



**UNIVERSITI PUTRA MALAYSIA**

***ENVIRONMENTAL AND SOCIAL ASSESSMENTS OF AN ISLAND  
MARINE PARK IN MALAYSIA***

**MOHD IQBAL BIN MOHD NOOR**

**IPTPH 2018 5**



**ENVIRONMENTAL AND SOCIAL ASSESSMENTS OF AN ISLAND  
MARINE PARK IN MALAYSIA**

By

**MOHD IQBAL BIN MOHD NOOR**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,  
in Fulfillment of the Requirements for the Degree of Doctor of Philosophy**

**August 2018**

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment  
of the requirement for the degree of Doctor of Philosophy

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MARINE PARK IN MALAYSIA**

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**August 2018**

**Chairman : Professor Mohd Shahwahid Othman, PhD**  
**Institute : Tropical Forestry and Forest Product**

This study addresses issues and constraints faced by managing tourism development inside Marine Protected Areas in Malaysia by focusing on Tioman Island Marine Park as case study sites. With increasing number of tourist arrivals and greater tourism development in the area, issues of sustainability of Tioman Island Marine Park might be put into questions. The conflict between tourism development and environmental sustainability in Malaysia Marine Parks is getting complicated when some tourism stakeholders believe that the governing policy of the parks are not tailored for their demands to achieve competitive advantage and this might burden the management of protected areas. This problem is addressed by applying three essays that cover three objectives. The general objective of this study is to assess tourism impact on environment and social behaviour in Tioman Island Marine Parks. The first essay assesses the impact of tourism activities in Tioman Island Marine Park by using Life Cycle Assessment theory. The results of each assessment case indicated that transportation to/from the island, accommodation, snorkeling activities, and waterfall trekking activities leave negative impacts on human health, ecosystem quality and resources. The advantages of Life Cycle Assessment method include it offers a rational and comprehensive approach to evaluate the environmental impacts in every stage of a product's system. The second essays purpose is to reveal the current social network of stakeholders, interests, and participation in marine protected areas by applying Social Network Analysis. The study site covers three villages in Tioman Island Marine Park, Malaysia and the stakeholders are representatives from tourism distribution channel of Tioman Island Marine Park. The social network study focused on the discrete ties patterns for these villages and how these patterns can be used to manage the tourism network for the island. Network maps can help policy makers and implementing agency in planning and monitoring changes in tourism suppliers' arrangements by providing a unique methodological frame for collecting and organizing data. Finally, the third essays aim to investigate the relationship between

social capital dimensions and environmental behavior in marine parks and to examine the impact of cultural capital in mediating the relationship between social capital and environmental behavior. Data for this study were gathered from 124 respondents from the tourism distribution channel of Tioman Island Marine Park. The overall research process took over a year, in the month of May to August 2015 and June to August in 2016. The findings revealed positive effects of social capital and cultural capital on environmental behavior. The combination of these three essays proves that tourism development has different impacts on Marine Protected Areas management and its implementation. The research findings could help the government and policy planners by offering important inputs for policy direction in reviewing and analysing the possible impact of existing policies on Marine Park conservation. The contribution of this study in shaping the future of society depends on how policymakers, intellectuals, economic agents, and citizens will decide to orient research and use its results.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**PENILAIAN ALAM SEKITAR DAN SOSIAL BAGI TAMAN LAUT PULAU  
DI MALAYSIA**

