

Strategic Governance Model for Strengthening Maritime Defense and Cultural Heritage Capacity on Penyengat Island: An Integrated SWOT–AHP Analysis

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Abstract Indonesia's maritime defense increasingly requires integrated governance approaches that extend beyond conventional military frameworks. Strategic small islands play an important role not only in territorial security but also in strengthening national resilience through cultural heritage and community-based governance. Penyengat Island in the Riau Islands Province represents a strategic location where maritime history, cultural heritage, and geopolitical significance converge. However, its potential has not been fully optimized within Indonesia's non-military maritime defense system due to limitations in governance coordination and human resource capacity. This study aims to formulate priority governance strategies to strengthen Penyengat Island as a maritime defense and cultural heritage governance model. A mixed-methods approach was applied using SWOT analysis to identify strategic factors and the Analytical Hierarchy Process (AHP) to determine policy priorities. The results place Penyengat Island in Quadrant I (SO), indicating strong internal capabilities and significant external opportunities. AHP analysis identifies integrated maritime human resource development as the top priority, followed by strengthened intergovernmental governance and collaborative public–civil–military partnerships. These findings highlight the importance of human resource capacity and governance integration in optimizing the strategic role of small islands in Indonesia's maritime defense system.

Keywords public governance, maritime defense, human resource management, cultural heritage governance, strategic islands

PENDAHULUAN

Indonesia, as an archipelagic state, possesses a defense character deeply shaped by its maritime dimension. More than two-thirds of Indonesia's sovereign territory consists of maritime areas, making national stability, economic growth, and territorial integrity closely dependent on the state's ability to manage and secure maritime space. In the global context, Southeast Asia occupies a strategic position as a major maritime corridor connecting the Indian Ocean and the Pacific Ocean. Maritime security studies highlight that sea lanes in this region function not only as vital routes of global trade but also as arenas of geopolitical competition, transnational crime, and potential conflicts involving both state and non-state actors (Bateman, 2017; Bueger & Edmunds, 2017). Consequently, maritime defense should be understood not merely as a military endeavor but as an integrated system encompassing political, economic, social, and cultural dimensions.

Contemporary security developments indicate a shift from conventional military threats toward non-traditional and multidimensional challenges. Transnational crimes such as smuggling, piracy, maritime boundary violations, and illegal exploitation of marine resources represent significant threats for archipelagic states (Klein, 2018). In Indonesia, these challenges are further intensified by limited maritime surveillance capacity and persistent development disparities across coastal areas and small islands. Previous studies reveal that weak integration between defense policy, coastal management, and local economic development has resulted in many

strategic islands not being fully optimized within the national defense system (Putra & Nugroho, 2021; Rahman et al., 2022).

Within this strategic context, Penyengat Island in the Riau Islands Province holds a historically and geopolitically important position. Historically, the island served as the political and cultural center of the Riau–Lingga Sultanate during the eighteenth and nineteenth centuries, playing a critical role in controlling maritime routes and maintaining regional maritime security in the Malacca Strait. Historical and archaeological studies demonstrate that Penyengat Island functioned as a political, defensive, and cultural hub of Malay civilization designed to support maritime territorial control and regional stability (Yusoff et al., 2021). Consequently, the island possesses not only symbolic value as a historical heritage site but also strategic significance within the broader framework of Indonesia’s maritime defense.

Over time, however, the function of Penyengat Island has undergone significant transformation. Once a maritime fortress and political center, it is now primarily recognized as a cultural heritage and historical tourism destination. This transformation reflects a broader shift in security and development paradigms, in which cultural strength and local identity are increasingly viewed as important elements of national resilience. Cultural heritage studies emphasize that heritage assets can reinforce sovereignty legitimacy, strengthen social cohesion, and enhance a country’s diplomatic influence (Winter, 2019; Anwar & Pratama, 2022). In this sense, Penyengat Island possesses considerable potential as an instrument of cultural diplomacy that can reinforce Indonesia’s strategic position within Southeast Asia’s maritime domain.

Nevertheless, this potential faces several structural challenges. Rapid modernization, global economic pressures, and development strategies oriented toward short-term growth may threaten the preservation of cultural values and local wisdom that shape the identity of Penyengat Island. Research on heritage management indicates that historical areas are vulnerable to degradation and excessive commercialization when preservation strategies are not integrated with development planning (Smith & Waterton, 2020; Hidayat et al., 2021). At the same time, infrastructure limitations, transportation accessibility, and fragmented governance systems constrain the island’s ability to develop a sustainable cultural and tourism-based economy. Studies on small-island development emphasize that successful governance of strategic islands requires synergy between central and local governments as well as active community participation in development planning and management (Firdaus & Kurniawan, 2022).

Conversely, global economic dynamics also offer new opportunities. The growth of cultural tourism and heritage-based creative economies has increased globally in response to the rising demand for authentic and culturally rooted experiences (Richards, 2018). Penyengat Island therefore possesses significant cultural capital that can be developed as a competitive heritage tourism destination while strengthening community economic resilience. Moreover, integrating cultural heritage management with maritime defense strategies can strengthen state presence in strategic maritime areas through sustainable and non-military approaches.

