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High-stakes decision-making and the future of AI governance: Indigenous self-determination and lessons from the Arctic Council

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ABSTRACT

Current AI governance risks remaining dominated by state-centric models that marginalise Indigenous peoples and historically excluded communities. This paper proposes a human-centric AI governance framework that reconceptualises AI governance institutions as socio-technical decision systems responsible for structuring ethical, political, and regulatory choices about AI deployment. It argues that Indigenous self-determination and participatory rights should be embedded as design principles of AI governance architecture rather than treated as consultative add-ons. By integrating relational knowledge systems and collective responsibility models, pluralistic governance structures can enhance the legitimacy, resilience, and ethical robustness of AI-related decision processes. The analysis uses the Arctic Council's model as an institutional reference to show how co-governance arrangements can inform the design of inclusive AI governance. The paper contributes to decision systems research by extending the concept of the socio-technical decision system to high-stakes AI governance and by formulating institutional principles for pluralistic AI governance, organised around decision-systems logic.

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Human-centric AI governance; AI governance; socio-technical decision systems; Indigenous knowledge; participatory governance; legal pluralism; decolonial governance

Introduction

The accelerating progress in the field of frontier AI has given rise to an increased emphasis on the necessity of international coordination and regulatory oversight (Dung, 2025; Trager et al., 2023). Indigenous peoples remain significantly underrepresented in global AI governance, despite being directly affected by AI-driven data extraction, infrastructure expansion, and algorithmic systems operating on Indigenous lands and knowledge domains (Childs, 2022; Lewis et al., 2025). This study considers the role of AI in relation to Indigenous peoples, a population of more than 476 million across over 5,000 distinct groups worldwide (Food and Agriculture Organization [FAO], 2026).

This paper argues that Indigenous self-determination and participatory rights must be treated as foundational components of ethical AI governance. It proposes a pluralistic governance framework that reconceptualises future AI governance institutions as socio-technical decision systems. For the purposes of this article, pluralistic AI governance is understood as a socio-technical decision system that structures who can contribute to governance, how deliberation occurs, what kinds of decisions are produced, and how those decisions are monitored and revised over time (Kavanagh, 2026a).

While AI-enabled decision-making systems form an important practical context for this article, the paper's primary focus is not the internal design of operational AI tools. Instead, it proposes a pluralistic, distributed model for future global AI governance. This paper focuses on the missing dimension in decision-systems research: the model for integrating Indigenous self-determination and participation into the global AI decision system.

Recent developments show that AI already plays a role in high-stakes decision chains relevant to Indigenous peoples. For example, AI-enabled satellite monitoring is being used to detect mining-related deforestation across the Amazon, including within protected areas and Indigenous territories, with clear implications for enforcement (Monitoring of the Andes Amazon Program [MAAP], 2025). Indigenous rights

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and participation matter throughout the decision chain, including data governance, risk definition, validation, oversight, and redress. The argument developed here also connects to a broader literature showing that AI is already influencing consequential decision processes (Al-Surmi et al., 2022; BaniHani et al., 2024).

This article adopts a conceptual and normative approach, supported by an illustrative institutional case. The central claim is that AI governance bodies can be understood through the lense of the 'sociotechnical ecology of AI' (Domínguez Hernández et al., 2026). It is guided by a socio-technical decision-systems perspective, which treats governance institutions as systems that structure inputs, deliberation, authority, outputs and feedback through the interaction of actors, institutional rules and technical infrastructure (Baxter & Sommerville, 2011; Clegg, 2000; Trist & Bamforth, 1951). Maas (2025) argues that global AI governance is an evolving and still fragmented governance architecture, with multiple possible future pathways and uncertain institutional consolidation. Looking at that future AI governance system as a socio-technical decision system can therefore help to advance the field of decision systems and global governance.

