

## Strategic pathways for resilient coastal tourism: insights from Sawarna, Indonesia

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**Abstract.** Sawarna Beach is one of the leading coastal tourism destinations in Banten Province, Indonesia, offering a variety of activities. This study presents a strategic planning approach to strengthen tourism resilience in Sawarna and ensure its future sustainability. Using Interpretive Structural Modeling (ISM), key elements influencing tourism governance were identified and structured into a hierarchical decision framework. Four core dimensions, strategic objectives, constraints, intervention programs, and stakeholders, were analyzed through expert judgment and contextual relationship mapping. Results reveal that sustainable ecosystem management, local economic empowerment, and improved coordination between institutions are fundamental drivers of resilience. Constraints such as limited infrastructure, weak stakeholder collaboration, and a lack of community awareness hinder effective tourism planning. Strategic programs involving integrated planning, community-based monitoring, and disaster preparedness were prioritized. The ISM model also highlighted the critical role of regional tourism agencies and village governments as independent actors in the governance landscape. These findings offer a replicable framework for resilience-based tourism development in similar coastal contexts. The findings emphasize that participatory approaches and strong institutional collaboration are fundamental in developing resilient and sustainable tourism frameworks.

**Key Words:** collaboration, coastal management, ecosystem governance, resilience, sustainable tourism.

**Introduction.** Attention to coastal tourism resilience in Indonesia has increased significantly over the past decade. High pressures on coastal ecosystems, including climate change, increased frequency of natural disasters, land conversion, and tourism expansion, pose serious threats to the resilience of coastal tourism. There has become a concern in popular coastal tourist destinations such as Bali, Lombok, Pangandaran, Karimunjawa, Bunaken, Labuan Bajo, and Banten. In Banten areas such as Sawarna, where livelihoods increasingly rely on tourism, building adaptive capacity is no longer optional but essential. Strategic integration of resilience principles into tourism development frameworks is crucial for maintaining such destinations' ecological balance and economic viability (Jarratt & Davies 2020; Abdel-wahab & El-saghier 2023). The region's exposure to climate-related threats, including shoreline changes, flooding, and extreme weather events, underscores the urgency of developing localized adaptation strategies.

Effective climate resilience requires collaborative planning involving local governments, tourism enterprises, and community stakeholders. Empirical research highlights the value of participatory governance models that can accommodate local

realities and align stakeholder interests within a unified framework (Karani & Failler 2020; Modi 2024). In Sawarna, this translates to developing vulnerability assessments into actionable programs that preserve ecosystem services while ensuring economic continuity (Cheer et al 2019).

The blue economy framework provides a comprehensive approach by prioritizing marine conservation and inclusive growth at the core of coastal tourism planning. This concept emphasizes sustainable use of marine resources and strengthens local governance systems through community engagement and cross-sectoral collaboration (Kabil et al 2022; Alsaleh & Wang 2024). This alignment can be achieved through zoning arrangements based on tourism activities, visitor restrictions based on carrying capacity, and the development of environmentally friendly supporting facilities (Silvitiani 2017; Ismail 2021; Hengky 2023).

Operationalizing such integrated strategies necessitates structured decision-support tools. ISM, for instance, offers a systematic approach for identifying, analyzing, and prioritizing key factors that influence tourism resilience. Its application enables planners to understand the causal relationships between drivers, constraints, programs, and actors, thus facilitating strategic interventions that are both contextually grounded and forward-looking (Umar 2022; Benavente et al 2023; Soontiens-Olsen et al 2023).

This research aims to formulate an inclusive, adaptive, and responsive governance pathway through a comprehensive ISM approach to tourism management in the Sawarna coastal area. The clarity of roles and involvement of actors in managing tourism activities on Sawarna Beach is important in mitigating the vulnerability of coastal tourism, which is greatly influenced by various factors. The results of this study can serve as a guide for authorized stakeholders in implementing appropriate management measures to ensure sustainable tourism activities at Sawarna Beach.

**Material and Method.** This study adopted a mixed-method design, combining qualitative inquiry with semi-quantitative analysis to understand tourism resilience in Sawarna, Indonesia, comprehensively (Schoonenboom & Johnson 2017). The methodological framework was built around the application of Interpretive Structural Modeling (ISM), which enables systematic structuring of complex interrelated elements through expert judgment and matrix-based analysis (Attri et al 2013).

**Data collection.** Primary data were gathered through Focus Group Discussions (FGDs) and in-depth expert interviews involving local tourism stakeholders, including representatives from the Government of Sawarna Village (two persons), Lebak Regency Tourism and Culture Office (one person), Village-Owned Enterprise Agency (three persons), Legon Pari Mustika Private Company (two persons), and State Forestry Public Corporation/Perhutani (one person). These sessions aimed to identify key variables related to tourism management objectives, existing constraints, proposed intervention programs, and the institutional actors involved. Data, including regional development plans, environmental assessments, and previous tourism studies in the area, were reviewed to support triangulation. Respondents were selected purposively based on their knowledge and involvement in tourism governance, ensuring the inclusion of formal authorities and informal community actors. The criteria for selecting respondents were at least two years of involvement in tourism management at Sawarna Beach, a good understanding of coastal tourism implementation, and an understanding of policies related to coastal use for tourism activities.

**Research site.** The study was conducted in four main beach areas (Figure 1) within Sawarna Village: Ciantir Beach, Goa Langir Beach, Tanjung Layar Beach, and Legon Pari Beach. Each site represents varying degrees of environmental vulnerability and tourism development intensity, enabling comparative analysis across resilience scenarios (soft tourism).

