

Digital Sovereignty as Social Justice: Protecting African Maritime Commons in the Age of AI

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Abstract

The rapid digitalization of the African maritime domain has ushered in a period of unprecedented data extraction that threatens the integrity of the marine commons. While foreign-funded surveillance infrastructures proliferate across the Gulf of Guinea, they simultaneously expose deep institutional vulnerabilities and facilitate a modern form of digital colonialism. This paper examines the critical dissonance between established maritime obligations under the United Nations Convention on the Law of the Sea and the opaque practices of private artificial intelligence systems. By framing maritime data as a vital form of indigenous knowledge and a cultural commodity, this paper addresses the scholarly gap regarding who exerts communicative power over algorithmic insights derived from Global South marine environments. Through socio-legal analysis, the study demonstrates that the current international legal architecture fails to protect the digital agency of coastal communities against the encroachment of proprietary systems. Drawing upon theories of digital hegemony, it contextualizes how these power dynamics disrupt the flow of strategic information. The paper proposes the adoption of Blue Data Trusts as a necessary fiduciary framework to ensure transparency and accountability. By outlining specific legal and contractual mechanisms, it provides a blueprint for aligning digital infrastructure with African Sustainable Development Goals. This work contributes a novel conceptual framework for digital sovereignty as a form of social justice, offering scholars in the digital humanities and legal studies a pragmatic approach to reclaiming authority over the maritime commons in the age of artificial intelligence.

Keywords: Digital Sovereignty, Data Colonialism; Maritime Law, AI Governance, Blue Economy, Data Trust

1. Introduction

The governance of the world's oceans is increasingly mediated through digital technologies. Artificial intelligence (AI), satellite observation systems, machine learning, autonomous monitoring devices, and advanced geospatial analytics now play a central role in fisheries management, maritime security, environmental monitoring, marine conservation, and shipping operations. These technologies depend upon vast quantities of maritime environmental data generated from sensors, satellites, underwater networks, remote sensing platforms, and other digital infrastructures (Jahanbakht et al., 2021). As ocean governance becomes increasingly data-driven, maritime data are no longer merely scientific inputs. They have emerged as strategic resources capable of generating economic value, regulatory influence, and geopolitical advantage through AI-enabled analysis and prediction (Bakker, 2022).

Recent developments in marine AI demonstrate the transformative potential of these technologies. AI systems can process large volumes of oceanographic, ecological, and navigational data to support fisheries forecasting, biodiversity monitoring, maritime surveillance, pollution detection, and conservation planning (Ditria et al.). In many respects, these innovations promise significant benefits for sustainable ocean governance. They offer opportunities to improve environmental monitoring, strengthen maritime domain awareness, and enhance the management of increasingly complex marine ecosystems (Khaskheli et al., 2023; Adeola, 2025). Yet the growing reliance on AI also raises important questions about ownership, control, and access to the data and algorithmic outputs upon which these systems depend.

These questions are particularly significant in the African context. Much of the digital infrastructure used to collect, process, and analyse maritime data remains concentrated within foreign technology firms, satellite operators, multinational research networks, and transnational digital platforms. While African states contribute valuable environmental, fisheries, and navigational data through their coastal and maritime spaces, the economic and strategic value generated from those data is frequently realised elsewhere. It may therefore be suggested that a new form of enclosure is emerging within the maritime commons. Unlike traditional enclosure, which centred on physical resources and territorial control, contemporary forms operate through the extraction, processing, and commercialization of data. The result is a situation in which algorithmic knowledge derived from African maritime environments may be controlled by actors who remain largely outside local regulatory and accountability structures.

A growing body of scholarship has begun to conceptualise these developments through the lenses of data sovereignty and digital colonialism. Data sovereignty literature generally argues that meaningful control over data constitutes an increasingly important dimension of political, economic, and social autonomy (Hummel et al., 2021; Yusuf, 2024). From this perspective, sovereignty extends beyond territorial jurisdiction and encompasses the ability of states, communities, and other stakeholders to determine how data are collected, used, shared, and commercialised. Scholars examining digital colonialism advance a related but more critical argument. They contend that contemporary digital infrastructures often reproduce historical patterns of extraction by concentrating control over data, technological capabilities, and knowledge production within powerful actors located primarily in the Global North (Mwema & Birhane, 2024; Effoduh, 2025). While the mechanisms differ from earlier forms of colonial exploitation, the underlying concern remains similar. Value generated from local resources is

frequently appropriated elsewhere, often without corresponding mechanisms for accountability or equitable benefit sharing.

