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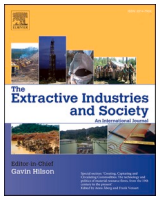

Original article

Redundancies, layers, and dilemmas: Comparing private standards and public regulations in lithium mining

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ABSTRACT

An expanding array of transnational Environmental, Social, and Governance (ESG) standards has emerged to mitigate harms across critical minerals supply chains. This proliferation of international, private governance standards is interacting with domestic, public regulations guiding mining activity in resource rich states. When private and public requirements duplicate, overlap, or diverge they can create inconsistent processes, administrative burden, and dilemmas through a patchwork of basic components in supply chain management (Cashore et al., 2021). Applying a typology of interactions between private authority and public policy to lithium mining in Argentina, we argue that private/public rules are loosely complementary in some respects and independently coexisting in others. Comparing a rigorous private standard, the Initiative for Responsible Mining Assurance (IRMA), to public regulations we find that both include similar provisions for environmental protection and public participation . IRMA provides better protections for indigenous peoples' participation, though it lacks significant enforcement mechanisms. Questions remain over the private sector's ability to guarantee – in practice – the rights of indigenous and other affected communities, or to protect ecosystems in the rush for critical minerals. Resulting governance dilemmas illustrate an increasingly crowded regulatory space in lithium mining that indiscriminately presumes public regulatory gaps, while it privatizes accountability.

1. Introduction

Electric vehicles (EV) sales are accelerating in the Global North, in one of the most visible signs of a consumer-led transition from fossil fuels to renewable energy sources. This shift to EVs relies on intensifying global supply chains, beginning with the extraction of critical battery minerals and metals like lithium. The World Bank estimates that the production of lithium for projected battery storage needs will have to increase by 500 percent by 2050. The rush for critical battery minerals presents both an answer to, and a major problem for, a just energy transition (Kingsbury, 2022; Kramarz et al., 2021). Civil society groups, indigenous peoples, and other pastoralist communities (hereafter affected communities) have raised concerns about the social and environmental impacts of mining. In Argentina, these concerns have primarily centered on the consumption of water in arid territories of extraction and the negative effects of mining on human livelihoods and biodiversity. Affected communities have also denounced the lack of local participation in decision-making and the limited availability of up-to-date public environmental information as federal and provincial governments work to entice further expansion of the lithium sector (Dorn and Gundermann, 2022; Escosteguy et al., 2022; Murguía and Bastida, 2023).

An expanding array of transnational Environmental, Social, and Governance (ESG) standards has emerged over the past decade to provide protections across battery supply chains (Deberdt and Le Billon, 2021). This proliferation of standards has been justified on the basis of inadequate domestic legislation and as a response to a gap in the governance of mineral extraction (Hiete et al., 2019). This study empirically investigates the presence and nature of this gap in a lithium bearing region. It also addresses an analytical question regarding the

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nature of interactions between international, private standards and domestic, public legislation. A growing literature most often describes these private-public interactions in terms of complementarity versus competition (Andonova et al., 2017; Eberlein et al., 2014; Hiete et al., 2019; Marques and Eberlein, 2021). We explore types of interactions through a comparison of the Initiative for Responsible Mining Assurance Standard (hereafter IRMA Standard) and existing legislation in Argentina at the national and subnational levels.

2. Methodology

The northern province of Catamarca provides a particularly useful case for understanding the interactions between private standards and public regulation in the Argentine lithium sector. The province hosts the Fenix mine, the first lithium project in the country with the longest regulatory track record for analysis. As of 2024, the province has 16 lithium projects at various stages of development (SIACAM, 2024). Situated in the high-altitude salt flats of the arid Puna ecoregion, the Fenix mine provides lithium carbonate to major automotive customers including Tesla, BMW, and General Motors. The mine started production in 1997, and in 2021 was the first in the country to initiate an IRMA certification process – the starting point of this article's analytical timeline. The Initiative for Responsible Mining Assurance (IRMA) enjoys the reputation of being among the strongest standards in the industry (MacInnes et al., 2017; Mudd 2021). As Mudd and others have argued "IRMA requirements for certification cover human rights, environment, social, governance, financial and economic aspects of mining – and is arguably the absolute 'platinum' standard for sustainability certification and recognition" (2021, 196).

