Collaborative Governance Model for Mangrove Ecotourism: Bintan Island Case, Indonesia

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Abstract

This research aims to identify gaps in indicators and variables of Collaborative Governance associated with Mangrove-based ecotourism in Bintan Island, Riau Islands, Indonesia. Furthermore, the conditions of Collaborative Governance are analyzed to obtain an ego-sectoral relationship between stakeholders with the development process carried out according to their respective visions and missions. This is qualitative research with primary and secondary data collected through interviews and transcripts. The data was analyzed using in-depth triangulation and NVivo software to determine the interpretive constructor. The results showed that stakeholders could use Mangrove conservation policies in Bintan Island to form bottom-up and top-down Collaborative Governance models. However, despite finding weak indicators and variables based on NVivo coding in the context of the priority Penta Helix model, the proposed model involving Penta Helix indicators can be implemented. Therefore, stakeholders can provide goods for Mangrove Ecotourism for domestic and foreign tourists.

1. Introduction

Mangroves are a typical ecosystem primarily found in coastal and slightly sloppy areas protected from waves (Guannel et al., 2016; Khakhim et al., 2021). These ecosystems grow optimally in coastal areas with large river estuaries and deltas, where the water flow contains many muds (Hartati & Pin, 2021). Nugroho (2019) stated that Mangroves are difficult to cultivate in rocky coastal areas with large waves and strong tidal currents because these conditions do not allow the deposition of silt, which is necessary for growth. Regarding the magnitude of Mangrove ecosystems' ecological and economic benefits, the existence of Mangrove ecosystems needs to be maintained. In addition, population growth is also increasing rapidly, leading to a rise in the need for human life, specifically in coastal areas (Malik et al., 2019; Nengsih et al., 2021). Collaborative Governance is often used to solve problems, such as social conflicts between stakeholders, and to formulate regional development plans for environmental protection policies.

This increase in demand causes pressure on natural resources due to the community's inability to take ecological losses into account. Furthermore, the development of coastal areas around Mangrove Forests is often not carried out with environmental awareness, damaging the ecosystems (Surjanti et al., 2020). Therefore, Mangrove Forest is inseparable from ecotourism because it is a way of utilizing natural resources for human satisfaction. Tourism activities supported by various facilities and services provided by the community, business actors, and the government are due to tourist visits (Hakim et al., 2017; Harto et al., 2021; Hussin et al., 2009). According to Ceballos-Lascursairán (1996) and Gössling (1999), ecotourism is a tourism activity that seeks to minimize negative impacts on tourism activities.

Implementing development in the regional scope is no longer the government's responsibility. Therefore, collaboration with various actors or stakeholders is needed. This is in line with the governance paradigm in state administration science, which aims to promote the government's role to other groups, thereby building good Governance. Its development has experienced refinement into the concept of Collaborative...
Governance, which is interpreted as a public institution in the implementation and objectives of interested parties. A policy or program needs to be involved by consensus in the formulation, and participatory process, with the results, shared responsibility among the related parties (Chandler & Chandler, 2019). Harto et al. (2021) and Scheyvens (1999) defined ecotourism as the process of conserving and improving the welfare of local communities. It benefits local communities' environment, culture, and economy (Fistiningrum & Harini, 2021). A tourist who participates in nature tourism activities uses the services of local guides and stays at residents' inns, commonly called homestays, thereby contributing to the area's economy (Hussin et al., 2009; Towoliu & Takaendengan, 2015).

The enormous potential of Indonesia's Mangrove resources has become a strategic matter to be developed in the tourism sector (Musadad & Ibrahim, 2019; Parmawati et al., 2018; Rizal, 2018). The collaborative relationship between actors is associated with the involvement of various agents and players from several jurisdictions, governments, and external third-party providers of goods and services, as well as governments and citizens (O'Flynn & Wanna, 2008).

