

Decolonizing AI Policy in the Philippines: IPMRs' Perspectives on Western-Based AI Strategies and the Guiding Role of Paniyaw, Ngilin, and Bain

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Abstract: This study examined Indigenous Peoples Mandatory Representatives' (IPMRs') perspectives on decolonizing Philippine AI policy through the Kalinga ethical triad of Paniyaw (prohibitions), Ngilin (stewardship), and Bain (solidarity), proposing these values as an indigenous-centered alternative to Western AI governance frameworks. Employing a mixed-methods convergent parallel design, the research surveyed 94 IPMRs across six Kalinga municipalities, namely Tinglayan, Lubuagan, Pasil, Balbalan, Tanudan, and Tabuk City, complemented by semi-structured interviews and indigenous-guided focus groups. Findings revealed that IPMRs demonstrated only slight familiarity with Western AI strategies ($M=2.56$), including NAISR 2.0 and GDPR-influenced frameworks, yet strongly affirmed the applicability of Paniyaw-Ngilin-Bain to AI ethics domains ($M=4.42$). Regression analysis showed that general AI awareness ($\beta=.309$, $p=.044$) and policy terminology knowledge ($\beta=.318$, $p=.031$) positively predicted framework affirmation, while perceived Western AI influence on local projects exerted a significant negative effect ($\beta=-.276$, $p=.049$). IPMRs viewed operationalization as feasible at the community level ($M=3.96$), affirming internal capacity for monitoring and scalability, though constrained by technical expertise gaps, funding shortages, and institutional resistance. Qualitative data positioned Paniyaw-Ngilin-Bain as sacred ethical boundaries protecting cultural knowledge from AI extractivism, data commodification, and surveillance. The study concluded that Paniyaw-Ngilin-Bain constituted a legitimate, scalable indigenous AI governance architecture, contingent upon institutional recognition, IPMR capacity-building, and policy reforms integrating indigenous data sovereignty into NAISR 2.0.

Keywords: Indigenous data sovereignty, Kalinga ethics, AI governance, decolonial AI, Paniyaw-Ngilin-Bain, IPMR, NAISR 2.0

1. INTRODUCTION

The Colonial Architecture of Global AI Governance

The global trajectory of artificial intelligence governance has entered an era of intensifying scrutiny, with scholars and policymakers increasingly documenting how dominant frameworks perpetuate systemic colonial biases and algorithmic opacity that marginalize non-Western and indigenous epistemologies. As Mohamed et al. (2020) established, contemporary AI development encodes forms of algorithmic oppression, exploitation, and dispossession that extend colonial power relations into digital systems, privileging Western rationalist and individualist conceptions of knowledge while treating indigenous ways of knowing as epistemically subordinate. This colonial architecture is not accidental; it reflects what Couldry and Mejias (2019) term data colonialism, the systematic appropriation of human experience through datafication, normalizing the exploitation of communities and their knowledge systems for capital accumulation, just as historic colonialism appropriated territory and resources for profit.

Contemporary AI governance frameworks, whether rooted in the European Union's General Data Protection Regulation model of individual privacy rights or Silicon Valley paradigms of



profit maximization, have been developed overwhelmingly within Global North normative paradigms, with limited or no perspectives from African, indigenous, and other marginalized epistemic communities (Ayana et al., 2024; Ofosu-Asare, 2024). The design, governance, and regulation of AI remain concentrated among a small number of actors in the United States, China, and Western Europe, which Ofosu-Asare (2024) describes as epistemic monopolies, resulting in global ethical AI frameworks that reflect the values and power asymmetries of technologically advanced, economically dominant actors. Systems trained predominantly on Western corpora encode cultural and linguistic biases that sustain epistemic hierarchies, systematically surfacing Western knowledge systems as global academic and technological norms (Frontiers in Education, 2026). As Lewis et al. (2024) argue, the field of AI has been largely built on Western rationalist epistemologies that exclude many ways of knowing the world and therefore cannot provide a sufficient foundation for adequately, robustly, and humanely conceptualizing intelligence for all of humanity.

