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How has mission-oriented innovation policy addressed justice considerations? A systematic review

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Mission-oriented innovation policies have major justice implications because they aim to radically transform our societies. Although research on these policies rarely engages with the notion of justice, this paper rests on the premise that it has implicitly provided insights that are relevant, and which could function as an entry point for a much-needed debate on mission justice. In response, we identify and explicate implicit considerations of distributive, procedural, recognitional, and restorative justice in the context of missions by means of a systematic literature review. While the scholarly debate on missions has indeed raised relevant questions regarding justice, we find that it has provided few meaningful answers. In particular, scholars seem to overlook restorative justice considerations that could help rectify historical wrongdoing. We highlight the imperative and ways in which scholars and policymakers can engage with justice more explicitly to formulate, implement, and evaluate missions for more just transitions.

Keywords: distributive justice; procedural justice; recognitional justice; restorative justice; just transition; transformative innovation policy.

1. Introduction

In order to address some of our grand societal challenges, policymakers across the globe increasingly turn towards mission-oriented innovation policy (MOIP). While some MOIPs centre around technological achievements (e.g. space programs), attention has recently shifted towards transformative forms of MOIP. Such 'new' long-term policy approaches provide ambitious, concrete, and time-bound objectives that require major transformations of our sociotechnical systems (Mazzucato 2018; Hekkert et al. 2020; Janssen et al. 2021). Because MOIP aims to instigate such disruptive transformations, it may come as no surprise that they have significant justice implications.

The adjacent debate on 'just transitions' considers such implications and revolves around questions like 'who wins, who loses, how and why[?]' (Newell and Mulvaney 2013: 133). The notion of justice relates to the ways and extent to which stakeholders and the environment are treated in an equitable, fair, and respectful manner (Williams and Doyon 2019). The wicked nature of the problems that MOIP aims to address suggests that there is no single best way of perceiving, understanding, and working with justice considerations. While most stakeholders would support the idea of justice, many of them hold very different ideas of what justice means to them (Dignum et al. 2016). Justice is therefore a contested notion that is 'inherently plural' and which draws attention to the multitude of sometimes implicit and conflicting justice considerations (Brackel et al. 2023: 3). These considerations

are crucial for moral reflection and provide insights into how policies should be adapted. As such, policymakers will need to reflect on these in order to formulate, implement, and evaluate MOIPs that are viewed as both effective and desirable (Wiarda et al. 2024).

Although the field of just transitions has extensively studied the role of justice in the context of transitions (e.g. Newell and Mulvaney 2013; Jenkins, Sovacool and McCauley 2018; Williams and Doyon 2019; Kaljonen et al. 2021; Wang and Lo 2021), Urias, Kok and Ulug (2024: 1) rightfully point out that 'an explicit engagement with the concept of justice is lacking' in the debate of MOIP. Scholars have criticized MOIP for not sufficiently taking into account normative considerations (Kirchherr, Hartley and Tukker 2023) and call for a better understanding of what we call 'mission justice' (Kok and Klerkx 2023; Wiarda et al. 2024).

Building on the just transitions literature, justice considerations generally relate to at least four justice dimensions (c.f., Jenkins et al. 2016; McCauley and Heffron 2018; Kaljonen et al. 2021; Tschersich and Kok 2022; Kok and Klerkx 2023), namely, 'distributive', 'procedural', 'recognitional', and 'restorative' justice (Fig. 1). We argue that these four dimensions are particularly relevant for MOIP because they have been conceptualized and used for the context of sociotechnical transitions (Wang and Lo 2021). In addition, these dimensions are domain-agnostic in the sense that they bear relevance across mission domains (e.g. energy, food, climate, etc.) as also implied by the work of Jenkins et al. (2016), Kaljonen
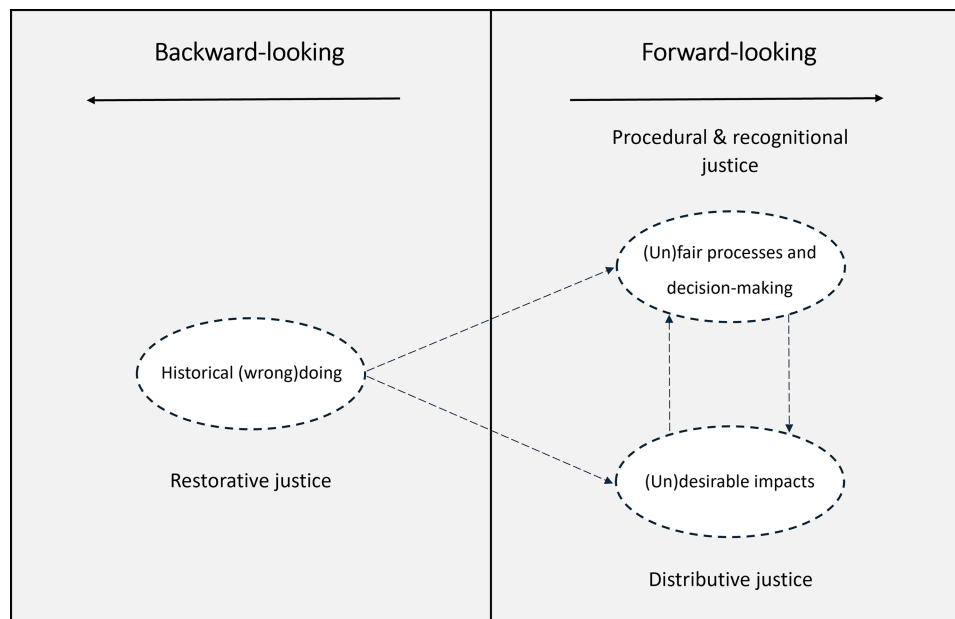
Figure 1. Four dimensions of justice.

et al. (2021), and Cañizares, Copeland and Doorn (2024). While we acknowledge that there are other justice dimensions and domain-specific forms that may be relevant for MOIP, we will use these four dimensions as our entry point for a better understanding of mission justice.

Distributive justice considers how beneficial and harmful consequences of decisions are distributed among stakeholders (Williams and Doyon 2019). These consequences can refer to the distribution of material goods (e.g. wealth) but may also point to the allocation of nonmaterial goods such as risks and responsibilities. This does not imply that impacts need to be distributed evenly. Societal challenges 'affect places in different ways and to different extents' (Wanzenböck and Frenken 2020: 56) and the fair distribution of impacts therefore partly depends on the context-specific implications of the societal challenges that MOIP addresses. The long-term character of mission-oriented transitions suggests that intergenerational justice—as a form of distributive justice—is especially relevant and that policymakers will need to consider how opportunities and burdens are distributed across generations (Page 1999; Barry 2017).