Therefore, to support the tourism industry, the government needs to work with the private sector to provide the necessary facilities and infrastructure (Ruhanen, 2013; Tang, 2021). One such method is the provision of hotels and accommodation services for foreign and domestic tourists (Salim et al., 2018; Santos & Giraldi, 2017). Ecotourism activities are an effective alternative to overcome overexploitation by the community by creating economic options (Henri & Ardiawati, 2020; Situmorang, 2018). A good Mangrove ecosystem can be used as ecotourism to improve the economy in Indonesia's coastal and border areas (Chow & Tsui, 2019; Su & Li, 2021; Yousaf, 2021).

Bintan Island, located on the border between Indonesia and Singapore, has a resource area of 9,146 Ha of Mangrove Forest. Therefore, it requires the potential services of several stakeholders to be directly involved in its utilization (Kurnianingsih et al., 2021; Oktaviana et al., 2021). Collaborative Governance is the participation of several people, groups, and organizations to achieve the expected goals. It can complete a shared vision to achieve positive results for the audience. Emerson et al. (2011) stated that the collaboration between interested parties in managing Mangrove Ecotourism tends to accelerate its management at the central and regional levels.

Bintan Island is currently building a sustainable Mangrove Forest ecosystem in its local communities to sustain the tourism industry built for several years (Akbar & Ikhsan, 2019). Utilization activities carried out on Mangrove Ecotourism on this Island take place optimally. Therefore, a good collaboration between the private government and the community is needed for continuation (Mahadiansar et al., 2021a). On the other hand, media participation in promoting Mangrove Ecotourism on Bintan Island requires impacting the transmission of information beneficial to both domestic and foreign tourists.

Ecotourism is the development of the tourism industry to create employment opportunities (Mahadiansar et al., 2021b; Sentanu & Kumalasari, 2020). In decision-making, joint and deliberative commitments are essential for all stakeholders in innovating strategic Collaborative Governance policies. According to
Emerson et al. (2012), Innes & Booher (2012; 2003), and Wanna (2008), public policy innovation is a necessity that the government must conduct because it concerns the interests of many people.

Initially, indigenous people living on the coast carried out Bintan Island Mangrove Ecotourism following the Malay Customary Institution (LAM). However, the local community responded with concern about coastal conditions due to abrasion and high levels of salt carried by very extreme sea breezes.

The Malay Customary Institution (LAM) is a social process that formally applies the local wisdom system and promotes the preservation of Mangrove Forests. It is dynamic in the western world and is usually referred to as Indigenous Knowledge (Warren, 1992). Conceptually, this local wisdom system is rooted in knowledge and traditional management approaches. Therefore, it has close relationships with the environment and natural resources, thereby leading to an understanding of the local, standard, or indigenous communities' ecological system, which prevents them from conducting activities capable of ecologically damaging the area (Jackson & Warren, 2005). In 2016, local communities first managed Mangrove plants, which were more productive due to their ability to grow and breed endemic flora and fauna.

The main activities of this Bintan Mangrove Ecotourism are planting, maintaining, and providing special interest tourism assisted by other parties. The development concept using the agro silver fishery (wana mina) is to implement social forestry programs in Mangrove Forest areas (Kauti & Ueda, 2016; Taylor, 1993). Based on observations, local wisdom has cultural values that have been carried out since birth. Therefore, it is used to maintain the Mangrove ecosystem and other biological environments. Nevertheless, the coastal communities of Bintan Island are still homogeneous in the process used to preserve Mangrove Forests. This is because their primary source of livelihood is fishing, and people understand that these forests are an ecological asset of life that needs to be preserved by generations.

Although the current position of the coastal communities of Bintan Island is greatly disturbed by the presence of exclusive tourism industry activities (establishing hotels and resorts) and mining processing (showing smelters), their tradition of maintaining the continuity of Mangrove Forests from the beginning has never been conflicted. However, since the existence of investment-labeled economic activities, the Mangrove Forest ecosystem has suffered sporadic and massive damage. This is due to ineffective collaboration, coordination, and informal connectivity in the managerial process.

