top sector (like Agri & Food, Horticulture & Starting Materials, Life Sciences & Health, and High-Tech Systems & Materials). Every 2 years, the Top teams made agreements with government authorities and social organizations around desired innovation activities, which crystallized in KIAs. These agendas formed the basis for a contract signed by "triple helix parties" (i.e. government, research, and enterprises) in which they committed themselves to the agendas. As a result of the Top sector policy, a strong public–private innovation apparatus emerged between 2011 and 2017, building on a long tradition of joint innovation coordination in the Dutch agri-food sector (Spiertz and Kropff 2011).
4. An overview of projects funded can be found at https://www.kia-landbouwwatervoedsel.nl/projecten/.

References

Alcalde Heras, H., Estensoro, M., and Larrea, M. (2020) 'Organizational Ambidexterity in Policy Networks', *Competitiveness Review*, 30: 219–42.

Alkemade, F., Hekkert, M. P., and Negro, S. O. (2011) 'Transition Policy and Innovation Policy: Friends or Foes?', *Environmental Innovation and Societal Transitions*, 1: 125–9.

Alves, A. C., Vonortas, N. S., and Zawislak, P. A. (2021) 'Mission-Oriented Policy for Innovation and the Fuzzy Boundary of Market Creation: The Brazilian Shipbuilding Case', *Science and Public Policy*, 48: 80–92.

Awuzie, B., and McDermott, P. (2017) 'An Abductive Approach to Qualitative Built Environment Research: A Viable System Methodological Exposé', *Qualitative Research Journal*, 17: 356–72.

Barré, R. et al. (2013) 'Measuring the Integration and Coordination Dynamics of the European Research Area', *Science and Public Policy*, 40: 187–205.

Bergek, A., Hellsmark, H., and Karltorp, K. (2023) 'Directionality Challenges for Transformative Innovation Policy: Lessons from Implementing Climate Goals in the Process Industry', *Industry and Innovation*, 30: 1110–39.

Bless, A., Davila, F., and Plant, R. (2023) 'A Genealogy of Sustainable Agriculture Narratives: Implications for the Transformative Potential of Regenerative Agriculture', *Agriculture & Human Values*, 40: 1–19.

Bloom, N., Van Reenen, J., and Williams, H. (2019) 'A Toolkit of Policies to Promote Innovation', *Journal of Economic Perspectives*, 33: 163–84.

Boon, W., and Edler, J. (2018) 'Demand, Challenges, and Innovation. Making Sense of New Trends in Innovation Policy', *Science and Public Policy*, 45: 435–47.

Borrás, S., and Edler, J. (2020) 'The Roles of the State in the Governance of Socio-technical Systems' Transformation', *Research Policy*, 49: 103971.

Brown, R. (2020) 'Mission-Oriented or Mission Adrift? A Critical Examination of Mission-Oriented Innovation Policies', *European Planning Studies*, 29: 739–61.

Bryman, A. (2016) *Social Research Methods*. Oxford: OUP.

Bui, S. et al. (2016) 'Sustainability Transitions: Insights on Processes of Niche-Regime Interaction and Regime Reconfiguration in Agri-food Systems', *Journal of Rural Studies*, 48: 92–103.

Cappellano, F. et al. (2022) 'Where Innovation Meets Directionality: An Index to Measure Regional Readiness to Deal with Societal Challenges', *European Planning Studies*, 30: 1549–76.

Cappellano, F., Molica, F., and Makkonen, T. (2024) 'Missions and Cohesion Policy: Is There a Match?', *Science and Public Policy*, 51: 360–74.

Clauss, T. et al. (2021) 'Organizational Ambidexterity and Competitive Advantage: The Role of Strategic Agility in the Exploration-Exploitation Paradox', *Journal of Innovation and Knowledge*, 6: 203–13.

Dagevos, H. et al. (2020) *Circulaire Uitdagingen*. Wageningen: Wageningen Economic Research.

Dagevos, H., and de Lauwere, C. (2021) 'Circular Business Models and Circular Agriculture: Perceptions and Practices of Dutch Farmers', *Sustainability (Switzerland)*, 13: 1–15.

