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Complexities in the Development of Maritime Transport Through Special Autonomy Funds

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Abstract

The development of maritime transport is influenced not only by governance structures, but also by the complexity of policies arising from the interaction of various interrelated factors. In practice, policies often have cross-regional impacts, face funding constraints, and are supported by data systems that are not yet integrated. This study aims to analyse the complexity in the development of maritime transport through the Special Autonomy Fund in South Sorong Regency. The research employs a qualitative approach using a case study strategy. Data were collected through interviews, observations, and documentation, and subsequently analysed using an interactive model. The findings reveal that policy complexity is reflected in three key aspects. Firstly, externalities and spillover effects that result in uneven policy impacts across regions. Secondly, limited funding mechanisms that rely on higher levels of government. Third, data fragmentation hinders evidence-based decision-making processes. These three aspects interact with one another and form systemic complexity in policy governance. Policy complexity requires a more integrative and adaptive approach. Policy management cannot be carried out in a linear manner, but must be able to accommodate interactions between factors within a dynamic system.

Introduction

The development of maritime transport in South Sorong Regency not only raises issues of governance across different levels of government, as discussed previously, but also reveals a high degree of policy complexity (Salossa et al., 2025; Candra, 2025; Sinaga & Effendi, 2026). This complexity arises as a consequence of the interaction between various actors, conflicting interests, resource constraints, and the region's unique characteristics. In other words, the issues faced can no longer be understood in a linear manner, but rather as part of an interconnected and dynamic system.

Empirically, this complexity can be seen in how maritime transport policies do not merely impact a single sector or region, but also generate spillover effects that are not always well managed (Ceyhun et al., 2026; Sun et al., 2025; Chen et al., 2026). For example, the development of port infrastructure in one district is often not accompanied by improved connectivity with other regions, thereby limiting its benefits. In some cases, the existence of a port is not accompanied by sufficient economic activity, meaning that the infrastructure built does not function optimally. This demonstrates that policies implemented in one location do not automatically result in evenly distributed impacts across other regions (Hu et al., 2026; Zhao et al., 2025; Ma et al., 2023).

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Furthermore, this complexity is also reflected in funding issues. Although the Special Autonomy Fund (OTSUS) provides additional fiscal space for local governments, in practice its allocation and use are not entirely flexible (Gogo & Ochiga, 2025; Kustiani et al., 2026; Ohoiwutun, 2026). There are various regulations, sectoral priorities, and cross-level budgeting mechanisms that must be followed, often limiting local governments' ability to respond to specific and urgent needs. On the other hand, dependence on funding from the central and provincial governments also leads to delays in programme implementation and creates uncertainty in long-term planning.

This complexity is further evident in the management of data and information. In practice, maritime transport development planning still faces limitations regarding integrated data (Zou et al., 2025; Wu et al., 2025; Rauf & Dhanekula, 2026). Data on community needs, regional potential, and mobility patterns are not always available in a complete and accurate manner. Furthermore, data held by individual agencies is often not interconnected, thereby hindering evidence-based decision-making processes. This situation indicates that the issue lies not only in the availability of data, but also in ownership, access, and coordination in its management (Boukhatmi & Dhanekula, 2026; Pittri et al., 2026; Amrullah & Wening, 2026).

Moreover, complexity arises from the interactions between actors with differing interests and capacities (Upham et al., 2026; Ma et al., 2026; Vohryzek et al., 2022). The central, provincial, and district governments each have their own roles and authorities, yet they do not always align with the same policy direction. Differences in development priorities, limited coordination, and local political dynamics also influence how policies are formulated and implemented. Furthermore, the involvement of non-governmental actors, such as indigenous communities and business operators, adds another dimension to this complexity, particularly when existing interests are not entirely aligned (Islam & Jahan, 2025; Babugura et al., 2026; Khan et al., 2022).

The geographical characteristics of South Sorong Regency as a coastal and archipelagic region are also a key factor that compounds the complexity of policy-making. Challenging natural conditions, limited inter-regional access, and high dependence on maritime transport mean that every policy decision carries far-reaching consequences. In such a situation, sectoral and piecemeal policies tend to be ineffective, as they fail to address the interconnections between existing issues (Botah, 2023).