The extractive logics embedded in AI governance manifest most acutely through data commodification and algorithmic surveillance, processes that Roberts and Montoya (2023) connect directly to colonial data mining, wherein indigenous voices are systematically excluded from the development of technologies that rely on and profit from their data. The CARE Principles for Indigenous Data Governance, affirming Collective Benefit, Authority to Control, Responsibility, and Ethics, have emerged as a counter-framework to challenge the colonial appropriation of indigenous knowledge, asserting that data sovereignty is an extension of indigenous peoples' fundamental right to self-determination (Carroll et al., 2021; Global Indigenous Data Alliance, 2023). Yet these principles remain largely aspirational in most national AI strategy frameworks, which continue to treat indigenous knowledge as a resource to be extracted rather than as a foundation of governance itself.

NAISR 2.0 and the Philippine Context

The Philippines' National AI Strategy Roadmap 2.0, officially launched on July 3, 2024, by the Department of Trade and Industry under the mandate of the Tatak Pinoy Act, exemplifies this global disconnect between technological ambition and indigenous cultural sovereignty (Department of Trade and Industry, 2024). NAISR 2.0, co-supported by the Asian Development Bank and endorsed by major technology corporations including Google, AWS, and Microsoft, positions the Philippines as a regional AI Center of Excellence, articulating seven strategic imperatives centered on economic competitiveness, generative AI integration, workforce transformation, data access, and research and development (Department of Trade and Industry, 2024; Digital Policy Alert, 2024). The roadmap projects that widespread AI adoption could contribute up to PHP 2.6 trillion (approximately USD 44.5 billion) to the national GDP annually, underscoring AI's predominantly economic orientation (Department of Trade and Industry, 2024).

While NAISR 2.0 acknowledges ethics and governance as an emerging theme, its strategic imperatives reveal a structural gap: the roadmap aligns Philippine AI policy with international standards such as the EU AI Act and international regulatory norms, yet systematically overlooks the cultural sovereignty protections mandated under Republic Act 8371, the Indigenous Peoples' Rights Act of 1997, which requires meaningful representation and participation of indigenous peoples in governance processes affecting their communities (National Commission on Indigenous Peoples, 1997). The Philippine Statistics Authority (2020) estimates that indigenous peoples constitute approximately 14 to 17 percent of the national

population, representing over 110 ethnolinguistic groups whose knowledge systems, governance traditions, and relational ethics remain structurally absent from NAISR 2.0's framework. This omission constitutes a replication of colonial hierarchies in digital form, where the economic imperatives of technological modernity override the cultural sovereignty rights of historically marginalized communities.

Indigenous Peoples Mandatory Representatives, elected under IPRA to protect cultural sovereignty and ensure indigenous participation in governance, remain conspicuously sidelined in AI discourse despite their statutory mandate (National Commission on Indigenous Peoples, 1997). The concentration of NAISR 2.0's implementation within the DTI, Bangko Sentral ng Pilipinas, and technology industry partners, without meaningful consultation with IPMRs or indigenous community organizations, reflects what Mohamed et al. (2020) identify as predatory inclusion: the nominal representation of marginalized groups within systems designed primarily to serve dominant interests. Perera et al. (2025) argue that the potential incommensurability between AI systems and indigenous knowledge frameworks constitutes a form of epistemic violence, erasing sacred knowledge, disrupting intergenerational transmission, and imposing technological rationality on communities whose governance has historically been organized around relational rather than extractive logics.

Kalinga Relational Ethics as Decolonial Counter-Framework

Against this backdrop, Kalinga Province offers a profound and undertheorized resource for decolonial AI governance. The Bodong peace-pact institution, one of Southeast Asia's most enduring indigenous conflict-resolution systems mediating inter-tribal relations among the Kalinga for centuries, embeds a sophisticated relational ethics rooted in three core values: Paniyaw, encompassing divine moral prohibitions establishing sacred boundaries that render certain acts categorically impermissible; Ngilin, encompassing stewardship and restraint through taboos governing human-nature and human-community relations; and Bain, encompassing reciprocity enacted through communal solidarity and mutual obligation (Fiar-od, 2016; Scott, 2009).