Nevertheless, the relationship between data governance and sovereignty remains contested. Some scholars argue that extensive data sharing is essential for scientific collaboration, technological innovation, and effective responses to transboundary environmental challenges (Khaskheli et al., 2023). Marine ecosystems do not conform to political boundaries, and many forms of environmental monitoring depend upon the integration of large-scale datasets across jurisdictions. From this perspective, restrictive approaches to data governance risk fragmenting scientific cooperation and limiting innovation. This argument carries considerable force, particularly in the context of climate change and marine conservation. However, it does not fully resolve questions concerning the distribution of benefits, the governance of AI-generated insights, or the concentration of decision-making power within private technological infrastructures. Open access to data and equitable governance of data are not necessarily synonymous. The challenge therefore lies in balancing the legitimate benefits of data sharing with safeguards against new forms of technological dependency.

Although debates surrounding data sovereignty, digital colonialism, and AI governance continue to expand, a significant gap remains within existing scholarship. International maritime law and digital governance scholarship have largely evolved as separate fields of inquiry. The United Nations Convention on the Law of the Sea (UNCLOS) remains the foundational legal framework governing maritime spaces and marine resource management. Yet UNCLOS was negotiated long before the emergence of contemporary data economies and provides limited guidance regarding ownership, control, and commercial exploitation of AI-generated maritime intelligence (Khaskheli et al., 2023; Alam et al., 2024). At the same time, emerging scholarship on AI governance increasingly addresses issues such as data ownership, algorithmic accountability, intellectual property, and private regulation, but rarely considers how these questions operate within maritime spaces or affect developing coastal states (Johansson et al., 2021; Nwanosike, 2025). Consequently, the intersection between maritime governance and private AI governance remains insufficiently explored.

This gap has important implications for African maritime governance. As AI becomes embedded within blue economy initiatives, fisheries management systems, maritime surveillance programmes, and environmental governance frameworks, uncertainty surrounding the legal status of maritime data risks reinforcing existing asymmetries in knowledge production and technological power. The position becomes particularly concerning where local communities, coastal states, and indigenous knowledge holders possess limited influence over how maritime data are transformed into commercially valuable algorithmic assets. Such developments raise broader questions concerning social justice, participation, accountability, and the future governance of the maritime commons.

This article examines digital sovereignty as a social justice concern within the governance of African maritime commons. It argues that existing legal and governance frameworks inadequately address the ownership and control of AI-generated maritime intelligence derived from African maritime environments. Drawing upon scholarship on data sovereignty, digital colonialism, maritime governance, and AI regulation, the article explores the normative gap between UNCLOS and emerging forms of private AI governance. It then advances the concept of a Blue Data Trust

as a potential governance mechanism capable of promoting transparency, accountability, and equitable benefit sharing while supporting sustainable and inclusive forms of ocean governance.

2. Theoretical Framework: Digital Hegemony, Data Colonialism and Digital Sovereignty

2.1 Digital Hegemony and the Political Economy of Data

The governance challenges associated with maritime artificial intelligence cannot be understood solely through technical or regulatory analysis. They are fundamentally questions of power. The increasing dependence of governments, industries, and communities on digital infrastructures has created new forms of influence that extend beyond traditional territorial control. In this context, data function not merely as information but as a strategic resource capable of shaping economic opportunities, regulatory decisions, and knowledge production.

The concept of digital hegemony provides a useful lens through which to understand these developments. Drawing from broader theories of hegemony, digital hegemony refers to the ability of dominant actors to shape the technological systems, standards, and knowledge structures through which social and economic life is organised. Control over digital infrastructures increasingly determines who can collect data, generate insights, and influence decision-making processes. Zuboff (2019) argues that contemporary digital economies are characterised by the extraction of behavioural data that are transformed into predictive products for commercial gain. While the study primarily focuses on surveillance capitalism, the underlying logic extends beyond individual consumer data. It may be suggested that similar dynamics are visible in maritime governance, where environmental, navigational, and fisheries data are increasingly converted into valuable algorithmic assets.

