Strengthening ocean economic development: A multi-stakeholder approach

Harun Idham Akbar[1,5], *Kastana* Sapanli[1,2], *Ario* Damar[3,4], *Wiwin* Ambarwulan[5], and *Tridoyo* Kusumastanto[2,3*]

[1]Graduate Program of Tropical Ocean Economics, Faculty of Economics and Management, Bogor, IPB University, Indonesia
[2]Department of Resource and Environmental Economics, Faculty of Economics and Management, Bogor, IPB University, Indonesia
[3]Center for Coastal and Marine Resources Studies, Bogor, IPB University, Indonesia
[4]Department of Aquatic Resources Management, Faculty of Fisheries and Marine Sciences, Bogor, IPB University, Indonesia
[5]Research Center for Limnology and Water Resources, Research Organization for Earth Sciences and Maritime, Bogor, National Research and Innovation Agency, Indonesia

Abstract. Sustainable development of Ocean Economy Sectors (OES) requires not only sectoral progress but also an effective multi-stakeholder approach. Yet, existing studies on OES governance often emphasize economic indicators while overlooking stakeholder influence, dependence, and alignment. This study addresses that gap by analyzing seven sectors in Daerah Khusus Jakarta (DKJ): fisheries, marine tourism, mining, maritime industry, marine transportation, marine construction, and marine services through a multi-stakeholder approach. Data were collected through a cross-sectional survey using quantitative and qualitative methods, with thirty respondents from key stakeholder groups in North Jakarta, where OES activities are concentrated. The Matrix of Alliances and Conflicts: Tactics, Objectives, and Recommendations (MACTOR) method was applied, offering a framework for mapping relations. Influence (Ii) and dependence (Di) scores were derived through pairwise comparisons, using weighted values to capture direct and indirect relationships. Results encompass stakeholder identification and classification (nine groups, central government most influential, settler communities least), OES contributions in DKJ's GRDP (marine construction highest at 42.5%, marine services lowest at <0.01%), the influence–dependence matrix (governmental dominance, limited community power), analysis of relations (moderate convergence 2.5, divergence 1.5), strategic recommendations emphasizing a multi-stakeholder approach, and implications for a sustainable ocean economy in DKJ.

* Corresponding author: tridoyo@apps.ipb.ac.id

1 Introduction

Sustainable development in ocean economies requires the integration of diverse sectors to achieve ecological, economic, and social benefits. Stakeholder synergy is central to this process, fostering collaboration across seven Ocean Economy Sectors (OES): (1) fisheries, (2) marine tourism, (3) mining, (4) maritime industry, (5) marine transportation, (6) marine construction, and (7) marine services [1]. In Indonesia, regional economic performance is commonly measured through the Gross Regional Domestic Product (GRDP). For the Special Region of Jakarta (Daerah Khusus Jakarta, DKJ), GRDP data indicate that OES contribute substantially to the regional economy, underscoring the importance of embedding these sectors into sustainable development planning [2]. This linkage between GRDP and OES provides a quantitative foundation for aligning coastal economic growth with ecological sustainability.

Nevertheless, natural resource management within OES faces complex challenges, particularly the tension between short-term economic priorities and long-term environmental conservation. Human-induced changes such as pollution, over exploitation, and climate change threaten the sustainability of marine resources [3]. Empirical studies in Jakarta Bay reveal significant degradation of mangrove ecosystems critical for carbon storage and shoreline protection due to land conversion and coastal development [4]. Furthermore, research on policies and community empowerment highlights that effective management depends on stakeholder synergy and inclusive governance [5].

Numerous studies on the ocean economy have been conducted across various countries, including Indonesia, primarily focusing on macroeconomic aspects or governance structure analysis in isolation. However, research that integrates stakeholder mapping with sectoral regional GRDP performance remains very limited. This is particularly evident in the case of DKJ, which serves as the center of governance and national trade in Indonesia, located in a vulnerable coastal zone undergoing rapid urbanization. To address this gap, the present study develops an integrated framework that links quantitative stakeholder analysis (influence–dependence modeling based on MACTOR) with GRDP performance. The objectives of this research are threefold: (1) to map the influence and interdependencies among stakeholders in the OES, (2) to analyze the relationship between stakeholder power structures and regional GRDP performance, and (3) to identify governance gaps and strategic pathways for sustainable ocean economic development. The findings are expected to be replicable for other coastal urban management contexts. Accordingly, this study provides profound insights for policymakers on coastal sustainability by prioritizing a multi-stakeholder approach.