We deployed three strategies to carry out our analysis of governance gaps and interactions between private and public rules. First, taking as our point of departure the environmental and social priorities identified in a recent survey of stakeholders across industry, government, and civil society (Obaya et al., 2023), we developed a database of applicable elements of the IRMA Standard and thirty national and provincial regulations. The resulting database allowed us to analyze how industry and public actors responded to these priorities by applying three global governance norms designed to mitigate social and environmental harms: Environmental Impact Assessments (EIA), public participation, and Free, Prior, and Informed Consultation/Consent (FPIC).

EIAs involve identifying, predicting, evaluating, and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions and commitments (IAIA, 2009). Public participation in natural resource governance became enshrined as an international principle following the Rio Declaration of 1992. The principle states that environmental issues are best handled with the participation of all concerned citizens, at the relevant level, with appropriate access to information, and with the opportunity to influence decision-making processes. Heeding this principle, Latin American countries negotiated the Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean (also known as "Escazu Agreement") which entered into force in 2021. This was the first regional environmental treaty to set standards on the rights of access in environmental issues and promote capacity building to strengthen public participation. According to Christel and Gutierrez (2017: 2), in Argentina, public participation "is the key mechanism through which constitutionally enacted environmental rights become effective." Finally, Free, Prior, and Informed Consultation/Consent (FPIC), as outlined by the International Labour (ILO) Organization Convention 169 and the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), refers to the collective right of indigenous peoples to be consulted substantively and in good faith in order to achieve consent when a proposed project is expected to affect them.[2]

Second, we carried out a workshop with legal, mining, and policy experts to develop criteria for a code book, which we used to categorize the documents retrieved. Third, we followed a two-way deductive-inductive process. In iterative rounds we analyzed public regulations to identify substantive provisions for the application of EIA, public participation, and FPIC, and then turned to the IRMA Standard to see whether there were equivalent requirements and additional ones that were not covered by public regulation. We returned to the public rules to verify whether those additional, private requirements had any equivalencies in public regulations. This allowed us to include provisions that had not been identified in the first round. We continued to iterate between public and private rules to verify and exhaust all potential equivalences. The entire coding process allowed us to identify not only areas of complementarity, competition, and duplication, but also gaps, fragmentation, and nuanced differences between public regulations and the IRMA Standard in Argentina's oldest lithium bearing region. The coding process was conducted in Excel, independently by two researchers to increase accuracy and consistency through intercoder reliability.

3. Conceptual framework

The rise of transnational private standards has created a broad, fragmented, and voluntary ecosystem of accountability initiatives (Kramarz 2022). In this context, private actors operate in a marketplace of self-governance, selecting standards they prefer according to their own criteria, degree of scrutiny, and liability (e.g., potentially avoiding any sanctions). There are multiple challenges embedded in an expanding sphere of private governance standards when it interacts with public regulations guiding mining activity in producer states. When private and public requirements overlap, diverge, or duplicate they can create inconsistent processes or administrative burden (Cashore et al., 2021). At the macro level of supply chain management, this patchwork of public regulations and private standards can generate confusion among participating companies and regulators (Elkind et al., 2020). Corporate actors often complain about a large and changing number of reporting requirements that creates audit fatigue, while a propagation of private and public certification schemes creates consumer confusion and enables greenwashing.

To disentangle the substance and relational effects of private and public rules governing lithium in Argentina, we adopt Cashore et al.'s (2021) typology of interactions between private authority and public regulations. This framework helps us understand "the myriad ways in which governance actors and institutions engage with and react to one another" (Eberlein et al., 2014: 2), but it is particularly useful for our case because it focuses on interactions between private authority and public policy. This framework is broader than previous approaches which have focused on a more binary analysis between coordination

[2] We use the "FPIC" acronym to refer either to *consultation* or *consent* (unless otherwise specified) due to the variable scope of this accountability mechanism across domestic and international legal frameworks. For example, while ILO Convention 169 focuses on the consultation (as a process to obtain an agreement or consent), UNDRIP textually mentions free, prior, and informed consent (giving a stronger focus to the result of the process). In this article, we refer to FPIC as the concept that encompasses both and will highlight specific meanings when appropriate.

versus competition. It is also easily applicable to "diverse realms of public policy" (Cashore et al., 2021: 2). In mapping private and public interactions, the framework distinguishes between complementary, competitive, and coexistence types, adding sub-type interactions for each category. We focus specifically on the complementary and coexistence categories.