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Kajian ini membahaskan isu dan kekangan yang dihadapi oleh pengurusan pembangunan pelancongan di Kawasan Perlindungan Marin di Malaysia, dengan memberi tumpuan kajian kes kepada Taman Laut Pulau Tioman. Dengan penambahan kedatangan pelancong dan penumbuhan tinggi pelancongan di kawasan ini, isu kemampunan Taman Laut Pulau Tioman mula dipersoalkan. Konflik diantara pembangunan pelancongan dan kemampunan alam sekitar di Taman Laut Malaysia menjadi semakin rumit apabila sebilangan pihak berkepentingan dari industri pelancongan merasakan polisi pembangunan kini tidak mengikut kehendak mereka yang ingin mencapai kelebihan daya saing dan konflik ini menyukarkan pihak pengurusan kawasan perlindungan. Masalah ini dibahaskan dengan menggunakan tiga esei yang merangkumi tiga objektif. Objektif umum kajian ini adalah untuk menilai impak pelancongan kepada alam sekitar dan perlakuan sosial di Taman Laut Pulau Tioman, diikuti oleh tiga spesifik objektif, iaitu; (i) Menilai kesan pelancongan kepada alam sekitar di Taman Laut Pulau Tioman, (ii) Untuk mengidentiti dan memetakan aktor yang berkaitan dengan industri pelancongan di dalam Taman Laut Pulau Tioman bagi melihat rangkaian hubungan, interaksi dan pengaruh mereka, dan; (iii) Untuk menyiasat hubungan di antara modal sosial dan perlakuan terhadap alam sekitar di Taman Laut Pulau Tioman. Esei pertama menilai impak aktiviti pelancong di Taman Laut Pulau Tioman dengan menggunakan teori *Life Cycle Assessment*. Penilaian ini mampu memberikan pandangan baru kepada alam sekitar dan membantu pembuat polisi dalam merangka dan memantau aktiviti pelancongan di kawasan perlindungan. Esei kedua pula memetakan rangkai sosial pemegang kepentingan didalam Kawasan Perlindungan Marin untuk mendapat kefahaman yang lebih baik dalam corak hubungan antara pemain didalam rangkaian pelancongan di Kawasan Perlindungan Marin. Tujuan esei ini adalah untuk menunjukkan rangkaian sosial terbaru pemegang kepentingan, kehendak dan penglibatan di dalam Kawasan Perlindungan Marin. Akhirnya, esei ketiga menyiasat hubungan diantara modal sosial dan tingkah laku

alam sekitar di Taman Laut Pulau Tioman, dan mengkaji impak modal budaya dalam mengantara hubungan diantara modal sosial dan tingkah laku alam sekitar. Kombinasi tiga esei ini membuktikan modal sosial mempunyai impak berbeza kepada pengurusan Kawasan Perlindungan Marin dan implikasinya. Data untuk kajian ini telah dikumpulkan dari 124 responden. Proses penyelidikan keseluruhan mengambil masa setahun, pada bulan Mei hingga Ogos 2015 dan Jun hingga Ogos 2016 Penemuan kajian dapat membantu kerajaan dan pembuat polisi dengan memberikan input penting arah tuju polisi berdasarkan analisis dan kajian impak polisi sedia ada Taman Laut. Ini akan membantu mengurangkan konflik antara pihak berkepentingan disebabkan halangan alam sekitar dan sekaligus meningkatkan efisiensi pengurusan Taman Laut. Sumbangan kajian ini adalah dengan membantu masyarakat memahami bagaimana pembuat dasar, intelektual, ejen ekonomi dan rakyat sendiri dalam mengarahkan kajian dan menggunakan hasilnya.



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I certify that a Thesis Examination Committee has met on 17 August 2018 to conduct the final examination of Mohd Iqbal bin Mohd Noor on his thesis entitled "Environmental and Social Assessments of an Island Marine Park in Malaysia" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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## LIST OF ABBREVIATIONS

MPAs	Marine Protected Areas
TIMP	Tioman Island Marine Park
SD	Sustainable Development
SC	Social Capital
SCa	Structural Capital
RC	Relational Capital
CC	Cognitive Capital
C	Cultural Capital
EB	Environmental Behavior
SNA	Social Network Analysis
PLS-SEM	Partial Least Square – Structural Equation Model
DOFM	Department of Fisheries Malaysia
NGO	Non-Governmental Organization

# CHAPTER 1

## INTRODUCTION

This study addresses the issues and constraints faced by the management of tourism development in Marine Protected Areas (MPAs) in Malaysia, focusing on Tioman Island Marine Park (TIMP) as a case study. This problem is addressed by applying three essays that cover three objectives. The first essay covers the environmental impacts of tourism activities on the island, the second essay covers the social network of the tourism stakeholders, and the last essay covers their perception and attitude towards environmental behaviours. Hence, the discipline of this study belongs to the natural resource management in the context of tourism in the protected areas. This chapter covers the introduction, which provides the background and problem statement of the study. This chapter also summarises the research objectives and significance of the study. A section is provided at the end of this chapter to show the detailed structure of the thesis for easy referencing.