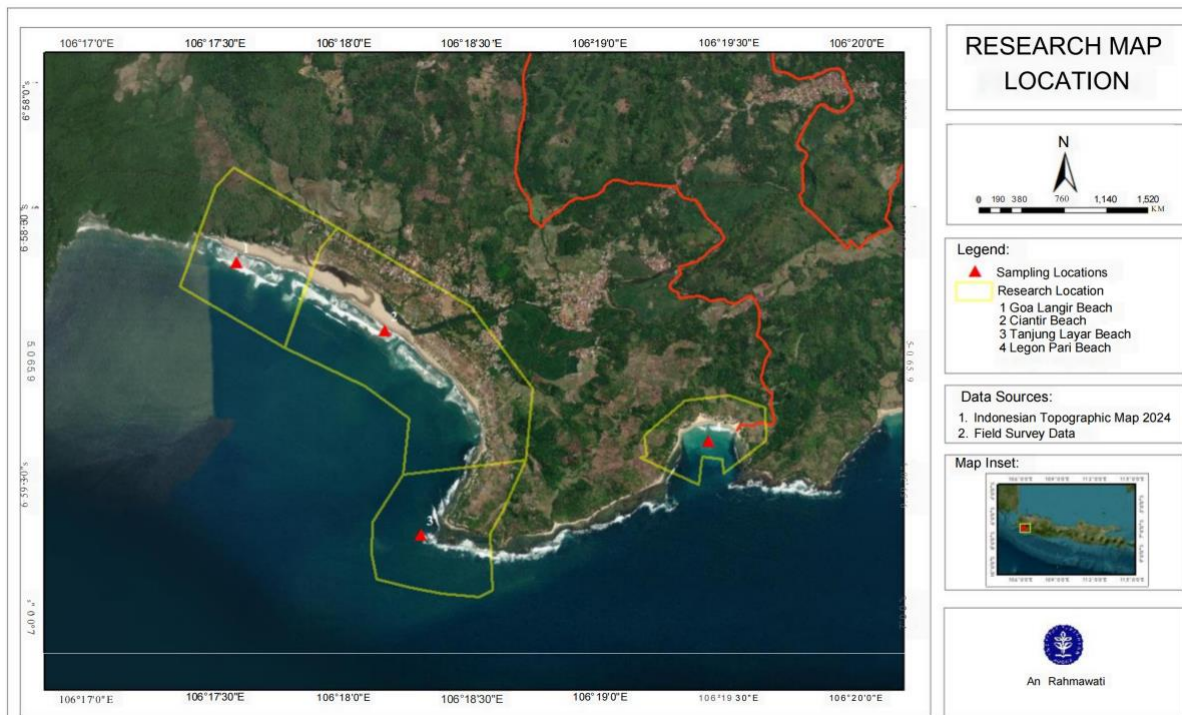


Figure 1. The main beaches of the study area, Ciantir Beach, Goa Langir Beach, Tanjung Layar Beach, and Legon Pari Beach

**ISM framework.** ISM's capability to simplify complex problems into structured, manageable formats allows for a clearer understanding of the intricate relationships between various elements involved in a system. Thakur and Ramesh highlight that ISM assists in identifying hierarchical arrangements of critical components, helping decision-makers recognize which elements significantly influence others, particularly in the healthcare waste management sector (Thakur & Anbanandam 2016). Similarly, Jena et al (2017) emphasize that examining the interactions among identified elements facilitates a better understanding of a system's structure, leading to more informed decision-making processes. This aspect of ISM is crucial in sectors such as environmental management, where decision-making often involves balancing numerous interrelated factors.

1. The ISM process in this study followed the standard modeling stages proposed by Sushil (2012) and Saxena et al (1992), which are as follows:
2. Identification of sub-element: Elements were derived from literature, stakeholder interviews, and the results of ecological and economic assessments. Identification of key elements through qualitative inputs from FGDs and literature review. These elements were grouped into four categories: (i) management objectives, (ii) constraints, (iii) strategic programs, and (iv) actors.
3. Development of Structural Self-Interaction Matrix (SSIM) based on expert evaluations of contextual relationships among sub-elements. This evaluation aims to determine whether, and in what direction, one element influences another at Sawarna Beach. Experts interpret the nature of influence between each pair based on their knowledge and experience. The evaluation focuses on whether element *i* influences element *j*, *j* influences *i*, both influence each other, or no relationship exists. Expert judgements were used to assess contextual relationships among elements using the following logic:
  - i. V: element *i* influences element *j*
  - ii. A: Element *j* influences element *i*
  - iii. X: mutual influence (elements *i* and *j* influence each other)
  - iv. O: No direct relationship (no influence between *i* and *j*)
4. Conversion to Reachability Matrix: Transformation to Reachability Matrix (RM) by converting SSIM symbols into binary values (1 or 0). Transitivity was applied to ensure logical consistency.

5. Level partitioning: Partitioning of levels to determine hierarchical placement of elements. Elements were grouped into hierarchical levels based on reachability and antecedent sets.
6. Formation of a diagram (directed graph) and development of an ISM-based structural model.
7. Driver-dependence analysis: Using MICMAC (Matrice d'Impacts Croisés Multiplication Appliquée à un Classement - Cross-Impact Matrix Multiplication Applied to Classification) analysis, each element was mapped to one of four quadrants:
  - Independent (drivers): high influence, low dependence
  - Linkage: high influence and dependence
  - Dependent: low influence, high dependence
  - Autonomous: low influence and low dependence

In the ISM framework, particularly during the MICMAC analysis phase, system elements are classified into four distinct quadrants based on their driving power (y-axis) and dependence power (x-axis) (Attri et al 2013). These axes provide critical insights into the relative influence and reliance of elements within complex systems, such as coastal tourism resilience planning, as presented in Figure 2.

Driving power, plotted along the vertical axis, refers to the capacity of a particular variable to influence other elements within the system. A high driving power indicates that the element can trigger changes in numerous other components and is often strategic. In contrast, dependence power, plotted on the horizontal axis, indicates how much an element relies on other variables to function effectively. Together, these dimensions form a matrix that groups system elements into four strategic zones (Saxena et al 1992; Modi 2024).