Under complementary interactions, three subtypes – collaboration, coordination, and isomorphism – form a continuum from tightly coupled to more loosely connected interactions. Whereas in collaborative arrangements private and public actors pursue active partnerships towards shared goals, in isomorphic interactions connections are much more loosely coupled. Although private and public objectives may not be completely aligned, both sets of actors unconsciously emulate international best practices without explicit coordination. For example, in the case of Environmental Impact Assessments, international best practices recommend identifying the social impacts of mining projects through early engagement with affected stakeholders and elaborating alternative project designs to avoid negative impacts (Wasserman, et al., 2023). When private and public regulations emulate these best practices, they create a dynamic of isomorphism. Even in the absence of intentional coordination, both actors are following the broader international norm through the use of similar instruments and assessments.

Coexistence refers to interactions that are neither complementary nor competitive; "instead they occupy a middle-ground characterized by contingency" (Cashore et al., 2021: 1175). Under the rubric of coexistence, the framework distinguishes between institutional layering and chaos. In the first case, private standards and public regulations have divergent governance goals and strategies with intended or ad hoc divisions of labor, sometimes resulting in unclear sources of authority and legal obligations. In the second case, private and public actors have overlapping, unpredictable, and incoherent interactions.

Using this framework, we find loosely complementary, isomorphic interactions between the IRMA Standard and public regulations in the EIA and public participation governance spheres, since both types of regulations pursue similar goals, following international best practices without explicit coordination. In contrast, we find coexistence dynamics, in the form of institutional layering, in the application of FPIC. Here, divergent goals are visible when private standards require consent from indigenous communities, while public regulations uphold only the duty to consult affected communities. Table 1 below summarizes these analytical categories which we develop in the empirical sections that follow.

4. Private standards and public regulations in lithium governance spheres

4.1. The IRMA standard

In 2006, a coalition of non-governmental organizations, businesses purchasing minerals and metals for manufacturing, affected communities, mining companies, and labor unions founded the Initiative for Responsible Mining Assurance. Its primary tool is the IRMA Standard for Responsible Mining, a set of third party audited best practices necessary for certification. This voluntary standard applies to all types of industrial or large-scale mining and all non-energy mined resources, excluding energy fuels.

The IRMA Standard covers four areas: "business integrity," "social responsibility," "environmental responsibility," and "planning and managing for positive legacies." The process starts with a company self-assessment verified by independent third-party auditors, which is then made public on the company's website. The IRMA Standard evaluates the degree to which a mining company has successfully implemented the best practices it outlines.[3] For private actors, obtaining IRMA certification provides a measure of market legitimacy in an industry often challenged with obtaining social license to operate (Franken et al., 2020; Meadows et al., 2019).

Table 1
Types of interactions between private standards and public legislation.

Interaction type and subtype	Characteristics	Governance sphere
Complementary		
Isomorphism	Emulate international best practices Refer to similar governance goals Objectives may not be completely aligned	Environmental Impact Assessments Public Participation
Coexistence		
Institutional layering	Private and public actors have different governance goals and strategies Unclear sources of authority and substantive obligations	Free Prior and Informed Consultation/Consent

4.2. Public regulations for lithium mining in Argentina

Argentina's federal system means mining is governed by both national and provincial agencies and laws. The national government establishes the general regulatory framework and Congress has the power to dictate the Mining Code.[4] Since the 1994 constitutional reform, provinces own the mining resources in their respective territories, therefore the general mining regime provided by the national Code is applied and regulated by the provinces in their own jurisdictions. In 1995, National Law Number 24.585 added environmental provisions to the Mining Code. Federal law establishes minimum requirements regarding environmental protection and public participation that must be met or exceeded by subnational regulations. Argentina also recently ratified the Escazú Agreement, an international treaty guaranteeing rights and obligations regarding public participation and access to information on environmental matters across national and subnational jurisdictions. Following ratification of the Escazú Agreement, Argentina enacted Law N 27.566 (2020) which modified the national framework, and subnational regulations, although gaps remain (MAyDS, 2022).