Global Indigenous AI Critiques and the Philippine Research Gap

The urgency of integrating indigenous knowledge into AI governance has been affirmed across global contexts. In Aotearoa New Zealand, *kaitiakitanga*, the Māori concept of guardianship and stewardship, has been operationalized in AI governance frameworks to prioritize environmental sustainability, data sovereignty, and community well-being over narrow optimization metrics (Taiuru, 2024; Brown et al., 2024). Similarly, Ubuntu ethics in African contexts, emphasizing relational humanity and communal flourishing, has been advanced as a viable complementary ethical framework for AI governance that addresses epistemic injustices arising from the exclusion of African values from dominant AI discourse (Springer Ethics and Information Technology, 2025; Birhane, 2023). The 2025 United Nations International Day of the World's Indigenous Peoples, themed Indigenous Peoples and AI: Defending Rights, Shaping Futures, marked a watershed moment in affirming that indigenous communities are not passive subjects of AI's consequences but active rights-holders who must shape AI governance from the ground up (Cultural Survival, 2025).

However, as Ofosu-Asare (2024) and Khurana (2025) document, decolonial applications of indigenous AI ethics remain critically scarce in Southeast Asian and Philippine contexts, leaving NAISR 2.0's ethical deficits without indigenous-centered correctives. The Decolonial AI

Sovereignty model proposed by Pradhan and Dey (2025) argues that indigenous governance of AI must extend beyond data inclusion to encompass full epistemic jurisdiction, including the right to refuse participation in extractive digital systems, a right analogous to Paniyaw's absolute prohibitions. Yet these theoretical frameworks have not yet been translated into concrete policy alternatives for the Philippines, where the intersection of IPRA mandates, indigenous governance traditions, and the national AI strategy creates a unique and urgently understudied site of decolonial practice.

Research Objectives

The present study, grounded in this critical gap, centered the perspectives of IPMRs as statutory governance actors with both cultural authority and legal mandate, in critiquing Western extractivism as encoded in NAISR 2.0 and proposing indigenous-centered alternatives grounded in the Paniyaw-Ngilin-Bain triad. Specifically, the study aimed to: (1) determine the level of IPMR awareness and familiarity with Western AI strategies using descriptive statistics;

(2) measure the level of IPMR agreement on the applicability of Paniyaw, Ngilin, and Bain to AI ethics domains; (3) determine the extent to which IPMR awareness of Western AI strategies predicted their affirmation of the triad as ethical governance frameworks; (4) assess respondents' perceptions of the feasibility of operationalizing the triad; (5) determine the extent to which IPMRs' awareness related to their support for operationalizing the triad; and (6) elicit IPMRs' lived interpretations of how Paniyaw, Ngilin, and Bain established non-negotiable ethical boundaries against Western AI extractivism.

2. METHODS

Research Design

This study employed a mixed-methods convergent parallel design, integrating quantitative and qualitative approaches to explore IPMRs' perspectives on decolonizing Philippine AI policy through the Paniyaw-Ngilin-Bain ethical triad. The convergent parallel design allowed for the simultaneous collection and independent analysis of quantitative and qualitative data, which were subsequently triangulated to produce a more complete and mutually validating account of the research phenomena than either strand could produce alone (Creswell & Creswell, 2018). Quantitative data provided measurable insights into awareness levels, agreement thresholds, and perceptions of feasibility, while qualitative data captured lived interpretations and decolonial critiques. This design was consistent with Smith's (2012) decolonizing methodologies, which position indigenous community members as knowledge producers rather than research subjects and prioritize integrating quantitative precision with qualitative narrative richness in research affecting indigenous communities.

Locale of the Study

The research was conducted in the municipalities of Tinglayan, Lubuagan, Pasil, Balbalan, and Tanudan, and the chartered City of Tabuk within the Province of Kalinga, Cordillera Administrative Region, Philippines. These localities were selected because they are predominantly Kalinga-inhabited areas where IPMR institutions are established under IPRA and where ancestral knowledge systems, including the Bodong institution, continue to inform local governance practices (TESDA CAR, 2023).

Respondents and Informants

The quantitative strand surveyed 94 IPMRs who held formal mandates to represent Kalinga interests in government, were actively engaged in, or were affected by, AI and data policy issues, and served as living interpreters of Paniyaw, Ngilin, and Bain as ethical systems. The demographic profile of respondents showed that the majority were older adults aged 56 and above (59.6%), with most having served as IPMRs for one to three years (68.1%). Educational attainment ranged from elementary to postgraduate levels, with high school graduates forming the plurality at 40.4%. The City of Tabuk contributed the largest proportion of respondents at 32.98%, followed by Tinglayan at 15.96%.