### 1.1 Background of the Study

Coastal and marine ecosystems are facing a growing number of varying degrees of environmental degradations due to threats from human exploitations. The exploitations of marine resources like pollution, habitat destruction, ocean acidification, and overfishing have caused unpredictable impacts on the chemistry, physical structure, and biological and ecological functioning of oceans worldwide (Fabry et al., 2005; Halpern et al., 2008; Papageorgiou, 2016). This situation has raised worldwide concern and awareness on the status of ocean health and sustainability (Islam et al., 2017; Metcalfe, 2013). This concern has triggered the need to find a more effective approach to protect coastal and marine ecosystems. Policy makers around the world have stated that the model of ocean development used today needs to be amended as humans have altered the marine ecosystems more rapidly and extensively in this current time than any other time periods in history (Costanza, 2008; Liqueste et al., 2013).

Policy makers around the world have launched a series of initiatives to conserve the ocean; one of the initiatives that acknowledged by the world authorities is the creation of Marine Protected Areas (MPAs) (Bennett & Dearden, 2014; McClanahan et al., 1999; IUCN, 2013). MPAs have been suggested to be a useful tool to conserve marine habitats and their biodiversity (Fabinyi, 2008; Russ, 2002). By establishing MPAs, the authorities create a restricted fishing area at one particular site for marine habitat to reproduce safely, with the hope for a spill over effect to occur into the surrounding areas (Fabinyi, 2008; Russ, 2002). One of the most authoritative definitions of MPAs is:

*“...any defined area within or adjacent to the marine environment, together with its overlying waters and associated flora, fauna and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings...”*

(Secretariat of the Convention on Biological Diversity, 2009).

The implementation of Marine Protected Areas (MPAs) hopes to bring security to biodiversity conservation, along with the support of sustainable marine resources upon which humans depend on (Christie and White, 2007; Chen and Lopez-Carr, 2015). In Southeast Asia, MPAs are used for various purposes including fishery conservation, tourism, mining, transportation, and communication (Siry, 2006; Nadzir, Ibrahim, & Mansor, 2015). However, due to its multiple uses, it has led to a more rapid economic growth and increased population residing in the MPAs (Adeel & Pomeroy, 2002; Olaniyi, Abdullah, Ramli & Alias, 2012). This situation has a significant negative impact on the marine and coastal resources. The MPAs have been misused, and the resources that they are supposed to protect are suffering under insufficient institutional capacity and management, deficiency of integrated coastal decentralisation mechanisms, and a general lack of awareness of the role of the community in the implementation and management of MPAs (Siry, 2006; Siry, 2011).

Even though this situation brings negative impacts from the implementation of the MPAs, the policy makers of the MPAs argued that the implementation of ecological conservation and preservation needs to be in line with the social welfare and economic benefits to the locals and the country that implements it. They stated that to achieve sustainable and successful MPAs, it is important to consider the social and economic factors (Sumaila, 2002). Literature also stated that a country that establishes the MPAs is doing it not just for the benefits of biodiversity and food security, but also for tourism and pride in protecting their environment (Hind, Hiponia and Gray, 2010; Roque 2011).

The primary goals of the establishment of MPAs are to reduce the degradation of coastal and marine habitats, to maintain biodiversity, to prevent marine species loss, and to safeguard the ocean ecological stocks (McLeod et al., 2008). To achieve the objectives of the establishment, it is important to make sure that issues related to the environment become the principal compassion for the policy makers, and the attitudes and behaviours of stakeholders on the issues are tailored towards conservation, because they play vital roles in determining the success or failure of the MPAs (Kim, Borger and Chon, 2006).

In Malaysia, MPAs have been established since the 1980s by the Department of Fisheries Malaysia (DoFM). With approximately 3,600 km of coral reef areas, the primary objectives of MPAs are to protect the coral reef ecosystems from fishing and other harmful activities and ensure a sustainable development of marine biodiversity (Islam et al., 2013; 2017). The idea of establishing MPAs in Malaysia first appeared

when it was discovered that the marine fishery resources were declining. This was followed by the gazettelement of Malaysian Marine Parks in 1994, which became a law in 1995 upon reviewing the Fisheries Act 1963. To-date, Malaysia has established and gazetted 42 Marine Parks in offshore islands in Peninsular Malaysia under the Fisheries Act 1985 (Islam et al., 2013; 2017) (Table 1.1).