Finally, the General Law of the Environment No. 25.675 (2002) requires public consultation prior to the approval of any project with potential negative and significant effects on the environment. It also requires civil society participation in environmental assessment procedures, a provision that is reinforced by the Escazú Agreement. The province of Catamarca has its own EIA regulation (Provincial Resolution Number 74/2010, 2010) and Secretariat of Mining issued Resolution Number 330/2016 (Provincial Resolution Number 330/2016, 2016) that requires participatory monitoring and public consultation, while the Provincial Directorate of Mining Environmental Management enacted the Regulatory Provision Number 3/2021, setting guidelines to implement public consultation on mining projects. The implementation of FPIC in Argentina is less clear. Despite being a signatory of UNDRIP and having ratified ILO Convention 169, there are no guidelines – in national nor in subnational laws – to integrate FPIC into the EIA processes.

5. Interacting rules: the IRMA standard and public regulations

In this section we examine the provisions, gaps, and nature of

[3] There are three levels (IRMA 50, IRMA 75, and IRMA 100) that reflect different degrees of performance across the four sections of the IRMA Standard.

[4] The Mining Code has been modified by Law N 24.585 which introduces a series of amendments to protect the environment. This law was accompanied by an act passed by COFEMIN that includes more details on the contents of the Impact Assessment Reports, not directly binding unless they have been effectively incorporated into the local law through appropriate means (such as provincial laws or resolutions).

interactions between the IRMA Standard and public regulations at three stages of application: when they enter into effect, during implementation, and in monitoring and sanctioning. As Table 2 summarizes, private and public rules on the application of EIA exhibit *isomorphism* at each stage of application. Even without identical alignments, they refer to similar governance goals. For example, both require identifying and assessing environmental and social impacts, adapting projects, and monitoring environmental and social effects. In both cases, the IRMA Standard and public regulations unconsciously or independently emulate the process of applying the standard of EIA as an international best practice.

Private-public rules on participation also stand out as a case of *isomorphism* as summarized in Table 3. Goals and objectives are not completely aligned but they refer to similar governance objectives considered best practices. Both the IRMA Standard and public regulations require early and ongoing engagement and establishing monitoring committees on social and environmental performance. They also both mention several discretionary options to promote engagement, such as participatory committees, emulating international norms. Public regulations state that engagement must occur from the outset of the EIA report process, whereas the IRMA Standard more ambiguously states that it must begin "prior to or during the mine planning stage." Unlike public regulations, the IRMA Standard explicitly requires members to develop a stakeholder engagement plan.[5] In addition, although domestic law requires engagement mechanisms, its primary focus is on "public consultation," while the primary focus of the IRMA Standard is on "stakeholder and community engagement." Although the concepts are vague without explicit definitions, "engagement" might imply a more demanding provision than "consultation" in the hierarchy of public participation (EPA, 2024). Finally, there are significant differences in consequences for non-compliance. The IRMA Standard's sanction involves a negative impact on the final project's score. Public regulations are theoretically more severe, with non-compliance resulting in the failure to obtain permits in a timely fashion, if at all.

The application of FPIC presents an example of *institutional layering* where private and public rules clearly diverge. While public regulation refers to FPIC as consultation, the IRMA Standard requires consent of indigenous people for certification. Although Argentina has ratified both UNDRIP and ILO Convention 169, domestic legislation has established a *consultation* duty rather than a *consent* one. UNDRIP is a United Nations declaration which establishes principles that should guide state actions but has not been incorporated as a binding norm to the Argentine legal framework, while the ILO Convention is an international treaty that has been signed by the country and incorporated as a binding norm into its domestic legal framework by Law N 24.071. The country has not adopted any other regulation, either at the national or subnational level,

Table 2
Comparison of provisions regulating Environmental Impact Assessment[6]: IRMA Standard and public regulations.