The main problems in Mangrove habitat management are associated with a decrease in pond activities, construction of docks, sharing of sporadic economic activities, and irresponsible forest exploitation. In addition, the considerable population growth around the coast led to excessive use of natural resources, thereby damaging Mangrove Forests throughout the tropics. The depletion of these forests has become a significant concern for developing countries, including Indonesia, in Bintan Island, which lacks academic knowledge on the importance of Mangrove Forests.

According to Scheyvens (1999) and Yasir et al. (2020), one of the efforts used to increase the productivity of coastal areas without destroying the balance of the ecosystem is by developing the Mangrove Forest
area into an ecotourism destination. This development process is mutually beneficial due to its ability to sustain Mangroves in coastal communities without damaging the ecosystem (Alfiandri et al., 2021). Therefore, the local community needs to be involved in increasing Mangrove Ecotourism activities to enable them to feel its benefits as long as it is appropriately managed (Harahab & Setiawan, 2017). Furthermore, the government needs to assist in the form of capital to aid in the Development of Mangrove Ecotourism Areas, such as tourism-supporting infrastructures (Murtini et al., 2018; Zhang et al., 2014).

The agencies involved in developing Bintan Mangrove Ecotourism, namely the government, the private sector, and the community, must act as facilitators, partners, and the main actors to achieve a common goal. In utilizing Mangrove Ecotourism on Bintan Island, research confirmed several sources as each actor involved. Therefore, there has to have collaborative activity between stakeholders. Therefore, carrying out a collaborative-based system on Bintan Island is essential based on this explanation.

2. Research Methods

Denzin (1978) stated that qualitative research is an interpretive constructivist paradigm approach. Therefore, this research explores openly discussed phenomena following cycle-based Collaborative Governance on Mangrove Ecotourism in Bintan Island by making a framework as the validity process (Cardno, 2003). Figure 1 shows the method used to convert NVivo files on an interview from audio to text. In the first stage, the issues investigated on ecotourism and Mangroves were identified, followed by determining the context of analysis in the second stage (Stage & Manning, 2003).

In the third stage, informants, as stakeholders of the Penta Helix element, converted audio to text to make it easier to fill in an NVivo file based on thematic analysis (Wiltshier, 2011). Finally, in the fourth stage, essential keywords are classified by coding the files, Nodes and looking for relevant information needed for the focus of Collaborative Governance-based ecotourism research on Bintan Island.

The triangulation process (Olsen, 2004) was conducted in the fifth and sixth stages to determine the cause and effect of the reciprocal process in the analysis obtained (O'Sullivan et al., 2013). The result facilitates in-depth analysis (Sandelowski, 1995) to create and compile a new model of Mangrove Ecotourism based on new Collaborative Governance. Figure 2 is a research cycle to develop Collaborative Governance.

The various aspects of this research cycle drive development plans and continuously reflect the human desire and willingness to try something. This is because the desire to acquire and develop knowledge is a basic human need that motivates them to conduct structured scientific research in social life.

3. Results

Coding of Mangrove Ecotourism Research based on Collaborative Governance
NVivo software was used to perform deductive coding in the analytical context of Collaborative Governance by showing the tendency of indicators and research variables toward objects used in Mangrove Ecotourism on Bintan Island. The interview transcripts are prepared and explored using relevant keywords in the coding process. Therefore, frequent word that appears on indicators and variables are easily traced. The classification of the Nodes created in NVivo Codes is shown in Table 1.
Table 1
Results of Explore Nodes on NVivo in Interview Transcripts About Mangrove Ecotourism based on Collaborative Governance