It can thus be seen empirically that the development of maritime transport in South Sorong Regency is taking place within a highly complex context, in terms of policy, institutional frameworks and regional conditions. This complexity not only reflects the multitude of actors and factors involved, but also indicates the existence of reciprocal relationships that are not always predictable. Consequently, an analytical approach is required that can explain these dynamics more comprehensively, particularly in understanding how the interaction between these factors influences the effectiveness of multilevel governance.

The theory of complexity in the study of multi-level governance stems from the idea that modern governance systems can no longer be explained solely through hierarchical or linear principles, but must be understood as complex adaptive systems that are dynamic, uncertain and often non-deterministic. In this context, governance is viewed as a system comprising numerous actors, institutions, and levels that interact simultaneously and adapt to changes in the environment.

According to Kumanan Wilson (2004), complexity in MLG reflects the existence of externalities and spillovers between regions, challenges in multi-level funding, as well as issues

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of data ownership and access, which are often unevenly distributed. This complexity leads to uncertainty in policy outcomes and difficulties in coordination between levels of government.

A similar perspective is outlined by Bovaird (2005), who emphasises the importance of viewing governance as a non-linear system, where feedback, uncertainty, and uncontrolled actor interactions create dynamics that cannot be predicted through classical rational approaches. This is relevant in the context of MLG because public policy is often influenced by actors from various levels (local, national, international), sectors (government, private, civil society), and domains (political, social, economic).

This is also emphasised by Ansell and Gash (2008) in highlighting the complexity of collaboration in their study on collaborative governance, which notes that complexity arises from negotiation processes between actors with unequal interests and capacities. In the context of MLG, complexity is not only caused by the multitude of actors, but also by unequal access to resources, information, and authority.

Complexity in the context of MLG becomes increasingly significant when linked to 'wicked problems' policy issues that have no single solution and involve considerable uncertainty, such as the development of remote regions, the management of shared resources, and the governance of strategic sectors such as transport. In such studies, complexity theory offers a better approach to comprehensively explaining Multi-Level Governance.

Kumanan Wilson (2004) highlights that policy complexity within the Multi-Level Governance framework stems not only from overlapping authorities but also from the presence of externalities and spillovers, funding issues, and matters of data ownership and management. These three elements are interrelated and can complicate the processes of decision-making, implementation, and policy evaluation across various levels of government.

Preliminary research findings indicate that the implementation of Multi-level Governance in the development of maritime transport through the Special Autonomy Fund in South Sorong Regency faces various complex challenges closely linked to intergovernmental relations regarding authority, fiscal matters, and information systems. Based on the theory of complexity proposed by Kumanan Wilson (2004), the complexity within this multi-level governance system encompasses aspects of policy externalities and spillovers, funding issues, and matters of data ownership and access. These issues are interrelated and create disorder in the governance of maritime transport development within this special autonomous region.

Firstly, regarding externalities and spillover effects, maritime transport policies implemented by the South Sorong Regency government are not systematically aligned with the needs and dynamics of the surrounding regions. Coordination with the provincial government or with other regencies/cities is not structured, meaning that the policies adopted often impact other regions without collaborative planning. The absence of regular cross-regional or cross-level forums leads to weak communication between governments, as well as the emergence of conflicting interests when central, provincial and regency policies overlap without harmonisation.

The next issue arises regarding funding. Although the Special Autonomy Fund provides fiscal flexibility, in practice, the maritime transport sector is not a top priority in the allocation of the regional budget. Many programmes focus more on land infrastructure development, such as roads and bridges, whilst maritime transport receives only a small share. The budget preparation process also lacks coordination across levels of government, resulting in frequent discrepancies between budget planning documents and actual implementation on the ground.