It also draws on decision-support research that views such systems as responsible mechanisms for informing and supporting decision-makers rather than replacing them (Power, 2001). This perspective is used here to analyse AI governance as a responsible socio-technical decision system (Papagiannidis et al., 2025). The paper draws on scholarship in AI governance, international law, Indigenous studies, and decision systems to develop a pluralistic framework for human-centric AI governance. Informed by a decolonial and legal-pluralist lens, the Arctic Council's Permanent Participant model is used heuristically, as an institutional example that helps identify design principles for embedding participatory authority, epistemic pluralism, and co-governance into emerging AI governance arrangements.

The analysis is grounded in three main contributions: (1) it advances a normative and institutional argument that Indigenous self-determination and participatory rights should be understood as core principles of human-centric AI governance; (2) using the Arctic Council as an illustrative institutional reference point for participatory design, the paper proposes four governance principles for pluralistic AI governance from decision-systems logic:

(1) broadening legitimate inputs,
(2) institutionalising inclusive deliberation,
(3) linking participation to decision authority, and
(4) embedding feedback, redress, and revision.

Digital colonialism and institutional decision asymmetries

Global AI governance is characterised by digital colonialism. Governance decisions that shape the global AI ecosystem are disproportionately made by a narrow set of actors. Indigenous peoples, and also other marginalised communities, remain excluded from meaningful participation (Dafoe, 2018; LaForge et al., 2024; Roberts et al., 2024).

The concept of digital colonialism provides a useful lens for understanding these dynamics. Building on Quijano's (2000) notion of the coloniality of power, digital colonialism describes how data extraction, platform dominance, and regulatory norm diffusion extend historical power asymmetries into digital infrastructure. Within AI governance, this manifests as external decision authority over data governance, infrastructure siting, and algorithmic deployment in Indigenous territories, often without meaningful participation or consent (Childs, 2022). Indigenous communities have articulated forms of resistance to extractive technological governance (Plaut, 2023; Lewis et al., 2025). From a human-centric AI governance perspective, the AI governance lack of trust and legitimacy represent a problem of governance architecture (Sigfrids et al., 2023).

Why Indigenous participation matters epistemically, legally, and institutionally?

Many Indigenous relational worldviews understand knowledge as embedded within relationships among people, land, ecosystems, ancestors, and future generations (Jessen et al., 2021; Tynan, 2021). This relational cosmology, according to Richardson Kineweskwêw (2025), is a 'three-eyed seeing approach'. From a human-centric AI governance perspective, these epistemologies offer alternative models of decision logic that

emphasise reciprocity and long-term stewardship. Indigenous identity and governance are inseparable from community recognition and collective responsibility (Avalos, 2023). Decision authority should not be concentrated in hierarchical institutions as effective governance systems must support plural forms of knowledge in order to be sustainable (Cash et al., 2003).

The increasing demand for large-scale data to train AI systems intensifies these tensions. Indigenous knowledge is frequently incorporated into digital infrastructure without adequate recognition of collective ownership or data sovereignty (Casimirri, 2003; Walter & Suina, 2018). From a human-centric standpoint, this reflects an imbalance of authority, a system-threatening condition (Sigfrids et al., 2023).

The participation of Indigenous peoples in AI governance is grounded in the international legal principle of self-determination, which affirms the right of peoples to control political, social, and cultural development. The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) provides the most authoritative international framework for Indigenous participatory governance. Article 3 affirms the right of Indigenous peoples to self-determination, while Article 18 establishes their 'right to participate in decision-making in matters which would affect their rights'. Together, these provisions support the institutionalisation of Indigenous participation as decision authority within AI governance frameworks. Within AI governance contexts, the right to self-determination translates into claiming decision authority over technologies that affect Indigenous lands, data, and knowledge systems (Anaya, 2004; Jones, 2024).

Despite normative recognition, Indigenous participation in global governance forums is often limited to observer or consultative status, with little influence over binding regulatory outcomes (Belfer et al., 2019). In AI governance, this gap is particularly consequential because decisions about data governance, infrastructure siting, model deployment, and risk assessment have direct impacts on Indigenous sovereignty and community wellbeing (Childs, 2022).

