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## Artikel

# The Institutional Structural Model For Sustainable Maritime Tourism In The Kepulauan Seribu National Parks

Linda Noviana<sup>1</sup>, Tatan Sukwika<sup>1</sup>, Kholil<sup>1</sup>

<sup>1</sup>Program Studi Teknik Lingkungan, Fakultas Teknik Universitas Sahid, Jakarta

✉ Penulis koresponden: [tatan.swk@gmail.com](mailto:tatan.swk@gmail.com)

**Abstrak:** Taman Nasional Kepulauan Seribu, terletak di utara Jakarta, berfungsi sebagai kawasan wisata bahari utama dengan daya tarik keindahan terumbu karangnya. Namun, peningkatan jumlah pengunjung berdampak negatif pada terumbu karang. Untuk mengurangi dampak ini, peran pemangku kepentingan sangat penting. Ada enam institusi yang terlibat dalam pengelolaan kawasan ini: Balai Taman Nasional Kepulauan Seribu (BTNKS), pemerintah daerah, dinas pariwisata, masyarakat lokal, pengusaha, dan LSM. Namun, keenam institusi ini tidak bekerja sama dengan harmonis dan sering mengalami tumpang tindih fungsi. Penelitian ini bertujuan menganalisis bentuk institusi yang tepat untuk pengelolaan wisata bahari yang berkelanjutan, menggunakan metode interpretative structural modelling (ISM) dengan data dari diskusi para ahli. Hasilnya menunjukkan bahwa BTNKS, Pemerintah Kabupaten Kepulauan Seribu, dan Dinas Pariwisata memainkan peran penting. Hambatan utama yang harus segera diatasi meliputi koordinasi antar institusi yang lemah, penegakan hukum yang tidak efektif, dan pengetahuan pemandu wisata yang kurang memadai. Program yang diperlukan adalah membangun koordinasi antar stakeholder dan kemitraan serta mengembangkan kapasitas pemandu wisata.

**Kata Kunci:** interpretative structural modelling, keberlanjutan, taman nasional Kepulauan Seribu, wisata bahari.

**Abstract:** The Kepulauan Seribu National Park, located north of Jakarta, is a primary marine tourism destination with its beautiful coral reefs as the main attraction. However, the increasing number of visitors is negatively impacting the coral reefs. To mitigate these effects, the role of stakeholders is crucial. Six institutions manage this area: the Kepulauan Seribu National Park Official (BTNKS), the local government, the tourism office, local communities, entrepreneurs, and NGOs. However, these six institutions do not collaborate harmoniously and often experience overlapping functions. This study aims to analyze the appropriate institutional framework for sustainable marine tourism management using interpretative structural modeling (ISM) with data from expert discussions. The results indicate that BTNKS, the Kepulauan Seribu Regency Government, and the Tourism Office play significant roles. The main challenges that must be addressed urgently include weak inter-institutional coordination, ineffective law enforcement, and inadequate knowledge among tour guides. The program needed is to build coordination between stakeholders and partnerships and develop the capacity of tour guides.

**Keywords:** interpretative structural modelling, Kepulauan Seribu national park, marine tourism, sustainability.

## 1 INTRODUCTION

Marine tourism is a concept of tourism activities that can be used to balance the utilization and protection of coastal and marine resources. Ecotourism activities must positively

contribute to environmental sustainability, not just prioritize the development of tourist activity. According to Firmansyah et al. (2023b) and Mashjoer (2020), marine ecotourism is a coastal tourism activity developed through marine protection. One of the protections provided is to

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comply with natural law and coordinate the implementation of development plans that emphasize environmental carrying capacity. Furthermore, Björk (2000) states that tourism is an activity done by humans to enjoy the beauty of nature, protect the environment and study it.

Kepulauan Seribu has excellent potential to develop marine tourism; one of the objects of tourist attraction is coral reefs. It is indicated by the increasing number of tourist visits since 2022. Even in 2022, the number of tourists reached 316.740 people and increased in 2023 to 404.845 people BPS (2023).