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The complexity is also keenly felt in matters of ownership and access to strategic data. Local governments face limitations in accessing data on shipping, logistics and the potential of waterways data that is in fact vital for designing targeted maritime transport policies. Most of this data is controlled by central government agencies or vertical institutions, and requests for data from local authorities are often held up by convoluted bureaucracy. The absence of an integrated inter-agency information system results in policy planning and evaluation being fragmented and not evidence-based. These limitations not only hinder the effectiveness of multi-level governance but also reduce accountability and public transparency, as data is not openly available and is not utilised to foster participatory dialogue with the public or local businesses. These issues demonstrate that, in the context of complexity, the implementation of multi-level governance has not been effective.

Methods

This study employs a qualitative approach using a case study strategy to gain an in-depth understanding of the complexities of multi-level governance in the development of maritime transport through the Special Autonomy Fund (OTSUS) in South Sorong Regency. A qualitative approach was chosen because this study seeks to explore the dynamics of interactions between actors, policy mechanisms, and relationships between factors that are complex and non-linear, which cannot be adequately explained through a quantitative approach (Creswell & Poth, 2018).

Case studies enable researchers to understand phenomena contextually and to examine the interrelationships between variables in real-world situations (Yin, 2018). In this context, case studies are used not only to describe phenomena but also to explain how policy complexity is formed and influences governance processes.

The focus of the analysis in this study is directed at three dimensions of complexity: externalities and spillovers, funding, and data ownership. These three dimensions are operationalised as units of analysis to understand how maritime transport policies generate cross-regional impacts, how funding mechanisms influence policy implementation, and how data and information management plays a role in the decision-making process. This approach enables the researcher to examine policy complexity in a more systematic and in-depth manner.

Informants in this study were selected using purposive sampling, based on the consideration that they possess knowledge, experience, and direct involvement in the development of maritime transport and the management of the OTSUS Fund in South Sorong Regency. Purposive sampling was employed to ensure that the data obtained is relevant to the research focus (Patton, 2002). In addition, snowball sampling was also used to identify additional informants deemed to possess important information based on recommendations from previous informants.

The informants for this study comprised officials and staff from the West Papua Provincial Transport Department, officials and staff from the Teminabuan Class III Port Authority Office, officials and staff from the Sorong Class 1 Navigation District, members of the Papuan People's Council, representatives of the Sorong City Port Authority, members of the West Papua Provincial Legislative Council, the Chair of the Memate Indigenous Community Institution, the First Vice-Chair of the Imeko Tribe, ship operators/business owners, and indigenous communities.

Data collection was carried out using three main techniques: in-depth interviews, observation and document analysis. In-depth interviews were used to explore participants' experiences. Data analysis in this study employed the interactive analysis model proposed by Miles, Huberman and Saldaña (2014), which encompasses the processes of data condensation, data

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presentation and drawing conclusions. To ensure the validity of the data, this study employed credibility-testing techniques through triangulation of sources and methods, member checking, and increased rigour in observation (Lincoln & Guba, 1985).

Results and Discussion

From the perspective of Multi-Level Governance complexity as outlined by Kumanan Wilson (2004), the dimensions of externalities and spillovers refer to the reality that the impacts of a public policy rarely stop rigidly at the boundaries of a single administrative jurisdiction. Instead, these impacts spread, seep through, and affect other regions or levels of government, whether economically, socially, spatially, or institutionally. In the context of maritime transport infrastructure development through the utilisation of the Special Autonomy Fund (Otsus) in South Sorong Regency, this dimension of externalities serves as a crucial analytical lens.

The construction of a wharf and the opening up of maritime connectivity in this region demonstrate that infrastructure policy is not an isolated entity. Such policies not only transform the landscape of South Sorong Regency itself, but also generate significant cross-border implications extending to Maybrat Regency, Tambrauw Regency, the City of Sorong, and even restructure the regional distribution network across West Papua Province as a whole.

Empirically, at the regency government level, the South Sorong Regency Government views the development of ports and wharves as a strategic instrument to break the historical economic deadlock. For years, the region's economic access has been hampered by an asymmetrical reliance on Sorong City Port as the primary distribution hub. This reliance has created severe logistical inefficiencies, where goods distribution must follow circuitous routes, undergo double handling (repeated loading and unloading), and is heavily dependent on land routes vulnerable to weather conditions.