Procedural justice is concerned with whether decision-making processes are fair, transparent, and inclusive (Williams and Doyon 2019; Tschersich and Kok 2022). It requires stakeholder engagement that is equitable, for example, in terms of gender, communities, or political groups (e.g. activists; Jenkins et al. 2016). Procedural injustices may emerge in various ways. For example, transitions can be framed on the basis of policy reports, scientific articles, and consultancy insights that ignore and exclude local, indigenous, or cross-cultural knowledges. Injustices may also arise from not disclosing or withholding information relevant to decisions.

Recognitional justice relates to the ways and extent to which stakeholders are represented, considered, and respected (Honneth 2004; Whyte 2011). It requires the acknowledgement of diverse values and worldviews that often are the products of various backgrounds (e.g. socio-economic or cultural backgrounds; Tschersich and Kok 2022). Recognition claims can focus on the effects of recognition between and within stakeholder groups, which draws attention to how the recognition of some stakeholders may come at the cost of others (Kortetmäki 2016). Recognitional injustice tends to relate to forms of nonrecognition, misrecognition, and disrespect (Jenkins et al. 2016).

Restorative justice is a relatively new conception of justice which highlights the need to rectify historical wrongdoings by compensating, for example, stakeholder (groups) and the environment (McCauley and Heffron 2018; Tschersich and Kok 2022). This may be done through material means (e.g. financial compensation or nature restoration), but can also involve efforts to rebuild trust and relationships (Kaljonen et al. 2021). Decolonization may be viewed as one form of restorative justice.

Distributive, procedural, recognitional, and restorative justice constitute the 'what', 'how', 'who', and 'for whom' of mission justice. Although they interact and overlap, each of them has intrinsic normative value (Kortetmäki 2016; Tschersich and Kok 2022). Justice dimensions can be used in the evaluative and normative sense—that is to determine how things are and how things should be (Jenkins et al. 2016). As discussed, it remains unclear how these types of justice considerations return in the context of MOIP. Although MOIP scholars rarely point out justice considerations explicitly (Urias, Kok and Ulug 2024), we observe in published work that scholars discuss and work with them in an implicit way.

This study therefore conducts a systematic literature review to reveal and explicate how research on MOIP has implicitly addressed the four dimensions of justice. In contrast to the 'outward' analysis of Urias, Kok and Ulug (2024) that considers explicit work on justice in adjacent research (e.g. postdevelopment studies), we contribute to the mission debate by providing an 'inward' analysis of research that explicitly works with MOIP. Doing so will help us understand how the literature of MOIP has addressed justice considerations, which would signify how the notion of justice returns
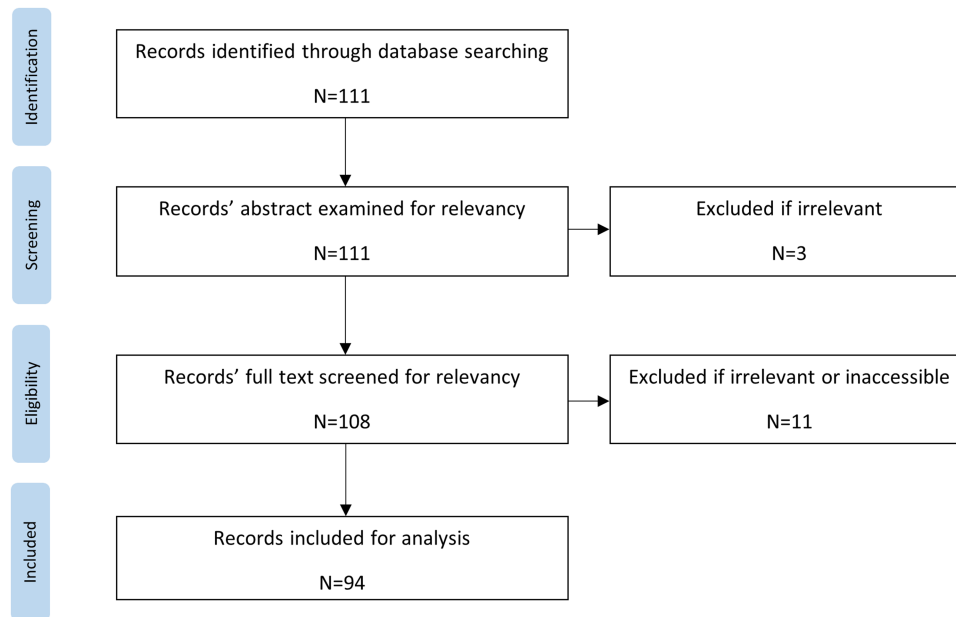
Figure 2. Flow diagram for data identification, screening, and eligibility. Based on Moher et al. (2009).

in the context of missions, and could reveal what aspects of justice are currently under-represented in ongoing work. Although it is not our intention to introduce a new conceptual framework for MOIP, implicit justice considerations could help lay the groundwork for conceptualizations of mission justice, and would advance our understanding of the socio-ethical implications that MOIP engenders. As Jenkins et al. (2016) point out, understanding such justice considerations helps us formulate strategies that promote justice in the related policies. In what follows, we will first describe the method of our research, after which we will discuss the identified justice considerations for each of the four justice dimensions.

2. Method

In order to identify and describe implicit considerations for mission justice, we conducted a systematic literature review of the MOIP literature. This literature was subsequently examined using deductive thematic analysis.

2.1 Data collection

We started by collecting all English, Spanish, Dutch, and German academic articles, book chapters, and conference proceedings from Scopus that were indexed before March 2024, and which contained the term 'mission-oriented innovation' in its title, abstract, or keywords. We used this search keyword as opposed to 'mission-oriented innovation policy' to also collect articles of the mission debate that may have an indirect relevancy for policies. One such example includes the article of Fielke et al. (2023) that discusses the link between mission-oriented innovation systems and responsible innovation, but which does not use the term 'policy' in their title, abstract, or keywords. We excluded articles of adjacent fields and the broader field of transformative innovation policy because we are specifically interested in how the explicit mission literature has addressed justice considerations. The search query that was used for our data collection is the following:

TITLE-ABS-KEY ("mission-oriented innovation") AND (LIMIT-TO (DOCTYPE, "ch") OR LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "re") OR LIMIT-TO (DOCTYPE, "cp")) AND (LIMIT-TO (LANGUAGE, "English") OR LIMIT-TO (LANGUAGE, "Spanish") OR LIMIT-TO (LANGUAGE, "Dutch") OR LIMIT-TO (LANGUAGE, "German"))

This search strategy yielded 111 contributions (Fig. 2). The abstracts were examined for relevancy to exclude any contributions that are not concerned with the 'new' generation of transformative missions as highlighted by Mazzucato (2018), defined by Hekkert et al. (2020) and Wanzenböck et al. (2020), and further conceptualized by Wittman et al. (2021). On the basis of this, we view transformative MOIP as innovation policies that set long-term societal goals (1), address wicked problems (2), and which require socio-technical system transformations (3). As discussed, this focus is important because of the justice implications that are associated with the potential transformations of contemporary MOIP. We therefore exclude articles that focus on company missions, military missions, and technology-focused accelerator missions (e.g. space programs). The screening of abstracts resulted in 108 contributions. These were then fully screened for the same relevancy criteria, leaving 94 contributions for our analysis.