For the qualitative strand, the municipal IPMRs and one provincial IPMR were included as key informants. This decision was justified by the small and specialized population of higher-level IPMRs in the province, who were directly involved in legislative participation, policy advocacy, and coordination with local government units. Their inclusion as the complete population of higher-level IPMRs in the province strengthened the credibility of the qualitative findings and ensured that perspectives came from those most closely engaged in governance and decision-making processes, consistent with the qualitative design's prioritization of depth, relevance, and richness of information over large sample size (Patton, 2015).

Data Collection Instruments and Procedures

Data collection combined structured questionnaires, semi-structured interviews with conversational guides, and indigenous-guided focus groups, all conducted in accordance with local cultural protocols. The structured questionnaire measured awareness of AI and NAISR 2.0, agreement with Paniyaw-Ngilin-Bain grounded policy reforms, and perceptions of the feasibility of indigenous-centered AI governance. Semi-structured interviews and indigenous-guided focus groups explored AI understandings, value alignments, perceived benefits and harms, and invited relational storytelling within indigenous-centered methodological approaches, consistent with Datta's (2018) and Gerlach's (2018) frameworks for relational and indigenous research.

Data were gathered across all six research sites through researcher-administered questionnaire distribution, followed by semi-structured individual interviews and focus group sessions with key informants. The study adhered throughout to indigenous community protocols, secured free, prior, and informed consent from all participants, and ensured that research outputs would be returned to participating communities in accessible and usable forms, consistent with the CARE Principles for Indigenous Data Governance (Carroll et al., 2021).

Data Analysis

The study employed a mixed-methods analytical approach, blending quantitative descriptive tools with qualitative interpretive techniques. For Objectives 1 and 2, descriptive statistics, specifically means and standard deviations for awareness levels and Likert-scale means with a threshold of 4.0 and above for strong agreement on Paniyaw-Ngilin-Bain applicability, provided baseline summaries of IPMR perceptions. Objective 3 utilized multiple regression analysis to test the predictive relationship between IPMR awareness of Western AI strategies and their affirmation of the Kalinga triad. Objectives 4 and 5 employed composite scoring and Pearson correlation analysis to examine relationships among awareness, agreement, and feasibility constructs. The qualitative strand utilized thematic analysis of semi-structured interviews and focus group data, with codes developed inductively from respondent narratives and organized

into subthemes and major themes through iterative analytical cycles consistent with decolonizing methodological approaches (Smith, 2012; Thambinathan & Kinsella, 2021). Triangulation of quantitative and qualitative findings was conducted following the convergent parallel design protocol to assess the degree of confirmation and complementarity across methodological strands (Creswell & Creswell, 2018).

3. RESULTS

IPMR Awareness and Familiarity with Western AI Strategies

Indigenous IPMRs demonstrated limited yet emerging familiarity with Western AI policies and data protection frameworks, with a grand mean of 2.56 and a standard deviation of 0.71, interpreted descriptively as Slightly Familiar. Respondents showed relatively stronger recognition of broad AI concepts, registering a mean of 2.81 and interpreted as Moderately Familiar, and AI-related discussions in media and community forums, registering a mean of 2.76 and also interpreted as Moderately Familiar, compared to specific legal instruments. Familiarity with the General Data Protection Regulation scored the lowest at a mean of 2.24 and was interpreted as Slightly Familiar, while awareness of NAISR 2.0 registered a mean of 2.64 and was interpreted as Moderately Familiar. The concrete influence of Western AI ethics and policy documents on AI-related initiatives in their communities was the second-lowest-scoring indicator, with a mean of 2.33, indicating Slightly Familiar.

This pattern of higher general and lower technical-legal familiarity aligns with international evidence that complex legal-technical frameworks such as the GDPR and the EU AI Act are much less widely understood than general ideas about AI, even within Europe (Ntoutsis et al., 2020; Brkan, 2019; Veale et al., 2018). Research on marginalized and underserved groups similarly documents low baseline AI literacy and limited policy awareness, emphasizing the importance of targeted, context-sensitive educational interventions (Bahangulu & Owusu Berko, 2025; Okada et al., 2025). Literature focusing specifically on indigenous peoples and AI further suggests that Western policy debates around instruments such as the GDPR and the EU AI Act often unfold with minimal indigenous participation and are rarely translated into local epistemologies, languages, and governance traditions (Perera et al., 2025; Srivastava & Upadhyay, 2024).