De Graaff, S., Wanzenböck, I., and Frenken, K. (2023) 'The Politics of Directionality in Innovation Policy through the Lens of Policy Process Frameworks', .

Deleidi, M., and Mazzucato, M. (2019) 'Putting Austerity to Bed: Technical Progress, Aggregate Demand and the Supermultiplier', *Review of Political Economy*, 31: 315–35.

Diercks, G. (2019) 'Lost in Translation: How Legacy Limits the OECD in Promoting New Policy Mixes for Sustainability Transitions', *Research Policy*, 48: 103667.

Diercks, G., Larsen, H., and Steward, F. (2019) 'Transformative Innovation Policy: Addressing Variety in an Emerging Policy Paradigm', *Research Policy*, 48: 880–94.

Ditzler, L., and Driessen, C. (2022) 'Automating Agroecology: How to Design a Farming Robot without a Monocultural Mindset?', *Journal of Agricultural and Environmental Ethics*, 35: 2.

Doblinger, C., Wales, W., and Zimmermann, A. (2022) 'Stemming the Downturn: How Ambidexterity and Public Policy Influence Firm Performance Stability during Economic Crises', *European Management Journal*, 40: 163–74.

Elzinga, R. et al. (2023) 'Assessing Mission-Specific Innovation Systems: Towards an Analytical Framework', *Environmental Innovation and Societal Transitions*, 48: 100745.

Foray, D. (2019) 'On Sector-Non-neutral Innovation Policy: Towards New Design Principles', *Journal of Evolutionary Economics*, 29: 1379–97.

Fuenfschilling, L., and Truffer, B. (2014) 'The Structuration of Socio-technical Regimes — Conceptual Foundations from Institutional Theory', *Research Policy*, 43: 772–91.

Geels, F. W. (2002) 'Technological Transitions as Evolutionary Reconfiguration Processes: A Multi-level Perspective and A Case-Study', *Research Policy*, 31: 1257–74.

Gieske, H., Van Buuren, A., and Bekkers, V. (2016) 'Conceptualizing Public Innovative Capacity: A Framework for Assessment', *The Innovation Journal*, 21: 1.

Green, J., and Thorogood, N. (2004) *Qualitative Methods for Health Research*, 1st edn. London: SAGE.

Grillitsch, M. et al. (2019) 'Innovation Policy for System-wide Transformation: The Case of Strategic Innovation Programmes (SIPs) in Sweden', *Research Policy*, 48: 1048–61.

Gupta, A. K., Smith, K. G., and Shalley, C. E. (2006) 'The Interplay between Exploration and Exploitation', *Source: The Academy of Management Journal*, 49: 693–706.

Haddad, C. R. et al. (2022) 'Transformative Innovation Policy: A Systematic Review', *Environmental Innovation and Societal Transitions*, 43: 14–40.

Hajer, M. et al. (2015) 'Beyond Cockpit-ism: Four Insights to Enhance the Transformative Potential of the Sustainable Development Goals', *Sustainability*, 7: 1651–60.

Hekkert, M. P. et al. (2020) 'Mission-Oriented Innovation Systems', *Environmental Innovation and Societal Transitions*, 34: 76–9.

Hoogstra, A. G. et al. (2024) 'The Transformative Potential of Circular Agriculture Initiatives in the North of the Netherlands', *Agricultural Systems*, 214: 103833.

Howells, J., and Edler, J. (2011) 'Structural Innovations: Towards a Unified Perspective?', *Science and Public Policy*, 38: 157–67.

Janssen, M. (2020) 'Post-commencement Analysis of the Dutch "Mission-Oriented Topsector and Innovation Policy" Strategy (Issue December)'.

Janssen, M. et al. (2024) 'Governance Arrangements for the Implementation of Transformative Innovation Policy: Insights from a Comparative Case Study', Lund University, Centre for Innovation Research (CIRCLE).

Janssen, M. J. (2019) 'What Bangs for Your Buck? Assessing the Design and Impact of Dutch Transformative Policy', *Technological Forecasting and Social Change*, 138: 78–94.

Janssen, M. J. et al. (2021) 'The Promises and Premises of Mission-Oriented Innovation Policy—A Reflection and Ways Forward', *Science and Public Policy*, 48: 438–44.