2 Materials and methods

2.1 Study area

DKJ located between latitude 6°00'–6°30' S and longitude 106°30'–107°10' E, encompasses five administrative areas: Central, North, East, West, and South Jakarta, bordering the Java Sea to the north, Bogor Regency and Depok City to the south, Bekasi City to the east, and Tangerang City to the west. Covering 664.01 km², it serves as Indonesia's hub for business, politics, and culture, with a complex socio-economic landscape marked by a 2024 Gini Index of 0.431, per capita income of about IDR 60 million (the nation's highest), and a poverty rate of 3.6% in 2023. With a population of 11.1 million growing at 1.2% annually, DKJ faces mounting pressure on infrastructure and public services, while its 4.9% economic growth contributes 16.7% to Indonesia's GDP. In this context, synergy among stakeholders is vital to advance OES through policies that balance growth with sustainability.

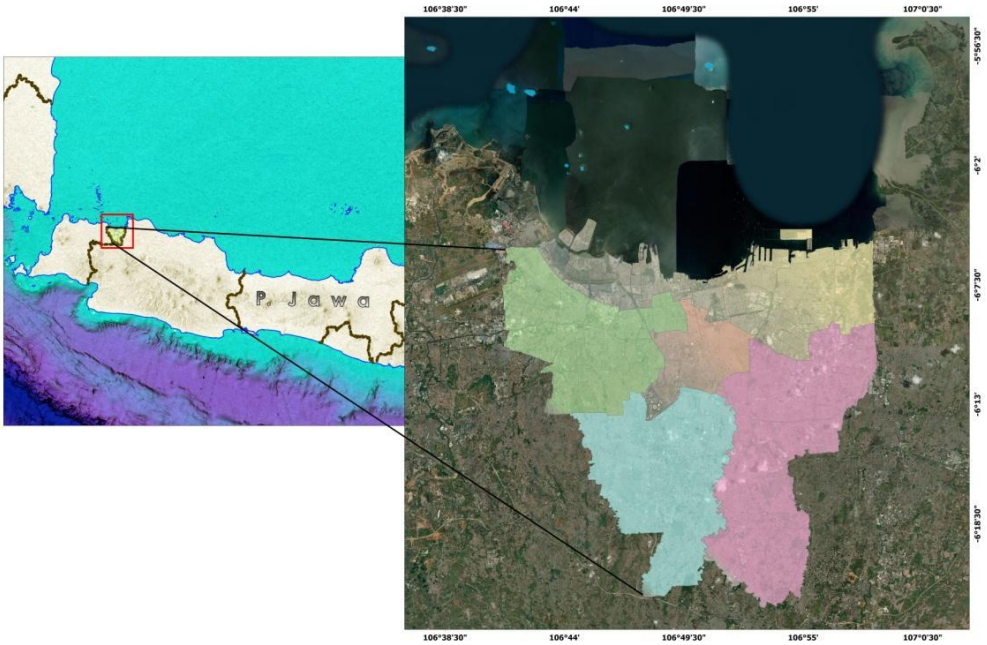

Fig. 1. Research location in DKJ (Daerah Khusus Jakarta).

2.2 Data collection

This study employed a cross-sectional survey research method with both quantitative and qualitative approaches, involving respondents aged 18 years and older. The sample size was determined to be 30, guided by principles of stakeholder mapping and data saturation commonly applied in qualitative research. In stakeholder analysis, the adequacy of the sample is not solely based on statistical distribution assumptions, but rather on the point at which additional respondents no longer yield new insights into stakeholder roles, relationships, and interdependencies [6]. Primary data were collected through interviews with key stakeholders in North Jakarta, specifically in Penjaringan, Pademangan, Tanjung Priok, Koja, and Cilincing where most OES are concentrated, while secondary data were drawn from the 2024 GRDP of DKJ published by BPS Jakarta and supplemented with national and international publications [7]. A purposive sampling approach was applied to select respondents, including individuals, groups, and organizations engaged in processes, activities, or systems within the OES of DKJ.