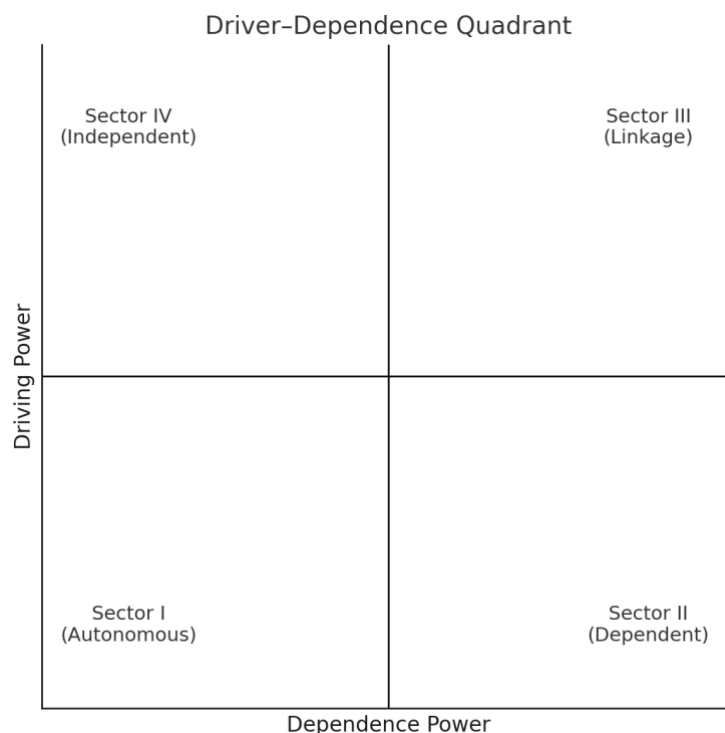


Figure 2. The ISM quadrant

Sector I (Autonomous) comprises variables characterized by low driving and low dependence power. These elements are often weakly connected to the overall system, having minimal influence on or from other variables. Although they might initially appear insignificant, their roles should not be dismissed outright. Such variables may become more relevant under certain conditions or long-term strategies (Attri et al 2013). However, for most planning contexts, they are not immediate priorities.

Sector II (Dependent) includes elements with low driving but high dependence power. These are typically outcome-based variables that reflect the results of system dynamics. Their position indicates that other elements have a significant influence on them, but they exert a limited influence in return. In coastal tourism systems, indicators such as increased tourist satisfaction or improved community welfare often fall into this category. They represent goals or performance benchmarks that can only be improved by strengthening the driving elements (Cheer et al 2019; Karani & Failler 2020).

Sector III (Linkage) comprises variables with high driving and dependence power. These elements are highly interactive, simultaneously influencing and being influenced by others. Their dual role makes them inherently unstable; a minor change can have cascading effects. These variables often include institutional coordination mechanisms or cross-sectoral collaboration initiatives. Due to their central role and vulnerability, they require continuous monitoring and adaptive management (Sushil 2012; Soontiens-Olsen et al 2023).

Sector IV (Independent), by contrast, consists of elements with high driving power but low dependence. These are considered strategic drivers in system planning. Their actions or configurations have a significant impact on the system, yet they are relatively self-sufficient. As such, they are ideal candidates for policy intervention and strategic investment. In resilience-based tourism planning, variables such as government leadership, regulatory frameworks, and infrastructure governance are often classified in this quadrant. Investing in these elements tends to generate widespread and sustainable influence across the system (Umar 2022; Abdel-wahab & El-saghier 2023).

By analyzing the positioning of each variable within this quadrant framework, decision-makers can identify leverage points and critical paths for intervention. The strategic utility of the ISM quadrant lies in its ability to clarify the internal dynamics of complex socio-environmental systems, ultimately supporting more coherent and targeted policy responses (Benavente et al 2023; Kabil et al 2022).

## Results and Discussion

***Strategic tourism management: key element analysis for Sawarna's Coastal Area.*** The comprehensive analysis of key elements for managing coastal tourism in Sawarna was conducted using four core components: objectives, constraints, strategic programs, and key actors. Each component includes interrelated sub-elements, which were identified through a literature review and expert interviews with stakeholders from tourism, local government, and conservation sectors. These elements are selected based on the necessity to fulfill critical indicators for sustainable tourism management. Analyzing the contextual relationships among sub-elements enables the identification of priority actions and informs the development of effective, targeted strategies. In managing Sawarna beach tourism, the priority action is developing an integrated management planning strategy so that existing tourism activities can operate within carrying capacity and ensure their sustainability.

Management objectives are a foundation for formulating a coherent vision and mission for sustainable coastal tourism development in Sawarna. Sawarna beach tourism management that is not based on the area's carrying capacity has the potential to negatively impact the sustainability of natural resources. A decline in the quality of natural resources can reduce the number of tourist visits, which in turn reduces revenue for tourism operators. The priority objective in this study is to produce a sustainable Sawarna beach tourism management strategy by prioritizing the aspects of carrying capacity and sustainability of natural resources. The other objectives, such as ecosystem preservation, community empowerment, and infrastructure improvement, offer direction for future interventions and policies (Holling 1973; Berkes & Ross 2013).

The second component, constraints, aims to identify existing barriers that may hinder the realization of tourism development goals. These include institutional fragmentation, low public awareness, budgetary limitations, and inadequate infrastructure. Understanding these barriers is essential for developing mitigation

strategies that enhance governance capacity and stakeholder engagement (Folke et al 2005).

Next, the strategic programs component focuses on actionable interventions designed to address existing constraints and facilitate the achievement of tourism objectives. Programs such as integrated coastal planning, capacity-building, environmental monitoring, and destination branding are essential for building resilient tourism systems (Cheer et al 2019; Bramwell & Lane 2000). The final element, key actors, entails identifying stakeholders involved in tourism governance, including the District Tourism Office, village authorities, local tourism groups (Pokdarwis), and private sector investors. Mapping these actors is crucial for ensuring inclusive and collaborative management. Effective coordination and role clarity among these groups support a participatory planning process aligned with the principles of adaptive and collaborative governance (Ansell & Gash 2008).