<table>
<thead>
<tr>
<th>Name</th>
<th>Files</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Collaborative Process</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commitment to Process</td>
<td>24</td>
<td>100</td>
</tr>
<tr>
<td>Mutual Recognition of Interdependence</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>Openness to Exploring Mutual Gains</td>
<td>20</td>
<td>84</td>
</tr>
<tr>
<td>Shared Ownership of Process</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Face-to-Face Dialogue</td>
<td>19</td>
<td>46</td>
</tr>
<tr>
<td>Intermediate Outcomes</td>
<td>23</td>
<td>269</td>
</tr>
<tr>
<td>Joint Fact-Finding</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>Small Wins</td>
<td>20</td>
<td>92</td>
</tr>
<tr>
<td>Strategic Plans</td>
<td>23</td>
<td>84</td>
</tr>
<tr>
<td>Shared Understanding</td>
<td>24</td>
<td>164</td>
</tr>
<tr>
<td>Clear Mission</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>Common Problem Definition</td>
<td>18</td>
<td>48</td>
</tr>
<tr>
<td>Identification of Common Values</td>
<td>17</td>
<td>37</td>
</tr>
<tr>
<td>Trash Building</td>
<td>21</td>
<td>98</td>
</tr>
<tr>
<td><strong>Facilitative Leadership</strong></td>
<td></td>
<td>45</td>
</tr>
<tr>
<td><strong>Institutional Design</strong></td>
<td></td>
<td>83</td>
</tr>
<tr>
<td>Clear Ground Rules</td>
<td>22</td>
<td>127</td>
</tr>
<tr>
<td>Forum Exclusiveness</td>
<td>9</td>
<td>26</td>
</tr>
<tr>
<td>Participatory Inclusiveness</td>
<td>21</td>
<td>64</td>
</tr>
<tr>
<td>Process Transparency</td>
<td>23</td>
<td>86</td>
</tr>
<tr>
<td><strong>Starting Condition</strong></td>
<td></td>
<td>204</td>
</tr>
<tr>
<td>Incentives for and Constraints on Participation</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>Power-Resource-Knowledge Asymmetries</td>
<td>23</td>
<td>133</td>
</tr>
<tr>
<td>Prehistory of Cooperation or Conflict</td>
<td>12</td>
<td>49</td>
</tr>
</tbody>
</table>
Table 1 indicates that all informants understand the variables and indicators conveyed. However, the frequency shows that the numbers filled in files and references are still related to Collaborative Governance. The highest number of files lies in the hands of the collaboration process, the commitment variable to the process, and the initial conditions for collaboration. Therefore, Collaborative Governance-based Mangrove Ecotourism already exists, starting with the collaboration process and explaining the initial conditions of Mangrove Ecotourism on Bintan Island. However, the smallest number lies in the joint ownership and institutional design in individual forum agendas, which shows a small number based on NVivo's processing with sectoral egos in each institution.

The plan for the cooperative forum that discusses Mangrove Ecotourism on Bintan Island has not been adequately conducted. Therefore, Collaborative Governance in each institution does not have a clear vision and mission for a shared commitment. These findings indicate significant problems implementing cooperation forums and joint commitments in all stakeholder institutions. This is because institutions have different interests in seeing Mangrove Ecotourism as a potential for sustainable tourism management by protecting the environment. Therefore, the economic value of tourism activities can be felt only in certain groups.

Stakeholder Research Coding with Penta Helix concept

Penta Helix is part of Collaborative Governance used to create a climate of cooperation to determine whether these conditions can work adequately or otherwise. Mangrove Ecotourism in Bintan Island plays a significant role in formal and informal institutions. In addition, it can strengthen Collaborative Governance-based Mangroves in coastal areas with natural potential. Therefore, these nature-based tourist destinations drive the local community's economy and tourism industry players. Based on the coding results on the processed data of informant interview transcripts, NVivo export results of Mangrove Ecotourism discussions on Collaborative Governance are shown in Table 2.