Application stages	Provisions		IRMA Standard	Public regulations
Entry point	Time and conditions of application		"Before any site-disturbing activity associated with the project" (5)	Before each mining stage begins. It must be updated every two years at most (2)
Implementation actions	Description of the project		Required (5)	Required (1)
	Identification of environmental effects	Direct	Required (5)	Required (1) (3)
		Indirect	Required (5)	Required (4) (3)
		Cumulative	Required (5)	Required (4) (3)
	Identification of social impacts		Social (broadly conceived) (5)	Specifies socio-economic (4) and socio-cultural impacts (2)
	Propose actions to avoid/prevent/mitigate any negative impact		Required (5)	Required (1) (3)
	Propose actions to rehabilitate, restore or recomposed the altered environment		Required (5)	Required (2)
	Alternative project design to avoid impacts		Required (5)	Required (4)
	Identify potential for hazardous events		Required (5)	Required (4)
Monitoring compliance and sanctions	Monitoring program		Required (5)	Required (4) (3)
	Sanctions for not fulfilling EIA procedure		Impact on company scoring (5)	The company does not get operating permit (1)
	Sanctions for noncompliance with EIA requirements		Impact on company scoring (5)	Fines/ Penalties (4)

Sources: (1) National Law Number 25.675 (2002); (2) National Law Number 24.585 (1995); (3) National Law Number 27.566 (Escazú Agreement ratification) (2020) (4) Provincial Resolution Number 74/2010, 2010; (5) IRMA (2018c) (Chapter 1.1 *Legal Compliance* and Chapter 2.1: *Environmental and Social Impact Assessment and Management)*.

Table 3
Comparison of provisions regulating public participation: IRMA Standard and public regulations.

Application stages	Provisions	IRMA Standard	Public regulations
Entry point	Time and conditions of application	"Prior to or during the mine planning" (4)	When the EIA report is being prepared (1)
Implementation actions	Ensure early engagement	Required (4)	Required (3)
	Develop engagement plan	Required (3)	Not required
	Record of public comments	Required (4)	Required (3)
	Assistance to vulnerable groups	Required (4)	Required (2)
	Provide information prior to participation	Required (4)	Required (2) (3)
	Report back to community on issues of concern	Required (4)	Required (2) (3)
Monitoring compliance and sanctions	Ongoing engagement plan	Required (4)	Required (3)
	Sanctions for non-compliance with Public Participation	The company does not get IRMA's certification (4)	Decision making process invalid (1)

Sources: (1) National Law Number 25.675 (2002); (2) National Law Number 27.566 (Escazú Agreement ratification) (2020); (3) Provincial Provision Number 3/2021, 2021; (4) IRMA (2018b) (Chapter 1.2: *Community and stakeholder engagement*).

[5] According to IRMA, the purpose of the plan is to (a) ensure that companies can engage with stakeholders in a culturally appropriate manner, (b) provide relevant and understandable information, and (c) establish processes that allow stakeholders to express their views and concerns and for the company to respond to them.

[6] Requirements stated in all tables apply to new mines. Existing mines are subject to a different application of the IRMA Standard.

that requires obtaining indigenous peoples' consent. Therefore, there is an obligation to carry out a consultation process (derived from art. 6.1 of ILO Convention 169) but there is not an obligation to obtain consent as result of that consultation. These are the parameters that guide public decisions over mining projects affecting indigenous peoples.

This difference between the private standard and the Argentine public regulations reflects divergent goals and governance strategies. In the absence of regulation by domestic legislation, there is uncertainty around the specific procedures and requirements of FPIC (see Table 4). On the other hand, the IRMA Standard sets specific obligations for companies, such as the identification of capacity gaps that may interfere with effective participation by indigenous peoples and the establishment of mutually agreed upon consultative processes. Whereas IRMA explicitly states that obtaining consent is required for certification of the mining project, domestic legislation does not specify whether the results of consultations are binding nor what the consequences of not obtaining consent are.