These conditions directly result in relatively high price disparities for essential goods and building materials in South Sorong. Therefore, the construction of an adequate seaport allowing large-scale cargo and passenger vessels to berth directly is projected to cut this lengthy supply chain. This reduction in the distribution chain will automatically slash logistics costs drastically.

Interestingly, the spillover effects of this efficiency are not limited to the coastal and lowland communities of South Sorong. These effects extend directly to the hinterland regions in the interior, particularly Maybrat Regency and parts of Tambrauw, which geographically lack direct access to the open sea. Until now, these inland regencies have also borne the burden of high commodity prices because their supplies are transported by land from Sorong City via South Sorong.

With the operation of a major port in South Sorong, this regency has the potential to transform into a new logistics sub-hub. This is a tangible manifestation of positive economic spillover. Goods prices in Maybrat will fall, inter-district mobility will increase, and most importantly, agricultural commodities or forest products from the Maybrat hinterland will have a shorter and cheaper route for sale outside the region via the port in South Sorong.

At the provincial level, the development of maritime transport in South Sorong is understood by the Provincial Government of West Papua as an integral part of the integration of the coastal spatial planning, which has long been fragmented. Geographically, this new province has very

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strong archipelagic and coastal characteristics. The provincial government recognises that the land-based development paradigm of the past is not entirely compatible with the region's natural landscape.

Strengthening maritime connectivity is therefore expected to yield systemic impacts. The anticipated externalities include the establishment of an interconnected regional economic network or 'blue economy'. The port in South Sorong is designed not merely as a stopover, but as a hub for consolidating the region's key commodities, such as wild-caught fisheries, mangrove crabs, prawns, sago-based products, and the potential for oil palm and mining.

However, these economic and spatial externalities also present significant governance challenges. These spillover effects necessitate the synchronisation of Regional Spatial Plans (RTRW) across districts and provinces. Without coordination across levels of government, the benefits of this port's development may not be distributed evenly, or could even trigger unhealthy competition between ports in the neighbouring South West Papua region.

From the central government's perspective, externalities manifest in the form of the application of technical standards, regulations, and integration with national strategic programmes such as the Sea Toll Road. The establishment of the Master Port Plan (RIP), the regulation of shipping lanes, the determination of harbour basin draughts, and maritime safety standards are the domain of the central government, the impacts of which are directly felt at the local level.

A central government decision to authorise or upgrade the status of a port in South Sorong will trigger a shift in the national shipping landscape. This will alter commercial shipping routes, redefine logistics corridors in eastern Indonesia, and change the patterns of private investment interest. Furthermore, the externalities of this central government intervention also encompass environmental aspects. Port development often requires dredging of sea channels, land reclamation, or the clearing of mangrove forests, the ecological implications of which (such as changes in ocean currents or coastal erosion) can extend to coastal areas beyond South Sorong. Managing these negative externalities requires full regulatory guidance from the central government through instruments such as the Environmental Impact Assessment (EIA), which must be strictly adhered to.

At the grassroots level, particularly for indigenous peoples and local coastal communities, the spillover effects of these maritime infrastructure policies manifest in highly complex social, cultural, and demographic dynamics. Maritime infrastructure is not built on empty space, but rather on territories that directly intersect with customary land and sea tenure systems.

The social impacts are a double-edged sword. On the one hand, local communities see opportunities for improved living standards, the creation of new jobs in the port sector, and easier access to education outside the region. On the other hand, the most feared social externality is the threat of economic marginalisation. The operation of a port is typically followed by an influx of economic actors from outside Papua (such as traders from Bugis, Buton, Makassar, or Java) who, with greater capital and experience, are better equipped to capitalise on the opening of maritime access.

Concerns about this dominance by outsiders underscore that externalities are not solely about economic efficiency or physical connectivity. There is a dimension of social justice that must be managed. This is where the urgency of utilising the Special Autonomy Fund becomes highly relevant. The Special Autonomy Fund must serve as an instrument of protection and affirmation, for example through capacity building for indigenous Papuan entrepreneurs, the provision of special credit facilities, or local regulations that protect local markets so that the economic spillover effects of the port truly empower the Indigenous People of Papua (OAP) rather than marginalising them.

