

Towards the Development of a Framework for Sustainable Marine Space Governance: A Proposal for Collaborative Design Approach

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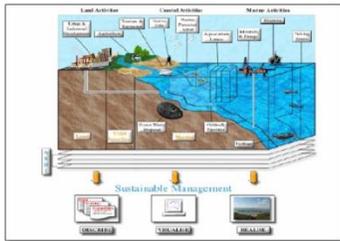
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Graphical abstract



Abstract

Malaysia is surrounded by ocean, approximately, 515,000 square kilometers covered by maritime realm and 4,576 km in length by coastline. The country has terrestrial borders with Thailand, Brunei Darussalam and Indonesia and has maritime borders with Thailand, Brunei Darussalam, Singapore, Indonesia, Vietnam and the Philippines. In addition Malaysia has many institutions for managing the marine environment. Hence the development of the institution and the scope still has some ambiguity, conflict and overlapping marine because organizations exist on the basis of a resolution of the Parliament. While on the physical condition, especially in the marine environment is difficult to determine the resolution authority area to an area of true governance. This paper addresses the need on collaborative design approach that fits into Malaysian marine space governance scenario, in particular with respect to stakeholder management. This paper first reviews several international collaborative designs. An exemplary model of collaborative has been developed, which constitutes the key factors that determine the success of collaborative implementation. This model is pending for experimentation to examine its effectiveness on Malaysia marine space governance.

Keywords: Sustainable marine space governance; marine space administrative issues; collaborative design

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1.0 INTRODUCTION

Marine administration has been defined as governing surrounding of the marine space. Governing the surrounding marine space tasks may include sustaining the natural environment, maintaining conservation and managing the resources. In Malaysia, governing such activities involves various departments at government stage as well as the stakeholder. Governing is not only about managing but it also regarding the decision making and distribution of knowledge which influenced the government, jurisdiction, stakeholder and others parties who have interest in those activities and specifically in marine space activities it shared in various ways amongst the state government, stakeholders and United Nations Convention on the Law of the Sea (UNCLOS), which is the overarching law governing the use of the ocean [1], [2].

The relationship between all parties together with the use of spatial-temporal sources could achieve many economic goals, social, politic, and environment blocked [3]. The spatial-temporal sources can provide higher usability and interactivity that can facilitate exchange and dissemination of spatial information among stakeholders and government agencies. The higher usability and interactivity of the spatial information sharing can be achieved by using the Geographical Information System (GIS). The GIS system

has been used to manage land information system since 1967. The upgraded and improved version of GIS system has been used to manage the land. Thus, it is possible to adapt the GIS system in marine administration environment in order to provide better marine governance and simultaneously improves the information systems on the ground [3]. The GIS system used spatial data together with the textual information which should covering accurate, up-to-date, complete and helpful information about the resources that currently exist, the nature of the environment, and also the consumers contact about the resources [4], for an effective management which can be referred as good governance. Specifically, good governance can be defined as the effectiveness on how the public institutions conduct and manage public resources such as marine spaces.

However, in Malaysia the marine spaces are not managed by single public institution but it was managed by several departments from the government, the stakeholder and an authorise individual who have interest on the marine spaces. As a result, it create complex, uncertain and conflict situations in determining the resolution of authority area of true governance. Therefore, it is important to establish a hierarchy of importance in authority area in order to meet the goals of economic, social, political and environmental blocked [3] as good governance can mean many

things depending on one's perspective or goals [5] though the foundation is the recognition of what is excluded, and also what is given priority in certain circumstances.

To manage a marine space with approximately, 515,000 kilometres square area covered by maritime realm and 4,576 km in length by coastline is a tedious task. Indeed, the maritime borders with Thailand, Brunei Darussalam, Singapore, Indonesia, Vietnam and the Philippines [6] as show in Figure 1 mean proper standard of governing the marine space is needed. As part of the South East Asian Region and a founding member of the Association of South East Asian Nations (ASEAN) the relationships with these nations should be importance as they are one of the stakeholders in Malaysia marine spaces.