2.3 Data analysis

The collected data were processed using the Matrix of Alliances and Conflicts: Tactics, Objectives, and Recommendations (MACTOR) method. Stakeholders were categorized into nine groups: (1) central government (CentGov), (2) Jakarta provincial government (ProvGov), (3) private sector (Private), (4) coastal communities (CoastComm), (5) NGOs, (6) researchers, (7) international organizations (IntOrg), (8) settler communities (SettComm), and (9) law enforcement (LawEnf). Their objectives for strengthening ocean economic development were aligned with sustainability indicators, including (1) sustainable fisheries exploitation, (2) diversification of ocean industries, (3) governance against IUU activities (4) marine research and innovation hubs, (5) coastal protection and climate adaptation, (6)

community empowerment, (7) blue finance mobilization, (8) alignment with global frameworks, (9) training and capacity building, (10) transparency in governance, (11) integration of marine spatial planning, (12) pollution reduction, (13) digitalization of ocean systems, and (14) equity in benefit sharing

Subsequently, an influence/dependence matrix was constructed to assess stakeholder power and dependency. While GRDP sectoral contributions were not direct input variables in MACTOR, they were incorporated as contextual indicators of influence, highlighting how economic weight reinforces or limits stakeholder power.

3 Results and discussion

3.1 Stakeholder identification and classification

Data collected from the stakeholder identification process provided the empirical foundation for mapping the principal stakeholders and their differentiated roles across the seven OES. Systematic classification of stakeholder interests and influence levels enabled the disentangling of complex interrelationships and highlighted the most critical determinants of sectoral integration in ocean governance. The results of stakeholder identification and classification, showing varying levels of influence across the seven OES, are presented in Table 1.

Table 1. Stakeholder identification and classification by OES.

No.	Stakeholder	Interest	Related OES	Influence Level
1	Central Government	National policy, regulation, funding	All sectors (1-7)	Very High
2	Jakarta Provincial Government	Regional implementation, coordination	Fisheries, marine tourism, marine transportation, marine construction, and marine services	High
3	Private Sector	Investment, innovation, business development	All sectors (1-7)	High
4	Coastal Communities	Resource use, local governance, livelihoods	Fisheries, Marine tourism, Marine services	Medium
5	Non-Governmental Organizations	Advocacy, transparency, community empowerment	Fisheries, Marine tourism, Marine services	Medium
6	Researchers	Scientific data, innovation, evidence-based input	All sectors (1-7)	Medium
7	International Organizations	Technical support, funding, global frameworks	Fisheries, mining, maritime industry, marine transportation, marine services	High
8	Settler Communities	Settlement, local development	Fisheries, marine tourism, marine construction, marine services	Low
9	Law Enforcement	Compliance, maritime security, IUU monitoring	Fisheries, maritime industry, marine transportation, marine services	High

The stakeholder classification presented in Table 1 highlights three tiers of influence defined by power and interest. At the highest level, stakeholders such as the Central Government, Provincial Government, Private Sector, International Organizations, and Law Enforcement hold formal authority and strategic capacity to shape policies, regulations, and resource allocation, making them decisive players in ocean governance. Medium-influence stakeholders, including Coastal Communities, NGOs, and Researchers lack full authority but contribute significantly by shaping public opinion, providing data, and advocating sustainability, functioning as context setters that build legitimacy and support [8]. At the lowest level, Settler Communities represent beneficiaries with limited control over policy outcomes, yet their acceptance remains critical, as effective communication with grassroots groups often determines the success of governance initiatives [9]. This stratification underscores the need to manage powerful stakeholders intensively while ensuring inclusive engagement with medium- and low-influence stakeholders to achieve sustainable integration across OES.

3.2 OES indicator contribution in DKJ

The ocean economy contributes approximately 22.6 percent to the GRDP of DKJ (Rp 2,848,652 billion) consistent with national analyses that emphasize the growing role of marine-based activities in Indonesia's economic development and their importance for sustainability [10]. The sectoral distribution of this contribution is presented in Fig. 2.

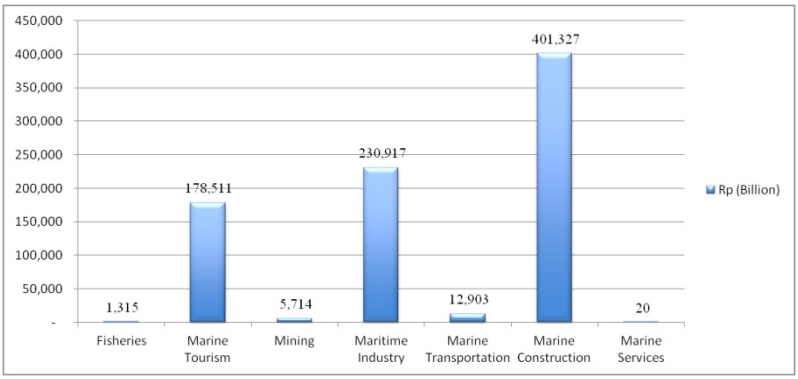

Fig. 2. GRDP contribution by sector in the ocean economy.