IPMR Agreement on the Applicability of Paniyaw, Ngilin, and Bain

IPMRs expressed a very high level of confidence in Paniyaw, Ngilin, and Bain as a strong ethical foundation for governing AI, as reflected in the overall strongly agree rating with a grand mean of 4.42 and a standard deviation of 0.47. The strongest endorsements were recorded for the framework's role in safeguarding indigenous knowledge against AI-driven erosion or misrepresentation (mean 4.64) and for its overall suitability as an ethical guide for AI projects involving their communities (mean 4.61). Respondents strongly affirmed that Paniyaw, Ngilin, and Bain could direct how AI systems collect, store, and share indigenous data, scoring a mean of 4.26, and could significantly reduce the risk of data misuse or data grabbing, scoring a mean of 4.43. The framework's compatibility with the CARE Principles for Indigenous Data Governance was strongly affirmed, with a mean of 4.53, while its capacity to ensure AI projects address community-defined rather than externally determined priorities registered the second-highest individual score, at 4.49. Only the first indicator, regarding PNB as a strong basis for indigenous data sovereignty, fell below the strongly agree threshold at a mean of 3.96, interpreted as Agree.

These findings closely mirror international work on indigenous data sovereignty and the CARE Principles, which emphasize indigenous control over data, resistance to extractive digital colonialism, and clear mechanisms for benefit-sharing and accountability in AI research and deployment (Carroll et al., 2020; Rana, 2024; Roy et al., 2025; Carroll et al., 2021). The high agreement on environmental stewardship, scoring a mean of 4.39, and assessment of AI's impacts on indigenous territories, scoring a mean of 4.46, resonates with research linking indigenous ecological ethics and data sovereignty to AI applications in biodiversity conservation, climate adaptation, and environmental management (Tella et al., 2025; Lewis et al., 2024; Jennings et al., 2023).

Regression Analysis: Predictors of Framework Affirmation

Regression analysis indicated that IPMR awareness of Western AI strategies was a modest but statistically significant predictor of their affirmation of Paniyaw, Ngilin, and Bain, with the relationship varying across specific indicators of awareness. General familiarity with AI ($B = 0.156$, $\beta = 0.309$, $t = 2.043$, $p = .044$) and familiarity with basic AI policy terms such as data protection and algorithmic bias ($B = 0.181$, $\beta = 0.318$, $t = 2.197$, $p = .031$) both showed positive and significant coefficients, suggesting that greater general familiarity with AI concepts and policy terminology was associated with stronger affirmation of the indigenous ethical frameworks. In contrast, the perceived influence of Western AI ethics or policy documents on AI-related projects in the community ($B = -0.165$, $\beta = -0.276$, $t = -1.997$, $p = .049$) yielded a negative and significant coefficient, indicating that the more IPMRs perceived Western AI ethics documents as shaping local AI projects, the less they affirmed Paniyaw, Ngilin, and Bain as central ethical anchors.

Other predictors, including NAISR 2.0 familiarity, GDPR familiarity, and awareness of how GDPR affected AI systems, showed non-significant effects ($p > .05$), implying that broad exposure to national AI policy and data protection regimes alone did not meaningfully shape IPMRs' affirmation of the Kalinga triad. The dual pattern of results, in which general AI awareness and literacy in AI policy terminology strengthened affirmation of indigenous ethical frameworks while the perceived influence of Western AI ethics on local projects weakened it, aligns with critiques of epistemic colonialism in AI governance, which argue that Western-centric policy framings often marginalize indigenous knowledge systems and governance logics (Mohamed et al., 2020; Napier et al., 2022).

Feasibility Perceptions

Respondents generally viewed the operationalization of Paniyaw, Ngilin, and Bain as feasible, particularly at the community level, with a grand mean of 3.96 and a standard deviation of 0.34, indicating agreement. Items reflecting internal community capacity registered the highest scores: lack of technical expertise in AI as a major barrier scored the highest at a mean of 4.72 and was interpreted as Strongly Agree, indicating universal recognition of this constraint; the capacity to scale from pilot projects to regional or national initiatives scored a mean of 4.47 and was interpreted as Strongly Agree; community capacity and resources for applying the framework scored a mean of 4.44 and was interpreted as Strongly Agree; and the feasibility of monitoring AI systems for bias, equity, and cultural safety using PNB scored a mean of 4.44 and was interpreted as Strongly Agree. The framework's realistic implementation within three to five years was affirmed at a mean of 4.43 and interpreted as Strongly Agree.