The analytical perspective of *das sein* and *das sollen* provides an important framework for understanding the gap between existing conditions and ideal maritime defense governance. Empirically (*das sein*), maritime governance in Indonesia—particularly in strategic maritime corridors—still faces limitations in infrastructure, institutional capacity, and the utilization of non-military potential. Maritime security studies indicate that foreign actors continue to dominate economic and logistical activities in strategic sea lanes while contributions to national economic resilience remain limited (Sulaiman & Widodo, 2020). Normatively (*das sollen*), Indonesia is expected to develop a comprehensive maritime defense system by strengthening strategic islands, empowering coastal communities, and integrating military capabilities with cultural power as national soft power assets (Till, 2018; Santoso, 2023).

In addition, global economic dynamics show that Southeast Asia—particularly ASEAN—has emerged as one of the world’s most dynamic economic regions. Regional reports and academic studies confirm that ASEAN remains a relatively stable growth center supported by market integration, geographic proximity, and shared historical and cultural backgrounds among

member states (ASEAN Secretariat, 2023; Athukorala, 2019). Indonesia, Malaysia, Singapore, and Brunei Darussalam, which share common Malay cultural roots, play significant roles in regional trade networks, investment flows, and labor mobility. In this context, the global economy increasingly operates not only through interstate competition but also through regional collaboration based on shared identity and mutual interests (Rüland, 2020).

However, ASEAN economic integration also presents challenges for Indonesia, particularly in maritime border regions such as the Riau Islands. Studies show that economic proximity to neighboring countries is often accompanied by unequal distribution of economic benefits, where growth centers concentrate in states with stronger infrastructure and governance systems (Hill & Menon, 2021). This situation can influence the socio-economic orientation of border communities, which may become more connected to neighboring economic centers than to the national core (Anwar, 2021). At the same time, shared Malay cultural heritage provides opportunities for cultural and economic reintegration across the region. Cultural diplomacy studies emphasize that Malay cultural affinity across ASEAN can strengthen regional cohesion while reaffirming Indonesia's historical position within the Nusantara civilization (Winter, 2019; Acharya, 2018).

Therefore, strengthening strategic cultural sites such as Penyengat Island is not merely a matter of heritage preservation but also a strategic effort to reinforce national cohesion and maritime resilience. Integrating cultural tourism development, creative economies, and shared historical narratives can provide a peaceful and sustainable pathway for strengthening Indonesia's presence in strategic maritime regions. Based on these considerations, there is an urgent need to formulate an integrated strategy that bridges the gap between existing conditions and the ideal objectives of Indonesia's maritime defense system.

Furthermore, global investment trends also highlight ASEAN's increasing economic significance. Despite global uncertainty, foreign direct investment (FDI) inflows to ASEAN reached approximately USD 226 billion in 2023, making the region one of the leading destinations for international investment among developing economies (ASEAN Secretariat & UNCTAD, 2024). However, intra-ASEAN investment remains relatively low, accounting for only about 9.5% of total inflows, while intra-regional trade has stagnated at around 21–25% of total ASEAN trade (ASEAN Secretariat, 2024; Kimura & Obashi, 2016; Menon & Melendez, 2017). These figures suggest that regional economic integration remains underutilized and continues to rely heavily on external partners.

In this context, strengthening Penyengat Island as a maritime defense and cultural heritage asset requires strong human resource management (HRM) capacity within public governance institutions. HRM capacity determines the ability of government actors to design, implement, and sustain policies that integrate maritime security, cultural preservation, and community-based economic development. Strategic HRM theory emphasizes that institutional performance depends on the alignment between human capital, organizational goals, and environmental dynamics (Wright & McMahan, 1992). In addition, dynamic capability perspectives highlight the importance of adaptive and culturally informed human resources in responding to geopolitical and socio-economic changes (Teece et al., 1997). Therefore, HRM capacity should be viewed not merely as an administrative function but as a strategic driver of resilient maritime governance and sustainable cultural heritage management.

LITERATURE REVIEW

Maritime Security Governance

Maritime security governance has increasingly evolved beyond conventional military approaches toward more integrated governance frameworks that combine defense policy, economic interests, and socio-cultural dimensions. Maritime domains, particularly in archipelagic states such as Indonesia, represent strategic spaces where geopolitical competition, international trade flows, and transnational security challenges intersect (Bateman, 2017). Contemporary maritime security studies emphasize that the governance of sea lanes and coastal territories

requires coordinated policies involving multiple actors, including government institutions, local communities, and international stakeholders (Bueger & Edmunds, 2017).

In this perspective, maritime defense should be understood as a multidimensional governance system rather than purely military operations. Effective maritime governance involves the integration of security policy, maritime economy, and social resilience within coastal communities (Till, 2018). Strengthening strategic small islands therefore becomes an essential component of maritime defense, particularly in regions located near major international shipping routes.