As shown in Fig. 2, the highest contributors to Jakarta's ocean economy are marine construction and the maritime industry, reflecting their dominant role in driving regional growth. In contrast, the lowest contributors are fisheries and marine services, which remain relatively modest in their economic share compared to other sectors [11]. This disparity underscores the importance of adopting a multi-stakeholder approach to strengthen all Ocean Economy Sectors, ensuring inclusive governance and sustainable outcomes [12].

3.3 Influence-Dependence matrix

As a critical instrument in stakeholder analysis, the Influence-Dependence Matrix serves to map the levels of influence and dependence among stakeholders within a system. This matrix enables researchers and policymakers to comprehend the dynamics of power relations, potential alliances, and vulnerabilities that emerge from stakeholder interactions. Through the MACTOR approach, stakeholder relationships can be systematically identified, as presented in Fig. 3.

MDI	CentGov	ProvGov	Private	CoastComm	NGOs	Research	IntOrg	SettComm	LawEnf
CentGov	0	4	3	2	3	3	4	1	2
ProvGov	2	0	3	3	2	2	1	2	3
Private	2	2	0	1	1	2	2	1	2
CoastComm	1	2	1	0	2	1	1	3	1
NGOs	1	2	1	2	0	2	3	2	2
Research	2	2	2	1	2	0	3	1	1
IntOrg	3	2	3	1	3	4	0	1	2
SettComm	1	2	1	3	2	1	1	0	1
LawEnf	2	3	2	1	2	1	1	1	0

Fig. 3. The matrix of direct influence (MDI).

The scoring procedure normalized stakeholder interactions on a 0–4 scale, aggregated into influence and dependence scores. The matrix was constructed as a 9×9 cross-tabulation of stakeholders, with diagonal zeros and balanced totals (Σrows = Σcolumns = 136). Validation was ensured through consistency checks, reliability testing, and sensitivity analysis. Numerically, Central Government scored highest in influence (23), NGOs in dependence (20), while Private stakeholders showed the lowest influence (9). These results confirm reproducibility and highlight the dominant role of government, the bridging function of international organizations, and the dependency of NGOs and research institutions. The extended matrix captures both direct and indirect relationships, offering a broader perspective on how influence flows across stakeholders. The results of this analysis are presented in Fig. 4.

MDII	CentGov	ProvGov	Private	CoastComm	NGOs	Research	IntOrg	SettComm	LawEnf	Ii
CentGov	14	17	16	12	16	16	16	11	14	118
ProvGov	12	16	13	13	14	12	12	12	13	101
Private	13	13	13	10	13	12	11	9	12	93
CoastComm	9	11	9	12	11	10	9	12	10	81
NGOs	13	14	13	11	15	12	11	11	11	96
Research	13	13	13	11	13	14	13	10	13	99
IntOrg	14	15	15	11	15	16	15	10	13	109
SettComm	9	11	9	12	11	10	9	12	10	81
LawEnf	11	13	12	12	11	12	11	10	13	92
Di	94	107	100	92	104	100	92	85	96	870

Fig. 4. The matrix of direct and indirect influence (MDII).

The stakeholder with the highest level of influence is the Central Government (Ii = 118), followed by International Organizations (Ii = 109), and Jakarta Provincial Government (Ii = 101). This indicates that these three stakeholders function as primary drivers within the system, possessing substantial capacity to shape policy directions and the dynamics among other stakeholders. Conversely, in terms of dependence Jakarta Provincial Government (Di = 107), NGOs (Di = 104), Private Sector and Researchers (Di = 100) occupy the highest positions. This suggests that they are more strongly influenced by other stakeholders, thereby tending to assume a more reactive rather than proactive role. In contrast, Settler Communities (Ii = 81, Di = 85) exhibit the lowest scores, reflecting limited involvement and relative isolation within the network of influence. Building upon the matrix results, the stakeholder configuration is further clarified through the map presented below. Fig. 5 presents the map

of influence and dependence, showing the Central Government and International Organizations as dominant with high influence and low dependence, Provincial Government with high influence and high dependence, NGOs, Researchers and Private Sector in balanced but constrained positions. Law Enforcement, Coastal Communities, and Settler Communities remain peripheral, with low influence and low dependence, underscoring their marginal role in decision making.