From a socio-technical decision-systems perspective, excluding affected communities from governance authority undermines both legitimacy and decision quality. Research on participatory governance demonstrates that inclusive decision processes improve institutional trust and long-term policy sustainability (Jager et al., 2020). For AI governance, embedding participatory rights as decision authority can help reduce epistemic blind spots and mitigate unintended social harms.

This paper conceptualises participatory rights as institutional design requirements. Embedding Indigenous participation into AI governance architecture transforms governance from consultation towards co-governance with decision authority.

Arctic Council as an illustrative institutional reference for participatory decision architecture

For comparative purposes in this article, the Arctic Council model is treated as an asymmetrical intergovernmental decision-making system, serving as an institutional reference point for theory-building.

Inputs

From a decision-systems perspective, one of the Arctic Council's most significant features is the way it broadens the inputs into intergovernmental governance. Unlike many international bodies that rely primarily on state representatives and technical experts, the Council formally recognises Indigenous organisations as Permanent Participants and creates an institutional channel through which Indigenous perspectives and knowledge can enter governance processes (Chuffart, 2025; Kavanagh, 2026b; Koivurova & Heinämäki, 2006). This matters analytically because it shows that governance legitimacy depends not only on who is recognised as a valid source of decision-relevant knowledge.

Barnes's (2026) strengthens this point by arguing that Permanent Participants do not merely contribute information to the Arctic Council; they help co-constitute its identity, legitimacy, and practices over time. Projects that include meaningful Indigenous input and knowledge co-production have been described as producing a more complete understanding of issues, greater community buy-in, and ultimately better solutions (Chater, 2019). Due to the colonial heritage and structural injustice in Arctic governance, states retain formal decision-making authority because Council final hard-law documents are adopted by consensus among the eight member states, and Permanent Participants do not have voting rights (Wood-Donnelly, 2023).

Deliberation

The Arctic Council is also useful because it demonstrates how participatory authority can be embedded within deliberative processes. Permanent Participants are involved in working groups, ministerial meetings, Senior Arctic Officials' processes, and policy discussions, giving them continuing procedural access rather than occasional consultative status (Cambou & Koivurova, 2020). This arrangement suggests that meaningful participation translates into integrating them into the recurring spaces where agendas are shaped and proposals are debated.

Decision architecture

The Arctic Council shows that participation can influence decision architecture even without full formal equality, mostly due to the soft-law nature of this intergovernmental forum. Permanent Participants have contributed to agenda-setting, knowledge co-production, and policy development, and have helped shape the Council's approach to environmental protection, sustainable development, scientific cooperation, and broader international discussions concerning climate change, black carbon, and persistent organic pollutants (Dorough, 2017; Landriault et al., 2019).

Feedback loops

Perhaps the most analytically valuable feature of the Arctic Council is that it reveals governance as a dynamic and reciprocal process. Permanent Participants have shaped the Council's norms, legitimacy, and practices, but the Council has also shaped the strategies, institutional identities, and reform agendas of the Permanent Participants themselves (Barnes, 2026). It is a co-constitutive process.

A proposed governance model for pluralistic AI governance

Emerging proposals for global AI governance increasingly emphasise centralised coordination, harmonised standards, and international oversight (Trager et al., 2023). From a human-centric AI governance perspective, the legitimacy of AI governance institutions depends on inclusive authority in decision processes (Batool et al., 2025; OECD, 2024; Roberts et al., 2024; United Nations, 2024). The preceding discussion of the Arctic Council provides a bounded institutional reference for this section. The Arctic Council is used heuristically to identify institutional lessons for pluralistic AI governance: the formal recognition of Indigenous actors as legitimate governance participants, the embedding of participation within recurring deliberative processes, the connection of participation to meaningful influence over outputs, and the importance of reciprocal feedback and institutional learning.

Rather than proposing a single global authority, the model advanced here is distributed and modular (Janssen, 2025; Monteiro & Singh, 2025; United Nations, 2024). Taken together, the model developed in this section yields four governance principles for pluralistic AI governance, organised around decision-systems logic.