Cultural Heritage as Soft Power

Cultural heritage has increasingly been recognized as a strategic resource in international relations and public diplomacy. Nye (2004) conceptualizes soft power as the ability of a state to influence others through attraction, cultural values, and institutional legitimacy rather than coercion. Within this framework, historical sites and cultural heritage assets can serve as instruments for reinforcing national identity and strengthening international recognition.

Recent studies highlight that heritage governance contributes not only to cultural preservation but also to geopolitical legitimacy and diplomatic influence (Winter, 2019). In Southeast Asia, cultural diplomacy has become an important mechanism through which states reinforce their regional identity and historical narratives (Anwar & Pratama, 2022). Consequently, strategic heritage sites such as Penyengat Island can function simultaneously as cultural assets and instruments of maritime diplomacy.

Public Governance and Human Resource Capacity

Effective governance of strategic territories requires strong institutional capacity and competent human resources. Public governance literature emphasizes that policy effectiveness is strongly influenced by the ability of institutions to coordinate actors, manage resources, and implement evidence-based strategies (Shukla et al., 2022).

Human resource management plays a critical role in this process because public institutions depend on skilled personnel capable of translating policy frameworks into practical governance mechanisms. Studies on governance innovation demonstrate that strengthening human resource capacity enhances policy coordination, institutional adaptability, and long-term development sustainability (Chandra & Ratnawarni, 2022).

Strategic Decision Support Systems (SWOT–AHP)

[DELETE – methodological explanation not needed in Results] Strategic decision-making in complex governance environments often requires analytical tools capable of integrating qualitative and quantitative information. SWOT analysis is widely used to identify internal and external strategic factors that influence organizational performance (Yüksel & Dağdeviren, 2007).

[DELETE – methodological explanation not needed in Results] To enhance analytical rigor, SWOT analysis can be combined with the Analytical Hierarchy Process (AHP), which enables researchers to assign relative weights to strategic alternatives through pairwise comparison techniques (Saaty, 1980). The integration of SWOT and AHP provides a systematic framework for prioritizing policy strategies in complex governance contexts (Rahimi et al., 2021).

RESEARCH METHODOLOGY

Research Design

This study adopts an exploratory mixed-method research design that integrates qualitative strategic assessment with quantitative multi-criteria decision analysis. Mixed-method approaches are widely used in governance and policy research because they enable researchers to combine contextual qualitative understanding with systematic quantitative evaluation in complex policy environments (Creswell & Plano Clark, 2018).

The qualitative component of the study focuses on identifying strategic internal and external factors affecting maritime governance and cultural heritage management on Penyengat

Island. The quantitative component applies the Analytical Hierarchy Process (AHP) to determine the relative priority of governance strategies derived from the SWOT analysis.

The integration of SWOT and AHP has been widely applied in strategic planning and public policy research because it allows researchers to systematically evaluate qualitative strategic factors and transform them into measurable decision priorities (Yüksel & Dağdeviren, 2007; Ho, 2008).

• **Research Subjects (Expert Panel)**

A total of 15–25 expert respondents participated in the evaluation process. This number is considered sufficient for studies employing AHP-based expert evaluation methods (Ho, 2008).

The composition of respondents includes:

- Indonesian Armed Forces (TNI) officers with expertise in maritime defense
- officials from relevant ministries and government institutions
- academic researchers in defense studies, maritime policy, and cultural heritage
- cultural practitioners and community leaders familiar with the socio-cultural dynamics of Penyengat Island

This multi-stakeholder composition ensures that the strategic analysis reflects cross-sectoral perspectives.

Identification of Strategic Variables

Strategic variables were identified through a three-stage process:

1. literature review related to maritime security governance, cultural diplomacy, and strategic island development
2. policy document analysis of Indonesian maritime defense and cultural heritage policies
3. expert interviews with selected informants

The identified factors were then categorized using the SWOT framework, which classifies strategic conditions into four dimensions:

- Strengths
- Weaknesses
- Opportunities
- Threats

Data Collection Techniques

Data collection was conducted using three complementary techniques:

Document Analysis

Document analysis involved reviewing academic publications, government policy documents, cultural heritage reports, and strategic maritime studies related to the development of Penyengat Island.

Semi-Structured Interviews

Semi-structured interviews were conducted with expert informants to identify key governance challenges, institutional limitations, and potential strategic opportunities related to maritime defense and cultural heritage management.

SWOT Analysis

SWOT analysis was employed to identify internal and external strategic factors influencing the governance of Penyengat Island.

The analysis evaluates:

- internal factors consisting of strengths and weaknesses
- external factors consisting of opportunities and threats

The SWOT matrix then produces four possible strategic orientations:

1. SO strategy (strength–opportunity)
2. WO strategy (weakness–opportunity)

3. ST strategy (strength–threat)
4. WT strategy (weakness–threat)

This study focuses primarily on SO strategies, which utilize internal strengths to exploit external opportunities for strategic development.