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Economic spillover effects into the hinterland such as Maybrat, changes in the regional shipping constellation of the province, integration with the national maritime agenda, and the threat of social externalities in customary territories are undeniable evidence. This reinforces Kumanan Wilson's postulate that, within a Multi-Level Governance framework, policies triggering widespread externalities demand the establishment of collaborative institutions, adaptive coordination, and egalitarian communication across levels of government. Without governance that harmonises the interests of the regency, province, central government, and indigenous communities, the grandeur of the maritime infrastructure in South Sorong will remain merely physical structures, unable to fulfil the mandate of the Special Autonomy Law for the greatest possible welfare of the Papuan people.

Based on these findings, it can be concluded that the indicators of externalities and spillovers in the development of maritime transport in South Sorong Regency represent an exceptionally high level of governance complexity. Policies regarding the construction of ports and the opening up of maritime connectivity cannot be reduced to mere 'local projects' belonging to a single regency government. It is a dual-dimensional policy that exerts cross-boundary impacts across regency borders, across economic sectors, across regulatory hierarchies, and even touches upon the cultural fabric of indigenous communities.

Funding and Complexity in the Development of Maritime Transport Through Special Autonomy Funds in South Sorong Regency, West Papua Province

From the perspective of the complexity of Multi-Level Governance as outlined by Kumanan Wilson (2004), the funding dimension highlights a critical reality: that the division of administrative authority between levels of government is not always accompanied by a balanced distribution of fiscal capacity. The mismatch between decentralised responsibilities and the availability of financial resources often referred to as vertical fiscal imbalance consistently creates a vertical dependency of local governments on the central government. Furthermore, this triggers fragmentation of policy direction, overlapping priorities, as well as anomalies and delays in programme implementation on the ground.

In the context of developing maritime transport infrastructure through the utilisation of the Special Autonomy Fund (Otsus) in South Sorong Regency, this funding issue is not merely a matter of a 'shortage of money'. The funding dimension has, in fact, become one of the most dominant aspects that structurally dictates the direction, pace, and nature of the dynamics of maritime development governance in the region.

Empirically, at the district government level, limited fiscal capacity within the Regional Revenue and Expenditure Budget (APBD) is the primary bottleneck. The maritime infrastructure sector encompassing port construction, channel dredging and the provision of berthing facilities is, by its very nature, a highly capital-intensive sector. On the other hand, South Sorong Regency's fiscal space is extremely limited. The local government is fully aware that optimising maritime transport offers significant opportunities to boost Local Own-Source Revenue (PAD) and end economic isolation by reducing logistics costs.

However, budgetary political realities force the regency government to make difficult choices. Budgetary priorities are, pragmatically, largely absorbed by meeting urgent basic needs, such as road construction, education operations, health services, and staff expenditure. Maritime infrastructure, although of strategic value in the long term, is often sidelined by the pressure of short-term needs that directly impact the livelihoods of the majority of the population and local political performance indicators.

What about the Special Autonomy Fund? Ironically, the allocation of the Special Autonomy Fund received by districts has not yet been significantly or proportionally directed towards the

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maritime transport sector. This occurs because the paradigm for using the Special Autonomy Fund at the local level remains heavily tied to efforts to catch up on the Human Development Index (HDI) through the education and health sectors. Consequently, the development of pioneer jetties or the upgrading of local port facilities remains heavily reliant on intervention and funding from the central government. This situation clearly highlights a gap between the urgent real needs of coastal spatial planning and the local government's fiscal capacity to address them.

At the provincial level (Southwest Papua), funding dynamics reveal a different complexity yet lead to the same conclusion: limited fiscal manoeuvre. Although the province receives the Additional Infrastructure Fund (DTI) under the Special Autonomy framework which is, by regulation, designated as mandatory spending for infrastructure its actual utilisation must be strictly allocated. As a new province overseeing a vast territory, funding for maritime infrastructure must compete fiercely with the development of the provincial administrative centre, the Trans-Papua Highway, and other basic infrastructure.