Inputs

What kinds of inputs are recognised as legitimate within AI governance? The first lesson from the Arctic Council: if pluralistic AI governance is to move beyond digital colonialism and state-centric design, it must broaden who and what counts as a legitimate source of decision-relevant knowledge. AI is already shaping high-stakes decision-making across healthcare, finance, technology, and public governance, which means that governance cannot rely exclusively on state preferences (Al-Surmi et al., 2022; BaniHani et al., 2024). It must also inclusively incorporate the perspectives of diverse communities (Aarab et al., 2025). This aligns with responsible AI governance research that distinguishes structural, relational, and procedural practices, suggesting that governance quality depends on participation (Batool et al., 2025; Papagiannidis et al., 2025).

Operationally, this means that FPIC (Free, Prior, and Informed Consent) and Indigenous data sovereignty frameworks such as CARE should be treated as governance inputs that help determine what counts as

acceptable data use, legitimate deployment, and collective benefit (Carroll et al., 2020; OECD, 2024; United Nations, 2024).

Deliberation

The second lesson from the Arctic Council concerns deliberation. Recent AI governance scholarship increasingly suggests that effective governance cannot be reduced to one-off consultation or ex post review, but must be embedded across the full AI lifecycle through institutionalised and recurring practices (Monteiro & Singh, 2025; Papagiannidis et al., 2025). Papagiannidis et al. conceptualise responsible AI governance in terms of structural, relational, and procedural practices, while Monteiro and Singh argue for a hybrid, iterative, and lifecycle-integrated governance model grounded in polycentric governance.

This suggests that Indigenous peoples should be integrated into agenda-setting, standard-setting, impact assessment, implementation review, and institutional evaluation through recurring and formally recognised channels of engagement. The objective is not to incorporate additional stakeholders into prevailing processes (despite the development of pilot prototypes for this purpose; see Cognisee, 2026), but rather to reconfigure the deliberative process itself in a manner that ensures affected groups possess structured authority within the institutions that govern AI. In practical terms, this necessitates the establishment of co-governance arrangements that ensure the involvement of affected communities in the processes involved in the establishment of priorities, the negotiation of standards, and the execution of oversight. This conclusion is further substantiated by recent research in the domain of public AI governance, which posits that in instances of conflicting core values, the efficacy of governance is contingent upon the implementation of procedurally fair deliberative processes, founded on principles of inclusion, publicity, relevance, and appeal (de Fine Licht, 2025).

A further lesson from current literature is that deliberation depends on capacity. Aarab et al. (2025) identify institutional pillars such as data interoperability, infrastructure, skills, and leadership reform as preconditions for successful AI integration in public governance. Likewise, the OECD's (2025) report on governing with AI stresses that governments face skills shortages, legacy systems, data problems, and high requirements for transparency, privacy, and representation. This means that capacity-building is part of governance architecture itself: without sustained support for Indigenous-led participation, inclusion risks remaining symbolic rather than operational.

Decisions

What kinds of decisions do governance institutions produce, and how does participation affect those outputs? The third lesson from the Arctic Council: participatory governance is most consequential when it is linked to meaningful influence over institutional outputs. One influential proposal in current AI governance debates is the creation of international certification or compliance bodies that assess whether jurisdictions or organisations meet shared governance standards (Trager et al., 2023). Such mechanisms can function as decision-support tools by shaping risk thresholds, regulatory priorities, and enforcement practices. However, governance should not be reduced to certification alone, especially where benchmark-based systems privilege narrow metrics over democratic legitimacy, contextual justice, and community rights (Mišić et al., 2025).

A pluralistic model links participation directly to decisions themselves: which risks are prioritised, what forms of AI deployment are considered acceptable, what thresholds of consent apply, and what accountability measures are triggered when harms occur. These are precisely the areas in which co-governance becomes institutionally meaningful, because it connects participation to authority over outcomes.