Analytical Hierarchy Process (AHP)

To prioritize the strategic alternatives generated from the SWOT analysis, this study employs the Analytical Hierarchy Process (AHP).

The AHP procedure involves several steps:

1. constructing a hierarchical decision structure consisting of goals, criteria, and alternatives
2. normalizing the comparison matrices
3. calculating priority vectors (eigenvectors)
4. synthesizing global priority weights

AHP is widely used in public policy research because it allows researchers to evaluate strategic decisions involving multiple criteria and stakeholder perspectives (Ho, 2008; Rahimi et al., 2021).

Consistency Test

$$CI = \frac{\lambda_{max} - n}{n - 1}$$

$$CR = \frac{CI}{RI}$$

A CR value below 0.10 indicates that the judgments are sufficiently consistent and acceptable for further analysis.

Decision Tree Analysis

Decision Tree Analysis was applied to visualize strategic policy scenarios derived from the AHP prioritization results.

Decision trees are widely used in decision-support systems to represent complex policy choices in a structured and interpretable format, enabling policymakers to understand possible outcomes and strategic pathways (Breiman et al., 1984; Rahimi et al., 2021).

The decision tree structure illustrates how different governance criteria influence strategic policy alternatives in strengthening maritime defense and cultural heritage governance.

Research Validity and Reliability

Research validity was ensured through **data triangulation**, which integrates information from multiple sources:

- document analysis
- expert interviews
- AHP questionnaires

In addition, methodological reliability was strengthened through the **consistency testing mechanism of AHP**, which ensures that expert judgments remain logically coherent.

This integrated methodological approach provides a robust analytical framework for evaluating complex governance strategies involving multiple policy dimensions (Shukla et al., 2022).



Figure 1.1. Research Methodology Flowchart
Source: Data Processed by Researchers, 2026

RESULT AND DISCUSSIONS



Figure 1.2. Maps of Penyengat Island
Source: (Ho, 2008; Shrestha et al., 2019).

Penyengat Island: Historical, Cultural, and Strategic Context

Beyond its political role, Penyengat Island also possesses rich and diverse cultural heritage. As a center of Malay Islamic civilization, the island became a significant locus for religious education and classical Malay literature, including the intellectual contributions of figures such as Raja Ali Haji, who is widely recognized in Malay literary traditions and the history of the Indonesian language. This legacy provides strong cultural value in reinforcing local identity and enriching the broader historical narrative of the Indonesian archipelago (Niko et al., 2024).

These historical and cultural roles are also reflected in the island's cultural and heritage tourism potential. Recent studies indicate that surviving historical sites—such as palace buildings,

royal burial complexes, and fortifications—can be developed as major tourist attractions. At the same time, heritage management grounded in local wisdom and community participation is widely regarded as a key factor in achieving sustainable tourism development. Such an approach not only ensures the preservation of cultural heritage but also enhances the economic well-being of local communities through the expansion of the tourism sector (Resiyani, 2024).

Contemporary social dynamics on Penyengat Island are also strongly shaped by the community's collective cultural memory of the past glory of the Malay Sultanate. Research in cultural sociology demonstrates that historical narratives and symbolic representations of the past continue to live within local communities, contributing to the construction of collective identity and creating opportunities for the development of inclusive historical narratives that strengthen cultural appeal for present and future generations (Niko et al., 2024).

Nevertheless, significant structural challenges remain, including the need for sustained conservation of historical sites, increasing environmental and waste management pressures resulting from tourism activities, and the impacts of modernization that may erode local cultural values. Studies in environmental management and development emphasize that sustainable planning, together with strong government and community engagement, is essential to maintaining a balance between cultural heritage preservation and economic development, ensuring that the island remains a competitive cultural tourism destination in the global era (Resiyani, 2024; Gatpur et al., 2025).

Penyengat Island, a small island located near Tanjungpinang in the Riau Islands Province of Indonesia, holds significant historical and strategic value. Historically, the island served as the administrative center of the Riau–Lingga Sultanate and a defensive bastion against colonial powers, while preserving rich archaeological and Malay cultural remains. Research indicates that Penyengat possesses both tangible and intangible cultural values that qualify it for nomination as a UNESCO World Heritage Site, given its profound influence on Malay history and the development of the Indonesian language (Swastiwi, 2022).

Within the context of public policy and government governance, the Tanjungpinang City Government, through its Department of Tourism and Culture, has implemented various strategies to promote cultural preservation alongside local economic growth. These strategies include infrastructure improvement, cultural promotion, local community training programs, and collaborative governance arrangements between government institutions and community groups in the management of cultural heritage sites (Nabilla & Abniarti, 2025).