Janssen, M. J. et al. (2023) 'Missions as Boundary Objects for Transformative Change: Understanding Coordination across Policy, Research, and Stakeholder Communities', *Science and Public Policy*, 50: 398–415.

Johnstone, P., and Newell, P. (2018) 'Sustainability Transitions and the State', *Environmental Innovation and Societal Transitions*, 27: 72–82.

Johnstone, P., Stirling, A., and Sovacool, B. (2017) 'Policy Mixes for Incumbency: Exploring the Destructive Recreation of Renewable Energy, Shale Gas "Fracking", and Nuclear Power in the United Kingdom', *Energy Research & Social Science*, 33: 147–62.

Kanger, L., and Schot, J. (2019) 'Deep Transitions: Theorizing the Long-Term Patterns of Socio-technical Change', *Environmental Innovation and Societal Transitions*, 32: 7–21.

Kattel, R., and Mazzucato, M. (2018) 'Mission-Oriented Innovation Policy and Dynamic Capabilities in the Public Sector', *Industrial and Corporate Change*, 27: 787–801.

Kern, F., and Howlett, M. (2009) 'Implementing Transition Management as Policy Reforms: A Case Study of the Dutch Energy Sector', *Policy Sciences*, 42: 391–408.

Kivimaa, P. et al. (2019a) 'Towards a Typology of Intermediaries in Sustainability Transitions: A Systematic Review and a Research Agenda', *Research Policy*, 48: 1062–75.

Kivimaa, P. et al. (2019b) 'Passing the Baton: How Intermediaries Advance Sustainability Transitions in Different Phases', *Environmental Innovation and Societal Transitions*, 31: 110–25.

Klein-Woolthuis, R. K., Lankhuizen, M., and Gilsing, V. (2005) 'A System Failure Framework for Innovation Policy Design', *Technovation*, 25: 609–19.

Klerkx, L., and Begemann, S. (2020) 'Supporting Food Systems Transformation: The What, Why, Who, Where and How of Mission-Oriented Agricultural Innovation Systems', *Agricultural Systems*, 184: 102901.

Klerkx, L., and Leeuwis, C. (2008) 'Delegation of Authority in Research Funding to Networks: Experiences with a Multiple Goal Boundary Organization', *Science and Public Policy*, 35: 183–96.

Klerkx, L., and Rose, D. (2020) 'Dealing with the Game-Changing Technologies of Agriculture 4.0: How Do We Manage Diversity and Responsibility in Food System Transition Pathways?', *Global Food Security*, 24: 100347.

Klerkx, L., and Villalobos, P. (2024) 'Are AgriFoodTech Start-ups the New Drivers of Food Systems Transformation? An Overview of the State of the Art and a Research Agenda', *Global Food Security*, 40: 100726.

Kuhlmann, S., and Rip, A. (2018) 'Next-Generation Innovation Policy and Grand Challenges', *Science and Public Policy*, 45: 448–54.

Larrue, P. (2019) *New Mission-Oriented Policy Initiatives as Systemic Policies to Address Societal Challenges: Analytical Framework and Typology of Initiatives*, pp. 1–58. Paris: OECD

LNV. (2018) *Landbouw, natuur en voedsel: waardevol en verbonden. Nederland als koploper in kringlooplandbouw*. The Hague: Ministerie van Landbouw, Natuur en Voedselkwaliteit.

LNV. (2019) *Realisatieplan Visie LNV Op weg met nieuw perspectief*. The Hague: Ministerie van Landbouw, Natuur en Voedselkwaliteit.

March, J. G. (1991) 'Exploration and Exploitation in Organizational Learning', *Organization Science*, 2: 71–87.

Markard, J. (2018) 'The Next Phase of the Energy Transition and Its Implications for Research and Policy', *Nature Energy*, 3: 628–33.

Martin, B. R. (2016) 'Twenty Challenges for Innovation Studies', *Science and Public Policy*, 43: 432–50.

Mazzucato, M. (2016) 'From Market Fixing to Market-creating: A New Framework for Innovation Policy Innovation Policy', *Industry and Innovation*, 23: 140–56.

Mazzucato, M. (2018a) *Mission-Oriented Research and Innovation in the European Union*, .