Furthermore, the implementation of the Second Special Autonomy Law (Law No. 2 of 2021) has brought about drastic changes to the funding architecture. The mechanism for channelling Special Autonomy Funds now increasingly resembles the Special Allocation Fund (DAK) scheme, which is fully controlled by the central government (a Block Grant system that has evolved into a Specific Grant). This new scheme tightens administrative requirements, demands the preparation of a Grand Design, and mandates compliance with technical guidelines (juknis) from the relevant ministries before funds can be disbursed.

The impact of this 'DAK-isation' of the Special Autonomy Fund is a reduction in local fiscal autonomy. Regions are required to meet rigid national procedural standards before receiving funding support. This confirms MLG's thesis that local fiscal flexibility within a decentralised system is often merely a structural illusion. Discretionary space (freedom to make decisions) is formally granted by law, but in substance its implementation is constrained by technical regulations from the centre and the pressures of local sectoral needs.

At the central government level, control over funding is tightly held through technical regulatory instruments. Substantial funding from the State Budget for the development of ports and docks in South Sorong is entirely dependent on whether the project is included in the national Master Plan for Ports (RIP). Without legitimisation from the RIP, the region's chances of securing State Budget funding through the Ministry of Transport are virtually impossible to realise.

This provision means that the RIP is not merely a technical planning document, but acts as a 'gatekeeper' that determines the direction of the country's maritime infrastructure investment. This mechanism clearly demonstrates the centrality and hegemony of fiscal control, which remains in the hands of the central government. Although local authorities proactively undertake feasibility studies or Detailed Engineering Designs (DEDs) at their own expense, the final say regarding construction funding remains with the ministry. This is a tangible manifestation of vertical dependency, where administrative decentralisation is not accompanied by strategic fiscal decentralisation.

The pressure of these structural funding constraints ultimately gives rise to adaptation strategies or more accurately, technical compromises by local governments in policy implementation. Rather than planning a port at an ideal location that might require fantastically high dredging costs for the shipping channel, local authorities are forced to seek coastlines with naturally deep-water depths. This choice of location is purely driven by efforts to keep the Cost Estimate (RAB) within budget so that the project does not stall halfway through.

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In addition to physical compromises, institutional compromises also occur. There is a clear reluctance on the part of local governments to establish a Regional State-Owned Enterprise (BUMD) specifically for shipping or port management. Regions prefer to hand over the operational management of pioneer shipping services to the private sector or state-owned enterprises (such as Pelni). This reluctance is based on fiscal calculations that the maintenance costs of maritime infrastructure and vessels are extremely high, as well as the risk of operational expenses (OpEx) that could drain the Regional Budget (APBD) if the venture incurs losses. This pragmatic adaptation demonstrates that technical and institutional decisions at the local level are entirely constrained by limited capital resources.

Meanwhile, at the grassroots level namely coastal communities, local businesses, and indigenous peoples these public funding constraints manifest in the quality of services they receive. Without sufficient funding to build adequate infrastructure and the absence of sustainable operational subsidies for shipping, the movement of goods and people remains difficult and expensive. Communities are forced to continue relying on land routes to Sorong City Port, which incurs high operational costs.

This situation ultimately triggers a 'vicious cycle' in the maritime economy: limited government funding hinders the development of adequate ports; the lack of proper ports makes logistics costs high and discourages private investment; slow investment and economic growth result in suboptimal local tax and fee revenue; and low Local Own-Source Revenue (PAD) in turn means the region lacks the funds to build maritime infrastructure.

Based on all these findings, it can be firmly concluded that funding indicators in the development of maritime transport in South Sorong Regency are the most stark representation of the complexity of power relations within Multi-Level Governance. Administrative authority may have been decentralised, but the 'muscle' of strategic funding remains centralised in Jakarta.