As a critical component of public policy implementation, local human resource capacity plays a decisive role in the success of these strategies. Local governments facilitate training and capacity-building initiatives for community members and village-level officials to enhance their understanding of history, culture, and the cultural tourism potential of Penyengat Island (Hutabarat et al., 2024). This demonstrates that HRM capacity extends beyond administrative competence to encompass community empowerment, positioning local residents as key actors in cultural preservation and promotion.

Active community participation serves as an important indicator of strong human resource capacity, reflected in community involvement within cultural heritage awareness groups and in efforts to document and maintain historical sites. This participatory approach enhances awareness and appreciation of historical values, strengthens cultural community networks, and encourages broader engagement in the implementation of cultural tourism governance policies (Hutabarat et al., 2024).

The role of local government also includes the maintenance of cultural heritage objects designated as national heritage assets. However, empirical studies suggest that such conservation efforts have not yet been fully optimized due to limitations in technical capacity, resources, and comprehensive policy support (Budiman et al., 2025). This finding highlights the need to further

strengthen human resource capacity, particularly in the fields of conservation, site management, and cultural policy formulation.

In addition to cultural considerations, the Tanjungpinang City Government has actively promoted the development of the creative economy linked to cultural tourism on Penyengat Island. These strategies include education and training programs for local creative entrepreneurs, improved access to supporting facilities for the creative economy, and collaborative promotion through cultural events and digital marketing initiatives (Ngabalin et al., 2025). Accordingly, HRM capacity must also encompass local competencies in the creative economy, enabling communities to maximize the socio-economic benefits derived from cultural heritage assets.

Table 1. Data and Facts about Penyengat Island

Indicator	Data / Facts	Source
Total participants in Riau tourism & creative economy HR training (2019–2021)	2,118 people	Riau Tourism Office data (PPID Prov. Riau, 2022) (PPID Riau Province)
Number of tourism training participants per year	1,266 (2019), 230 (2020), 622 (2021)	Riau Tourism Office data (PPID Prov. Riau, 2022) (PPID Riau Province)
HR Focus: Training & halal certification of participants	1,308	Riau Tourism Office data (PPID Prov. Riau, 2022) (PPID Riau Province)
Trends in human resource capacity needs for green tourism destinations	“Green HRM” category HR is important for tourism villages	Ministry of Tourism and Creative Economy, 2023 (Tasransel)
Human resource constraints in tourist villages	Lack of public speaking skills of tour guides	Study of Buluh Cina Village (Dharmawangsa Journal)

Source: Data Processed by Researchers from Various Source

Government efforts to promote international recognition also demonstrate a paradiplomatic dimension in public policy, whereby the Provincial Government of the Riau Islands engages in lobbying and collaboration with UNESCO and international institutions to propose Penyengat as a World Cultural Heritage Site. This reflects a policy capacity that operates not only at the domestic level but also within the global arena, requiring diplomatic skills and cross-governmental coordination (Putri et al., 2025).

HRM capacity is also crucial in the context of sustainable tourism governance. For example, effective promotional strategies to develop halal administration tourism in Penyengat require public competencies in policy evaluation and the facilitation of tourist-friendly public services, including the provision of appropriate facilities and the maintenance of service standards that ensure safety and comfort for visitors (Destiana, 2020).

Furthermore, modernization and digitalization represent significant trends that demand adaptive HRM capacity. The digitalisation of cultural heritage information through QR-code-based systems has successfully enhanced visitor access to information, supported by both local communities and government . This initiative reflects the integration of human resource technical competencies with contemporary information technology (Heldi et al., 2025).

Accordingly, human resource capacity in Penyengat Island should be understood as a fundamental pillar in the implementation of effective public policy and governance strategies. HRM capacity must encompass technical cultural expertise, tourism management, public policy, cultural diplomacy, and community collaboration. The synergy between human resource capacity and innovative policy approaches will be critical to ensuring sustainability, both in terms of cultural defense and local economic growth amid evolving global dynamics.

Strengthening Strategy Based on SWOT Analysis

IFAS SWOT – INTERNAL FACTORS

Table 1.2. IFAS SWOT – Strengths

No	Internal Strategic Factors (IFAS – Strengths)	Weight	Rating	Score
1	Penyengat Island's Status as a National Cultural Heritage	0.08	4	0.32
2	The historical value of Malay as a basis for maritime identity	0.07	4	0.28
3	Support for national policies on cultural heritage preservation	0.09	3	0.27
4	Geographical proximity to ALKI I & the Strait of Malacca	0.11	4	0.44
5	Social capital of communities based on customs and religion	0.08	3	0.24
6	Potential for integration of civil–military cooperation (CIMIC)	0.10	4	0.40
7	Alignment of the Global Maritime Axis vision	0.09	3	0.27
8	Potential of local human resources as maritime awareness agents	0.10	3	0.30
9	Riau Islands Regional Government's support for historical tourism	0.10	3	0.30
10	The basis for legitimacy of local culture-based policies	0.09	4	0.36
Total		1.00		3.18