2.2 Data analysis

From the remaining contributions, we derived implicit justice considerations through a deductive thematic analysis (Braun and Clarke 2006; Braun et al. 2019). Our analysis was deductive in the sense that contributions were analysed by means of open coding to identify any statements that relate to the existing four dimensions of distributive justice (e.g. how are beneficial and harmful impacts shared fairly?), procedural justice (e.g. are decision-making processes considered fair and transparent?), recognitional justice (e.g. which values and worldviews are recognized in transformations?),

and restorative justice (e.g. how are injustices in the past, corrected in the present?). Open coding was done on both the sentence and paragraph-level to account for the implicit nature in which justice considerations are mentioned. Articles were openly coded by one author, and grouped into coherent themes through axial coding. A second author checked these open and axial codes against the four justice dimensions to strengthen the inter-coder reliability of the analysis. A third author subsequently reviewed all themes for their validity. Collective discussions among all authors served to agree on which themes are linked to which of the four justice dimensions because justice considerations can relate to multiple dimensions of justice.

3. Results

In what follows, we will discuss the implicit justice considerations from the literature according to our four categories of distributive, procedural, recognitional, and restorative justice. Common themes of considerations are highlighted in Tables 1–4. We will reflect on these insights in our discussion section (Section 4).

3.1 Distributive justice

Distributive justice seeks to describe to what extent beneficial and harmful consequences of decisions are shared fairly among stakeholders (Williams and Doyon 2019). In the context of missions, this form of justice is rarely discussed explicitly (with the exception of Kok and Klerkx 2023). A common implicit consideration includes the notion of public value that is repeatedly emphasized but rarely defined, and which seeks to ask what there is to be distributed in the first place (e.g. Mazzucato, Kattel and Ryan-Collins 2020; Valdivieso, Uribe Gómez and Ordóñez-Matamoros 2021; Sarv and Soe 2022; Soe, Sarv and Gasco-Hernandez 2022). How public value is determined, who participates in such processes, and how it is (co)created remains largely unaddressed. Such questions are inherently difficult because mission-oriented innovations 'challenge the idea of value that should be measured' (Kattel and Mazzucato 2018: 791). In addition, stakeholders hold different value-systems which lead them to value and interpret mission outcomes differently (Nylén, Johanson and Vakkuri 2023).

Table 1. Examples of implicit considerations of distributive justice

Exemplary themes	Exemplary considerations for distributive justice
Public value	What type of values do missions bring for society at large?
Inclusive growth	Who will profit from missions-oriented innovation?
Knowledge sharing	How is knowledge shared among stakeholders?
Diffusion of innovation	Who will have access to solutions for societal problems?
Risks and opportunities	Who is at risk when taking mission-oriented opportunities?
Costs and benefits	Who bears the costs and who reaps the benefits of pursuing missions?
Winners and losers	Who wins and who loses from mission-oriented transitions?

Table 2. Examples of implicit considerations of procedural justice

Exemplary themes	Exemplary considerations for procedural justice
Directionality	Who determines the directionality of missions?
Inclusion	Who are included and excluded in missions?
Influence	How much influence do stakeholders have in shaping missions?
Incumbency	How and why do incumbents influence decisions relevant to missions?
Opposition	To what extent is there room for opposition?
Collaboration	How is collaborative decision-making structured and coordinated?
Power	How is power distributed and allocated across stakeholders?
Empowerment	How are marginalized stakeholders engaged and empowered?

Table 3. Examples of implicit considerations of recognitional justice

Exemplary themes	Exemplary considerations for recognitional justice
Problem framing	What is the diversity of problem framings like?
Solution pathways	What are alternative solution pathways proposed by stakeholders?
Blame	What are different ideas of blame and responsibility?
Vulnerability	How do stakeholders experience problems unevenly?
Values	What plurality of values do diverse stakeholders hold?
Perceptions	How are risks and benefits perceived and valued differently?
Contexts	How do unique contexts relate to problems and solutions?

Table 4. Examples of implicit considerations of restorative justice

Exemplary theme	Exemplary considerations for restorative justice
Learning from the past	What can we learn from the past?
Neocolonialism	How do we prevent neocolonial ramifications of missions?
Amends with the past	How can we restore socio-ecological injustices from the past?

Closely related to public value is the notion of inclusive growth (Mazzucato 2016) that could be engendered through processes of value creation (i.e. innovation) and value capture (i.e. exploitation) (Jütting 2024). Similar to the discussion on public value, scholars have expressed concerns regarding the disproportionate—and arguably unfair—distribution of profits (Mazzucato 2016). These observations are deemed important for addressing global problems 'in ways that are meaningful for the many, and not just profitable for the few' (Pfotenhauer et al. 2022: 21). As Voldsgaard et al. (2021: 3674) state for their case, 'the value created by mission-oriented innovation policy and patient public capital may be appropriated when the investment pays off, thereby contributing to economic inequality' . The repeated call for inclusive growth begs the question of what this would exactly entail (Frahm, Doezema and Pfotenhauer 2022). In practice, national governments may prefer to keep such profits within national borders (Reike, Hekkert and Negro 2022).

Beyond profit distribution, scholars have implicitly considered how knowledge and innovation is distributed as a consequence of missions. Conventionally, the 'diffusion of the results outside of the core of participants [was] of minor importance or actively discouraged', but the outcomes of transformative missions are encouraged to reach as many stakeholders as possible (Robinson and Mazzucato 2019: 939). This is also implicit in the contribution of Van der Loos, Negro and Hekkert (2020) who describe the importance of collaborations between start-ups, knowledge institutes, and incumbents. Similarly, 'market parties acknowledge increasingly the benefits of sharing knowledge', but 'a clear coordination of this knowledge development and diffusion […] seems to be lacking' (Coenen, Visscher and Volker 2023: 32). What is more, the extent to which we can address grand challenges is contingent on the system-wide adoption of innovations because 'only when there is adoption can there be a practical impact of the innovation' (As also described by Craens, Frenken and Meelen 2022; Valdivieso, Uribe Gómez and Ordóñez-Matamoros 2021: 23). Policymakers can draw lessons from similar challenge-led contexts. In the COVID-19 pandemic, for instance, inadequate data sharing and the hoarding of vaccines in high-income countries resulted in 'less equity and distribution of vaccine doses to low-income countries […] making health inequality painfully visible' (Van De Burgwal et al. 2023: 11–12).