Feedback loops

The fourth design question concerns feedback loops: how governance institutions monitor outcomes, respond to contestation, and revise their practices over time. Referring to the Arctic Council model, governance institutions require mechanisms through which affected communities can contest outcomes,

shape revisions, and contribute to ongoing institutional learning. This is particularly important in AI governance because AI systems are dynamic and often produce new harms only after deployment. Monteiro and Singh (2025) explicitly build constant monitoring into their Wheel of AI Governance model. The OECD work (2025) on governing with AI stresses that many public-sector AI systems remain in pilot or early-implementation phases and that governments still lack evidence on long-term outcomes, scaling, and trust effects.

Pi and Proctor argue that access to redress is access to justice and that current AI governance arrangements often fall short in protecting individuals' rights when harms occur. Their argument is especially relevant here because a pluralistic governance model should not end with approval, certification, or deployment. It should include community-based review, consent withdrawal pathways, mechanisms for remedy, and institutional procedures for revising governance standards in light of experienced harm and new evidence (Pi & Proctor, 2025).

AI enablers in high-stakes decision-making

A human-centric AI governance architecture should govern the institutional enablers through which such systems are adopted and normalised. For Indigenous peoples, this necessitates their meaningful involvement in the governance of data infrastructure, procurement conditions, technical partnerships, and capacity-building arrangements.

AI enablers could be configured to preserve, structure and mobilise situated knowledge for collective decision-making. This interpretation is consistent with recent collective-intelligence scholarship, which suggests that AI can improve collective memory, collective attention, and collective reasoning when embedded in human-centred socio-technical systems (Riedl & De Cremer, 2025). An illustrative emerging prototype of this broader design direction is suggested by a new Cognisee startup, which publicly describes its work as 'Sovereign AI Labs', policy simulation, and collective-intelligence infrastructure intended to elicit local and Indigenous knowledge that is not readily accessible to generic large language models (Cognisee, 2026; XPRIZE, 2026).

Principles for pluralistic AI governance

The proposed AI governance architecture would alter AI-supported decision processes at four levels, corresponding to the four principles that translate decision-systems logic into a pluralistic model of AI governance:

(1) broaden legitimate inputs: recognising the right to self-determination, respecting Indigenous knowledge, community priorities, FPIC requirements, and data sovereignty claims as relevant forms of decision-relevant information;

(2) institutionalise inclusive deliberation: moving Indigenous participation from consultation to structured authority within agenda-setting, evaluation, and oversight;

(3) connect participation to decision authority: affect the decisions produced by governance bodies by requiring them to assess legitimacy, acceptable risk, consent conditions, and whether deployment should proceed at all;

(4) embed feedback, redress, and revision: strengthen feedback loops by embedding monitoring, contestation, review, and revision into governance after deployment.

The proposal is intentionally modular rather than blueprint-like. It argues that human-centric AI governance requires institutional arrangements that are distributed, participatory, reflexive, and capable of co-governance across layered sites of authority. The goal is to develop a sustainable decision system that are institutionally inclusive and adaptive in the face of high-stakes AI harms and uncertainties (Batool et al., 2025; OECD, 2024; Papagiannidis et al., 2025).

Conclusion

As AI becomes embedded in high-stakes governance decisions, the design of AI governance institutions is increasingly functioning as a form of collective governance architecture. The present study has argued that

contemporary AI governance frameworks remain constrained by state-centric decision models that marginalise Indigenous peoples and other historically excluded communities. This exclusion represents a structural weakness that undermines the legitimacy and long-term effectiveness of AI governance.

This paper proposes to integrate the rights of self-determination and participatory rights of Indigenous peoples into governance design. In the context of research into decision systems, the paper extends the concept of the socio-technical decision system to the governance of high-stakes AI-enabled decision chains. More broadly, the paper argues that pluralistic AI governance will be legitimate and effective only where governance architectures comply with four governance principles for pluralistic AI governance from decision-systems logic: broadening legitimate inputs, institutionalising inclusive deliberation, linking participation to decision authority, and embedding feedback, redress, and revision.

Author contributions

CRediT: **Elena Kavanagh:** Conceptualization, Data curation, Methodology, Writing – original draft, Writing – review & editing.

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