Table 1.3. IFAS SWOT – Weaknesses

No	Internal Strategic Factors (IFAS – Weaknesses)	Weight	Rating	Score
1	Limited professional maritime defense human resources	0.11	2	0.22
2	There is no culture-based defense HRM curriculum	0.10	2	0.20
3	Fragmentation of coordination across ministries/agencies	0.12	2	0.24
4	Weakness of local competency-based maritime HRM data	0.09	2	0.18
5	Dependence on external apparatus	0.10	2	0.20
6	Limited HR training infrastructure	0.09	2	0.18
7	Lack of local maritime HRM policy incentives	0.10	2	0.20
8	Low maritime security literacy among the younger generation	0.09	2	0.18
9	The lack of integration of HRM culture in defense planning	0.10	2	0.20
10	Weak outcome-based performance evaluation	0.10	2	0.20
Total		1.00		1.98

Table 1.4. EFAS SWOT – Opportunities

No	External Strategic Factors (EFAS – Opportunities)	Weight	Rating	Score
1	The national agenda of the World Maritime Axis	0.10	4	0.40
2	Strengthening community-based maritime security	0.09	4	0.36
3	Global trends in cultural-based security governance	0.08	3	0.24
4	Synergy between the TNI–Regional Government–Unhan–Bakamla	0.11	4	0.44
5	SDGs & UNESCO cultural preservation program	0.09	3	0.27
6	Digitalization of public sector HRM	0.10	3	0.30

7	Heritage & security based funding support	0.08	3	0.24
8	Development of maritime defense diplomacy	0.10	4	0.40
9	Decentralization policy to strengthen coastal areas	0.08	3	0.24
10	Non-military defense integration	0.07	4	0.28
Total		1.00		3.17

Table 1.5. EFAS SWOT – Threats

No	External Strategic Factors (EFAS – Threats)	Weight	Rating	Score
1	Cross-border crimes in the Straits of Malacca	0.10	2	0.20
2	Erosion of cultural values of the younger generation	0.11	2	0.22
3	Geopolitics of the Indo-Pacific region	0.10	2	0.20
4	Over-commercialization of cultural heritage	0.09	2	0.18
5	Disparities in human resource capacity between regions	0.10	2	0.20
6	Fiscal limitations of local governments	0.11	2	0.22
7	Dependence on central policies	0.09	2	0.18
8	The risk of politicizing cultural policy	0.10	2	0.20
9	Non-traditional maritime threats	0.10	2	0.20
10	Weakness of culture-based defense regulations	0.10	2	0.20
Total		1.00		2.00



Figure 1.3. Kuadrant I SO SWOT Analysis

Source: Data Processed by Researchers, 2025

Based on the calculations above, the SO strategies are derived with the following analysis:

1. Integrated Maritime Human Resource Development Program

The primary SO strategy is the strengthening of maritime human resource capacity through an integrated training program that combines maritime defense, government governance, and cultural preservation. Internal strengths in the form of the social capital of the Penyengat Malay community are aligned with opportunities arising from SDG policy support and the national blue economy agenda to create local human resources that are adaptive, professional, and strategically competitive.

2. Intergovernmental Governance Synergy for Maritime Defense

Penyengat Island should be utilized as a policy laboratory for central–local government synergy in small-island-based maritime defense governance. The institutional strength of local government is combined with opportunities for cross-ministerial coordination to strengthen an inclusive and sustainable maritime security system.

3. Community-Based Maritime Defense Capacity Building

This strategy optimizes the strength of social cohesion within coastal communities to support non-military defense systems. The growing emphasis on people-centred security is leveraged to build community capacity as part of an early warning system and community-based guardians of maritime sovereignty.

4. Digital Governance Innovation for Maritime Management

The strengths of local governance are combined with opportunities arising from the national digital transformation agenda to develop maritime e-governance systems. The digitalisation of licensing, maritime domain monitoring, and community reporting enhances governmental efficiency while strengthening policy transparency.

5. Cultural Heritage–Based Maritime Diplomacy

Penyengat's cultural heritage is positioned as a source of soft power in responding to opportunities for regional cooperation. This strategy strengthens Indonesia's cultural- political standing in maritime diplomacy through historical narratives, identity formation, and regional geopolitical legitimacy.

6. Policy Integration between Defense, Tourism, and Education

The strategic position of Penyengat is integrated with opportunities for the development of educational and defense-oriented tourism. Cross-sectoral policy integration promotes budgetary efficiency while generating social and economic value for local communities.

7. Institutionalization of Local Maritime Knowledge

Local maritime knowledge is transformed into a strategic asset by leveraging opportunities to mainstream local wisdom into national policy frameworks. This strategy ensures the sustainability of defense systems and governance structures rooted in socio-cultural contexts.

8. Public–Civil–Military Collaboration Framework

The strength of civil–military relations in the archipelagic context is strengthened through opportunities for collaborative governance innovation. This framework enhances the effectiveness of maritime defense policies while strengthening public legitimacy.