The Special Autonomy Fund, which was expected to be the sole solution, has in fact failed to effectively boost maritime infrastructure due to the dual burden of having to patch up other basic sectors and the constraints of increasingly centralised central regulations. Vertical dependency, limited local fiscal manoeuvre, pragmatic technical adaptations, and local economic stagnation make the funding dimension the decisive anchor for the fate of this policy. Thus, the funding issue in West Papua goes beyond mere numerical allocations in the DIPA/APBD; it reflects a struggle over authority, priorities, and structural fiscal power imbalances within Indonesia's multi-layered governance system.

Data Ownership and Complexities in the Development of Maritime Transport Through Special Autonomy Funds in South Sorong Regency, West Papua Province

Referring to the Multi-Level Governance complexity framework proposed by Kumanan Wilson (2004), the dimension of data ownership occupies a central position because data is, in essence, an instrument of power within public governance. This dimension emphasises the importance of ownership, control, and access to strategic information throughout the entire policy cycle, from formulation to implementation. In a multi-layered governance architecture, reality shows that data is rarely centralised under a single authority. Instead, information is scattered sporadically across various levels of the bureaucratic hierarchy and in the hands of non-state actors. If left uncoordinated, this fragmentation has the potential to trigger information asymmetry, create a syndrome of inter-institutional dependency, and become a thick wall hindering the smooth coordination of development.

Empirically, at the grassroots level of the bureaucracy, the South Sorong Regency Government emerges as the holder of data that is empirical, contextual, and highly oriented towards the real

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needs of the region. Local government is the party best acquainted with the demographic map of coastal districts, assessing the community's level of urgency regarding access to regular shipping services, and mapping the potential of key local commodities such as prawns, mangrove crabs, and oil palm all of which require evacuation routes. This information is not obtained from behind a desk, but is sourced directly from the dynamics of field observations, intensive interaction with coastal communities, and the gathering of aspirations through Development Planning Consultations (Musrenbang) at the village and regency levels.

Nevertheless, the wealth of local information held by this regency has inherent limitations. The data held by local governments is generally of a descriptive-sociological and administrative nature (Husna, 2026; Wahyudi et al., 2026). Due to budgetary constraints and a lack of specific expertise, proposals for port development sites from local authorities are often not supported by robust technical documentation, such as hydro-oceanographic survey results, wave and tidal dynamics, or comprehensive feasibility studies. This reality reveals an irony in governance: districts possess a very strong local understanding of why a port must be built, yet they remain constrained because they require technical validation from higher levels of government regarding its operational viability.

Moving up the administrative hierarchy, the Provincial Government of West Papua plays a crucial role as a bridge or clearinghouse for cross-jurisdictional data provision. At this level, data functions as an instrument of regional synchronisation. The provincial government is tasked with consolidating raw proposals from various regencies, including South Sorong, and reconciling them with considerations from vertical technical agencies such as the Harbour Master's Office and Port Authority (KSOP) and the Navigation District.

The focus of data management at the provincial level places greater emphasis on spatial aspects. Documents such as the Regional Spatial Plan (RTRW) and the Coastal and Small Islands Zoning Plan (RZWP3K) serve as crucial foundations containing maps of regional shipping routes, connectivity between feeder ports, and plans for coastal economic integration. Through this data management, the province acts as a mediator, translating local needs to align with national technical standards. However, jurisdictional boundaries remain a barrier; the province's role is purely mediatory and integrative, as the prerogative to issue final approval for a port lies entirely outside the governor's authority.

The central government, on the other hand, holds absolute control over strategic and technical maritime data. This information monopoly is institutionalised through the Master Port Plan (RIP) and various national shipping technical regulations. The RIP is positioned not merely as a planning document, but as the 'bible' of maritime transport, dictating the viability, hierarchical status, and scope of the port network across the entire territory of the Republic of Indonesia. All forms of high-resolution quantitative data ranging from draughts of anchorage basins, concrete quay construction standards, and vessel turning basins, to integration with the Sea Toll Road map are the exclusive prerogative of the technical ministries in Jakarta.