<table>
<thead>
<tr>
<th>Name</th>
<th>Files</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>24</td>
<td>549</td>
</tr>
<tr>
<td>Community</td>
<td>15</td>
<td>175</td>
</tr>
<tr>
<td>Business</td>
<td>23</td>
<td>147</td>
</tr>
<tr>
<td>Media</td>
<td>24</td>
<td>102</td>
</tr>
<tr>
<td>Academic</td>
<td>10</td>
<td>23</td>
</tr>
</tbody>
</table>
Table 2 is an interview session concerning the Penta Helix approach to Collaborative Governance-based Mangrove Ecotourism. The informants had an adequate understanding of the research's explanation. File and reference show the highest numbers for government and media in NVivo's processed results. This means that the government understands the concept of Mangrove Ecotourism and the media's involvement in conveying information to the public. However, the role of academics and local communities shows a small number of collective understanding due to minimal developmental interest.

Furthermore, from the academic context, only the development of Mangrove Ecotourism on Bintan Island is still lacking in academic research. Therefore, the importance of voluntary participation from Collaborative Governance actors is the incentives provided to involve stakeholders and the associated factors that shape these incentives. An imbalance of power or resources will impact the group's motivations and ability to participate in the collaborative process. According to Ansell & Gash (2008) and Savage et al. (2011), power between actors influences the actor's desire to attend formal meetings during the collaborative process.

Hierarchy of Collaborative Governance-Based Mangrove Ecotourism on Penta Helix Approach

The hierarchy or level of objects used in this research aims to determine the effect of object involvement. The order in question is the involvement of actors in Collaborative Governance based on an overview of answers that affect its management and development. Furthermore, the hierarchy also aims to determine the power influenced by the phenomenon in grouping the involvement of Mangrove Ecotourism in Collaborative Governance patterns. The processed results of NVivo are shown in Fig. 3.

Based on the level results on the Penta Helix component as an approach to Collaborative Governance-based Mangrove Ecotourism, four indicators of the initial condition were obtained: institutional design, collaborative process, facilitative leadership, and government component. Furthermore, the primary role variable for Collaborative Governance is at the highest level compared to other variables. This shows that local government initiatives need to be strengthened as a form of interaction between stakeholders to realize a grealiseperation pattern in the development and management of Mangrove Ecotourism and fact, formally and informally facilitating institutional activities; therefore, the high role of the government in decision-making is due to the existence of regional autonomy. Stakeholders are people who fill positions of authority in society, institutions, or government (March & Heath, 2008; Teisman, 2000).

Four indicators of Collaborative Governance do not show significance in the Penta Helix component. However, this condition does not significantly affect Mangrove Ecotourism on Bintan Island. This means that the role of Penta Helix is due to the lack of communication and coordination between institutions (Besley & Coate, 2003). Another reason is that it does not show significance in the academic component because the role is only limited to research on the object of Mangrove Ecotourism in the development and management of other stakeholders.

Mapping of Collaborative Governance Relationships on Penta Helix Concept
Mapping in the use of NVivo aims to describe whether concept theory or case research has a general relationship with the involvement of stakeholders in the development of Mangroves as ecotourism in general (Lee, 2019). Exploration of Mapping Coding, such as Cases and Nodes based on the interview transcript, impacts the relationship between indicators and variables. In the case of Collaborative Governance-based Mangrove Ecotourism in Bintan Island, the Penta Helix concept fulfills the elements of the five existing components, as shown in Fig. 4.

The findings show that the Collaborative Governance indicators in the Penta Helix concept do not have a general relationship capable of influencing indicators and components, such as academics. Furthermore, the absence of a leadership facilitation relationship among academics indicates that the collaborative process of Mangrove Ecotourism has not been adequately involved in the development process either formally or informally. This means that the impact of universities on Mangrove Ecotourism collaboration based on Collaborative Governance in Bintan Island does not affect the potential for development and policy innovation ideas. This is because stakeholders have their institutions responsible for assessing the potential for tourism growth in this area.