Along with the increasing population of Jakarta, and the growing number of tourists, the condition of coral reefs in the Kepulauan Seribu National Park (BTNKS) is also affected. In addition, water pollution caused by household and industrial waste, landfills, sand and coral mining, and mangrove logging also contribute to coral reef damage. According to Kepulauan Seribu National Park Center or BTNKS (2016), besides having positive impacts (economic and social), tourist activities in tourist destinations have negative consequences, primarily related to the environment. According to Ferdian et al. (2020), Swarbrooke (2020), and Syaiful et al. (2023) stated that the most apparent impact of marine tourism is the destruction of coral reefs and water pollution due to oil spills or others. Marine tourism activities that attract many visitors, such as mangrove tracking, snorkelling and diving, can damage the balance of coastal and marine nature. Continuing ecotourism activities in areas that have experienced environmental damage can be a good option, as long as there are serious efforts to repair and restore the environmental conditions. Therefore, it is important to conduct a thorough environmental assessment and ensure that the ecotourism activities developed are truly sustainable, prioritize conservation, and involve local communities as part of the long-term solution (Firmansyah et al., 2023a; Gedik & Mugan-Ertugral, 2019; Kholil et al., 2017).

Based on data from the Kepulauan Seribu National Park (BPS, 2023), the percentage of live coral cover in 2011 amounted to 39.35%, in 2013 amounted to 35.51% and in 2015 amounted to 32.23%. From these data, it can be seen that the existence of coral reefs is increasingly degraded by human activation. For this reason, it is necessary to study what causes the degradation of the coral reef, which is one of the objects of marine tourism attraction. The principles of marine ecotourism development, according to Harahab et al. (2020), Sasongko et al. (2020), and Sulaksana et al. (2023), are (a) environmental

conservation, (b) improving community welfare, (c) tourist satisfaction, (d) minimal negative impact, and (e) cultural preservation.

To ensure the sustainability of the Kepulauan Seribu National Park (TNKS), it is necessary to manage marine tourism with an institutional approach that involves elements of government, private sector, and community that work together to realize marine tourism management that pays attention to the environment. The cooperation of the three components is called co-management (Dahuri et al., 2021). The way to organize co-management in marine tourism management is with Interpretative Structural Modelling (ISM). ISM is an assessment conducted in groups (group learning process) to obtain a complex structural model of a system. The way to structure this method is by using graphical forms and sentences (Firmansyah et al., 2023a; Sushil, 2012). The ISM method has been successfully used to design appropriate institutions to ensure the sustainability of marine resource management in Banten Bay (Farkan et al., 2016), and it can also be used to identify institutions involved in ensuring its sustainability (Firmansyah et al., 2023a; Tangian et al., 2015).

This research aims to study and build a suitable institutional model based on the objective conditions to manage marine tourism in the Kepulauan Seribu National Park and determine the constraints and programs that must be carried out to create sustainable marine tourism.

## 2 METHOD

### 2.1. Study Area

This research was conducted in the Kepulauan Seribu National Park (TNKS) area in the northern part of DKI Jakarta. This area was chosen because it has implemented ecotourism tourism, but institutionally, the coordination still needs to be improved and overlapped. Details of the area's location can be seen in Figure 1.

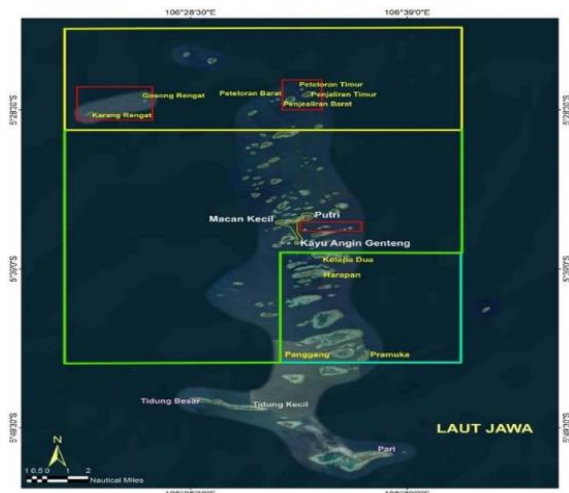


Figure 1. Location of study

2.2. Data Collection Methods

Data were collected through questionnaires. The questionnaire is in the form of a 10x10 paired matrix sheet comparing the level of importance between objectives and stakeholders required in this research. Expert interviews with 10 stakeholders via Focus Group Discussion (FGD), including institutional leaders, community leaders, local fishermen, entrepreneurs, and communities. To complement primary data from expert interviews, secondary data related to marine tourism in TNKS is also used from various sources: Reports, study results, books and others—data analysis using an Interpretative Structural Modelling (ISM). This ISM analysis aims to develop a hierarchy and classification of constraint sub-elements in 4 sectors, which in turn can determine which sub-elements are included in the predetermined variables (Sukwika, 2018; Sushil, 2012). The four sectors are autonomous (sector 1), dependent (sector 2), linkage (sector 3), and independent (sector 4). The outline of the four variables can be seen in Figure 2.