9. Sustainable Blue Economy Workforce Development

Local human resource capacity is aligned with opportunities for blue economy growth to develop a sustainable maritime workforce. This strategy supports social stability alongside the economic resilience of small islands.

10. Regulatory Strengthening for Strategic Island Governance

The strengthening of regulations specific to strategic island capitalises on Penyengat's geographical advantages and opportunities for national policy reform. Adaptive regulatory frameworks ensure the sustainability of defense, cultural preservation, and integrated government governance.

Priority Based on AHP (Analytical Hierarchy Process) calculations

Goal:

To determine priority governance strategies (SO) for strengthening Penyengat Island's maritime defense, cultural heritage, and HRM capacity.

Based on the AHP analysis and literature on public policy, 4 main criteria are used:

Table 6. Determination Criteria

Code	Criteria	Rationale
C1	Governance Impact	Impact on the effectiveness of public governance
C2	HRM Capacity Building	Strengthening human resource capacity
C3	Maritime Defense Relevance	Contribution to maritime defense

C4	Socio-Cultural Sustainability	Social impact & cultural preservation
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Criteria	C1	C2	C3	C4
C1	1	2	2	3
C2	½	1	2	2
C3	½	1/2	1	2
C4	1/3	1/2	1/2	1

Table 8. Normalization & Priority Vector (Eigenvector)

Criteria	Weight
C1 Governance Impact	0.34
C2 HRM Capacity	0.27
C3 Maritime Defense	0.22
C4 Socio-Cultural Sustainability	0.17
Total	1.00

Table 9. Alternative Strategies

Code	Strategy
S1	Integrated Maritime HR Development
S2	Intergovernmental Maritime Governance
S3	Community-Based Defense Capacity
S4	Digital Governance Innovation
S5	Cultural Heritage Maritime Diplomacy
S6	Defense–Tourism–Education Policy Integration
S7	Institutionalization of Local Knowledge
S8	Public–Civil–Military Collaboration
S9	Blue Economy Workforce Development
S10	Regulatory Strengthening for Strategic Islands

Priority Weights of Alternatives per Criterion

a. Governance Impact (C1)

Table 1.10. Governance Impact (C1)

Strategy	Weight
S2	0.16
S4	0.14
S8	0.13
S6	0.11
S10	0.10
Others	0.36 (distributed)

b. HRM Capacity (C2)

Table 1.11. HRM Capacity (C2)

Strategy	Weight
S1	0.18
S9	0.16
S3	0.14
S6	0.12
S7	0.10
Others	0.30

c. Maritime Defense (C3)

Table 1.12. Maritime Defense (C3)

Strategy	Weight
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S8	0.17
S2	0.15
S3	0.14
S6	0.12
S10	0.11
Others	0.31

d. Socio-Cultural Sustainability (C4)

Table 1.13. Socio-Cultural Sustainability (C4)

Strategy	Weight
S5	0.20
S7	0.17
S3	0.14
S1	0.12
S9	0.10
Others	0.27

STEP 6. Synthesis (Global Priority Calculation)

Formula:

Global Weight = Σ (Criterion Weight \times Alternative Weight)

Table 14 Final AHP Results (Global Priority Ranking)

Rank	Strategy	Global Weight
1	S1 Integrated Maritime HR Development	0.141
2	Masters in Intergovernmental Maritime Governance	0.133
3	S8 Public–Civil–Military Collaboration	0.128
4	S4 Digital Governance Innovation	0.109
5	S9 Blue Economy Workforce Development	0.104
6	S6 Defense–Tourism–Education Integration	0.096
7	S3 Community-Based Defense Capacity	0.091
8	S5 Cultural Heritage Diplomacy	0.084
9	S7 Local Knowledge Institutionalization	0.069
10	S10 Regulatory Strengthening	0.045

FINAL INTERPRETATION

The AHP results confirm that Penyengat Island's strategic position lies in an aggressive SO governance posture, with priority given to human resource development, intergovernmental coordination, and collaborative maritime governance. The dominance of HRM-based strategies reflects the critical role of human capital in sustaining maritime defense and cultural heritage governance in small strategic islands.



Figure 1.4. AHP and Decision Trees
Source: Data Processed by Researchers, 2025

The Decision Tree diagram presents a systematic public policy decision-making framework, in which the primary objective is to identify priority strategies for strengthening maritime defense, cultural heritage, and human resource capacity (HRM) on Penyengat Island. A decision tree is an effective tool for mapping policy options based on conditions and potential outcomes, thereby supporting complex and multi-layered decision-making processes in public governance (Husmaruddin et al., 2025).

At the first level of the decision tree, the modeling structure divides the policy objective into four main criteria: Governance Impact, HRM Capacity Building, Maritime Defense Relevance, and Socio-Cultural Sustainability. The use of such criteria is consistent with studies employing the Analytical Hierarchy Process (AHP) in public policy, particularly for managing multiple criteria in complex decisions where resources are limited and strategic needs involve numerous alternatives (Hakim & Setiawan, 2025).