The consequences of this centralisation of technical data are massive for regional autonomy. However sound the socio-economic arguments put forward by South Sorong Regency, and however substantial the Special Autonomy Funds ready for investment, the wharf construction project will wither before it can flourish if its location is not recorded in the national RIP. This situation demonstrates that behind the rhetoric of decentralisation and special autonomy, control over the circulation of strategic data and technical legitimacy remains firmly centralised (upward centralisation). The region's ability to manoeuvre autonomously is ultimately constrained by the central government's technocratic data barriers.

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Another crucial dimension often overlooked by formal bureaucratic frameworks is the existence of data ownership held by indigenous communities and local coastal communities. Within the sociocultural context of Papua, indigenous communities are the holders of extraordinarily strategic informal data. They hold intergenerational historical knowledge regarding the territorial boundaries of customary sea tenure, the locations of sacred coastal sites, and traditional fishing grounds that must not be infringed upon.

This traditional spatial knowledge is indeed rarely documented on official government documents bearing the Garuda seal or in the shapefile format of the Regional Development Planning Agency's (Bappeda) Geographic Information System (GIS). However, it possesses absolute social legitimacy. History has shown that the construction of physical port infrastructure can come to a complete halt instantly should a land dispute arise due to the disregard of customary ownership status. This fact underscores that indigenous communities hold a 'cultural veto'; a form of data control based on local knowledge whose standing is equal to, and at times even more decisive than, the state's engineering data. Failure to synchronise the state's formal-legal data with the collective memory of indigenous communities is the surest recipe for triggering horizontal conflict.

This fragmentation of information ownership across different actors gives rise to a governance constellation resembling a scattered jigsaw puzzle (Vittou et al., 2026). The information system within the maritime transport ecosystem in South Sorong has yet to find a cohesive integration platform. The regency holds the data fragments concerning social needs, the province holds the regional spatial planning fragments, the central government monopolises the technical legitimacy fragments, whilst the local community clings tightly to the fragments of customary territorial rights. High-level complexity erupts instantly when these data fragments each with their own language and basis of legitimacy collide, overlap, or fail to be exchanged transparently.

Based on these findings, it can be concluded that data ownership indicators within the maritime development initiative in South Sorong reflect a governance framework still shrouded in asymmetry. Various coordination efforts, such as joint navigation surveys and public consultations, have indeed been undertaken. However, the central government's hegemony over technical data, coupled with the regions' dependency on RIP approval, underscores the continued imbalance in vertical information power relations. At the same time, demands for recognition of indigenous communities' sociocultural data place an additional burden on the challenges of collaboration on the ground. Therefore, the true success of utilising the Special Autonomy Fund for the maritime transport sector hinges entirely on the magnanimity of all parties to create an inclusive data governance framework a system capable of respecting the central government's mathematical calculations, accommodating the provincial spatial vision, responding to the cries of district needs, whilst also bowing to the local wisdom of indigenous communities.

Conclusion

Based on the results of an analysis of the complexities involved in the development of maritime transport through the Special Autonomy Fund (OTSUS) in South Sorong Regency, it can be concluded that the policy dynamics at play are influenced not only by the multilevel governance structure, but also by the interaction of various interrelated and non-linear factors.

In terms of externalities and spillovers, this study shows that maritime transport policies generate impacts that extend beyond administrative boundaries, yet these have not been fully managed in an integrated manner. Consequently, development benefits tend to be unevenly distributed and, in some cases, fail to produce optimal effects on improving inter-regional

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connectivity. This indicates that the policies designed remain piecemeal and have not fully taken into account the interconnections between regions within a broader system.

In the funding dimension, complexity arises from funding mechanisms involving various levels of government with limited flexibility. Although the OTSUS Fund provides additional fiscal capacity, in practice its use remains constrained by top-down rules and priorities. This situation creates regional dependence on decisions at higher levels, whilst limiting the ability of local governments to respond adaptively to local needs.

Meanwhile, regarding data ownership, this study found that limitations in data and information management are a key factor exacerbating policy complexity. Data fragmentation, limited access, and a lack of inter-agency integration mean that planning and decision-making processes are not yet fully based on comprehensive data. This indicates that poorly managed information systems can act as a barrier to effective policy governance.

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