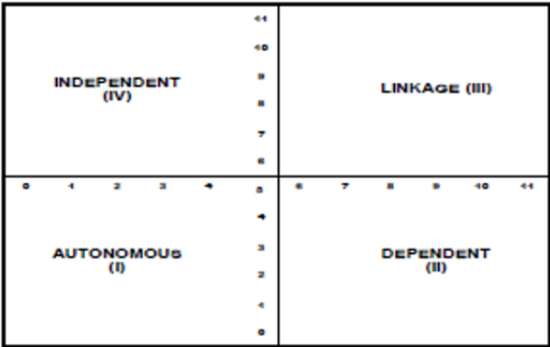


Figure 2. Diver Power Matrix Quadrant (Sukwika, 2018; Sushil, 2012)

No	1	2	3	4	5	6	7	8	9	10
E1										
E2										
E3										
E4										
E5										
E6										
E7										
E8										
E9										
E10										

Figure 3. Diver Power Matrix of Constraint elements (Sukwika, 2018; Sushil, 2012)

2.3. Data Collection Methods

The ISM method introduced by Saxena is the analytical method used to examine the institutional form of marine tourism management in TNKS. The stages of ISM are: (1) Identification of elements: identifying and listing system elements, (2) Contextual relations: establishing contextual relationships between elements by modelling objectives, (3) Structural Self-Interaction Matrix (SSIM): This matrix represents the elements of the respondents of the target relationship, (4) Reachability Matrix (RM): Prepare RM, then convert the SSIM notation into a binary matrix, (5) Level division: all System elements are grouped into different levels, (6) Canonical Matrix: grouping elements that are at the same level, (7) Diagraph: which is a graph of directly interconnected elements (8) Interpretative Structural Modelling: ISM is generated by moving all elements together with the actual element description: (Farkan et al., 2016; Firmansyah et al., 2023a; Sukwika, 2018; Sushil, 2012).

The Structural Self Interaction Matrix (SSIM) is an element of the respondent's perception of the intended relationship element. The symbols used to represent the relationship between two aspects of the system under consideration are V, A, X and O. Where V = relationship from element Ei to Ej, not vice versa. A = relationship from element Ej to Ei, not vice versa. X = interrelationship between Ei and Ej, and vice versa. O = no relationship between Ei and Ej.

The following conversion rules apply: (1) If the relationship of Ei to Ej = V in SSIM, then element Eij = 1 and Eji = 0 in RM; (2) If the relation Ei to Ej = A in SSIM, then element Eij = 0 and Eji = 1 in RM; (3) If the relationship of Ei to Ej = X in SSIM, then element Eij = 1 and Eji = 1 in RM; and (4) If the relationship of Ei to Ej = O in SSIM, then element Eij = 0 and Eji = 0 in RM. Where: Ei is the ith sub-element of the actor, i

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=1,2,3,4,5; and  $E_j$  is the  $J$ th constraint sub-element,  $j = 1,2,3,4,5$ .

According to Sushil (2012), ISM is concerned with interpreting complete representations of objects or systems through graph theory's systematic and iterative application. ISM analyzes system elements and resolves them graphically based on direct relationships between components and hierarchies. These elements include policy objectives, organizational goals, and evaluation factors. Direct relationships can occur in various contexts (relative to contextual relationships).

The institutional system in TNKS consists of (1) actor elements, (2) constraint elements and (3) program elements. In this research, the basis of consideration in selecting the program elements to be achieved is the dominant element consulted with experts in the management of conservation areas in TNKS. Changes in each system element in the management of marine tourism in TNKS are several sub-elements, consisting of Institutional Elements or Actors, namely the needs of actors in the management of marine tourism areas, meaning who are the actors who play a role in sustainable marine tourism management efforts; Main Constraints Element: The main obstacle in the management of marine tourism is the part that can hinder the management of marine tourism, Program Elements: Activities needed in the marine tourism management model in TNKS. The steps of the ISM method analysis can be seen in Figure 4.