4. Discussion

Condition of Mangrove Ecotourism on Bintan Island

One of the factors responsible for the significant number of foreign tourists entering Indonesia is that Bintan Island is located adjacent to Singapore and Malaysia. Therefore, mangrove tourism managers on this Island must be fostered to understand the benefits of sustainable Mangrove management to avoid damaging it for personal gains, such as exploitation, logging, and land conversion. Furthermore, Mangrove Forest has the potential for natural and environmental beauty in the form of ecosystem components consisting of vegetation, aquatic biota, wildlife, and the surrounding environment.

Bintan Island has the potential of Mangroves on its beautiful coast due to its ability to preserve the forests and increase tourist visits, enhancing the local community’s economy. Ecotourism is an appreciation of nature in the form of tourism products. Its marketing activities include Eco-Adventure, Eco-Cruise, Eco-Safari, Nature Tourism, Low Impact Tourism, Bio-Tourism, and Ecologically Responsible.

In 2003, Bintan Mangrove Discovery Tours was awarded the PATA (Pacifc Asia Travel Association) Gold Award for Ecotourism Project. This led to a partnership deal between the private sector and the community that utilized it more as a solution for the development of innovation and creativity (Akbar et al., 2021). However, the results show that the tourism industry only manages Mangrove Ecotourism in this area without involving the community.

Economic activities are more focused on the marine and fisheries sectors. Therefore the role of empowering local communities is less desirable, with few participants, as shown in Fig. 3. These community groups focus more on formal and informal tourism services for domestic and foreign tourists.
Based on the activities above, Mangrove Ecotourism still has the potential to be developed into various policy innovations through Collaborative Governance. However, the Penta Helix component of Collaborative Governance strength in Mangrove Ecotourism is still weak in the transparency process, leading to Mangrove Ecotourism development. According to research, this pattern does not work well. Therefore, tourists visiting Bintan for the first time must take the initiative to access Mangrove Ecotourism services.

Irman & Akbar (2021) and Winarno (2016) stated that policies must be implemented on tourism objects’ environmental damage regulations and rules. However, preliminary research did not identify the bottom-up and top-down potential analysis for developing Collaborative Governance-based Mangrove Ecotourism. Therefore, creating a new Mangrove Ecotourism destination is essential to minimize environmental damage on Bintan Island. Furthermore, this creation process is environmentally friendly. It prioritizes aspects of nature conservation, socio-cultural-economic empowerment of local communities, and elements of learning and education. Therefore, it is essential to strengthen Collaborative Governance to achieve these ecotourism goals.

Analysis of Mangrove Ecotourism Based on Collaborative Governance Model with Penta Helix Approach

Collaborative Governance emphasizes that actors and non-state actors are suitable to achieve a goal, irrespective of their varying interests. Collaboration shows that those who play an essential role in producing a policy are the government and private sector. Although Ansell & Gash (2008) stated that collaboration implies decision-making, non-state powerholders are also assigned various responsibilities. Furthermore, Collaborative Governance is a new paradigm in which communities, businesses, NGOs, and other stakeholders are involved in the decision-making process, policy implementation, and Governance in general. This engagement orientation attempts to answer big problems that cannot be solved individually (Nieto et al., 2015; Sofian et al., 2019).

In the Penta Helix component, participation that understands the initial conditions of Mangrove Ecotourism in the area has adequate knowledge of its programs and can maintain conservation ecosystems in forest areas (Muhyi & Chan, 2017; Sjögren Forss et al., 2021). Based on observations and interviews, Mangrove Ecotourism Management needs to involve complex social activities favorable to the local community. However, the implementation of Mangrove Ecotourism based on Collaborative Governance between government agencies and non-government institutions is less optimal due to overlapping interests, as shown in Fig. 4. Some parties run their programs without paying attention to others. For example, in ecotourism, sometimes less attention is paid to local communities because the tourism industry has superior facilities and infrastructure. This leads to sectoral egos that do not make cooperative efforts. Furthermore, the lack of optimal cooperation carried out by stakeholders related to the development of Mangrove Ecotourism in Bintan Island led to a lack of trust between actors, with poor communication and interaction in awareness-raising. This led to the absence of comprehensive cooperation in data collection, specifically in the local communities.
According to Ansell & Gash (2008), the Penta Helix approach is not part of the Collaborative Governance processes. Hence, the indicators are unimportant. However, in this research, it is the main foundation or basis for starting good Collaborative Governance. Therefore, the process can achieve outcomes that impact good service. The development of the Collaborative Governance model in question is shown in Fig. 8.