IRMA foresees possible overlaps between the standard and public regulations, stating that the State "always holds the primary duty to protect indigenous peoples' rights." It leaves the door open to circumventing public authorities, however, holding that in the absence of national laws, or in the exercise of their right to self-determination, indigenous peoples "may wish to engage with companies without State involvement." According to the standard, if national FPIC laws exist, companies must abide by those laws. Where a host government has established an existing legislative framework that requires or enables agreements between mining companies and indigenous communities, it may not be necessary for companies to run a parallel FPIC process based on the requirements of this chapter. It would, however, be necessary for companies to demonstrate to IRMA auditors that the process whereby the agreement was reached conformed with or exceeded IRMA FPIC requirements and met the general intent of this chapter. Therefore, institutional layering exists, with the burden of proof on the mining project to demonstrate that it has satisfied public regulations that meet the rigor of the IRMA Standard.

Table 4
Comparison of provisions regulating Free, Prior, and Informed Consultation/Consent (FPIC): IRMA standard and public regulations.

Application stages	Provisions	IRMA Standard	Public regulations
Entry point	Time and conditions of application	When indigenous peoples' rights or interests may be affected by the company's activities (2)	When measures which may directly affect indigenous peoples are under consideration (1)
Implementation actions	Interpretation of FPIC	Free Prior and Informed Consent (2)	Free Prior and Informed Consultation (1)
	Identify appropriate means to make the consultation	Required (2)	Required (1)
	Provide adequate information / description of the project	Required (2)	Required (1)
	Identify capacity gaps	Required (2)	Not required
	Strengthen capacity to participate in FPIC	Required (2)	Not required
	Document process in mutually agreed manner	Required (2)	Not required
Monitoring compliance and sanctions	Engage indigenous peoples in monitoring the agreement	Required (2)	Not required
	Promote ongoing engagement	Required (2)	Not required
	Repeat FPIC process if there are significant changes to the mining project	Required (2)	Not required
	Sanctions for noncompliance with FPIC conditions	The company does not get IRMA's certification (2)	Not specified
	Sanction for failure to obtain indigenous peoples' consent	The company does not get IRMA's certification (2)	Not specified

Sources: (1) National Law Number 24.071 (1992); (2) IRMA (2018a) (Chapter 2.2: *Free, Prior, and Informed Consent*).

6. Discussion and concluding remarks

In response to the empirical question of our study, we find little evidence of a significant regulatory governance gap that justifies the need for private governance standards. This is an important finding given the vast proliferation of private initiatives that are promoted as filling a regulatory gap. In the case of Argentina and lithium, both the IRMA Standard and domestic laws codify similar provisions to prevent and mitigate environmental harms and mandate public participation. The IRMA Standard provides better protections than public regulations for indigenous people's participation. It explicitly requires indigenous peoples' *consent*, while public regulations require only a *consultation*. Without consent, companies cannot obtain IRMA certification. Although Argentina is a signatory of UNDRIP and ILO Convention 169, it has not regulated FPIC in a detailed manner in domestic public law. Without such enabling legislation, there remains significant legal uncertainty regarding the specific procedures to be followed in the consultation process and the consequences of failing to obtain consent.

Gaps in the regulation of public and indigenous participation at the national and provincial levels affects the credibility of public agencies (Arias Mahiques et al., 2022). In many cases, these agencies address gaps by implementing participatory processes in a discretionary manner. Escosteguy et al. (2022) have analyzed a consultation process on lithium mining in the Argentine province of Catamarca and concluded that there were several barriers to local participation, and that the consultation did not even comply with national laws and international treaties. Similarly, at Olaroz, a lithium mining project in the province of Jujuy, the consultation process did not respect indigenous communities' time to discuss the project and did not meet the requirements of ILO Convention 169 (Marchegiani and Rausch, 2016). As a result, socio-environmental conflicts and tensions have arisen, in the form of strikes, mobilizations, and the development of alternative and grassroots consent and accountability regimes (Marchegiani and Parks, 2022; Ciftci and Lemaire, 2023). Although the issue of public participation in EIA processes related to mining projects is still an under-researched area of inquiry, some authors have claimed that ignoring the opinion of affected populations leads to conflicts and wholescale opposition to mining activities (Henríquez and Nozica, 2009; Ciudadano, 2020).