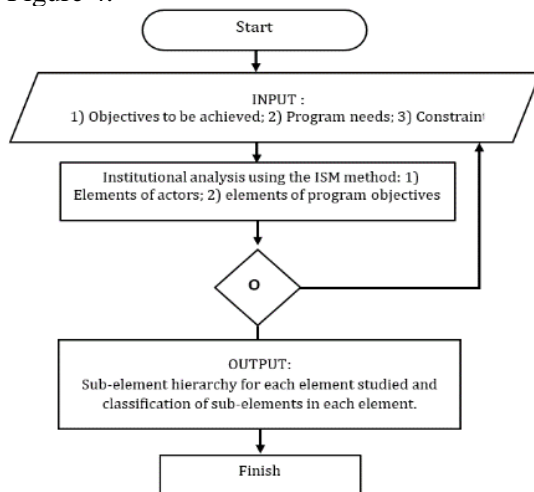


Figure 4. Flowchart of Institutional Analysis with ISM Method.

### 3 RESULT AND DISCUSSION

Institutional analysis in this study was conducted on two main elements, namely institutions and constraints, to ensure the sustainability of the Kepulauan Seribu National

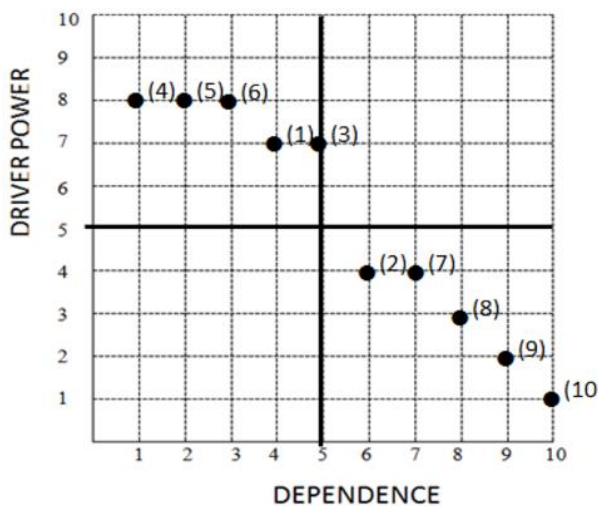
Park. The results of the analysis of the two elements are as follows:

#### 3.1. Institutional Elements

Institutional analysis using the ISM method analyses institutions that are very influential in managing the Kepulauan Seribu National Park based on 10 elements, where each element consists of sub-elements compiled based on the results of interviews and observations, namely: (1) The Ministry of Environment and Forestry (KLHK); (2) Special Capital Region Province of Jakarta (DKJ); (3) Maritime Affairs and Fisheries Service (DKP), (4) Kepulauan Seribu National Park Center (BTNKS); (5) District Government; (6) Tourism Office; (7) Regional Development Planning Agency (Bappeda); (8) Community; (9) Higher Education/University; (10) Non-Governmental Organization (NGO). The elements and sub-elements were determined based on 10 experts' opinions in their respective fields by conducting interviews and discussions. The elements interviewed were the Regent of the Kepulauan Seribu Administrative Regency and staff within the province of DKI, the Head of the Kepulauan Seribu National Park, and his staff.

Figure 4 shows the results of the ISM method of the sub-elements (4) BTNKS, (5) Kepulauan Seribu Regency Government, (6) Tourism Office, and (1) KLHK are in independent quadrant IV, meaning that the sub-elements have a high driving force to support the course of sustainable marine tourism, while (3) DKP is right on the vertical axis (Y), which means that it can be a driver or as an essential role (LINKAGE) in ensuring its sustainability. While (2) DKI Jakarta, (7) Bappeda, (8) Community, (9) Higher Education, and (10) NGO are in quadrant II, namely dependent, meaning that these institutions depend on changes in other variables, especially those in quadrant IV (Independent). Figure 4 shows that sub-elements (4) BTNKS, (5) Regency Government, and (6) Tourism Office are very influential institutions in ensuring the sustainability of the Kepulauan Seribu National Park. It is indicated by their position at the highest level (6), as shown in Figure 5. These three institutions will influence other institutions that are above (levels 5,4,3,2 and 1).