This structured framework allows for a more targeted and systematic approach to planning. Moreover, integrating ISM-supported analysis, such as the driver-power dependence matrix, offers strategic insights into the relationships between sub-elements. By emphasizing these interconnections, the framework ensures that tourism planning in Sawarna not only addresses immediate development goals and enhances long-term social-ecological resilience.

**Objectives sub-elements in coastal ecotourism management.** Within this element, a detailed ISM analysis was conducted to assess the contextual relationships among the sub-objectives. The ISM approach generated a Reachability Matrix Final (RMF), a driver-dependence quadrant, and a hierarchical structure diagram. Among these sub-objectives, the development of an integrated management planning strategy (L8) emerged as an independent driver, indicating its strong influence on other elements and low dependence on external factors. According to Sushil (2012), such elements play a pivotal role in shaping strategic direction and are critical to initiating effective change. The ISM analysis produced two key outputs: a driver-dependence quadrant illustrating the relative influence and reliance among sub-objectives (Figure 3), and a hierarchical structure model that maps the levels of interaction and priority among the elements (Figure 4).

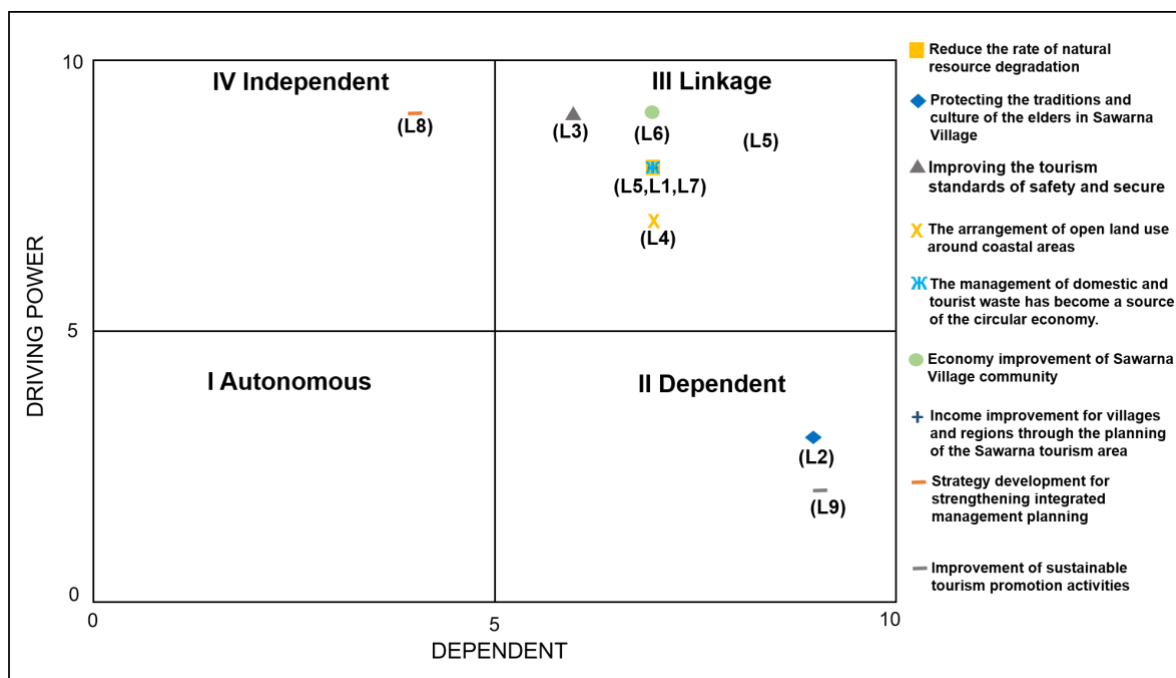


Figure 3. Diver power dependence matrix-objectives.

Several other sub-objectives were categorized in Quadrant III (Linkage) of the driver-dependence matrix. These include (a) enhancing tourism safety and security standards (L3), (b) increasing the local economic welfare of Sawarna’s residents (L6), (c) reducing natural resource degradation (L1), (d) transforming household and tourism waste into a circular economy resource (L5), (e) increasing village and regional revenue through tourism spatial planning (L7), and (f) organizing the use of open land around the coastal zone (L4). Sub-elements in this quadrant are highly influential and dependent, making them dynamic and sensitive to changes in the system. These findings suggest that the successful implementation of one sub-element can significantly affect the progress of others. However, the same interdependence also introduces the risk of cascading failures if not managed holistically (Saxena et al 1992; Sushil 2012).

The hierarchical structure further clarifies the order and relative priority among the sub-objectives, providing a roadmap for phased implementation. At the top level of the hierarchy L9, reinforcing its strategic role in driving systemic change. Mid-tier objectives like L1, L3, L5, L6, and L7 act as interconnected pillars supporting the core sustainability goal. These sub-objectives require synchronized execution, as progress in one may amplify or constrain the effectiveness of others. At the base of the hierarchy are operational elements such as land use organization (L4), which, while dependent, are essential for the practical realization of higher-level strategies. This hierarchical arrangement offers policymakers and local authorities actionable guidance by identifying leverage points and dependencies. It also underscores the importance of integrated planning and cross-sectoral collaboration to address the multifaceted challenges of coastal tourism management.