Collaborative Governance is a forum used to achieve a goal under certain conditions. Therefore, to fulfill shared goals, the government must collaborate with organizations and individuals to solve the problem of interdependence. Thus, the Penta Helix approach is essential because it helps the actors establish a stronger relationship, leading to commitment and a sense of shared ownership at the collaboration stage.

Furthermore, maximizing the Collaborative Governance process is essential where the sectoral egos can be resolved by strengthening the Penta Helix indicator, as shown in Fig. 7. The development model is necessary for preliminary research to determine each stakeholder’s cooperative role. Therefore, by resolving the Penta Helix approach, the Collaborative Governance process positively impacts the public, leading to quality activities, facilities, and services and creating complementary experiences with real value benefits. Stakeholder management reflects the outcome of understanding the collaboration process needed to achieve common goals.

Conclusion

The basic concept of the Collaborative Governance theory proposed by Ansell & Gash (2008) can develop Mangrove Ecotourism on Bintan Island. This is because it can be used to strengthen the foundation of the Penta Helix approach by having a shared commitment that Collaborative Governance should be involved both formally and informally to achieve common goals and reduce sectoral egos between institutions. Furthermore, Mangrove Ecotourism is currently a potential development process in coastal areas, with the ability to create new tourist destinations assuming the sustainability of Mangrove Forests is preserved.

Mangrove Ecotourism is based on Collaborative Governance to reduce problems that often occur on social issues. However, stakeholders’ inaccurate role makes the process often repeated because the Penta Helix approach does not reflect the birth of the initial condition indicator process until the institutional design becomes a polemic of Collaborative Governance. Therefore, the research on Mangrove Ecotourism based on Collaborative Governance in Bintan Island is fundamental due to the geographical conditions which attract domestic and foreign tourists.

Penta Helix’s approach, in general, can still be improved by conducting continuous interaction and communication to unify common goals, thereby preventing conflicts. In conclusion, the weakness of Mangrove Ecotourism based on Collaborative Governance in Bintan Island still shows a low understanding of stakeholders towards the concept of the Penta Helix approach. This process begins with the need for optimizing the government as a driving force for stakeholders’ involvement in providing sustainable ideas and innovations for Mangrove Ecotourism activities.
Declarations

Ethical Approval

Not applicable

Competing interests

Not applicable

Authors' contributions

Not applicable

Funding

Not applicable

Availability of data and materials

Not applicable

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   https://doi.org/10.1016/j.tmp.2021.100833


**Figures**
Figure 1

NVivo Files on interview transcripts from audio to text
Figure 2

Action research cycle to develop Collaborative Governance

(Adapted from Perkins et al., 2009)
Figure 3

Four Penta Helix Level Indicators: Initial Condition (a), Institutional Design (b), Collaborative Process (c), and Facilitative Leadership (d) on Collaborative Governance-based Mangrove Ecotourism in Bintan Island
Figure 4

Mapping of Collaborative Governance Relationships in Penta Helix Concept
Figure 5

One of Mangrove Ecotourism in Bintan Island. Source: Secondary Data, 2021
Figure 6

One of the Travel Services offers Mangrove Ecotourism Packages on Bintan Island
Figure 7

Reconstruction through NVivo on the Collaborative Governance Model (processed by researchers in the theory of Ansell & Gash 2008)
Figure 8

Development of Collaborative Governance Model by researchers.