Indeed, MOIP revolves around pursuing socially desirable outcomes (e.g. public value, inclusive growth, solutions for all) and earning the necessary public consent and legitimacy to do so (Kattel and Mazzucato 2018). However, scholars have criticized the ongoing debate for not reflexively considering the possible repercussions of mission-oriented innovation *ex ante* (e.g. Klerkx and Rose 2020; Kirchherr, Hartley and Tukker 2023; Wiarda et al. 2024). If we assess policies only in terms of their benefits, then this is argued to naively skew our perceptions of missions (Henrekson, Sandström and Stenkula 2024a). As Kattel and Mazzucato (2018: 791) put it, 'what we miss in both scholarly and policy debates is a better understanding of the institutional and political ramifications of mission-oriented policies'. The early identification of low societal acceptance could be a crucial symptom of at least high degrees of uncertainty regarding these ramifications (Wanzenböck et al. 2020). Some scholars underline that although 'it is unproblematic for private actors to bear high risk, it is difficult to justify, in a democratic setting, that politicians and civil servants take risks with taxpayers' money in the same way' (Henrekson, Sandström and Stenkula 2024b: 315). Hence, scholars have argued that politicians are usually willing to take credit for success, but may blame a scapegoat when mission-oriented projects fail (Elert and Henrekson 2021). Accountability regarding (the spending for) mission outcomes is therefore deemed an important requisites for legitimacy (Kok and Klerkx 2023). Citizens might be more willing to accept failures if the government can also demonstrate considerable successes (Mazzucato 2018). But who is at risk when taking such opportunities? Who bears the costs and who reaps the benefits? In other words, who really wins and loses from MOIP (as also questioned by Janssen et al.2021)? These questions are left unanswered. Applying insights from the academic debate on responsible innovation could lead to more 'winners' than 'losers' when pursuing transitions, but 'until we articulate inclusive visions of the future, it is difficult to start to anticipate what the impacts of the transition will be, and how they can be made more responsible' (Klerkx and Rose 2020: 5).

Giving substance to distributive justice considerations also draws attention to the challenges for the evaluation of mission outcomes. A fixation on mission goals can be a common pitfall as it may later turn out that these are no longer the most feasible and just scenarios (Klerkx, Turner and Percy 2023). The success or failure of missions is easily contested and therefore depends on who one asks (Kattel and Mazzucato 2018; Nylén, Johanson and Vakkuri 2023). Missions affect stakeholders in different ways and to different extents, and the way one approaches mission governance partly determines whether impacts are distributed fairly. Some scholars argue that techno-centric approaches likely reinforce existing power inequalities that further strengthen the position of incumbents rather than distributing outcomes in more equitable ways (Klerkx and Rose 2020). Such approaches are thus problematic because they benefit the 'usual suspects' who thrive from 'business-as-usual' (Klerkx and Rose 2020; Elzinga et al. 2023). In the context of circularity missions for example, Elzinga et al. (2023) find that recycling might not be deemed the best solution pathway by stakeholders, but that governments heavily support it in response to lobbyists that defend the interests of incumbents. Pre-existing inequalities reinforce and give rise to distributive injustices when expected end-users (e.g. farmers in an agricultural mission) cannot acquire benefits because they lack the necessary resources to cover developmental costs in the face of risks and uncertainty (Wojtynia et al. 2021). As a result, investments by the state are sometimes contested when they reinforce unsustainable practices of incumbent positions that have strong political links through lobbyists (Rodríguez-Barillas, Klerkx and Poortvliet 2024). Authors therefore urge policymakers to carefully consider how resources and impacts are distributed between public and private sectors, and across ecosystems and communities (Kok and Klerkx 2023). The interests, responsibilities and even rights of stakeholders should be discussed in relation to potential costs and benefits of missions that are being formulated in order to prevent delayed conflict or even grievance. Such ramifications became apparent for the Norwegian maritime mission where a failure to account for financial burdens led to 'significant price increases, a social outcry and resistance to electric ferries' (Bugge, Andersen and Steen 2022: 2325–2326).

3.2 Procedural justice

Procedural justice raises question regarding the fairness, transparency, and inclusivity of decision-making processes (Williams and Doyon 2019; Tschersich and Kok 2022). Democratic processes are crucial for missions because they have inherent normative value that may promote procedural justice (Kok and Klerkx 2023). While much of the mission debate emphasizes the importance of inclusion for the legitimacy of missions, Jansen et al. (2021 442) remind us that inclusion is also 'essential for *genuinely* addressing the underlying challenge and harnessing the capacity and resources from various groups' (emphasis added).

In considering procedural justice, policymakers can raise 'questions about who determines the direction of transformative change?' (Parks 2022: 1) and 'who is included and

excluded in mission-oriented innovation?' (Wiarda et al. 2024: 9). Despite inclusive notions such as co-innovation, innovation platforms, and responsible research and innovation, some stakeholders remain consistently excluded (Kok and Klerkx 2023). For example, the EU consulted the public in its mission formulations, but in practice this commonly led to national events that selected a limited range and number of citizens (Wanzenböck et al. 2020). Even if stakeholders are included in decision-making, 'how much say do they have in shaping these processes?' and 'which interests are explicitly or implicitly prioritised, and how are they represented [?]' (Janssen et al 2021: 440). Such questions draw attention to how actors constrain one another (Parks 2022). Governments were historically 'picking winners' which commonly echoed the vested interests of incumbents (Voldsgaard and Rüdiger 2021). Contemporary forms of MOIP more often 'pick the willing', that is to say, those that are willing to pursue missions (Mazzucato 2018). Forms of public procurement, taxation, and the allocation of new responsibilities lend themselves as possible policy instruments to support such willing actors (Henry et al. 2024).

What is more, governments have the power and central responsibility to orchestrate desirable changes (Henrekson, Sandström and Stenkula 2024b), but politicians are not always well-positioned to identify the most urgent societal needs that require immediate action (Schnellenbach 2024). Policymakers and politicians 'may not always "know best" or "act best"' (Kirchherr, Hartley and Tukker 2023: 4). Scholars point at the possible technocratic nature of MOIP, as priorities for directionality are often determined top-down and commonly favour myopic technological solutions over more social solutions that embrace the complexity of problems (Rosemann and Molyneux-Hodgson 2023). Such technocentric approaches could reinforce unequal forms of capitalist production that would take power away from vulnerable and marginalized communities (Klerkx and Rose 2020).