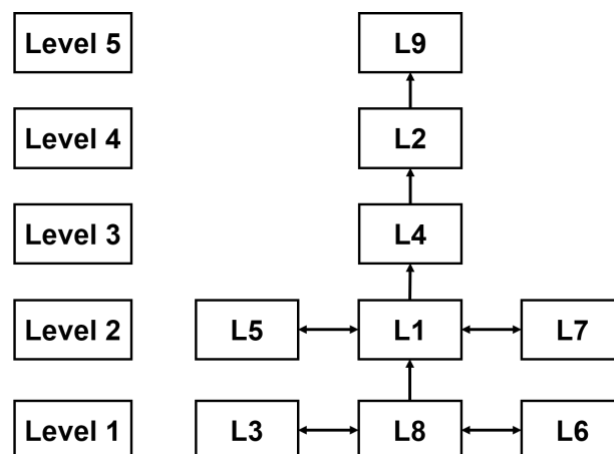


Figure 4. The hierarchical structure of the objectives' sub-elements.

**Problems with sub-elements in coastal ecotourism management.** The analysis of constraint sub-elements in managing Sawarna’s coastal tourism area revealed complex interdependencies among various limiting factors. These sub-elements were identified through a triangulated method that combined a literature review, in-depth expert interviews, and field observations. Using the ISM approach, a Reachability Matrix Final (RMF) was constructed to map the contextual relationships between constraints, and the resulting output was organized into a driver-dependence quadrant and hierarchical structure (Figure 5).

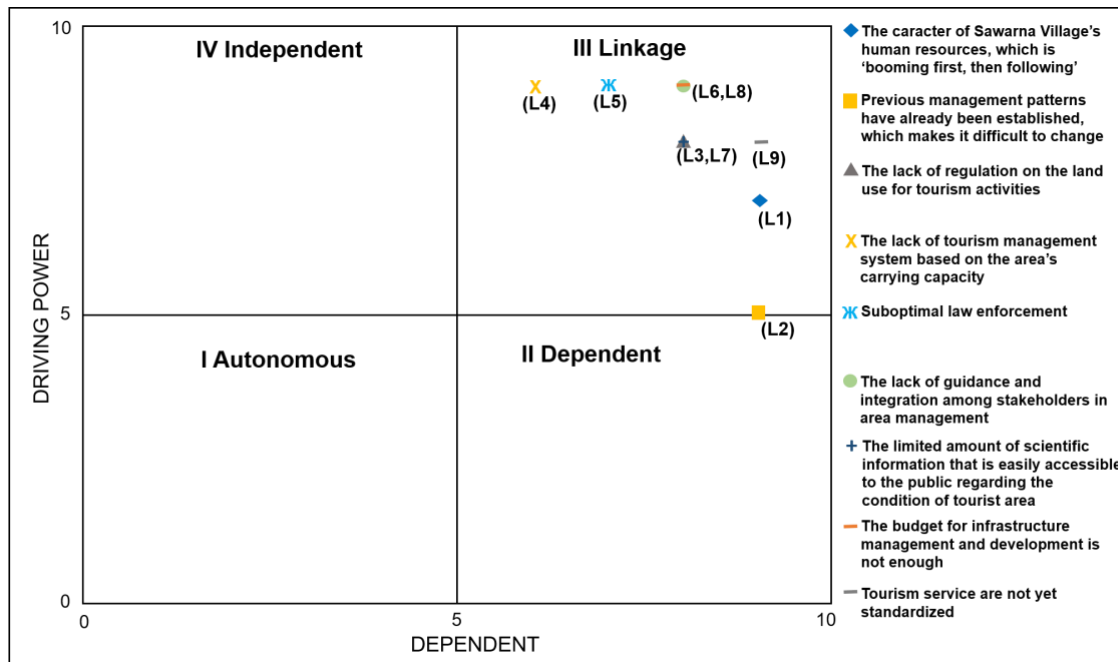


Figure 5. The driver power dependence matrix – problems.

The driver-dependence quadrant showed that most constraints were concentrated in Quadrant III (Linkage), indicating that these factors exhibit high driving power and dependence. This classification implies that changes to one constraint will likely have ripple effects on others, underscoring the need for coordinated and systemic responses. The eight sub-elements placed in this quadrant include:

- The reactive character of Sawarna's human resources, described as "booming first, then following" (L1),
- The lack of regulation on land use for tourism activities (L3),
- The absence of a management system based on the carrying capacity of the area (L4),
- Suboptimal law enforcement related to environmental and tourism standards (L5),
- Insufficient guidance and integration among stakeholders (L6),
- Limited access to scientific information for the local community (L7),
- Inadequate budget allocation for infrastructure management and development (L8),
- The absence of standardized tourism services (L9).

These constraints form a tightly linked system in which weaknesses in one area can compromise the effectiveness of others. For example, inadequate stakeholder coordination (L6) can hinder the implementation of capacity-based management systems (L4), while limited access to scientific information (L7) can reduce community engagement and compliance (Figure 6). Therefore, any strategy to overcome these barriers must adopt a holistic and collaborative approach, incorporating perspectives from government institutions, local communities, and private actors (Folke et al 2005; Ansell & Gash 2008).

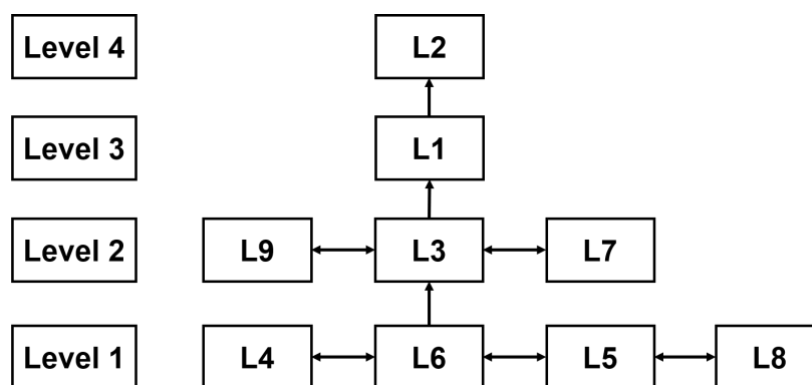


Figure 6. The hierarchical structure of the problem's sub-element.