Recent scholarship on AI governance reinforces this concern. Emerging studies suggest that algorithmic systems do not merely process information. They structure the conditions under which information becomes actionable knowledge (Hassen, 2025; Nwanosike, 2025). Consequently, power increasingly resides not only in data collection but also in the capacity to transform data into predictive intelligence. This shift is significant because it relocates authority from traditional public institutions toward actors possessing the technological infrastructure and computational capacity necessary to generate algorithmic insights. In maritime contexts, where many African states remain dependent on externally developed technologies, this creates an asymmetrical distribution of power that existing legal frameworks have struggled to address.

Some scholars dispute the suggestion that digital concentration necessarily undermines sovereignty. Advocates of open digital ecosystems argue that global innovation depends upon the unrestricted flow of information and technological collaboration across jurisdictions (Khaskheli et al., 2023). From this perspective, concerns regarding digital dependence may be overstated because technological networks create opportunities for knowledge sharing, capacity building, and economic development. The position carries weight, particularly in fields such as climate science and marine conservation where transboundary cooperation is essential. Nevertheless, the argument often assumes that participation within digital networks automatically produces equitable outcomes. Existing evidence suggests otherwise. The benefits of AI-driven governance are frequently distributed unevenly, with decision-making authority concentrated among actors controlling technological infrastructures rather than those generating the underlying data (Hummel

et al., 2021; Effoduh, 2025). Consequently, questions of power remain central to understanding maritime AI governance.

2.2 Data Colonialism and Algorithmic Extraction

If digital hegemony explains how power operates, data colonialism helps explain how that power is exercised. Data colonialism refers to the systematic appropriation of human activity, social interactions, environmental information, and cultural knowledge through digital infrastructures that convert these resources into economic value. The concept does not suggest a direct equivalence between historical colonialism and contemporary digital practices. Rather, it highlights recurring patterns of extraction, dependency, and unequal value distribution that resemble earlier colonial relationships.

A growing body of scholarship argues that data extraction increasingly functions as a new frontier of accumulation. Birhane (2020) contends that many AI systems reproduce forms of epistemic domination by embedding assumptions, values, and classifications developed in Western contexts into societies with different cultural and historical experiences. Similar concerns appear in studies of digital infrastructures in Africa, where data generated within local communities often become resources for external technological actors with limited accountability to those communities (Mwema & Birhane, 2024; Effoduh, 2025). The concern is therefore not simply economic. It also relates to who defines knowledge, whose perspectives are represented within algorithmic systems, and who benefits from their deployment.

The concept of colonality provides additional theoretical depth to this analysis. Quijano's theory of the colonality of power argues that colonial relationships persist beyond formal political independence through enduring structures of knowledge, authority, and economic organisation (Quijano, 2000). Mignolo (2011) similarly argues that modern systems of knowledge production often privilege particular forms of expertise while marginalising alternative ways of knowing. Applied to maritime governance, these perspectives suggest that AI-generated knowledge should not automatically be regarded as neutral or objective. Algorithmic systems are shaped by choices concerning data collection, model design, and performance objectives. Where these choices occur outside the communities most affected by governance outcomes, existing inequalities may be reinforced rather than reduced.

The position remains contested. Critics of data colonialism argue that the concept risks overstating continuity between historical colonialism and contemporary technological development (Pohle et al., 2025). Others suggest that digital sovereignty narratives may conceal protectionist objectives or technological nationalism rather than genuine concerns about justice (Elms, 2021). These critiques deserve attention because not every instance of cross-border data use constitutes exploitation. However, they do not eliminate the underlying concern that value derived from data may be concentrated in ways that exclude data-generating communities from meaningful participation or benefit sharing. The central question is therefore not whether data should circulate internationally but whether governance frameworks adequately address the distributive consequences of that circulation.

2.3 Digital Sovereignty, Blue Justice and the Maritime Commons

The preceding discussion provides the foundation for understanding digital sovereignty as a social justice issue. Data sovereignty has been described as the capacity of individuals, communities, organisations, or states to exercise meaningful control over the collection, use, storage, and dissemination of data (Hummel et al., 2021). While sovereignty has traditionally been associated with territorial authority, contemporary scholarship increasingly recognises that control over data and digital infrastructures has become an important dimension of political autonomy (Lehuedé, 2024; Pierucci, 2025).

Within ocean governance, this issue intersects with emerging scholarship on blue justice and equity. Blue justice scholars argue that marine governance arrangements frequently reproduce social inequalities by excluding vulnerable coastal communities from decision-making processes and concentrating benefits among more powerful actors (Blythe et al., 2023; Crosman et al., 2022). Recent studies on AI and marine policymaking suggest that algorithmic systems may intensify these dynamics where data biases, capacity asymmetries, or unequal access to technology shape governance outcomes (Ziegler et al., 2025; Chapman et al., 2021). Similar concerns have emerged within fisheries governance, where access to AI technologies and data infrastructures often remains unevenly distributed between industrial actors and small-scale fishing communities (Iyiola et al., 2025).