Figure 1 Malaysia and its South East Asian Neighbors [1]

In this paper we used collaboration design in order to view the relationships of the stakeholder. Based on the relationships a framework will developed. This framework is dedicatedly for Malaysia which suitable for Malaysia marine environment and able to adopted for global used since there are no accepted methodologies or frameworks at the international level, which facilitate the marine space governance systems. It will be an opportunity to not make the same mistakes we have made in land resource management and land information systems [3].

■ 2.0 SUSTAINABLE MARINE SPACE GOVERNANCE

The management of good governance of marine space administrative has been debated since at least the 2000s. The extensive literature and research reports found that it is hardly surprising; the marine space is under serious threat from a myriad of overlapping and conflicting interests. It is therefore imperative to manage, administer and govern the coastal zone in a considered, sustainable and structured manner; to protect and nurture the environment we live in. Failure to do so may have disastrous consequences for future generations [2]. This includes refining the management system, particularly the governance of marine space administrative. This unresolved problem has led to the lack of a concerted effort in the existing management in the marine space and the quality of sustainable marine space governance is indirectly being affected.

Sustainable marine space governance is spatial data management of the marine environment. Spatial data management of the marine space is divided into three major issues, namely legal,

technical, and stakeholders. Legal issues involving approach is the allocation of resource ownership, control, stewardship and use within society; regulation of resources and resource use (e.g., environmental protection, development and exploitation, rights to economic and social benefits); monitoring and enforcement of the various interests; adjudication of disputes, including inclusive processes; management of spatial (geographically referenced) and other types of information to support all of the above functions analysis is the way to see marine governance linked at law and information [3]. The role of the legal framework of each country in managing marine space is taken into account. There are multi-layered framework consisting of laws of the United Nations Convention of the Sea (UNCLOS), customary international law, and international treaties, the laws of the national, state and local laws that are derived from the traditions, laws, and the courts.

Historically, considering at the information about resources which currently exist, the nature of the environment where the resources exist, and also the users and uses of resources is always a need for the assessment and monitoring of marine areas which effectively is an important technical component governance of marine spaces. Information about living and non-living resources, bathymetry, spatial extent (boundaries), coastal change, marine pollutants, the characteristics of the sea floor, water quality, and all property rights can contribute to sustainable development and good governance of coastal and marine source is all this type of information has important spatial component of good governance of marine spaces [4], [5].

Complementary to the two issues discussed above is a strong contributing factor to the existence of a new solution called marine cadaster. Marine cadastre can be defined as an information system that enables the visualization of the effect of a jurisdiction's private and public laws on the marine environment (e.g. spatial extents and their associated rights, responsibilities, restrictions, and administration). Other relevant information such as that regarding the physical and biological natures of the environment may be connected to the cadastre using spatial referencing to give the cadastre a multipurpose function [6].

However, researchers are trying to see why marine cadastre cannot be adapted to a marine governance while marine cadastre has long voiced by the geomatics community since 2001. String researchers tried to look from the point of management with more advanced. Through literature studies researchers have identified one of the key factors of marine cadastre is difficult adapted due to the diversity of usage, different departments and agencies in the sea and conflict of interest [5]–[17]. These interests can be expressed in a variety of ways, for example: sovereignty, jurisdiction, administration, ownership (title), lease, license, permit, quota, customary rights, aboriginal rights, collective rights, community rights, littoral rights, public rights, rights of use, and public good. One feature of being a coastal state is that there is a multidimensional tapestry of these interests (and perhaps others) in the coast and offshore. Marine administrators are challenged with trying to understand and communicate this to the various decision makers and stakeholders.

Furthermore, decision-makers in both the land and marine environments will need access to this information to make effective and reliable decisions supporting marine administration. Then again, complex relationships and interactions between overlapping and often competing rights, restrictions and responsibilities, both in the marine environment and at the land-sea interface remain referring to the stakeholder management.