Scholars emphasize the role of bottom-up engagement to ensure that directionality is recognized and shared among actors (Mazzucato 2016). Mazzucato (2018: 811) firmly states that 'missions should engage the public' partly because 'solutions will be developed that will have an impact on people's daily lives'. This is particularly deemed relevant in the mission's problem identification and formulation (Wanzenböck and Frenken 2020). A bottom-up approach could strengthen and deepen democracy (Bauwens, Hekkert and Kirchherr 2020), and foster trust and transparency (Frahm, Doezema and Pfotenhauer 2022) in times that many countries experience a 'democratic deficit' (Kattel and Mazzucato 2018). Policymakers are not merely urged to include human actors, but should also consider nonhumans such as animals (Pigford, Hickey and Klerkx 2018). Novel approaches could guide trans- and interdisciplinary collaborations, which would lead to more robust, legitimate, and diverse outcomes (Mazzucato, Kattel and Ryan-Collins 2020; Janssen et al 2021; Kok and Klerkx 2023). Collaborative decision-making with local stakeholders is nevertheless a long-term and time-consuming process that requires reflexivity and mutual trust. Such trust is earned through transparent, open, reciprocal, and mutual interactions (Rabadjieva and Terstriep 2020) that can make solutions more relevant, desired, and accepted once the respective engagement is deemed legitimate (Frahm, Doezema and Pfotenhauer 2022;

Wiarda et al. 2023). One reason for this is that potential consumers are arguably better positioned to decide what they want than the government (Elert and Henrekson 2021). Even though the value of participation is increasingly clear, only rarely does this perceived value lead to practical implementation (Jütting 2024). Approaches such as innovation labs, citizen science, and user innovation could help implement forms of engagement (Karo 2018; Wiarda et al. 2023). Yet, such approaches often fall short in reaching this objective (Brown 2021; Stubbe, Busch-Heizmann and Lutze 2023) as some scholars even speak of 'token' inclusion in missions (Fielke et al. 2023).

Some stakeholders (e.g. citizens, indigenous communities) face structural barriers that prevent them from meaningfully participating in innovation systems that are historically directed by incumbents (Kok and Klerkx 2023; Klerkx, Begemann and Janssen 2024). Recent findings suggest that mission-oriented innovation projects are associated with more and earlier public participation, but not structurally more diverse or influential participation, which may give way for potential procedural injustices (Wiarda et al. 2023). If incumbents dominate participatory forms of decision-making, then we require a more grounded understanding of who should be allowed to partake in the establishment of missions (Bergek, Hellsmark and Karltorp 2023; Klerkx, Begemann and Janssen 2024). 'Participation should not be reserved for committed elites but should be distributed across all levels of an innovation system' and 'too often, the implementation of participation only reaches certain population groups and individuals' while 'groups that have no relation to science or people with low digital literacy, including older people, are not reached' (Stubbe, Busch-Heizmann and Lutze 2023: 378–379). It may therefore come as no surprise that some scholars are sceptical about the participation of incumbents and lobbying groups in policymaking (e.g. Busch, Foxon and Taylor 2018; Henrekson, Sandström and Stenkula 2024b). Elzinga et al. (2023) even plead for a reduction of power and access of incumbent lobbyists who tend to defend the status quo.

Although incumbents indeed commonly hinder policies that could disrupt existing markets, they can be important players for the acceleration of transitions if they identify profitable opportunities in future markets (Bugge, Andersen and Steen 2022). The Dutch offshore wind energy sector, for instance, was initially met with resistance from the oil and gas lobby, but has later received broad support and legitimacy from them once the institutional conditions changed (Van der Loos, Negro and Hekkert 2020). Ultimately, the implementation of policy rarely happens without some coordination or collaboration with existing companies (Bergek, Hellsmark and Karltorp 2023). Turning 'the winners' into 'the willing' may be possible if missions offer added value to incumbents that outweigh their added work (Rabadjieva and Terstriep 2020).

It is clear by now that MOIPs are the products of political processes that involve a plurality of stakeholders from which opposition may emerge along value conflicts (Wanzenböck et al. 2020). But 'to what extent is there space for dissent and conflict, and how are these conflicts negotiated?' (Janssen et al 2021: 441). The expected benefits of mission-oriented innovation become more visible and understood through the tensions that emerge from conflicts of interests, epistemological differences, power dynamics, and diverse values of

actors when engaged in anticipatory practices (Rosemann and Molyneux-Hodgson 2023). These claims leave us wondering how possible differences can and should be resolved (e.g. through intermediaries) (Janssen et al. 2023). Governments are said to have an important role in coordinating and aligning actors that clash in contested environments (Elzinga et al. 2023). They are well-positioned to leverage constructive and agonistic approaches to conflict resolution, of which agonistic approaches especially point at power as one of the decisive factors (Wiarda, Coenen and Doorn 2023).

Conflicts and negotiations underline the importance of managing power inequalities in decision-making for procedural justice (as also suggested by Pigford, Hickey and Klerkx 2018; Klerkx and Begemann 2020; Wojtynia et al. 2021; Lehoux et al. 2023). One may think of an uneven distribution of resources, relations, information, and capabilities across actors (Rabadjieva and Terstriep 2020; Henrekson, Sandström and Stenkula 2024a). This also relates to how MOIP could empower vulnerable stakeholders (Kok and Klerkx 2023). Empowerment is arguably a responsibility of policymakers (Elzinga et al. 2023) and Bugge and Fevolden (2019) speak of 'balanced empowerment' to describe a government's ability to delegate power in a dual, more decentralized, structure of bottom-up and top-down interaction. Finding this balance is considered critical for the success of missions (Jütting 2020) partly because a too top-down governance deters the adoption of solutions (Dinesh et al. 2021). Some scholars point out that MOIP could benefit from more decentralized modes of governance by more inclusively involving societal stakeholders in decision-making (Bauwens, Hekkert and Kirchherr 2020; Rabadjieva and Terstriep 2020). Bottom-up processes require political willingness and are prone to new challenges (Rabadjieva and Terstriep 2020), and procedural injustices may emerge if such engagement only takes place in late stages of innovation when its solely concerned with the adoption and contextualization of largely developed solutions (Rosemann and Molyneux-Hodgson 2023). Klerkx and Rose (2020) therefore plead for more engagement in upstream phases of mission-oriented transitions.

3.3 Recognitional justice

Recognitional justice is concerned with representation, consideration, and respectful treatment of stakeholders (Honneth 2004; Whyte 2011). In recognizing stakeholders views, policymakers direct efforts towards stakeholder engagement when formulating missions (Kattel and Mazzucato 2018) because following visions that are 'determined by only a select group of people (policy-makers or other powerful actors) is unlikely to be fit-for-purpose' (Klerkx and Rose 2020: 5). As Wanzenböck et al. (2020: 475) put it: '[MOIP] runs the risk of providing a one-size-fits-all approach' that leans on 'taken-for-granted problem definitions … while marginalizing opposing voices or discarding complex trade-offs'. Reflexivity and social learning therefore play a crucial role (Coenen, Visscher and Volker 2023; Wiarda et al. 2024) because alternative problem framings are commonly sidelined (Pfotenhauer et al. 2022).