However, the feasibility outlook became critical when questions shifted to external institutional actors and existing legal frameworks. Respondents disagreed that AI developers and institutions were willing to follow their community's data governance rules, scoring a mean of 2.60 and interpreted as Disagree, and that existing national AI or data protection laws supported the implementation of Paniyaw, Ngilin, and Bain, scoring a mean of 2.37 and interpreted as Disagree. These findings echo critiques of epistemic colonialism in AI governance, where global and national regulatory frameworks privilege Western legal and technical logics over indigenous knowledge systems and self-governance norms (Mohamed et al., 2020; Research Support, UQ, 2023). The tension between normative feasibility and structural feasibility suggests that successful operationalization of the triad requires both internal capacity-building and external policy alignment (PIDS, 2020; GIDA, 2022).

Correlation Analysis: Relationships Among Awareness, Agreement, and Feasibility

Pearson correlation analysis revealed that all three pairwise relationships among mean awareness of Western AI strategies, mean agreement on PNB applicability, and mean feasibility perceptions of operationalization were statistically significant at the conventional alpha level.

The correlation between mean awareness and mean agreement was positive and statistically significant ($r = .272$, $p = .008$, $N = 94$), indicating that IPMRs who were more familiar with Western AI governance frameworks tended to express stronger agreement that the Paniyaw-Ngilin-Bain triad was applicable to AI ethics domains. The correlation between mean awareness and mean feasibility perceptions was similarly positive and statistically significant ($r = .282$, $p =$

$.006$, $N = 94$), suggesting that greater familiarity with Western AI frameworks was associated with stronger rather than weaker confidence in the operationalizability of indigenous alternatives. The strongest correlation in the matrix was between mean agreement on applicability and mean feasibility perceptions ($r = .408$, $p = .000$, $N = 94$), indicating that IPMRs who more strongly agreed that PNB was applicable to AI ethics also tended to perceive its practical implementation as more feasible, suggesting that belief in the framework's ethical legitimacy and belief in its practical viability were mutually reinforcing dispositions.

Qualitative Findings: PNB as Sacred Ethical Foundations

Thematic analysis of the qualitative data identified four major themes that converged to establish Paniyaw, Ngilin, and Bain (PNB) as sacred ethical foundations governing indigenous engagement with AI. The first major theme, PNB as sacred ethical foundations, encompassed subthemes of PNB as guiding principles, spiritual accountability through respect for Kabunyan, the sacred relationship with land and nature, community harmony through Bain, and moral restraint as a dimension of Bain. Respondents consistently described PNB not as mere cultural preferences but as enduring moral imperatives governing daily life and decision-making, rooted in accountability to Kabunyan, the Supreme Creator of the Universe, and in the sacred character of land, water, air, and food.

The second major theme, AI as a threat to indigenous ethics, encompassed the subthemes of exclusion of indigenous authority, unauthorized use of knowledge through data extraction, and misinformation through false or misleading AI outputs. Respondents described AI systems as frequently collecting, reproducing, and circulating information without consulting the elders or community members who held authority over such knowledge, and as presenting indigenous concepts such as the Bodong and Pagta in generic or inaccurate ways that constituted

violations of cultural authority and collective responsibility rather than mere technical inaccuracies.

The third major theme, red lines in AI engagement, encompassed the subthemes of sacred knowledge protection, misrepresentation of Bodong and Pagta, and non-negotiable ethical boundaries defined by PNB. Respondents articulated clear and specific ethical limits on permissible AI engagement with indigenous knowledge, with Ngilin associated with respect for the sacred character of environmental relationships and Bain associated with the exercise of self-restraint to avoid harmful actions against people, nature, and the spiritual order.

The fourth major theme encompassed the subthemes of AI serving the communal good through truth, peace, and justice; the critique of profit-driven logic as fundamentally contrary to indigenous values; and the consequences of boundary crossing, including cultural harm and damage to communal integrity. Respondents articulated a clear counter-vision: AI that served truth, peace, and justice, governed by consent, stewardship, and reciprocity, rather than by profit and extraction.