The governance of marine spaces is the management of stakeholder activities in these spaces. To optimize this management and to address stakeholder issues requires that effective governance

frameworks be in place. Collaborative, cooperative, and integrative governance are improved frameworks for dealing with stakeholder issues [5]. Therefore to ensure the governance of marine space is at the maximum patch the effective management of stakeholder activities in marine space much be carefully consider. Furthermore there are no accepted methodologies or frameworks at the international level, which facilitate the marine space administration systems. Marine space administration is necessary for national development. This condition will make the governance of marine space become more difficult and more complicated because lack of comprehensive coastal zone management programs due to uncertainty and fragmentation in jurisdiction, administration, ownership, and use of coastal resources: There are not well established arrangements for collaboration among all of the government agencies at the several levels involved and each activity causes a new process of stakeholder identification and consultation. From an information perspective this has led to a lack of consistent data about interests and boundaries along the coast [5].

There are various problems and issues occurring in the marine environment even though most of the country had its own marine environment management system. Currently, many countries have a land administration system and some kind of marine management system, but these generally operate as separate entities [18]. This can cause conflict within the coastal zone or land-sea interface. According to the researchers again there is the need to effectively manage the coastal zone as well as the need for integration of data between the land, coast and marine environment requires a management system that incorporates them all. As what had reported by local researchers, most countries have a land administration system that operated as separate entities from their marine administration system [1]. This causes management gaps at the coastal zone.

Case explosion on the review of the need for the management of the marine environment is due to increasing pressure on the oceans, and the resulting tension between economic and environmental interests [19]. As competition for and scarcity of ocean resources and usage rights increases, so too do the tensions between the desire to retain the sea as a pristine environment, the desire to harvest economic resources and the desire to use it as a waste disposal site. There is increasing concern over access and usage of the ocean as a result of a number of factors such as technological advances in mining and fishing, and the many harmful environmental impacts associated with these activities. There are continual incidents of pollution. Poaching and over fishing have endangered certain biological species. Moreover, certain species are being exploited commercially, even though we have insufficient scientific knowledge to estimate what are sustainable levels of exploitation [19].

Marine environment management is much more complicated than in land management. Hence, ocean governance about the accuracy, up-to-date, complete and useful information regarding the resources that currently exist, the nature of the environment within which those resources exist, as well as users' relationships to those resources is therefore always a requirement for effective governance of marine areas. Information on (but not limited to) living and non-living resources, marine contaminants, water quality, shoreline changes, seabed characteristics, bathymetry, spatial extents, and property rights, responsibilities and restrictions all contribute to the sustainable development and good governance of marine environments [6].

From the perspective of management, Malaysia have many of institutional to manage and administering the marine environment. However, the developing of institutional area and scope was still

have some ambiguity, conflict and overlapping on marine because the organizational was establish base on act from Parliament resolution. On that physical especially on marine environments it is quite difficult to define the fix and accurately the authority area for true governance area. Keeping in mind that Malaysia is a country covered by water more than land, it is necessary to develop a governance framework for stakeholder management towards sustainable marine space administrations. This framework will take into account the indicators in the success of a sustainable management in various aspects of management.

■3.0 STAKEHOLDER ISSUES AND LEGAL ASPECTS

The decision about how to define stakeholders is consequential, as it affects who and what counts [20]. For example Eden and Ackermann define stakeholders as 'People or small groups with the power to respond to, negotiate with, and change the strategic future of the organization' [21]. Stakeholder as 'any group or individual who can affect or is affected by the achievement of the organization's objectives [22]. Choosing Eden and Ackermann's definition would focus an organizations' attention only on people who have the power to respond to or negotiate whereas using Freeman's definition would result in a longer list of stakeholders including those without any obvious power to impact the organization.

In Malaysia, there are various stakeholders and activities in the marine environment such as in land development, coastal activities, agriculture, tourism related activities, native title or indigenous issues, marine parks or protected area, aquaculture, oil and gas exploration, shipping the international boat or local, waste management from industry, cable and pipelines for the water supply or electricity and heritage area such as shipwreck. There are many different activities occurring on the ocean surface as shown in Figure 2.