Mazzucato, M. (2018b) 'Mission-Oriented Innovation Policies: Challenges and Opportunities', *Industrial and Corporate Change*, 27: 803–15.

Mazzucato, M., Kattel, R., and Ryan-Collins, J. (2020) 'Challenge-Driven Innovation Policy: Towards a New Policy Toolkit', *Journal of Industry, Competition and Trade*, 20: 421–37.

Ministry of EZK. (2019) 'Missies voor het topsectoren- en innovatiebeleid'.

Molas-Gallart, J. et al. (2021) 'A Formative Approach to the Evaluation of Transformative Innovation Policies', *Research Evaluation*, 30: 431–42.

Muscat, A. et al. (2021) 'Principles, Drivers and Opportunities of a Circular Bioeconomy', *Nature Food*, 2: 561–6.

Nowacki, C., and Monk, A. (2020) 'Ambidexterity in Government: The Influence of Different Types of Legitimacy on Innovation', *Research Policy*, 49: 103840.

Nylén, E.-J., Johanson, J.-E., and Vakkuri, J. (2023) 'Mission-Oriented Innovation Policy as a Hybridisation Process: The Case of Transforming a National Fertilising System', *Science and Public Policy*, 50: 509–20.

OECD. (2023) 'Reaching Net Zero: Do Mission-Oriented Policies Deliver on Their Many Promises?', in *OECD Science, Technology and Innovation Outlook 2023*. Paris: OECD.

Oenema, J., van Ittersum, M., and van Keulen, H. (2012) 'Improving Nitrogen Management on Grassland on Commercial Pilot Dairy Farms in the Netherlands', *Agriculture Ecosystems and Environment*, 162: 116–26.

Ondersteijn, C. J. M. et al. (2002) 'Management Strategies on Dutch Dairy Farms to Meet Environmental Regulations; A Multi-case Study', *Netherlands Journal of Agricultural Science*, 50: 47–65.

O'Reilly, C. A., and Tushman, M. L. (2008) 'Ambidexterity as a Dynamic Capability: Resolving the Innovator's Dilemma', *Research in Organizational Behavior*, 28: 185–206.

Parks, D. (2022) 'Directionality in Transformative Innovation Policy: Who Is Giving Directions?', *Environmental Innovation and Societal Transitions*, 43: 1–13.

Pel, B. (2016) 'Trojan Horses in Transitions: A Dialectical Perspective on Innovation "Capture"', *Journal of Environmental Policy and Planning*, 18: 673–91.

Peters, K., and Buijs, P. (2022) 'Strategic Ambidexterity in Green Product Innovation: Obstacles and Implications', *Business Strategy and the Environment*, 31: 173–93.

Ploegmakers, H. et al. (2020) 'Analyse debat kringlooplandbouw eindrapport'.

Polt, W. (2019) 'Re-orienting STI Policies Towards Mission-Oriented Innovation Policies—Where Do We Stand? Where Are We Heading?' *Joint CSTP/ CIIE Workshop Session 2: Reorienting STI Policies and Funding to Tackle Societal Challenges*. October.

Rigolot, C., and Quantin, M. (2022) 'Biodynamic Farming as a Resource for Sustainability Transformations: Potential and Challenges', *Agricultural Systems*, 200: 103424.

Robinson, D. K., and Mazzucato, M. (2019) 'The Evolution of Mission-Oriented Policies: Exploring Changing Market Creating Policies in the US and European Space Sector', *Research Policy*, 48: 936–48.

Savin-Baden, M., and Howell Major, C. (2013) *Qualitative Research the Essential Guide to Theory and Practice*. Milton Park: Routledge.

Schot, J., and Steinmueller, W. E. (2018a) 'New Directions for Innovation Studies: Missions and Transformations', *Research Policy*, 47: 1583–4.

Schot, J., and Steinmueller, W. E. (2018b) 'Three Frames for Innovation Policy: R&D, Systems of Innovation and Transformative Change', *Research Policy*, 47: 1554–67.

Spanó, E. et al. (2024) 'Legal–Institutional Design and Dynamic Capabilities for Mission-Oriented Innovation Agencies: A New Framework', *Science and Public Policy*, 51: 192–206.