The ISM-derived hierarchical structure further supports this analysis by presenting a four-level framework that prioritizes constraints based on their systemic influence. The first level, which includes the most foundational barriers, consists of:

- a) The absence of a tourism management system based on carrying capacity (L4),
- b) Suboptimal law enforcement (L5);
- c) Lack of stakeholder integration (L6);
- d) Inadequate infrastructure funding (L8).

These issues are classified as root constraints, as their resolution is essential for addressing upper-level challenges. Their foundational nature suggests that policy interventions must begin here to ensure lasting impact and facilitate cascading improvements throughout the system. At the top of the hierarchy (Level 4) lies a single sub-element: the persistence of outdated tourism management patterns (L2). This constraint primarily results from more profound systemic weaknesses and will likely persist unless lower-level challenges are addressed. The hierarchical position of L2 implies that it functions more as a consequence than a root cause, validating the need for a phased and structured response strategy.

By outlining the interconnections and structural importance of each constraint, this framework offers practical guidance for decision-makers. Targeted solutions should focus initially on Level 1 constraints, which serve as leverage points to enable systemic change. This approach enhances the resilience of the coastal tourism management system and ensures that interventions are both efficient and sustainable (Sushil 2012; Saxena et al 1992).

**Program sub-elements in coastal ecotourism management.** The contextual relationships among program sub-elements reveal that specific interventions are more critical in reinforcing the economic resilience of coastal tourism planning in Sawarna, Lebak Regency. These high-priority sub-elements function as catalysts for broader management success and as foundational components that influence the resolution of existing constraints. These elements were identified by field observations, expert consultations, and a systematic literature review, followed by analysis using the ISM approach.

The ISM analysis produced a Reachability Matrix Final (RMF), a driver-dependence quadrant map, and a hierarchical structure collectively representing the systemic interconnections between programmatic sub-elements. Notably, sub-element L5—focused on enhancing community capacity in tourism management and disaster mitigation—was situated in Quadrant IV (Independent) of the driver-dependence matrix (see Figure 7). This classification indicates that L5 is an autonomous driver with high strategic leverage and minimal reliance on other sub-elements. As such, L5 emerges as a linchpin in building resilience through grassroots empowerment (Figure 7).

Community-based capacity building plays a pivotal role in the sustainable management of coastal resources, especially in regions where tourism heavily depends on the area's ecological integrity. Previous studies have shown that community involvement improves care for natural resources and encourages more responsible

tourism practices (Juliana et al 2023). Additionally, evidence from Sawarna shows that issues such as waste buildup, environmental damage, and inconsistent policy enforcement are best handled when local communities have the skills to manage tourism impacts and participate in conservation efforts (Hengky 2023). Capacity-building programs also provide greater economic independence, allowing residents to gain from tourism while reducing their dependence on outside help (Fatimah & Ayu 2020). For these reasons, investing in community-based capacity building is a smart and necessary way to enhance both environmental sustainability and the long-term strength of coastal tourism in Sawarna. Given the proximity of residents to these natural assets, empowering them with the necessary skills and knowledge not only fosters stewardship but also enhances adaptability to climate-related and environmental risks (Berkes & Ross 2013; Cheer et al 2019).

The hierarchical structure, as shown in Figure 8, delineates a five-tier progression of program elements. At Level 1, the most foundational stage, two critical sub-elements are positioned: (a) L6: establishment of binding regulations among managers, communities, and tourists, (b) L8: development of clear evacuation and tourism route maps for the coastal zone. These elements function as prerequisites for the successful execution of upper-tier strategies. Regulatory frameworks (L6) ensure that tourism development aligns with local cultural values, environmental sustainability, and visitor safety, acting as governance anchors (Bramwell & Lane 2011). Meanwhile, spatial mapping (L8) offers operational preparedness against hazards, aligning with international best practices in tourism disaster risk reduction (Zhong et al 2021).

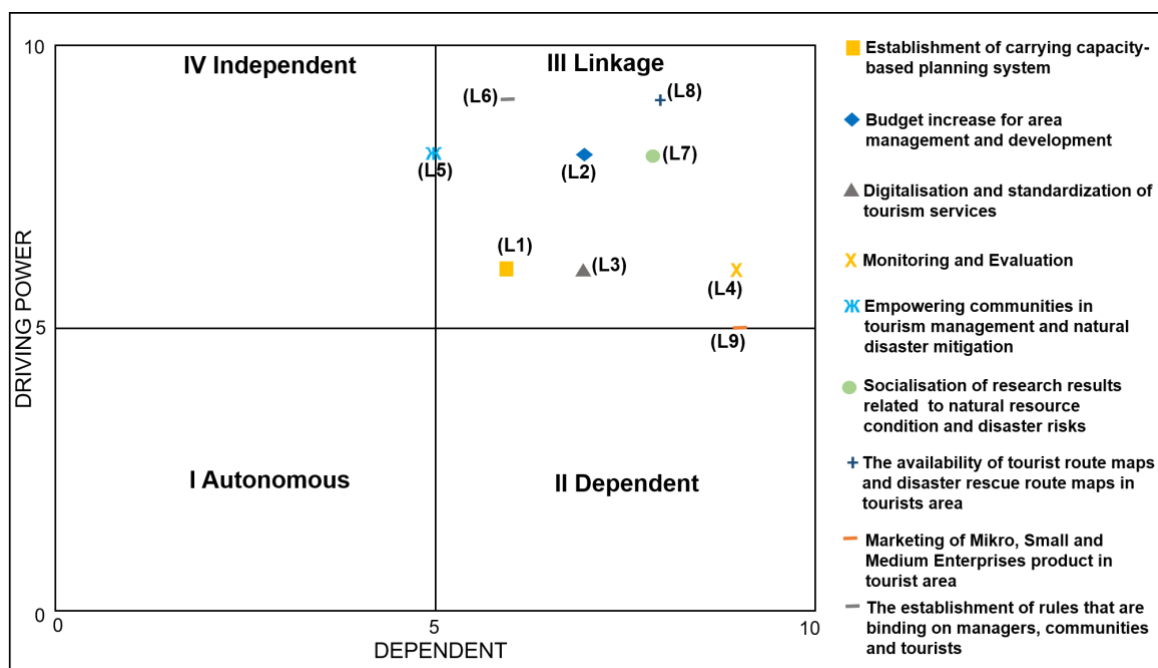


Figure 7. The diver power dependence matrix program.