In response to the analytical question of this study, on the nature of interactions between private and public rules, our findings show characteristics of isomorphism and instances of institutional layering. In terms of the former, private standards and public regulations emulate international best practices in response to concerns by car manufacturers, EV consumers, and the jurisdictions in which they are situated, suggesting de jure duplication of rules and potential for an administrative burden. In the case of the latter, private standards and public regulations in the FPIC governance sphere have divergent goals and create fragmentation of authority through institutional layering.

Despite IRMA's comparatively high standards, it is not a foregone conclusion that the private sector is best situated to guarantee the rights of affected communities or to protect ecosystems in the rush for critical

minerals. As a private and voluntary standard, IRMA lacks strong enforcement mechanisms. Its most significant and only sanction is to refuse certifying a particular project. Public regulations, on the other hand, have enforcement mechanisms including fines, permit refusals, and withdrawals of mining concessions, but offer communities fewer resources than the private standard to influence decision-making given the comparatively weaker mechanisms of participation we found in our analysis. Furthermore, the process of determining sanctions against non-compliant companies remains opaque and distant from those on the frontlines seeking redress.

In addition to the question of sanctions, the interactions between private and public rules we have examined here raise two other key governance questions. First, if private authority provides better protections in some spheres than rules developed by democratically elected officials, what channels of redress do different domestic publics have at their disposal? Second, if more stringent private standards are successfully demanded by EV consumers, who is the emergent authoritative actor in global supply chains of critical minerals: the citizen or the consumer, and what does this mean for democratic governance of natural resources? IRMA and similar private initiatives illustrate what Cashore et al. (2021) identify as a secular trend toward replacing substantive rulemaking with a combination of best practices and voluntary standards regimes. This layering of public regulations with private management follows trend lines toward neoliberalization in place in Argentina and beyond for over four decades. The results of these reforms in terms of democratic participation, economic development, and especially environmental stewardship have been mixed, at best.

Cashore's et al. (2021) typology is not sufficient to fully describe the complexities involved when analyzing the application of private standards and public regulations in practice. As indicated in Haslam (2018: 17), when institutions for varying reasons "cannot accommodate pressures from powerful actors for change, then these pressures may be redirected from formal institutions to more flexible informal institutions." The possible use of voluntary guidelines as a "stick" when they are supposed to be a "carrot" denote competitive substitution interactions that could play a medium- to long-term role in the dynamic relation between private companies and states in the mining sector (Pelfini et al., 2020). Andonova et al. (2017) also argue that there is a dynamic relationship between national policies and transnational governance that cuts across the domestic-international divide and goes beyond the alleged dichotomy between micro-level incentives and larger-scale processes that create and spread normative and market-based pressures.

These challenges create several avenues for further research and point to the limits of privatizing accountability in response to environmental and social concerns. Better results are more likely to come from drafting comprehensive legal frameworks where legal loopholes are found, enhancing the capacity of producer states to implement and monitor compliance in cases where comprehensive legislation already exists, and strengthening states' regulatory influence over global mining firms (Murguía and Bastida, 2023). Energy transitions and EV manufacture have heightened attention to the consequences of extraction, putting the choices, sacrifices, and priorities around lithium mining into fresh light (Köppel and Scoville-Simonds, 2024). This is a critical opportunity to reconsider approaches to energy governance and the relationship between states, societies, nature, and markets. Initiatives on the part of industry to foster a set of best practices and to encourage good corporate citizenship are no replacement for public participation and democratic oversight that understand public and environmental goods as intrinsic priorities rather than add-ons to obtain a social license to operate and maximize returns to shareholders.

CRediT authorship contribution statement

Teresa Kramarz: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Maria Victoria Arias Mahiques:** Writing – review & editing, Visualization, Methodology, Formal analysis, Data curation. **Tomas Allan:** Writing – review & editing, Visualization, Validation, Methodology, Investigation, Formal analysis, Data curation. **Melisa Escosteguy:** Writing – review & editing, Validation, Methodology, Investigation, Data curation. **Donald Kingsbury:** Writing – review & editing, Writing – original draft, Methodology. **Lucas Seghezzo:** Writing – review & editing, Visualization.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.exis.2024.101479.

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