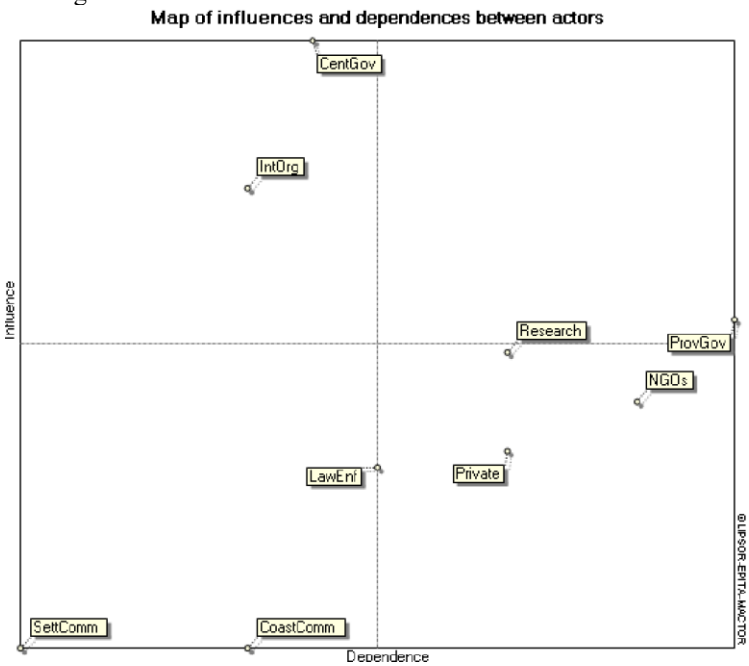

Fig. 5. Map of influences and dependences between stakeholders.

3.4 Analysis of stakeholder dynamics and strategic recommendations for multi-stakeholders synergy

Stakeholder interactions reveal both cooperation and conflict that shape pathways for sustainable coastal management. The analysis distinguishes between convergence, reflecting alignment and collaboration, and divergence, highlighting conflicting interests that may hinder governance outcomes. The results are displayed in Fig. 6, showing stakeholder convergences (Fig. 6a), divergence patterns requiring careful management (Fig. 6b).

The matrix and the network diagram in Fig. 6 offer a comprehensive quantitative picture of stakeholder dynamics. The matrix establishes the hierarchy of influence and dependence, while the network diagram demonstrates how these positions translate into actual relational structures. The Central Government's high influence score is mirrored by its dense and strong connections, confirming its systemic dominance. NGOs and Research Institutions, though less powerful numerically, gain relevance through their bridging roles. At the same time, peripheral actors such as Coastal Communities and Law Enforcement are consistently marginalized both in terms of scores and network position. Previous studies highlight that influence-dependence matrices provide insights into power asymmetries and support inclusive decision-making in complex socio-ecological systems [13]. Building on these insights, the findings from the MACTOR analysis reinforce the need for a multi-stakeholder approach that integrates economic, ecological, and social objectives. To operationalize this approach, clear strategic recommendations are required. Derived directly from the

quantitative evidence and relational patterns identified in the analysis, these recommendations translate abstract governance principles into actionable measures. They are presented in Table 2.