At Level 4, the hierarchy positions L9, promotion of local MSME (Micro, Small, and Medium Enterprises) products, as the final output, dependent on the proper implementation of previous levels. This configuration implies that MSME development cannot thrive without foundational supports like regulatory consistency and safety mapping. In similar tourism contexts, MSMEs have been found to significantly benefit from structural preparedness and institutional clarity (Hulu 2022; Ratnaningtyas et al 2025).

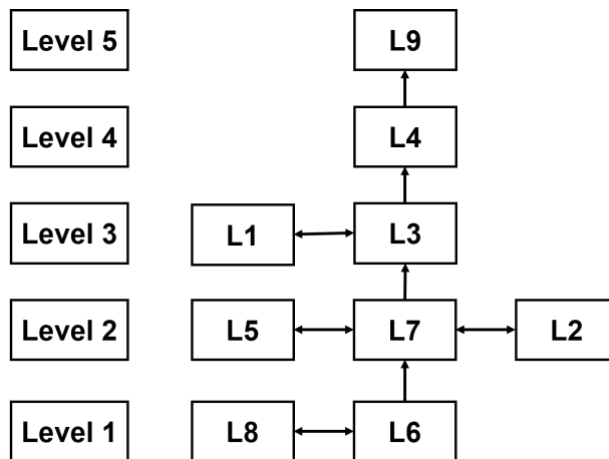


Figure 8. The hierarchical structure of the program sub-element

Thus, the hierarchical flow emphasizes a phased implementation strategy. Stakeholders must first secure governance mechanisms and hazard mapping (Levels 1-2), followed by the integration of scientific research and capacity building (Levels 3-4), to enable sustainable tourism marketing and community entrepreneurship (Level 5). This structure prioritizes impactful interventions and promotes resilience by reducing vulnerabilities and enabling long-term adaptive capacity in tourism planning (Folke et al 2005; Sushil 2012).

**Actor sub-elements in coastal ecotourism management.** The ISM analysis reveals a nuanced understanding of the contextual relationships among actor sub-elements involved in managing the snorkeling-based coastal ecotourism in Sawarna, Lebak Regency. Seven key institutional actors were identified based on triangulated insights from literature review, stakeholder interviews, and field observation. These were analyzed regarding their driving power and dependence to determine their relative strategic positioning.

The Department of Tourism and Culture of Lebak Regency (L1) emerged as the sole actor located in Quadrant IV (Independent) of the Driver Power-Dependence Matrix (Figure 9). This positioning highlights the department's strong influence over tourism governance initiatives, with minimal reliance on other institutions. As a strategic leader, this agency holds the authority to enforce regulatory frameworks, allocate budgets, and initiate integrated tourism planning, consistent with findings from Bramwell & Lane (2000), who emphasize the centrality of governance bodies in steering sustainable tourism agendas.

In Quadrant III (Linkage), five actors demonstrated both high influence and high dependence:

- a) The Village-Owned Enterprise (BUMDes),
- b) The Government of Sawarna Village,
- c) The Regional Planning and Development Agency (Bappelitbangda),
- d) Perhutani (The State Forestry Public Corporation), and
- e) The Regional Disaster Management Agency (BPBD).

These entities are dynamically positioned as "key players" whose engagement is vital for successfully implementing cross-sectoral programs. However, due to their mutual dependencies, disruptions in one actor's performance may cascade into others, affirming the need for strong horizontal coordination (Ansell & Gash 2008; Berkes & Ross 2013).

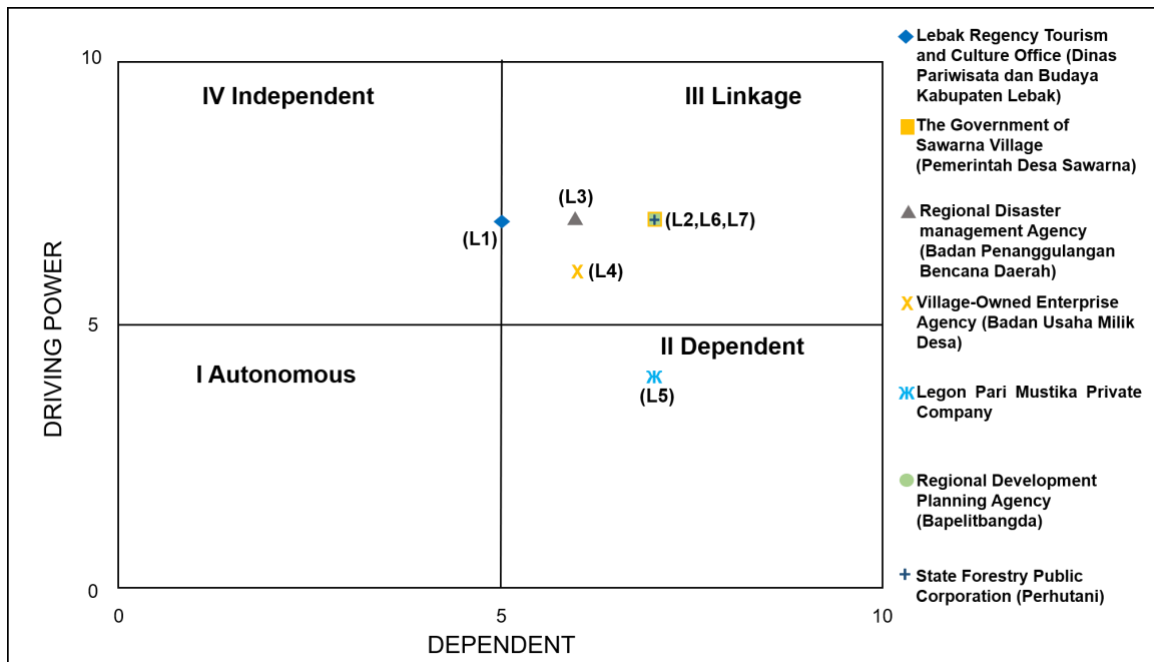


Figure 9. The diver power dependence matrix - actor.