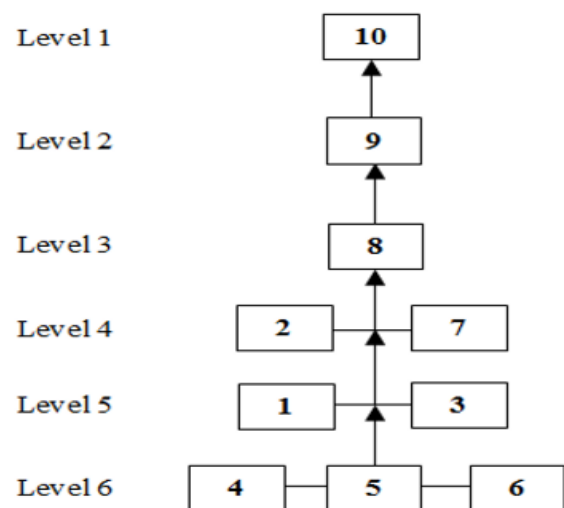


Description: K1. KLHK; K2. Prov. DKJ; K3. DKP; K4. BTNKS; K5. Kepulauan Seribu District Government; K6. Tourism Office; K7. Bappeda; K8. Community; K9. Higher Education/ University; K10. NGO.

Figure 5. Institutional Power-Dependence Driver Matrix

Figure 6 above shows that the three institutions, BTNKS (4), Regency Government (5) and the Tourism Office (6), are the three institutions that play the most role in ensuring the sustainability of the Kepulauan Seribu National Park, but currently only BTNKS is directly managing and responsible (4), while geographically it is under the Kepulauan Seribu Regency government, so the local government should have direct responsibility for maintaining its sustainability. Likewise, the Tourism Office of the Kepulauan Seribu Regency Government because this area is a tourist area.

Based on the model diagram in Figure 5 Level 6, it is known that KLHK, which oversees the National Park and the Kepulauan Seribu Regency Government, is a vital driving factor. At level 4, it can be seen that the DKI Jakarta provincial government and the Kepulauan Seribu National Park Center (independent variables) have a powerful influence. It shows that these four institutions strongly influence the level of effectiveness and sustainability in the management of the Kepulauan Seribu National Park. From the institutional analysis results, the government's involvement through the Ministry of Environment and Forestry towards the National Park Center dramatically determines the effectiveness of sustainable marine ecotourism management.



Description: (1) KLHK; (2) DKI Jakarta; (3) DKP; (4) BTNKS; (5) Regional Government; (6) Tourism Office; (7) Bappeda; (8) Community; (9) Universities; (10) NGO.

Figure 6. The institutional structural model of the management of the Kepulauan Seribu National Park

The government can perform its function by facilitating through policies, regulations, research and development (Firmansyah et al., 2023b; Sukwika, 2018). The Ministry of Marine Affairs and Fisheries, Communities, Universities and Community Institutions are included in sector III (Linkage) of the system (Figure 5), meaning that the variables in this sector must be studied carefully because the relationship between variables is unstable. Any action on these variables impacts other variables, and feedback effects can amplify the impact (Sukwika, 2018; Sushil, 2012). The expected impact is to increase the chances of successful management programs such as those carried out by the Ministry of Marine Affairs and Fisheries through the Marine and Agriculture Sub-Department, universities through Research and Technology, and communities and non-governmental organizations. Formal community organizations that can support stewardship efforts by working with the government and district management. However, the linkage sector's sub-elements depend on independent key factors.

The Focus Group Discussion (FGD) results show that government agencies have been running independently without coordinating with each other. In addition, community involvement is less considered and tends not to care about managing marine tourism. According to Sukwika (2018), and Farkan et al. (2016), three essential aspects must be considered in management involving institutions, namely: 1) In terms of organizational structure, can flexibly respond to certain circumstances and adapt to the environment it

faces; 2) In terms of precise functions, each institution works based on its duties and functions, 3) In terms of values or norms, every organization must have values that are embraced by the elements in the organization. From the overall results of the ISM analysis, the key sub-elements of each institutional element are obtained. The key sub-elements are the main drivers in the system that determine the success factor in managing the Kepulauan Seribu National Park area institutionally if the Ministry of Forestry through the National Park Office can synergize well with the DKI Jakarta Provincial Government through the Kepulauan Seribu Administrative District Government, with efforts to equalize perceptions about the management of the National Park marine tourism area, a vital institution will be created.