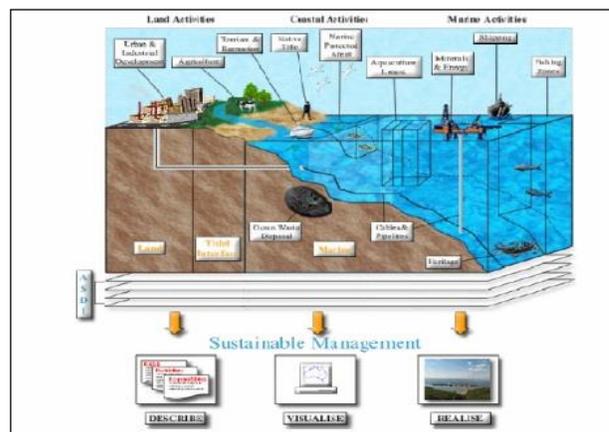


Figure 2 Illustration of multiple interests in the coastal zone [23]

All things mentioned above are the issues often in marine environment and that situation is need the clearly about the authorizations as the preliminary effort to effectively manage the marine source. Among the agency or organizational in marine area have followed the policy of department or agency but the true management in marine spatial is not yet reality. That situation is due to solid of efforts to protect and conserve the marine environment, and haphazard management practices, overuse of marine resources has resulted in marine management problems such as conflicts of sea use and environmental destruction [24].

There has been international recognition of the need to improve administration of the marine environment, in particular focusing on managing the different and overlapping maritime boundaries and the need for access to marine related spatial data. Decision-makers in both the land and marine environments will need access to this information to make effective and reliable decisions supporting marine administration. There are complex relationships and interactions between overlapping and often competing rights, restrictions and responsibilities, both in the marine environment and at the land-sea interface. In recent years there has been an increasing awareness of the importance of spatial data relating to the marine environment and the need for a structured and consistent approach to the definition, maintenance and management of offshore legal boundaries. It is within this context that the concepts of a marine spatial data infrastructure (Marine SDI) and a national marine cadastre have gained increasing prominence.

In recent years there has been growing awareness of the importance of spatial data related to the marine environment and the need for a structured and consistent approach to the definition, maintenance and management of the legal boundary offshore. Therefore this paper tries to see the potential for adaptation of existing collaboration design in the governance of the marine environment as a way to avoid conflict and overlapping use of marine space environment.

■4.0 COLLABORATIVE DESIGN

Collaboration is defined as a form of participation where stakeholders are jointly involved in priority setting and in the planning, implementation and evaluation stages of the process, thus allowing diverse stakeholders to work together to develop a more comprehensive understanding of the situation, to attempt to resolve a conflict or to develop solutions [25]. It incorporates the notion of pooling resources and sharing responsibility to address issues that no party can solve individually [26]–[28].

From various research findings, it can be summarized that the issue of marine space governance success as complex. It is a multifaceted problem with solutions depending on the research context. There are a large number of factors that may affect marine space governance, especially in terms of collaboration.

The seminar work of Jamal and Getz was the first platform to introduce theory of cooperation in the context of tourism management [29]. After that, several theoretical and empirical studies investigated various aspects of stakeholder collaboration in the context of tourism planning, addressing three broad areas: (i) early identification and involvement of key stakeholders [30]–[33], (ii) the maintenance of cooperation [31], [33]–[35], and (iii) the implementation of long-term outcomes of collaboration [31], [34].

Three main issues of collaboration is the early identification and involvement of key stakeholders; maintenance of the collaborative process; and (long-term) implementation of the collaboration. Table 1.0 summarizes the main issues reviewed in the available literatures. These issues will be the basis of this research in understanding the collaboration issues.

Table 1.0 Summary of literature reviews on collaboration issues

No.	Collaborations Issues	Researchers
1.	The identification and involvement of key stakeholders	[27], [29]–[31], [33], [36]–[44]
2.	Maintenance of the collaborative process	[33], [34], [37], [45], [46]
3.	(long-term) Implementation of the collaboration	[31], [32], [34]

The concept of collaborations through the three issues mentioned above will be used when building a model of a sustainable marine environment administration. Research illustrates that from a theoretical viewpoint it is possible to develop an collaborative design approach towards the development of a framework for sustainable marine space governance founded on seven indicators of collaborations. Table 2.0 presents the citations in the available literature reviewed on the collaboration indicators. It seems clear to suggest that collaborative design has already been well defined and dimensioned into seven indicators, i.e. Coordinating bodies, willingness, trust, management communication, visions and network structures/Social network and communication.