Recognitional justice strongly relates to the recognition of diverse views on problems and solutions (e.g. Wanzenböck et al. 2020; Wiarda et al, 2023; Wojtynia et al. 2021). In the wicked context of missions, stakeholders tend to fundamentally disagree due to differences in values and worldviews (e.g.

knowledge) (Wanzenböck et al. 2020). For example, Schlaile et al. (2022: 95) point out that even 'sustainability itself is a contested notion meaning very different things to different actors, likewise depending on their worldviews and respective paradigms'. This also means that stakeholders likely disagree on the viability and desirability of solution pathways that are needed to pursue a mission objective (Andersson and Hellsmark 2024). Coenen, Visscher and Volker (2023) reveal such disagreement in the Dutch circular infrastructure sector, which reportedly represents a serious barrier to transition. Mission justice requires policymakers to recognize the diversity of views on solutions because MOIP has 'provided innovators and firms with new opportunities to frame controversial technologies as offering critical "solutions" to key global challenges' (Rosemann and Molyneux-Hodgson 2023: 20). Stakeholders can furthermore disagree on who is to blame for the problems of interest. Wojtynia et al. (2021), for example, identify possible recognitional injustices perceived by farmers as they feel unfairly blamed by society for agricultural problems.

Reale (2021) argues that it is precisely disagreement that highlights the necessity for deliberations. Policymakers face serious challenges when stakeholders cannot agree on goals, lack a common vision, and hold diverging agendas (Wojtynia et al. 2021), partly because an unresponsiveness to stifling conflicts can breed resistance (Wanzenböck et al. 2020; Frahm, Doezema and Pfotenhauer 2022). Some scholars emphasize the importance of more communication and awareness raising as means to develop shared views on problems, solutions, and overarching missions (Schnellenbach 2024), but different viewpoints are usually not resolved through more scientific knowledge as stakeholder simply perceive and value risks and benefits differently (Schlaile et al. 2022). Scholars point out that recognizing and dealing with diverging perspectives, visions, and values requires high degrees of reflexivity (Janssen et al. 2023; Wiarda, Coenen and Doorn 2023), respect (Fielke et al. 2023), trust (Mazzucato 2018), and negotiation (Klerkx and Begemann 2020; Janssen et al 2021). This closely relates to the plead for forms of constructive (Wiarda, Coenen and Doorn 2023) or productive conflict resolution (Dinesh et al. 2021).

Recognitional justice therefore draws attention 'demand-pull' forces from stakeholders like worried citizens, affected individuals, consumers, or institutional activists (Klerkx and Begemann 2020; Mucarsel, Barile and Bhat 2023; Stubbe, Busch-Heizmann and Lutze 2023), which could also open-up opportunities for organizations that are often absent from conventional discourses such as social and solidarity economy organizations (Bauwens, Hekkert and Kirchherr 2020). Kattel and Mazzucato (2018) argue that Germany's EnergieWende exemplifies how missions would have never happened without social movements. In participatory decision-making, policymakers may therefore need to abandon stereotypical ideas of stakeholders (Stubbe, Busch-Heizmann and Lutze 2023). Parks (2022) similarly points out that policymakers need to discard perceptions of 'the public' as a monolithic and singular entity, and start recognizing the diverse publics that emerge around certain topics of concern.

What is needed is stakeholder engagement that moves beyond top-down and uni-directional communication by approaching missions more bottom-up and bi-directional (Rosemann and Molyneux-Hodgson 2023; Wiarda et al. 2024). The more policymakers recognize and empower

societal actors, the better such actors can articulate their needs and use their ingenuity (Janssen et al 2021; Fielke et al. 2023). Recognition may in turn earn legitimacy if this is reflected in problem framings (Wanzenböck et al. 2020). Scholars argue that in order to drive change, governments bear a social responsibility to strengthen the voices of local stakeholders and social movements (Bugge and Fevolden 2019; Chen et al. 2021; Dinesh et al. 2021). A failure to do so may result in the neglect of the values, concerns, and emotions of publics (Wiarda et al. 2023).

Some authors explain that in developing and diffusing solutions for missions, actors must acknowledge that solutions are not universal, but that they have to be sensitive to different socio-economic and political contexts (Klerkx and Rose 2020). This is partly the case because global problem framings and standardized solution can obscure and homogenize local, diverse, and situated voices of citizens (Wanzenböck and Frenken 2020; Pfotenhauer et al. 2022). Although there may be a seeming tension between the required context-sensitivity and scalability needed to make missions a success (Pfotenhauer et al. 2022), scholars increasingly recognize the importance of small wins as actions 'on the ground' that—although small—may result in transformative changes that are responsive to societal values (Bours, Wanzenböck and Frenken 2022). Mission can be translated to local contexts through local authorities such as provincial governments (Wojtynia et al. 2021) and local opinion leaders (Hjalager and Von Gesseneck 2020). Local contexts require recognition given that normative and contextual considerations affect the demand articulation of solutions (Rabadjieva and Terstriep 2020; Wanzenböck and Frenken 2020). Some scholar go even further by arguing that mission-led policies should be context-led instead (Brown 2021).

To some extent, mission can be anchored in specific contexts because they constitute 'fuzzy' policymaking that is rather opaque and lacking adequate detail (Brown 2021). This resonates with the concept of responsible innovation as such an openness would allow for diversity (Rosemann and Molyneux-Hodgson 2023). Governments thus need to have 'a capacity to set missions but also to leave enough space for contestation and adaptability' (Kattel and Mazzucato 2018: 797). However, such 'vagueness' has received criticism (Rohracher and Ornetzeder 2024), partly because it adds complexity and ambiguity (Coenen, Visscher and Volker 2023). In addition, 'remaining vague and defining societal challenges in broad terms can be the preferred political strategy, to circumvent conflicts or contestation along core values, and to support acceptance on a broad basis' (Wanzenböck et al. 2020: 484).

In contrast, increasing the interpretative rigidity of problems and required solutions closes down the meaning that different local communities can give to missions (Janssen et al. 2023). This closely relates to pleads for a greater sensitivity to cultural context (e.g. low and middle income countries) and indigenous knowledge (Kok and Klerkx 2023). Nonetheless, misrepresentation remains a common challenge, even in processes of stakeholder engagement (Stubbe, Busch-Heizmann and Lutze 2023). Misunderstanding or even ignoring local ways of reasoning and meaning-making often lead to resistance (Pfotenhauer et al. 2022), and as a result, some solutions are more contested in one country than in other (Wittmann et al. 2021). Such insights reinforce the conclusion of Fastenrath et al. (2023: 3) that mission-oriented innovation still

has 'to get to terms with its geographical dimensions, spatial context and multi-level governance'. Elzinga et al. (2023) similarly argue for more analyses of mission-specific innovation systems in diverse geographical contexts.