Spiertz, J. H. J., and Kropff, M. J. (2011) 'Adaptation of Knowledge Systems to Changes in Agriculture and Society: The Case of the Netherlands', *NJAS-Wageningen Journal of Life Sciences*, 58: 1–10.

Termeer, K. (2019) 'Het bewerkstelligen van een transitie naar kringlooplandbouw', 31.

Turner, J. A. et al. (2017) 'Land Use Policy Unpacking Systemic Innovation Capacity as Strategic Ambidexterity: How Projects Dynamically Configure Capabilities for Agricultural Innovation', *Land Use Policy*, 68: 503–23.

Turnheim, B., and Geels, F. W. (2013) 'The Destabilisation of Existing Regimes: Confronting a Multi-dimensional Framework with a Case Study of the British Coal Industry (1913-1967)', *Research Policy*, 42: 1749–67.

Turnheim, B., and Sovacool, B. K. (2020) 'Forever Stuck in Old Ways? Pluralising Incumbencies in Sustainability Transitions', *Environmental Innovation and Societal Transitions*, 35: 180–4.

Tushman, M. L., and O'Reilly, C. A., III (1996) 'Ambidextrous Organizations: Managing Evolutionary and Revolutionary Change', *California Management Review*, 38: 8–29.

Van de Burgwal, L. et al. (2023) 'An Elephant in the Glasshouse? Trade-offs between Acceleration and Transformation in COVID-19 Vaccine Innovation Policies', *Environmental Innovation and Societal Transitions*, 48: 100736.

Van Hout, M. A. et al. (2024) 'Designing an Instrument for Scaling Public Sector Innovations', *Science and Public Policy*, 51: 654–68.

Van Mierlo, B., Arkesteijn, M., and Leeuwis, C. (2010) 'Enhancing the Reflexivity of System Innovation Projects with System Analyses', *American Journal of Evaluation*, 31: 143–61.

Van Selm, B. et al. (2023) 'Recoupling Livestock and Feed Production in the Netherlands to Reduce Environmental Impacts', *Science of the Total Environment*, 899: 165540.

Van Zanten, H. H. E., Van Ittersum, M. K., and De Boer, I. J. M. (2019) 'The Role of Farm Animals in a Circular Food System', *Global Food Security*, 21: 18–22.

Verburg, R. W., Verberne, E., and Negro, S. O. (2022) 'Accelerating the Transition Towards Sustainable Agriculture: The Case of Organic Dairy Farming in the Netherlands', *Agricultural Systems*, 198: 103368.

Vermunt, D. A. et al. (2022) 'Five Mechanisms Blocking the Transition Towards "Nature-inclusive" Agriculture: A Systemic Analysis of Dutch Dairy Farming', *Agricultural Systems*, 195: 103280.

Wanzenböck, I. et al. (2020) 'A Framework for Mission-Oriented Innovation Policy: Alternative Pathways through the Problem–Solution Space', *Science and Public Policy*, 47: 474–89.

Wesseling, J., Meijerhof, N., and Delicado, A. (2023) 'Towards a Mission-Oriented Innovation Systems (MIS) Approach, Application for Dutch Sustainable Maritime Shipping', *PLOS Sustainability and Transformation*, 2: e0000075.

Wiarda, M. et al. (2023) 'Public Participation in Mission-Oriented Innovation Projects', *Technological Forecasting and Social Change*, 191: 122538.

Wiarda, M. et al. (2024) 'Responsible Mission Governance: An Integrative Framework and Research Agenda', *Environmental Innovation and Societal Transitions*, 50: 100820.

Wittmann, F. et al. (2021) 'Governing Varieties of Mission-Oriented Innovation Policies: A New Typology', *Science and Public Policy*, 48: 727–38.

Wojtynia, N. et al. (2021) 'A New Green Revolution or Agribusiness as Usual? Uncovering Alignment Issues and Potential Transition Complications in Agri-food System Transitions', *Agronomy for Sustainable Development*, 41: 1–20.

Appendix

Table A1. Interview respondents.

Organization	Respondent
Ministry of Economic Affairs and Climate Policy (EZK)	Respondent 1
Ministry of Agriculture, Nature and Food (LNV)	Respondent 2
	Respondent 3
	Respondent 4
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