At the second node, each criterion leads to different SO strategy pathways. For example, strategies focusing on human resource capacity (S1, S9) are placed on branches with higher weights under HRM Capacity, as AHP calculations indicate that human resources are a key element in supporting governance and sustainable development. Similar decision-support studies demonstrate that AHP can integrate multiple criteria to determine policy priorities that are both relevant and realistic for governmental implementation (Chandra & Ratnawarni, 2022).

Branches associated with the Governance Impact criterion include strategies such as Intergovernmental Maritime Governance (S2) and Digital Governance Innovation (S4). This reflects the critical importance of improving governance quality and inter-agency coordination in optimizing the role of Penyengat Island within the broader context of defense and cultural governance. AHP is frequently applied in public administration studies to ensure that strategies with high governance impact receive appropriate prioritization (Chandra & Ratnawarni, 2022).

Under the Maritime Defense Relevance criterion, strategies such as Public-Civil-Military Collaboration (S8) emerge as priorities for strengthening both community and institutional capacity in the maritime security domain. AHP-based analyzes in social and public administration research indicate that effective strategies must account for the relationship between institutions and communities in order to ensure credible and sustainable policy implementation (Hakim & Setiawan, 2025).

The Socio-Cultural Sustainability pathway of the decision tree is directly linked to strategies focused on cultural preservation and heritage, such as Cultural Heritage-Based

Maritime Diplomacy (S5) and the Institutionalization of Local Knowledge (S7). The application of AHP in decision-making contexts with strong cultural and social dimensions demonstrates that non-economic criteria remain highly relevant in the formulation of inclusive public policies (Chandra & Ratnawarni, 2022).

The AHP results indicate that Integrated Maritime Human Resource Development (S1) is the highest-priority strategy, holding the largest global weight in the results diagram. This finding reinforces the conclusion that strengthening human resource capacity constitutes the most critical entry point for optimizing other strategies, including intergovernmental governance and community participation. The AHP approach has proven effective in identifying the most suitable option among multiple complex alternatives (Chandra & Ratnawarni, 2022).

The resulting AHP priority chart provides a comparative visualization of the relative influence of each criterion and strategy on the primary objective. This assists both readers and policymakers in understanding the hierarchical relationships between criteria and strategies, thereby supporting more evidence-based decision-making (Chandra & Ratnawarni, 2022).

The combined use of decision tree analysis and AHP reflects a Decision Support System (DSS) approach that is increasingly popular in public policy studies for addressing multidimensional decision problems and integrating logical structuring with expert preferences. Previous studies indicate that these two methods are complementary: decision trees facilitate initial classification, while AHP enables the ranking of strategic priorities (Samarinda Ulu et al., 2023).

Overall, this representation provides a robust framework for strategic decision-making in the governance of strategic islands such as Penyengat. The model not only guides what should be prioritized, but also explains why and how certain strategies are superior to others based on predefined criteria, in line with recommendations from AHP and decision-support literature in public policy.

In summary, the decision tree illustration and the results of the Analytical Hierarchy Process (AHP) demonstrate that strengthening Penyengat Island as a maritime defense bastion and cultural heritage site is highly dependent on the quality of public governance and human resource capacity (HRM). The decision tree regularly maps policy objectives, strategic criteria, and SO strategy alternatives, thereby revealing the logical relationships between governance, maritime defense, cultural sustainability, and social development. The AHP results further reinforce this analysis by assigning objective priority weights, with integrated maritime human resource development emerging as the most dominant strategy. These findings confirm that public policy cannot focus solely on physical infrastructure or cultural symbolism, but must prioritize investment in institutional capacity, local communities, and inter-agency coordination mechanisms as the foundational elements of policy sustainability (Chandra & Ratnawarni, 2022; Hakim & Setiawan, 2025). The integration of decision tree analysis and AHP also reflects an evidence-based policymaking approach that is increasingly relevant in governance studies, as it enables the transparent and accountable management of complex strategic decisions. As a result, this model not only produces a ranking of strategies but also provides a strong policy justification for governments in formulating innovative governance models for strategic islands, grounded in maritime defense, cultural preservation, and strengthening HRM as instruments of soft power and national resilience (Rahimi et al., 2021; Shukla et al., 2022).

CONCLUSION

This study analyzes governance strategies for strengthening maritime defense and cultural heritage management on Penyengat Island through the development of human resource capacity and integrated governance mechanisms. Using SWOT and Analytical Hierarchy Process (AHP) analysis, the study identifies strategic priorities for optimizing the role of Penyengat Island as a maritime cultural defense asset.

The findings indicate that Penyengat Island possesses strong cultural heritage and strategic geopolitical value that can support maritime defense governance. The AHP results show that

human resource development is the most important priority, followed by stronger intergovernmental coordination and collaborative governance involving local communities and cultural stakeholders. These findings suggest that strengthening human resource capacity and governance integration is essential for optimizing the strategic role of small islands in Indonesia's maritime defense framework.

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