The hierarchical structure of actor sub-elements (Figure 10) further delineates priority relationships across three levels. At the top of the hierarchy (Level 3), Legon Pari Mustika private company (L5), a private investor, appears as the most dependent actor. While lacking independent driving power, this actor plays a complementary role in supporting community-based initiatives through funding and service provision. At the base (Level 1), actors such as Lebak Regency Tourism and Culture Office (L1), the Government of Sawarna Village (L2), and the Regional Development Planning Agency (L6) serve as foundational drivers for policy formulation, spatial planning, and regulatory oversight.

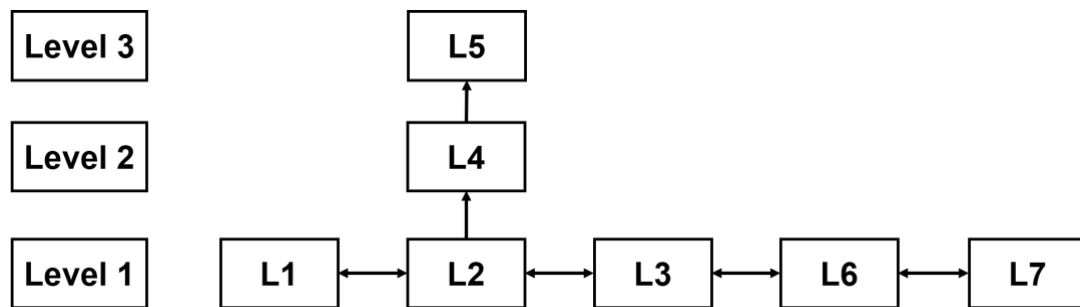


Figure 10. The hierarchical structure of the actor sub-element

Importantly, the mid-level actors Village-Owned Enterprise Agency (L4) and The State Forestry Public Corporation/Perhutani (L7) serve bridging roles, facilitating the implementation of tourism activities while safeguarding natural assets. This actor alignment resonates with findings by Folke et al (2005), which advocate for multi-tiered governance in managing complex socio-ecological systems. In the context of Sawarna, actors encompass administrative, private, and local community institutions, reflecting the importance of polycentric governance in achieving both ecological conservation and socioeconomic development (Cheer et al 2019).

In summary, the ISM-based actor analysis underscores the necessity of strategic collaboration among stakeholders. The Department of Tourism and Culture should spearhead integrative planning and enforcement efforts, while local entities such as the Village-Owned Enterprise Agency and the Government of Sawarna Village act as operational nodes for implementation. The region can effectively balance conservation goals with tourism development by fostering structured cooperation and shared

accountability, ensuring long-term coastal resilience. Previous research has shown that community-based governance, environmental carrying capacity, destination attractiveness, and digital marketing readiness are among the most influential factors shaping ecotourism sustainability in Bali Island (Wiranatha et al 2024). Moreover, Malaysian studies show that integrated governance and collaborative management, which connect government agencies, private stakeholders, and local communities, are crucial for ensuring that ecotourism initiatives offer socioeconomic benefits while protecting biodiversity and conservation areas (Darda & Bhuiyan 2022).

Integrating sustainable tourism practices into coastal governance is essential for simultaneously advancing Sustainable Development Goal (SDG) 13-climate action, and SDG 14 (life below water). Effective management practices like regulating visitor numbers, enforcing coastal zoning, cutting carbon emissions from tourism, and promoting community-based conservation help mitigate climate change and improve the ability of coastal communities to adapt. This supports SDG 13 (Scott et al 2012). At the same time, sustainable tourism supports SDG 14 by protecting crucial marine ecosystems, reducing pollution, and encouraging the conservation of coral reefs, mangroves, and seagrass beds, which often suffer from mass tourism (Baltaci & Gok 2025). Evidence from coastal areas in Indonesia indicates community-managed ecotourism can lessen environmental pressure, boost local stewardship, and create income from conservation. This strengthens both marine ecosystem resilience and climate adaptation strategies (Juliana et al 2023).

However, this study has several limitations, including its limited scope to Sawarna Beach, the small number of respondents, and the potential for bias in the perspectives of key stakeholders. Further research with quantitative validation or cross-site comparisons could enrich the results in the future.

**Conclusions.** This study demonstrates that ISM is a valuable tool for structuring strategic planning in coastal tourism. In the case of Sawarna, ISM revealed that strengthening community capacity and disaster mitigation (L5) is a key driver for achieving resilient and sustainable tourism. Priority programs such as regulatory enforcement and hazard mapping must be addressed first to support downstream initiatives like MSME promotion. The interlinked nature of most constraints, such as weak coordination, limited funding, and lack of integrated regulations, highlights the need for collaborative, multisectoral governance. The actor analysis positions the District Tourism Office as a central driver, supported by local institutions, including the Government of Sawarna Village and the Village-Owned Enterprise. Overall, the findings provide a structured roadmap for local stakeholders to prioritize interventions and strengthen resilience in coastal tourism planning. The ISM approach offers a practical framework that can be adapted to similar destinations facing complex socio-environmental challenges.

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**Conflict of interest.** The authors declare that there is no conflict of interest.

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