These developments support the argument that maritime data should not be viewed solely as a commercial resource. Arguably, such data form part of a broader marine knowledge commons upon which coastal livelihoods, environmental sustainability, and public governance depend. If AI systems generate value from maritime environments while excluding affected communities from participation, oversight, or benefit sharing, the resulting governance arrangements raise questions of distributive, procedural, and recognitional justice (Chen et al., 2024). Digital sovereignty therefore becomes more than a question of state control. It becomes a mechanism through which communities may seek recognition, accountability, and equitable participation in the governance of data-driven maritime futures.

2.4 Applying the Framework to African Maritime Governance

Taken together, digital hegemony, data colonialism, and digital sovereignty provide a coherent framework for analysing AI governance in African maritime spaces. Digital hegemony explains how technological power becomes concentrated through control of digital infrastructures. Data colonialism reveals how value extraction can occur through asymmetrical data relationships. Digital sovereignty and blue justice provide the normative basis for evaluating whether these arrangements are compatible with principles of equity and self-determination.

This framework is particularly relevant to maritime governance because ocean data occupy an ambiguous position within existing legal regimes. UNCLOS encourages scientific cooperation and the sharing of marine scientific information, yet it was developed before the emergence of AI-driven data economies. Consequently, it offers limited guidance regarding ownership and control of algorithmic outputs derived from maritime data. The theoretical framework developed here therefore provides the foundation for examining the governance gap that emerges between international maritime law and contemporary systems of private AI governance. It also establishes the normative basis for the Blue Data Trust proposal developed later in this article.

3. Legal and Governance Analysis: Addressing the Regulatory Collision

The integration of artificial intelligence into maritime governance has outpaced international legal norms, creating a profound regulatory void. While the 1982 UNCLOS serves as the foundational architecture for ocean governance, it was conceived in a pre-digital era (Khaskheli et al., 2023; Rothwell & Stephens, 2023). Its primary focus on physical state activities leaves it ill-equipped to govern the intangible, algorithmic processes that define modern maritime intelligence (Khaskheli et al., 2025; Pastra et al., 2025). Within the Nigerian context, the maritime legal framework remains predicated on a physical conception of the ocean, which is insufficient for digitally mediated practices (Nwanosike, 2025). As these technologies become central to environmental monitoring, maritime data shifts from neutral information to commercially valuable assets (Iyiola et al., 2025; Nwanosike, 2025). The existing framework struggles to resolve questions of accountability, arguably allowing private algorithmic power to fill the vacuum left by public international law (Jiang et al., 2026; Wang et al., 2025).

Regulatory collision between traditional maritime law and private AI governance is most evident in the ambiguity surrounding marine scientific research. UNCLOS does not explicitly define this term, a deliberate omission by its drafters to avoid diplomatic disputes (Yu, 2023). This was manageable when research was a state-led, physical endeavor, but it becomes a significant liability in the age of autonomous platforms (Pastra et al., 2025). When private firms deploy AI-enabled autonomous underwater vehicles to collect high-frequency datasets, the distinction between scientific observation and commercial data-harvesting collapses (Khaskheli et al., 2025). Some scholars maintain that UNCLOS possesses sufficient open-textured provisions to accommodate these innovations through evolutive interpretation (Jiang et al., 2026; Siig et al., 2023). However, others argue that this flexible interpretation is inadequate to manage the risks of data privatization and algorithmic opacity (Maas, 2019; Taeiagh, 2021). The position remains contested, yet coastal states in the Global South often lack the jurisdictional levers to regulate proprietary predictive models generated from their own waters (Jiang et al., 2026).