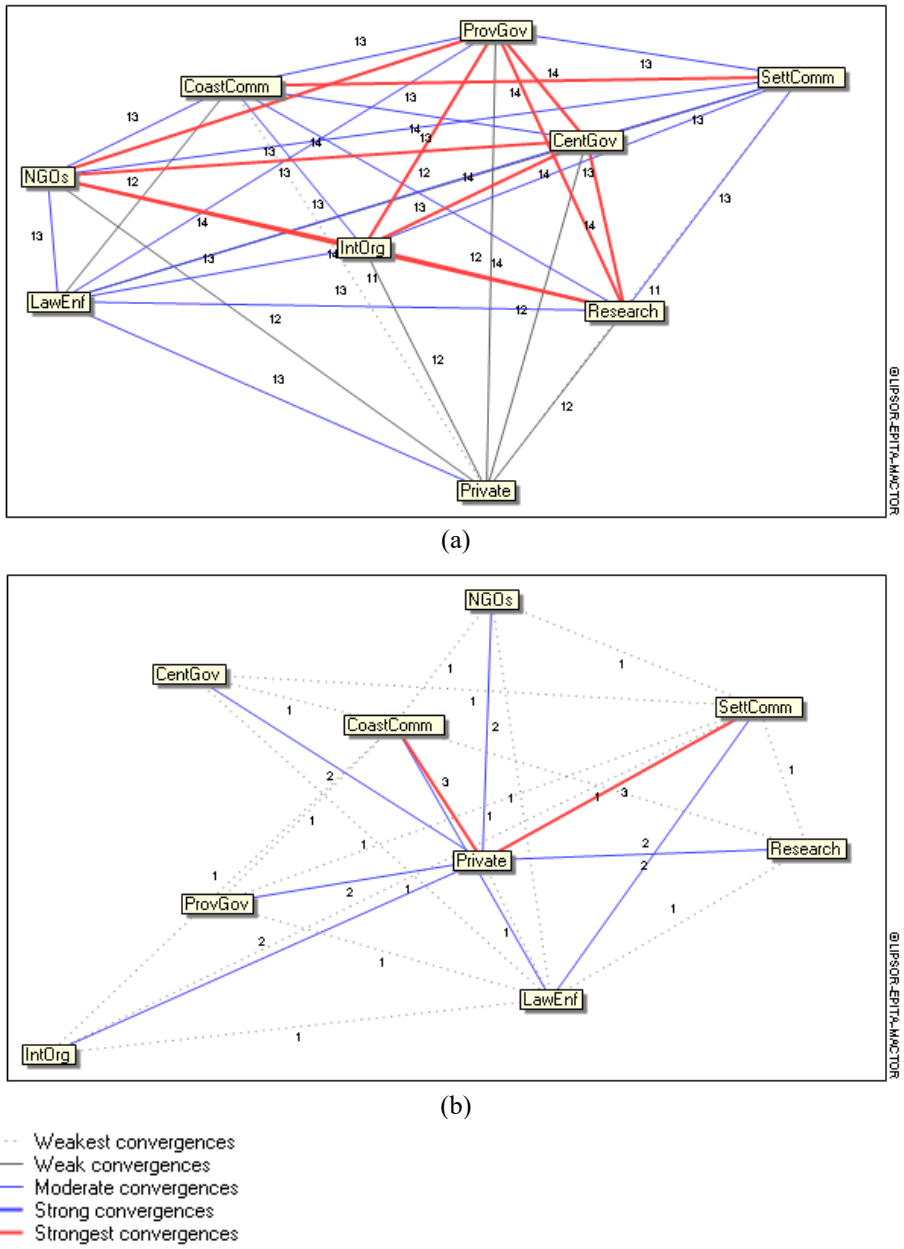

Fig. 6. (a) Convergences between stakeholders and (b) Divergences between stakeholders.

Table 2. Strategic recommendations for a multi-stakeholder approach to synergy.

No.	Strategic Focus	Recommendation	Expected Outcome
1	Rebalancing stakeholder influence	Elevate the role of communities, NGOs, and researchers through formal councils and participatory forums	More equitable distribution of influence and legitimacy in decision-making
2	Integrating ecological and social objectives	Embed ecological and social indicators into ocean economy governance frameworks	Alignment of economic growth with sustainability and social equity
3	Strengthening institutional capacity	Provide funding for applied marine research and community-based monitoring programs	Enhanced evidence-based policymaking and stronger institutional resilience
4	Addressing stakeholder ambivalence	Establish adaptive dialogue platforms and conflict-resolution mechanism	Constructive negotiation of competing priorities and reduced stakeholder conflict
5	Embedding sustainable practices	Introduce incentives such as green financing, certification, and ecological offsets	Private sector alignment with sustainability goals and long-term economic stability

3.5 Implication for sustainable ocean economy in DKJ

The results of the MACTOR analysis reveal critical asymmetries in stakeholder involvement within the governance of the ocean economy in DKJ. The implications of these findings extend across the seven key sectors of the ocean economy, each requiring tailored strategies to reconcile convergence, divergence, and ambivalence among stakeholders. These sectoral implications highlight the importance of aligning stakeholder configurations with the economic structure of the ocean economy. In particular, the correlation between Gross Regional Domestic Product (GRDP), key stakeholders, and strategic focus provides a more integrated perspective on governance priorities. Table 3 presents this correlation, offering a systematic linkage between economic performance and stakeholder engagement in the DKJ ocean economy.