3.4 Restorative justice

Restorative justice is concerned with the rectification of historical wrongdoings (McCauley and Heffron 2018; Tschersich and Kok 2022). This dimension of justice is discussed substantially less than other dimensions. To date, restorative justice considerations are poorly understood for missions, and contributions have mainly gone so far as to raise questions related to what restorative justice could mean. What is clear, however, is that policymakers will need to draw lessons from past experiences (Mazzucato 2018). One entry point might be a better understanding of the extent to which scalability logics behind MOIPs promote forms of globalization, colonization, and apparent standardization (Pfotenhauer et al. 2022). Kok and Klerkx (2023) subsequently underline the importance of including indigenous values and knowledge for social justice. They wonder how missions may restore socio-ecological injustices developed in the past, going beyond a mere redistribution of resources and power. After all, the transformative character of missions also means 'to change part of a system when changes in ecological, political, social or economic conditions make the existing system untenable' (Rabadjieva and Terstriep 2020: 2). Such transformations can face serious opposition by incumbents who tend to favour the continuity of growth-oriented paradigms (Wojtynia et al. 2021). Overall, restorative justice considerations resonate with earlier calls to rethink the institutions, processes, and cultures relevant to MOIP (e.g. Mazzucato 2018; Stubbe, Busch-Heizmann and Lutze 2023).

4. Discussion

This paper reveals implicit justice considerations for MOIP by means of a systematic literature review. In what follows, Section 4.1. outlines our main findings after which we will reflect on these in Section 4.2.

4.1 Main findings: justice considerations for missions

Our systematic review focused on four dimensions of justice—distributive, procedural, recognitional, and restorative. Distributive justice considerations for MOIP relate to notions of inclusive growth (Mazzucato 2016), public value (e.g. Valdivieso, Uribe Gómez and Ordóñez-Matamoros 2021; Sarv and Soe 2022), and the diffusion of knowledge and innovation (e.g. Van De Burgwal et al. 2023). Policymakers will need to recognize the distribution of risks and opportunities (Henrekson, Sandström and Stenkula 2024b), and consider to what extent costs and benefits are shared fairly among stakeholders. A number of scholars have urged for a greater apprehension of potential ramifications of MOIPs (Klerkx and Rose 2020; Kirchherr, Hartley and Tukker 2023; Wiarda et al. 2024) and underlined the importance of accountability (Elert and Henrekson 2021; Kok and Klerkx 2023). In turn, such insights would provide a better understanding of 'who wins' and 'who loses' in the pursuit of missions (Klerkx and Rose 2020; Janssen et al 2021).

In terms of procedural justice, scholars hinted that policymakers should consider who determines the directionality that underpins missions (Parks 2022; De Graaff, Wanzenböck and Frenken 2025). In shaping MOIP, specific attention should go to who is included and excluded in decision-making (Janssen et al 2021), while considering notions of influence, power, and empowerment in the context of collaboration and opposition (as hinted by e.g. Klerkx and Rose 2020; Janssen et al 2021; Kirchherr, Hartley and Tukker 2023; Wiarda et al. 2023).

Recognitional justice urges policymakers to reflexively acknowledge and possibly include different views on problems and solutions in the formulation and pursuit of missions (e.g. Klerkx and Rose 2020; Wanzenböck et al. 2020; Wiarda, Coenen and Doorn 2023; Wojtynia et al. 2021). This requires insights into what stakeholders think should be prioritized and valued (Kok and Klerkx 2023), particularly in local contexts because 'challenges do not present themselves as the same for every region or country, as underlying problems affect places in different ways and to different extents' (Wanzenböck and Frenken 2020: 56). Policymakers will need to consider the plurality of stakeholders—particularly that of publics (e.g. Parks 2022; Stubbe, Busch-Heizmann and Lutze 2023; Wiarda et al. 2023). Recognitional mission justice also relates to the ways and extent to which different views on risks and benefits are taken into account, and how the interests of marginalized and vulnerable stakeholders are represented and safeguarded in these processes (Schlaile et al. 2022; Klerkx, Turner and Percy 2023; Stubbe, Busch-Heizmann and Lutze 2023).

Our findings suggest that considerations for restorative justice have largely been overlooked. Indeed, policymakers should learn from the past (Mazzucato 2018), but the ongoing academic debate has so far merely wondered how we can make amends with the past (Kok and Klerkx 2023), and more specifically, how scalability logics inscribed in missions could perpetuate neo-colonial tendencies of the West (Pfotenhauer et al. 2022).

More broadly, this review reinforces the premise that distributive, procedural, recognitional, and restorative justice considerations interrelate in the sense that one consideration urges policymakers to incorporate other considerations. For example, different ideas of blame and responsibility (i.e. recognitional justice) underline the importance of including an opposition (i.e. procedural justice) to collectively determine who should bear costs and reap benefits throughout mission-oriented transitions (i.e. distributive justice).

4.2 A reflection and outlook—what is currently missing?

When reflecting on our review, we find that the debate on MOIP has indeed only implicitly considered dimensions of justice in the formulation, implementation, and evaluation of missions, with a few exceptions (e.g. Kok and Klerkx 2023; Wiarda et al. 2024). This confirms the observation of Urias, Kok and Ulug (2024) that justice is generally viewed as a side effect of MOIP (if considered at all). We furthermore reveal an under-representation of restorative justice considerations which hints that MOIP conceives justice as a primarily forward-looking notion. Moreover, given the mission

debate's disciplinary roots in economics and innovation sciences, it may come as no surprise that justice is associated with notions of profit sharing, directionality, and the diffusion of innovation. In doing so, it has raised various justice-related questions, but many of which have so far remained unanswered.

We therefore argue that the MOIP debate has insufficiently addressed matters of justice. What is missing is a more explicit engagement with the concept of justice, particularly with an appreciation of politics, conflict, power, morality, and responsibility. In our view, conceptual and empirical contributions should provide a better understanding of how (un)fairly beneficial and harmful impacts are distributed; to what extent decision-making processes can be considered inclusive and transparent; and which values and worldviews are recognized as (in)valid. Such contributions would address justice beyond an economic frame; not just as a side effect or externality, but as a primary concern of missions.