Table 2.0 Citations in the available literature reviewed on the collaboration indicators

No.	Collaborations Indicators	Researchers
1.	Awareness	[47]–[49][50], [51][52]–[54]
2.	Communications	[55][56], [57]
3.	Willingness	[49], [54], [58]–[63][63][63]–[65][66]
4.	Trust	[54][67][68][69][70] [57], [58], [71]
5.	Interdependency	[72] [27], [41], [58]
6.	Social Network	[73]–[80][81] [82], [83]
7.	Leadership	[84][85][86][87][88][56][89][90][91][92] [93][94][95][96]

Successful collaborations would lead to success the decision making in a multi stakeholder administration. Decision making is a process of identifying and selecting several possibilities actions which normally based on values and preference of the decision maker. In land and marine environments, the decision maker has to make effective and reliable decisions to ensure that the development of the particular land and marine spaces are well coordinated and able to create highly secure social environment standards. In order to realise such decision, the land and marine spaces have to be managed by good governance. The collaborative design approach towards the development of a framework for sustainable marine space governance will be discussed in the next section.

■5.0 CONCLUSION AND RECOMMENDATIONS

Based on the theories, principles and an overview of the literature, the study recommends a framework that uses a collaborative approach to governance for sustainable marine environments such as that illustrated in Figure 3. The collaborative approach focuses

on three main issues outlined that identification and involvement of key stakeholders, maintenance of the collaborative process, and (long-term) implementation of the collaboration. Cooperation prototype model developed specifically for governance in understanding the basic concepts of a sustainable environment. There are seven indicators provided by the collaboration model which is awareness, communications, willingness, trust, social network, interdependency and leadership. However, the model has to be balanced with the role of Co-operation and administrative limits of the stakeholders in the marine environment. This is because the information presented by modeling collaboration indicator will help stakeholders build a sustainable collaboration. Therefore, the development model and role-based collaboration administrative limits are important stakeholders in this study to ensure effective cooperation model in the governance of a sustainable marine environment. Through seven indicators aided by collaboration model, it is hoped that it will help to develop sustainable governing in marine space administration. There is still a thin layer of lining in the cloud and we may expect to see the light at the end of the tunnel.

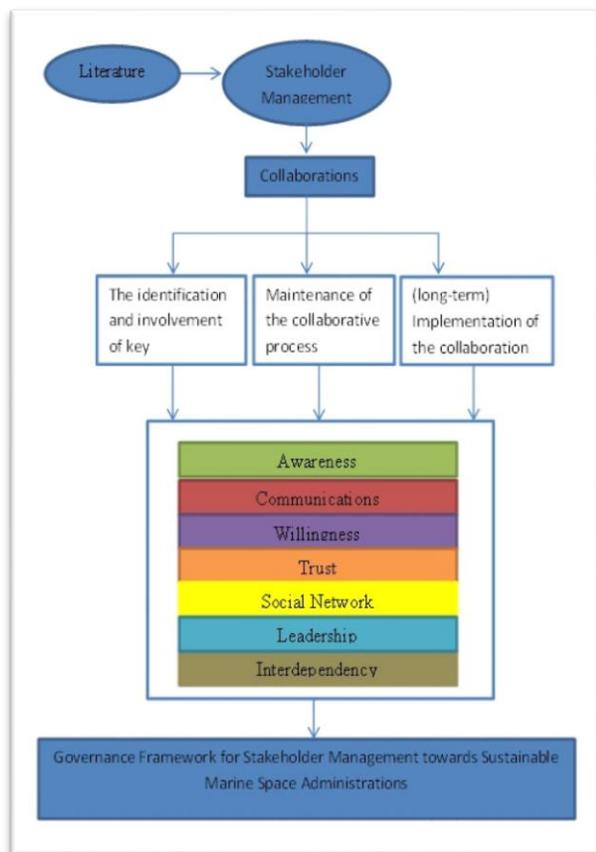


Figure 3 Conceptual framework for stakeholder management towards sustainable marine space administration

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