The MACTOR analysis highlights significant asymmetries in stakeholder involvement within DKJ's ocean economy. The private sector exerts dominant influence, particularly in marine construction (42.5%), maritime industry (24.5%), and marine tourism (18.9%), while government agencies, NGOs, researchers, and local communities remain underrepresented. This concentration of economic value underscores the need to rebalance stakeholder roles and embed sustainable practices to avoid marginalizing ecological and social priorities.

In contrast, fisheries (0.1%) and marine services (<0.01%) contribute minimally to GRDP, yet their governance must still be considered to prevent exclusion from policy frameworks. Mining (0.6%), led by the central government, demands strategies to address

stakeholder ambivalence, while marine transportation (1.4%), under provincial authority, requires strengthened institutional capacity. These findings align with Kelly et al. and Niner et al., who emphasize interdisciplinary research and co-production of knowledge as foundations for legitimacy and collaborative governance [14, 15]. Overall, DKJ must align GRDP priorities with ecological and social objectives to achieve long-term sustainability.

Table 3. Correlation of GRDP, key stakeholders, and strategic focus in DKJ ocean economy.

No.	OES	GRDP Contribution (Rp Billion, % Share)	Dominant Stakeholder	Strategic Focus Alignment
1	Fisheries	1,315 (0.1%)	Coastal Communities	Integrating Ecological and Social Objectives
2	Marine tourism	178,511 (18.9%)	Private Sector	Integrating ecological and social objectives
3	Mining	5,714 (0.6%)	Central Government	Addressing stakeholder ambivalence
4	Maritime industry	230,917 (24.5%)	Private Sector	Embedding sustainable practices
5	Marine transportation	12,903 (1.4%)	Provincial Government	Strengthening institutional capacity
6	Marine construction	401,327 (42.5%)	Private Sector	Rebalancing stakeholder influence
7	Marine services	20 (<0.01%)	Private Sector	Embedding sustainable practices

4 Conclusion

This study provides a systematic mapping of stakeholder influence and interdependence within the ocean economy sectors of DKJ, offering both quantitative insights and methodological contributions. The influence–dependence matrix revealed critical asymmetries: the Central Government, International Organizations, and Jakarta Provincial Government emerged as primary drivers with high influence scores (Ii = 118, 109, and 101, respectively), while the Jakarta Provincial Government, NGOs, and the Private Sector together with Researchers (Di = 107, 104, and 100). Settler Communities, with the lowest scores (Ii = 81, Di = 85), were positioned at the periphery, underscoring their marginal role in governance. These findings highlight the uneven distribution of power and the need for a

multi-stakeholder approach that balances economic, ecological, and social priorities. The correlation analysis between stakeholder power structures and GRDP performance further demonstrated that sectors with concentrated influence, particularly those dominated by private stakeholders exhibit stronger economic outcomes but weaker inclusivity. Conversely, sectors with fragmented or underrepresented stakeholder involvement show governance gaps that hinder sustainable development. This linkage between GRDP and stakeholder asymmetries provides an explicit contribution to the literature by integrating economic performance metrics with governance analysis, thereby bridging institutional and economic dimensions of ocean economy research.

Methodologically, the study advances reproducibility by detailing the scoring procedures and matrix construction. Influence (Ii) and dependence (Di) scores were derived through pairwise comparisons of stakeholder interactions, using weighted values to capture both direct and indirect relationships. The MACTOR framework was employed to construct the matrix, ensuring that convergence, divergence, and ambivalence among stakeholders were systematically represented. Validation was conducted through consistency checks across multiple iterations, sensitivity analysis to test robustness under varying weight assignments, and reliability testing to confirm stability of stakeholder positioning. These procedures ensure that the analytical framework can be replicated in other socio-ecological contexts, thereby strengthening its scientific robustness. By explicitly linking quantitative stakeholder mapping with GRDP performance and validated methodological procedures, this study contributes a replicable framework for analyzing governance gaps and designing strategic pathways toward sustainable ocean economy development.