### 3.2. Constraint Element

Weak knowledge and ability of the community in natural resource management (K1); Weak knowledge of tour guides (K2); Institutional system (K3); Weak coordination between related parties (K4); Government policies that are less supportive or inconsistent (K5); There are still differences in perception in the management of TNKS (K6); Weak law enforcement and regulations on marine tourism (K7); The high cost of conservation and management of marine tourism (K8); Weak control and observation of TNKS conservation areas (K9); Low community participation (K10); Lack of guidance on tour guides (K11). The results of the analysis are shown in Figure 6.

Classification of sub-elements of sustainable marine tourism program constraints based on driver power and dependence (Figure 6) shows that (K3) weak institutional system, (K4) weak coordination between related parties, (K5) government policies that are less supportive or inconsistent, (K6) There are still differences in perception in the management of TNKS, (K7) Weak laws and regulations on marine tourism, (K8) The high cost of conservation and management of marine tourism is in the independent quadrant (quadrant IV), meaning that these sub-elements have a high driving force to support the course of sustainable marine tourism. These elements cause other elements to change, and the six elements become the main obstacles of the program to ensure the sustainability of the Kepulauan Seribu National Park.

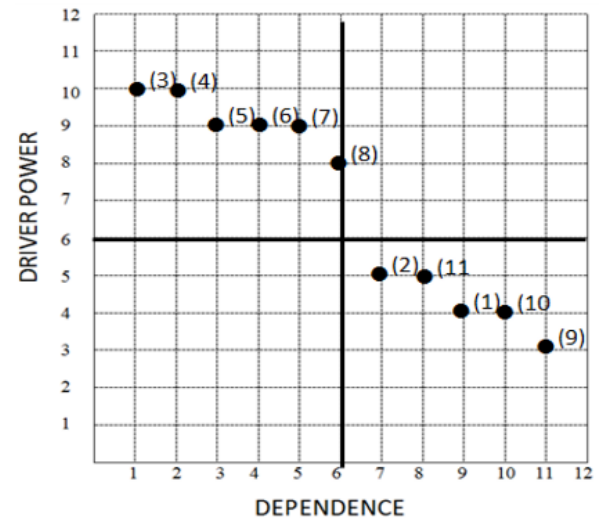


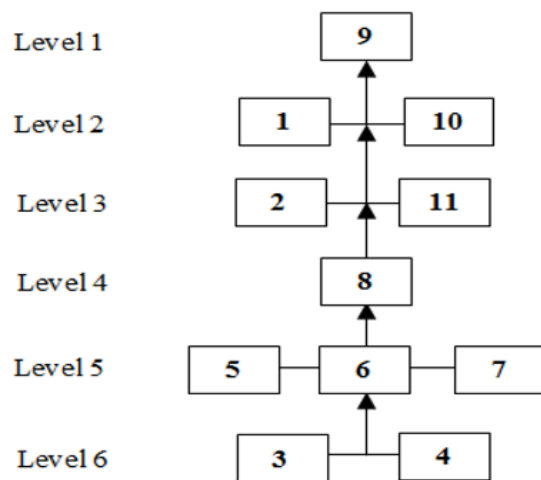
Figure 6. Driver Power Matrix of Constraint

Sub-elements in quadrant II, namely (K2) Weak knowledge of tour guides, (K11) Lack of guidance on tour guides, (K1) Weak knowledge and ability of the community in natural resource management, (K9) Weak control and observation of TNKS conservation areas, (K10) Low community participation. It shows that these elements have a high dependency, and must be considered because they can turn into determinants of success if the situation allows.

Based on its position, (K3) Weak institutional system and (K4) Weak coordination between related parties should be the main priority among other constraint elements. It is necessary to form a management institution that involves policymakers, especially BTNKS, the Kepulauan Seribu Regency Government, the Tourism Office, KLHK, and DKP. In addition, the DKI Provincial Government, BAPPEDA, Universities, and Business Actors.

The hierarchical structure of constraint elements consists of six levels. According to Heumasse et al. (2014), and Tresiana (2017) a good form of management is to reasonably accommodate all stakeholders' interests and view each party's dignity as an equal entity to achieve common goals.