4. DISCUSSION

Triangulation of Findings

The triangulation of quantitative and qualitative findings across the study's objectives revealed a coherent, mutually reinforcing body of evidence consistently affirming the Paniyaw-Ngilin-Bain triad as a legitimate, applicable, and urgently necessary ethical framework for governing AI in indigenous Philippine contexts. Rather than producing contradictory findings, the two methodological strands converged at every major analytical point, constituting what Creswell and Creswell (2018) describe as a confirmatory mixed-methods outcome, in which independent data sources arrive at the same substantive conclusions through different epistemological routes, thereby strengthening the study's overall credibility and transferability.

The quantitative finding that IPMRs were only Slightly Familiar with Western AI governance frameworks overall was directly confirmed by the qualitative strand, where respondents described their encounter with AI not through the language of regulatory instruments but through the language of moral violation and sacred responsibility, speaking of systems that extracted community data without elder consultation, reproduced indigenous concepts without verification, and circulated knowledge without consent. This pattern confirmed Perera et al.'s (2025) finding that indigenous communities experienced the downstream consequences of AI systems without awareness of the upstream policy decisions that produced them, a condition of epistemic dispossession that the awareness scores in this study empirically documented.

The overwhelmingly strong applicability agreement, with a grand mean of 4.42 and a particularly high score on knowledge protection at a mean of 4.64, found its deepest explanation in the qualitative data, where respondents described PNB not as cultural preferences but as sacred ethical imperatives rooted in accountability to Kabunyan and the preservation of sacred relationships among human beings, land, water, and communal life. The high quantitative agreement on knowledge protection reflects what Carroll et al. (2020) and Rana (2024) describe as indigenous data sovereignty grounded in spiritual and relational accountability: the belief that certain knowledge is sacred and that its unauthorized extraction constitutes a moral violation rather than a technical irregularity.

The regression results were triangulated with equal precision. The two significant positive predictors, general AI familiarity and AI policy terminology literacy, found their qualitative parallel in respondents' capacity to critically name and contrast AI's extractive profit logic against indigenous values of truth, peace, and justice, demonstrating the form of critical AI literacy that Freire (1970) theorizes as conscientization and that Ayana et al. (2024) document as enabling marginalized governance actors to generate indigenous alternatives through informed critique of dominant frameworks. Conversely, the significant negative predictor of perceived Western AI influence on local projects found its qualitative explanation in the theme of epistemic colonialism and governance demoralization, where AI operating without consultation or accountability to indigenous authority produced not a stronger indigenous affirmation but a sense that Western frameworks were already determining outcomes.

The feasibility findings revealed a bifurcation fully triangulated across both strands. Quantitatively, IPMRs strongly affirmed community capacity, monitoring feasibility, scalability, and the feasibility of realistic implementation within three to five years, while simultaneously disagreeing that AI developers would follow community governance rules and that national laws supported PNB implementation. The qualitative strand articulated this tension directly: respondents expressed unwavering confidence in PNB's authority, rooted in Kabunyan and the Bodong institution, while doubting the willingness of Western developers and the Philippine state to subordinate technological and economic interests to indigenous governance. This mapped precisely onto what Roberts and Montoya (2023) identify as the fundamental asymmetry of indigenous data governance: communities possess the normative foundations but are denied institutional leverage without external policy alignment.

Theoretical Implications

The study's findings carry significant theoretical implications for the decolonial AI governance literature. The pattern of significant positive correlations among awareness, agreement, and feasibility, with the agreement-feasibility correlation at $r = .408$ being the strongest in the matrix, established that indigenous governance actors did not need to choose between epistemic engagement with Western AI systems and affirmation of indigenous alternatives. On the contrary, the data suggested that these orientations were complementary: the more IPMRs knew about Western AI governance, the more strongly they affirmed the Paniyaw-Ngilin-Bain framework, and the more they affirmed it, the more confidently they envisioned its operationalization as a practical reality within Philippine AI policy.

This finding resonated deeply with Lewis et al.'s (2024) argument that indigenous knowledge systems functioned as integrated architectures of meaning rather than discrete ethical prescriptions: when governance actors perceived a framework as genuinely applicable to the problems they faced, they simultaneously perceived it as actionable, because the framework's relational logic generated its own implementation pathway through existing community institutions and deliberative practices. In the Kalinga context, IPMRs who recognized the alignment between Paniyaw's prohibitive ethics and AI data governance, between Ngilin's stewardship logic and environmental accountability in AI systems, and between Bain's reciprocal solidarity and benefit-sharing requirements were also more likely to see the Bodong's existing mechanisms, including Pagta covenant-making and Sipat community oversight, as ready institutional vehicles for operationalization (Fiar-od, 2016; Vecaldo et al., 2015).