References

1. T. Kusumastanto, Ekonomi kelautan (Ocean economics – OCEANOMICS), (Pusat Kajian Sumberdaya Pesisir dan Lautan – Institut Pertanian Bogor, Bogor, 2002).
2. Badan Pusat Statistik Provinsi DKI Jakarta, Laporan Berita Resmi Statistik Provinsi DKI Jakarta Tahun 2024, (BPS Jakarta, Jakarta, 2024).
3. Barbier, Valuing ecosystem services for coastal wetland protection and restoration: progress and challenges. Resources. **2**, 213 (2013). https://doi.org/10.3390/resources2030213
4. Sudirman, M. Helmi, H.L. Salim, Geospatial modeling of blue carbon ecosystem coastal degradation in jakarta bay, indonesia. J. Oceanogr. **1**, 80 (2019). https://doi.org/10.14710/ijoce.v1i1.6266
5. Mindarti, A. Jonsa, S. Sjamsuddin, F. Amin, H.J. Ferdhianzah, Enhancing coastal resilience through policy implementation and community empowerment. Int. J. Innov. Res. Sci. Stud. **8**, 4764 (2025). https://doi.org/10.53894/ijirss.v8i3.7609
6. C. Wilson, M. Heide, J-P. Villeneuve, Mapping multi-stakeholder initiatives for public governance and transparency: A comparative assessment of trends and motivations. Policy Stud. **46**, 1 (2023), https://doi.org/10.1080/01442872.2023.2282569
7. Badan Pusat Statistik Provinsi DKI Jakarta, Produk Domestik Regional Bruto Provinsi DKI Jakarta menurut lapangan usaha 2020–2024, (BPS Jakarta, Jakarta, 2025). https://jakarta.bps.go.id/id/publication/2025/04/11/bebf2fbdd2fe415799964768/produk-domestik-regional-bruto-provinsi-dki-jakarta-menurut-lapangan-usaha-2020-2024.html
8. B. Matovu, F. Mahmoud, B. Mwabvu, A. Muyomba, S. Nalubega, Global Ocean governance and policy: Are current trends in research and collaboration networks invigorating toward sustainable ocean futures?. KMI Int. J. Marit. Aff. Fish. **16**, 77 (2024). https://doi.org/10.54007/ijmaf.e4

9. M.R. DesJardine, W. Shi, J. Westphal, Shareholder politics: The influence of investors' political affiliations on corporate social responsibility. J. Manage. **50**, 1569 (2023). https://doi.org/10.1177/01492063221151161
10. Wuwung, A. McIlgorm, M. Voyer, Sustainable Ocean development policies in Indonesia: Paving the pathways towards a maritime destiny. Front. Mar. Sci. **11**, 1401332 (2024). https://doi.org/10.3389/fmars.2024.1401332
11. K. Sapanli, T. Kusumastanto, S. Budiharsono, A. Sadelie, Dynamics and policies of Indonesia's ocean economic development, J. Kebijakan Sosial Ekon. Kelautan Perikanan **10**, 1 (2020).
12. Voyer, G. Quirk, A. McIlgorm, K. Azmi, Shades of blue: What do competing interpretations of the Blue Economy mean for oceans governance?. J. Environ. Policy Plan. **20**, 595 (2018). https://doi.org/10.1080/1523908X.2018.1473153
13. M.S. Reed, A. Graves, N. Dandy, H. Posthumus, K. Hubacek, J. Morris, C. Prell, C.H. Quinn, L.C. Stringer, Who's in and why? A typology of stakeholder analysis methods for natural resource management, J. Environ. Manage. **90**, 1933 (2009), https://doi.org/10.1016/j.jenvman.2009.01.001
14. R. Kelly, M. Mackay, K.L. Nash, C. Cvitanovic, E.H. Allison, D. Armitage, A. Bonn, S.J. Cooke, S. Frusher, E.A. Fulton, B.S. Halpern, P.F.M. Lopes, E.J. Milner-Gulland, M.A. Peck, G.T. Pecl, R.L. Stephenson, F. Werner, Ten tips for developing interdisciplinary socio-ecological researchers. Socio-Ecol. Pract. Res. **1**, 149 (2019). https://doi.org/10.1007/s42532-019-00018-2
15. H.J. Niner, D. Wilson, K. Hoareau, M. Strand, J. Whittingham, D. McGarry, B. Erinosho, S. Ibrahim, S. Tshiningayamwe, S. Febrica, A.M.S.N. Lancaster, M. Prokic, Reflections on the past, present, and potential futures of knowledge hierarchies in ocean biodiversity governance research. Front. Mar. Sci. **11**, 1347494 (2024). https://doi.org/10.3389/fmars.2024.1347494