This governance gap is compounded by a reliance on private law mechanisms to manage communal maritime resources. Because international law offers limited guidance on AI-generated intelligence, control is increasingly dictated by private contracts between technology suppliers and maritime operators (Johansson et al., 2021). These contracts often prioritize commercial confidentiality and intellectual property protections over public interest objectives of equity and sustainability (Schütz Veiga & Marcos, 2026; Abbott, 2022). In Nigeria, the Copyright Act 2022 and the Patents and Designs Act are predicated on human creativity, creating a legal gap regarding the status of AI-generated works (Obianyo, 2025; Oloko, 2025). The Copyright Act 2022 presents a critical case study in legislative stagnation, as current Nigerian law is firmly rooted in the anthropocentric paradigm, which requires a human author for the protection of copyrightable works (Obianyo, 2025). As AI systems increasingly generate maritime monitoring reports, predictive navigation models, and environmental baseline data, these outputs frequently fall into a legal limbo (Oloko, 2025). Because the Act does not contemplate machine-generated output, these assets are often treated as unprotected public domain materials, despite their high commercial value (Obianyo, 2025).

This statutory silence creates a doctrinal paradox. While maritime firms rely on copyright to protect their investments in data-driven insights, the lack of clear authorship criteria under the Copyright Act 2022 allows for the unauthorized appropriation of this intelligence by competitors (Oloko, 2025; Obianyo, 2025). The judicial system is currently unequipped to determine whether a human's role in prompting or training an AI constitutes sufficient originality to warrant protection (Obianyo, 2025). This uncertainty forces firms to rely on restrictive contractual protections rather than statutory rights, which inherently favors dominant technology suppliers over smaller, local maritime operators (Johansson & Argüello, 2026). Furthermore, the Patents and Designs Act remains similarly constrained, operating on the assumption of human inventorship and leaving the patentability of AI-derived technological processes in doubt (Oloko, 2025). If the Nigerian legal framework fails to modernize these intellectual property standards, the country risks losing control over its own maritime data. Foreign entities capable of deploying superior algorithmic infrastructure will continue to extract value from Nigerian waters while maintaining proprietary control over the resulting insights (Nwanosike, 2025). This scenario necessitates a legislative evolution that moves beyond human-centric definitions to recognize the unique status of AI-generated intelligence, perhaps by creating a *sui generis* category of rights that balances commercial incentives with the public interest (Obianyo, 2025; Oloko, 2025).

Recent international developments, specifically the Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ Agreement), demonstrate an emerging awareness of these deficits. The BBNJ Agreement represents a significant step by establishing frameworks for benefit-sharing, technology transfer, and the governance of digital sequence information (Lawson et al., 2025; Taghizadeh & Asgarian, 2024). By mandating notification mechanisms, the BBNJ Agreement attempts to bridge the gap between scientific advancement and equitable resource distribution (Broggiato et al., 2025; Humphries et al., 2025). Nevertheless, these advancements face hurdles. The reliance on patents and exclusivity-based rules can constrain the distributive goals of the agreement, potentially creating access barriers for states with limited scientific infrastructure (Schütz Veiga & Marcos, 2026; Marlow et al., 2026). Thus, while the BBNJ Agreement offers a model for future regulation, the tension between the freedom of marine scientific research and the common heritage of humankind remains unresolved (Humphries, 2025; Massimi, 2024).

Ultimately, the failure to adapt these frameworks leaves the maritime commons vulnerable to a new form of digital enclosure. The current landscape is one of regulatory fragmentation, where inconsistent national approaches are patched onto outdated international instruments (Khaskheli et al., 2025; Zaidan & Ibrahim, 2024). This fragmentation undermines the predictability of international law and obscures the structural injustice inherent in how AI-driven insights are harvested from African maritime environments (Zou et al., 2025; Iyiola et al., 2025). To achieve digital sovereignty, it may be suggested that a shift is required: moving beyond a purely technocentric view of data to one that recognizes AI-generated maritime intelligence as a strategic public good requiring transparency and mandatory benefit-sharing (Jiang et al., 2026; Nwanosike, 2025). Without such reforms, the digital transformation of the ocean risks deepening the inequalities that international maritime law was designed to mitigate.

4. African Maritime Commons: Digital Enclosure and the Crisis of Governance

The governance of Africa's maritime commons is increasingly caught in a struggle between the promise of technological surveillance and the persistent reality of institutional fragility. While emerging digital tools offer potential pathways to enhance maritime domain awareness and combat illicit activities such as illegal, unreported, and unregulated fishing, their implementation frequently occurs within a profound regulatory void. It may be suggested that the rapid digitalization of the maritime domain across the Gulf of Guinea outpaces the capacity of regional states to provide meaningful oversight, leaving critical infrastructure vulnerable to both external control and local neglect (Nwanosike, 2025; Okafor-Yarwood et al., 2024). This reliance on foreign-funded technological systems for maritime security arguably masks a deeper institutional failure, wherein the lack of indigenous data management capacity forces states into a precarious dependence on supra-regional actors (Okafor-Yarwood et al., 2024; Schandorf, 2024).