The strength of the agreement-feasibility correlation, relative to the two awareness-based correlations, also suggested that the pathway from awareness to feasibility was largely mediated by agreement, positioning the applicability assessment as a critical intermediate variable in the study's overall explanatory model. This mediation logic was consistent with Carroll et al.'s (2021) CARE framework, which argued that indigenous communities' capacity to govern AI systems derived first and foremost from their recognition of their own frameworks as legitimate and applicable, a recognition that then translated into the confidence and institutional will to operationalize those frameworks against the resistance of dominant paradigms.

5. CONCLUSION AND RECOMMENDATIONS

Conclusions

The study demonstrated that IPMRs in Kalinga were not merely aware of Western AI strategies in a limited sense but also recognized the ethical and governance gaps that these frameworks left unaddressed in indigenous contexts. While respondents reported only slight familiarity with specific Western legal and policy instruments overall, they strongly affirmed the relevance of Paniyaw, Ngilin, and Bain as a culturally grounded and ethically sound framework for AI governance, indicating that indigenous ethical reasoning remained robust and highly relevant even amid rapidly changing technological systems.

The quantitative results demonstrated that awareness of Western AI strategies was positively associated with support for operationalizing the Kalinga core values. Greater conceptual awareness of AI could strengthen indigenous ethical affirmation, but the visible dominance of Western frameworks in local settings might weaken confidence in indigenous-centered governance if not carefully contextualized. Respondents viewed the operationalization of Paniyaw, Ngilin, and Bain as feasible in practice, especially at the community level, affirming sufficient internal capacity, the possibility of monitoring AI for bias and cultural safety, and the scalability of the framework to broader initiatives. However, they also identified serious structural constraints, particularly a lack of technical expertise, insufficient funding, and limited support from AI developers and existing laws.

The qualitative findings established that Paniyaw, Ngilin, and Bain were understood by IPMRs as sacred ethical boundaries protecting community data, cultural knowledge, and spiritual integrity from extractive AI practices. The

study concluded that Paniyaw, Ngilin, and Bain provided a legitimate indigenous ethical architecture for AI governance in the Philippines, but their successful operationalization depended on genuine recognition by government, developers, and policy institutions, as well as sustained indigenous leadership and community-centered capacity-building.

Recommendations

For IPMRs. IPMRs should prioritize strengthening AI literacy within indigenous ethical frameworks and learning about Western AI policies, including NAISR 2.0 and GDPR, through lenses that affirm Paniyaw, Ngilin, and Bain as complementary ethical boundaries rather than alternatives. They should create community manuals or position papers that translate the triad into AI consent protocols, bias audits, and benefit-sharing rules, using Bodong and Pagta as enforcement mechanisms, and should demand representation in municipal AI planning sessions, insisting on FPIC for data use and veto rights over projects that violate PNB ethical red lines.

For Local Government Units. LGUs should integrate PNB into local AI and data policies by amending barangay, municipal, and provincial development plans to mandate Paniyaw-Ngilin-Bain impact assessments for AI projects, similar to Environmental Impact Assessment requirements. They should allocate dedicated funding for IPMR AI training, technical partnerships with universities, and pilot projects operationalizing PNB in local data governance, and should establish IPMR-led AI ethics committees with veto power over data-extractive projects, aligning with UNESCO AI ethics standards and national IPRA compliance requirements.

For Researchers. Researchers should conduct action research implementing Paniyaw-Ngilin-Bain in Kalinga AI applications, such as land mapping and environmental monitoring, and measure outcomes against Western benchmarks. Comparative studies should be replicated across other Cordillera indigenous cultural communities, including Ibaloy and Kankanaey, to develop a regional indigenous AI ethics charter, and findings should be translated into accessible policy briefs advocating PNB as a model for NAISR 2.0's indigenous inclusion clause.

For Future Researchers. Longitudinal feasibility-tracking studies should be conducted over the next three to five years to assess progress in operationalizing PNB and address the funding and technical barriers identified in this study. Broader comparisons across Philippine indigenous cultural communities examining how other groups adapt their ethical systems to AI would contribute to building a national indigenous AI governance taxonomy, and experimental designs testing PNB-infused AI prototypes against global standards would validate the scalability claims supported by the present study's findings.

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