We have argued that distributive, procedural, recognitional, and restorative justice bear particular relevance for missions because they have been conceptualized and applied to socio-technical transitions, and because they are widely applicable as they transcend specific domains (e.g. energy). However, the plural and contextual nature of justice also points at the value of other dimensions and domain-specific forms of justice that can promote mission justice (Schlosberg 2007). More specifically, we see merit in including dimensions such as intergenerational justice (Page 1999; Meyer 2017), epistemic justice (Fricker 2013), and global justice (Moellendorf 2012). Intergenerational justice is particularly relevant because missions are long-term policies that affect different generations across decades. It could guide policymakers in recognizing needs and rights of future generations, and in shaping and distributing mission outcomes fairly. Future research will need to target what mechanisms can help distribute risks and rewards of missions more equitably across generations, and what governance approaches can prevent short-term political cycles from undermining long-term goals. Epistemic justice likewise needs consideration because it is usually not evident whose knowledge is recognized as legitimate or true. In practice, different epistemologies (e.g. scientific, local, indigenous) clash with one another and with diverse normative considerations (Kok and Klerkx 2023). Lessons from global justice would further enrich mission justice because national missions have significant cross-border dependencies and implications (e.g. with the Global South). We wonder, for example, how MOIPs can promote fair distributions of benefits while mitigating existing global inequalities. Answering such questions would link the notion of justice to the emerging debate on the geographies of MOIP (Uyarra et al. 2025).

Domain-specific forms of justice (e.g. environmental justice) can provide insights in relation to certain contexts. For instance, the uptake of regional, local, or city-initiated missions suggests that insights from urban justice may be of value (Nederhand et al. 2023; Avelino et al. 2024a). In such cases, cities and regions are often active agents in re-framing and translating national missions to subnational contexts (Priebe and Herberg 2024; Uyarra et al. 2025). How such appropriated missions can do justice to both local and national values and concerns still remains an important open question

that should be explored. Similarly, energy justice can provide more domain-specific support for energy-related missions by drawing attention to principle such as 'affordability', 'transparency', and 'availability' (Jenkins et al. 2016; Sovacool et al. 2017; Williams and Doyon 2019).

Broadening and complementing distributive, procedural, recognitional, and restorative justice with the above dimensions and domain-specific forms of justice would bring in rich insights of fields that have not yet been linked or applied to the mission context (Urias, Kok and Ulug 2024). In response to recent criticism on missions (e.g. Kirchherr, Hartley and Tukker 2023; Henrekson, Sandström and Stenkula 2024b), we speculate that an engagement with mission justice could ground and balance some of the 'mission-optimism' that may be at play. In part, because this would draw more attention to the contested nature of the wicked problems that missions aim to address (Wiarda et al. 2024). Such an explicit engagement with justice would further 'humanize' current approaches to transformative missions and has intrinsic normative value (Jenkins, Sovacool and McCauley 2018).

What is more, the processes that lead up to the formulation, implementation, and evaluation of missions are political processes where autonomy, willingness, and capability largely influence the degree to which mission-oriented transitions are just. The notions of 'justice', 'politics', and 'power' are therefore inseparable (Healy and Barry 2017; Avelino et al. 2024b) because 'who defines *what is just*, and *for whom*, will be determined by power struggles' (Newell and Mulvaney 2013: 138). Our current understanding of transitions suggest that incumbents and politicians commonly oppose and invalidate those that jeopardize the status quo. Hence, more attention is needed to the politics of missions (c.f., Janssen et al 2021; Pfotenhauer et al. 2022; Kok and Klerkx 2023; De Graaff, Wanzenböck and Frenken 2025; Molica 2025) which can take place in political arenas of decision-making (Janssen et al. 2023; Klerkx, Begemann and Janssen 2024). In such contexts, it is crucial to better understand the roles of social movements as 'unruly publics' in their uninvited assertion of what justice means and takes (De Saille 2015; Gready and Robins 2017).

To further consolidate the practical relevancy of justice for MOIP, justice dimensions should be integrated and embedded in theories of transformation to inform governance strategies in response to public perceptions (Wang and Lo 2021). Recent work on responsible mission governance suggests that advances in participatory, anticipatory, reflexive, and tentative governance could mitigate some types of injustices (Wiarda et al. 2024). For example, justice hinges on reflexive governance as a means of 'imagining future alternatives and embodying and practising these in the present' (Avelino et al. 2024b: 15). In practice, governance arrangements can promote justice through forms of engagement, co-creation, and reframed public debates that recognize vulnerable, marginalized, and activistic citizens (McCauley et al. 2024).

5. Conclusion

This paper has responded to the explicit calls of scholars to better understand justice considerations for MOIP (Kok and Klerkx 2023; Wiarda et al. 2024). The premise of this paper was that these considerations are often discussed in the literature, without explicitly referring to the concept of justice. We have subsequently conducted a systematic review

of the mission literature to identify and reveal such implicit justice considerations. Our review confirms this premise and presents a range of considerations that could contribute to mission justice. To some extent, these considerations may have a broader relevance for transformative innovation policy (Diercks, Larsen and Steward 2019; Penna et al. 2023), next to other approaches like transition management and strategic niche management (Rotmans, Kemp and Van Asselt 2001; Schot and Geels 2008). Simultaneously, we believe that the goal-driven and top-down character of MOIP presents some unique challenges that require future research.

Our results show that the ongoing debate on MOIP disproportionately focuses on distributive, procedural, and recognitional justice considerations while largely overlooking the area of restorative justice. Mission justice is generally conceived as a forward-looking notion, implicitly concerned with the (economic) side effects of missions. We find that the debate has raised several justice-related questions, but has not yet provided meaningful answers that are grounded in empirics. We have also argued that justice considerations would require greater attention to power and politics, and that we may need to rethink current policy approaches to missions.

Following our review, we advocate for future research that explicitly deals with mission justice across various dimensions (e.g. intergenerational justice and epistemic justice) and domain-specific forms (e.g. energy justice and urban justice), particularly with that of restorative justice. For restorative justice, it is imperative that scholars stop treating the mission concept as a sole forward-looking notion, but also consider historical wrongdoings, path-dependencies, accountability, and lessons, retrospectively.

In advancing mission justice more generally, scholars will not need to reinvent the wheel but can draw valuable lessons from research on just transitions (e.g. Newell and Mulvaney 2013; Jenkins, Sovacool and McCauley 2018; Williams and Doyon 2019; Kaljonen et al. 2021; Wang and Lo 2021). A genuine engagement with justice would entail that 'injustice is then understood not simply as a "side effect" of transitional [mission] policies but as symptomatic of underlying structural inequalities that remain unaddressed' (Abram et al. 2022: 1038). Our work lays the groundwork for conceptualizations of mission justice, and advances our understanding of the socio-ethical implications that mission-oriented innovation policy may engender. It urges us to question ongoing practices in decision-making and bottom-up engagement when determining matters of directionality and risk-taking.

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