This regulatory collision is compounded by a persistent liability gap within regional counter-piracy architectures, such as the Yaoundé Architecture. While these mechanisms aim to harmonize information sharing, the reality often involves redundant and competing cooperative frameworks that prioritize administrative activity over functional enforcement (Schandorf, 2024; Tanimu, 2025). The position remains contested, as some observers argue that better technological integration is the primary solution to maritime insecurity (Goyal, 2025; Tachie-Menson, 2024). However, this technocentric focus often ignores the institutional realities of the Gulf of Guinea, where weak governance and systemic corruption create a culture of mistrust that prevents shipping and fishing entities from participating in data-sharing initiatives (Okafor-Yarwood et al., 2024; Adesanya, 2023). Criminal actors exploit these structural blind spots, moving fluidly across borders while states remain constrained by limited maritime domain awareness and incompatible administrative regimes (Adesanya, 2023; Duodu, 2025).

The integration of artificial intelligence into maritime governance further risks institutionalizing what some scholars describe as digital dispossession. By prioritizing abstract remote-sensing data over relational indigenous knowledge systems, contemporary ocean governance strategies often marginalize the lived experiences of coastal communities (Mbalisi & Nwaiwu, 2025; Ritts & Simpson, 2023). While proponents of AI-integrated environmental governance contend that artificial intelligence complements rather than replaces traditional ecological knowledge by enhancing predictive capabilities and improving environmental decision-making (Mbalisi & Nwaiwu, 2025; Johannes et al., 2025), practical implementation frequently reveals a different reality. Algorithmic frameworks, many of which are developed in Western technological contexts, are commonly deployed without adequate adaptation to local socio-cultural conditions. As a result, community-based management practices are sidelined, and indigenous ecological knowledge is progressively marginalized, contributing to the erosion of cultural heritage (Dike, 2025; Ofosu-Asare, 2025). Such digital interventions risk transforming the maritime commons into an enclosed digital space in which ownership and control of maritime data become concentrated in the hands of foreign technology providers, thereby weakening the digital sovereignty of African coastal states (Nwanosike, 2025; Okeke, 2025).

To move beyond this cycle of marginalization, it is imperative to move toward a hybrid governance model that emphasizes community-led design and epistemic justice. Policy frameworks must be restructured to integrate indigenous ecological intelligence alongside modern digital tools, ensuring that maritime intelligence functions as a strategic public good rather than a proprietary

asset (Mbalisi & Nwaiwu, 2025; Dike, 2025). Although some maintain that current flexible frameworks under the United Nations Convention on the Law of the Sea are sufficient to absorb these technological shifts, this view appears increasingly inadequate given the specific vulnerabilities of African coastal economies to data-driven exploitation (Adewumi & Suárez de Vivero, 2022; Nwanosike, 2025). The need for a cohesive, decolonized regulatory approach is critical to ensuring that the digital transformation of the maritime commons serves to empower, rather than disenfranchise, the populations that depend on these resources for their survival and development.

5. Discussion: Blue Data Trust Framework

The digitalization of the African maritime domain is not a neutral evolution of security capacity, but rather a significant regulatory rupture that exposes deep-seated institutional vulnerabilities. As evidenced by the rapid deployment of foreign-funded surveillance infrastructures, a clear liability gap has emerged within the Gulf of Guinea maritime governance regime (Nwanosike, 2025). This gap functions as a product of regime complexity, where the proliferation of overlapping regional frameworks, such as the Yaoundé Architecture, fails to account for the invisible power dynamics inherent in digital data flows (Schandorf, 2024; Larsen, 2026). When maritime domain awareness is outsourced to proprietary algorithmic systems, the resulting loss of local oversight effectively constitutes a form of digital dispossession, wherein the legal capacity to govern the maritime commons is systematically eroded (Nwanosike, 2025; Ritts & Simpson, 2023).