Figure 7 shows that there are 6 essential constraints located at levels 6, 5 and 4, namely weak institutional systems (3), weak coordination between parties (4), inconsistent government policies (5), different perceptions in management (6), weak laws and regulations (7) and high conservation costs (8). Of the six constraints, five main elements are considered necessary: weak institutional systems, weak coordination, inconsistent government policies, differences in perceptions among stakeholders, and lack of law or regulation enforcement. Therefore, these constraints should be prioritized for resolution.



Description: K1. Weak knowledge and ability of the community in natural resource management; K2. Weak knowledge of tour guides; K3. Weak institutional system; K4. Weak coordination between related parties; K5. Government policies that are less supportive or inconsistent; K6. There are still differences in perception in the management of TNKS; K7. weak laws and regulations on marine tourism; K8. The high cost of conservation and management of marine tourism; K9. Weak control and observation of the TNKS conservation area; K10. Low community participation; K11. Lack of guidance for tour guides.

Figure 7. Model Diagram of constraints in TNKS management

The main obstacle at level 6 is the weak institutional system and the need for coordination between stakeholders in managing marine tourism in the Kepulauan Seribu. It is because of the need for more cooperation between stakeholders, such as the government, entrepreneurs, the private sector, and the marine tourism object area community. For example, the facilities and infrastructure built for tourism objects do not provide financial results because there are no tickets. In addition, there are three essential things in this issue: the community and the government, the community and the private sector, and the government and the private sector. First, between the community and the government, for example, the difficulty of the tourism office in understanding the local community to be aware of tourism. Second, between the community and the private sector, namely the lack of cooperation between the private sector and the community in increasing community income. Third, between the government and the private sector, the tourism office is less proactive in controlling ships or boats that take passengers without any rules. This happens because of stakeholders' low commitment to their duties and functions. In addition, existing resources may not have an educational background in tourism (Heumasse et al., 2014). The government of Kepulauan Seribu Regency should play an essential role in maximizing the region's potential, namely as the

executor and responsible for tourism development.

It is to the views expressed by Javier dan Elazigue (2011), Chili dan Xulu (2015), and Vieira et al. (2016) which states that the functions of local government, especially the tourism office, are: 1) Acting as the executor and entirely responsible for all tourism activities and tourism development in the region as well as those related to business and other tourism; 2) The central government assigns local governments to carry out tourism management and development in the region with the principle of joint management. There are three sub-elements of constraints considered necessary in the Constraints Element at level 5: inconsistencies in government policies, differences in perceptions between stakeholders towards the management of national parks, and low enforcement of laws and regulations. For example, policies and regulations governing the management of the Seribu National Park often overlap between one institution and another. Because each stakeholder has different interests in the conservation area, the nature of the conservation area and that of a tourist attraction is often not realized. In addition, there is a lack of assertiveness of related institutions in law enforcement in the event of violations that damage the environment. It occurs due to the need for better communication and publication between stakeholders, which results in no mutual agreement (Chili & Xulu, 2015; Javier & Elazigue, 2011; Vieira et al., 2016; Zhu et al., 2020).

Based on the problems and discussions above, it is necessary to establish a management institution involving policymakers, especially BTNKS, the Kepulauan Seribu Regency Government and the Tourism Office, KLHK and DKP. In addition, the DKI Provincial Government, BAPPEDA, Universities, and Business Actors.

## 4 CONCLUSION

In the conclusion section, the results of this study obtained three crucial findings, namely as follows: The most influential institutions in the sustainable management of nature tourism activities in the utilization zone in the Kepulauan Seribu National Park Tourism Area are the Kepulauan Seribu National Park Official (BTNKS), the Kepulauan Seribu Regency Government and the Kepulauan Seribu Tourism Official. The obstacles that must be addressed immediately are weak coordination or cooperation between institutions, inconsistent government policies, differences in perceptions between

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institutions in the management of National Parks and weak law enforcement or regulations. Therefore, it is necessary to build cooperation, especially the three institutions, through the creation of joint programs, and supervision by their respective fields. A new institution must be formed consortium with the Kepulauan Seribu government, the Tourism Office, Ministry of Environment and Forestry (KLHK), Marine and Fisheries Office (DKP), Special Region of Jakarta Government (DKJ), Regional Development Planning Agency (Bappeda), and Kepulauan Seribu National Park Official (BTNKS) as the main stakeholders.

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