The structural reliance on these external technological frameworks serves to mask the absence of indigenous data management institutions, creating a state of precarious dependence. It may be suggested that the prevailing technocentric obsession with information sharing, without corresponding improvements in the legal architecture of accountability, reinforces the very asymmetries that existing international maritime law was designed to mitigate (Adesanya, 2023; Okafor-Yarwood et al., 2024). This creates a situation where criminal actors exploit the resulting institutional blindness, while the states themselves remain trapped in a cycle of data deficiency. The failure to treat maritime intelligence as a strategic public good rather than a proprietary commodity represents a significant doctrinal failure in the current blue economy transition (Duodu, 2025; Popoola & Olajuyigbe, 2023).

To reconcile these tensions, the adoption of Blue Data Trusts offers a necessary shift toward a hybrid governance model rooted in fiduciary responsibility. By inserting an independent intermediary between state interests and private technology providers, the data trust model directly addresses the lack of accountability inherent in current surveillance practices (Effoduh et al., 2024; Houser & Bagby, 2023). Unlike standard contract-based arrangements, which offer little protection for public interests, the fiduciary duty required by a data trust legally compels trustees to prioritize the collective benefit of coastal populations over the profit-seeking behaviors of technology firms (Zhao, 2025; Aldenhoff et al., 2026). This model provides a practical mechanism to implement the theoretical demands of decolonized AI governance, ensuring that digital tools are co-designed to protect, rather than colonize, indigenous ecological knowledge (Mbalisi & Nwaiwu, 2025; Ofosu-Asare, 2025).

The position that existing international conventions are sufficient to manage these risks remains contested and arguably inadequate. While proponents of flexible regulatory regimes emphasize the potential for technological innovation, they often overlook the epistemic dominance inherent in systems trained on Western-centric data (Ofosu-Asare, 2025; Okeke, 2025). As such, a decolonized approach is not merely a policy preference but an essential requirement to prevent the permanent marginalization of alternative, traditional maritime management practices (Mbalisi & Nwaiwu, 2025; Ray & Ray, 2026). Future governance must therefore transcend the current focus on administrative efficiency to embrace a more holistic, distributive framework that empowers coastal states to assert sovereignty over their digital maritime footprint.

5. Conclusion and Recommendations

The digitalization of the African maritime domain catalyzes a profound transformation in how we manage the ocean, yet this progress remains fraught with institutional instability. Our analysis indicates that current security strategies often prioritize administrative efficiency at the expense of necessary legal accountability. By relying on foreign proprietary surveillance systems without establishing local oversight mechanisms, coastal states inadvertently facilitate a form of digital dispossession. To move beyond this precarious dependence, the path forward requires a fundamental shift toward governance models that privilege equity, transparency, and the protection of Indigenous ecological knowledge.

To address these systemic vulnerabilities, the study therefore proposes three integrated recommendations for policymakers and regional institutions. First, states should formally transition toward the implementation of Blue Data Trusts to ensure that maritime intelligence functions as a strategic public good rather than a proprietary commodity. This model creates a necessary fiduciary buffer between private technology providers and state interests, compelling technical actors to prioritize the collective needs of coastal populations. Second, regional maritime authorities must integrate mandatory transparency and audit protocols for all algorithmic decision tools operating within their jurisdictions. This process requires aligning national policies with the African Union Continental AI Strategy to ensure that technological advancements reflect African values and local economic realities. Third, policymakers should formalize requirements for the co-design of data infrastructure to ensure that local communities retain authority over their marine areas, thereby preventing the marginalization of traditional fishing and management practices.

However, this research acknowledges certain limitations that invite significant avenues for future inquiry. The scope of this paper focused primarily on a doctrinal analysis of existing legal frameworks and governance trends. While this approach effectively highlights the structural fractures inherent in the current system, it lacks the empirical insights that could be gathered from practitioners, stakeholders, and community leaders directly involved in these maritime spaces. Consequently, the findings presented here would be greatly strengthened by future research that incorporates qualitative data derived from in-depth interviews.

Future scholars should prioritize direct engagement with coastal stakeholders to capture the lived realities of digital maritime surveillance on the ground. Such studies must investigate how traditional maritime actors perceive the encroaching influence of algorithmic systems and whether existing benefit-sharing mechanisms actually reach local fishing communities. Research should also explore the specific trust conditions, such as anonymity, restricted access, and reciprocal data exchange, that drive the willingness of fishers to participate in data sharing systems. By bridging

the gap between high-level legal theory and grassroots experience, subsequent scholarship can refine these governance models to better serve the people they are intended to protect. Ultimately, the future of the blue economy depends on our collective ability to govern the digital ocean through a lens of relational justice that respects local sovereignty and prioritizes long-term environmental resilience.

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