**Table 1.1 : MPAs in Malaysia**

State	Number (islands)	Area (ha)
<b>Kedah</b>	4	18,813
<b>Terengganu</b>	13	58,669
<b>Pahang</b>	9	67,661
<b>Johor</b>	13	76,565
<b>Labuan</b>	3	15,815
<b>Total</b>	42	235,723
<b>Gazetted area</b>	–	235,723
<b>Malaysian water</b>	–	45,318,600

(Source: Department of Marine Park, Malaysia 2016)

Marine Park is one of the types of Marine Protected Areas. Marine Parks in Malaysia usually allow recreational activities such as boating, diving, and fishing. Most Marine Parks include areas for commercial fishing, and sometimes they include closed areas, prohibiting extractive activities such as fishing, mining, and drilling. Marine Parks are very similar to the local parks on land as they are used by the community, and often have facilities that encourage their usage (Islam et al., 2013; 2017).

The Marine Parks in Malaysia are facing several problems and challenges such as environmental degradation, lack of enforcement, lack of coordination, lack of awareness, and poor socio-economic status that have direct effects on the environmental behaviour. The locals that reside in the Marine Parks have been stated as possessing limited resources and inadequate capacities to confront the many challenges (Cabanban and Nais, 2003). Environmental degradation affects them because most of the locals are dependent on the natural resources. To manage the natural resources, socio-economic factors should be considered because environmental conservation behaviour is influenced by demographic and socio-economic factors (Imran et al., 2014).

The problems and challenges faced by both policy makers and communities might come from the top-down approach deployed to govern the park. Many countries have been moving towards a more decentralised management system where the local stakeholders take control of the management, but in Malaysia, due to strong centralised political influences on fisheries and coastal management, this practice is still not being implemented (Siry, 2006). The establishments of Marine Parks in Malaysia are also legally forced on the community as opposed to other surrounding

countries such as Indonesia, Philippines, Vietnam, Cambodia, and Sri-Lanka, which are implemented through a referendum. Beside the Malaysian government supervisions of the coastal zone management, community participation in the management process is crucial for the effective management of natural and marine resources within Marine Parks (Nasuhon and Charles, 2010). Without the participation of local stakeholders in the decision-making process, some government policies may lead to resource devastation because of the denial of the locals towards ensuring sustainability (Ostrom, 2009).

There is a requirement for an assessment of the viability of the Marine Parks as an apparatus for marine and natural resource management in Malaysia. The assessment should evaluate the extent of management adherence to the objectives and goals of the MPAs in an optimum and proactive manner (Day, Hockings and Jones, 2002). Marine Parks are valued by their effectiveness and appropriateness as a successful natural resource management instrument. Therefore, such assessment can reveal the impacts of administrative mediations through confirmation of results, rather than speculations (Wells and Mangubhai, 2005; Jones, 2010). The assessment of Marine Parks is important because their inability to protect biodiversity could reduce public and political backings for conservation (Mora and Sale, 2011).

Malaysia's efforts in establishing the MPAs is commendable; however, gazetting a large number of protected areas alone cannot guarantee a decent life for the society if there remains a high level of inefficiency and irresponsibility. The motto of Marine Parks in Malaysia is *"To conserve, preserve and protect Malaysia's Marine Park Biodiversity and at the same time to ensure that its resources are utilised in a responsible manner for the continued progress and socio-economic development of Marine Park Island and community"*, which can only be achieved by having untouched habitats that please the conservationists, while the tourists can admire the natural panorama, and tourism suppliers can still have a competitive advantage.

## 1.2 Problem Statement

This study highlights the problems associated with MPAs in conserving marine resources and addresses the conflicts between local stakeholders and policy makers. Marine Parks in Malaysia are largely restricted by a series of problems and challenges, such as environmental issues, management issues, social factors, and lack of awareness that have direct effects on environmental behaviours (Cabanban and Nais, 2003; Kaur, 2006; Siry, 2006, Norlida Hanim, Redzuan & Nurul Farhana Aini, 2010).

Threats to the MPAs can be divided into two broad categories, namely: (i) local threats (pollution, sedimentation, over-fishing and direct impact of development), and (ii) global threats (climate change, ocean acidification) (Ahmad Kamil et al., 2017; Patterson, McDonald, and Hardy, 2017; Shahbudin et al., 2017). As there is little that the MPA management can do about the global threats, the environmental management

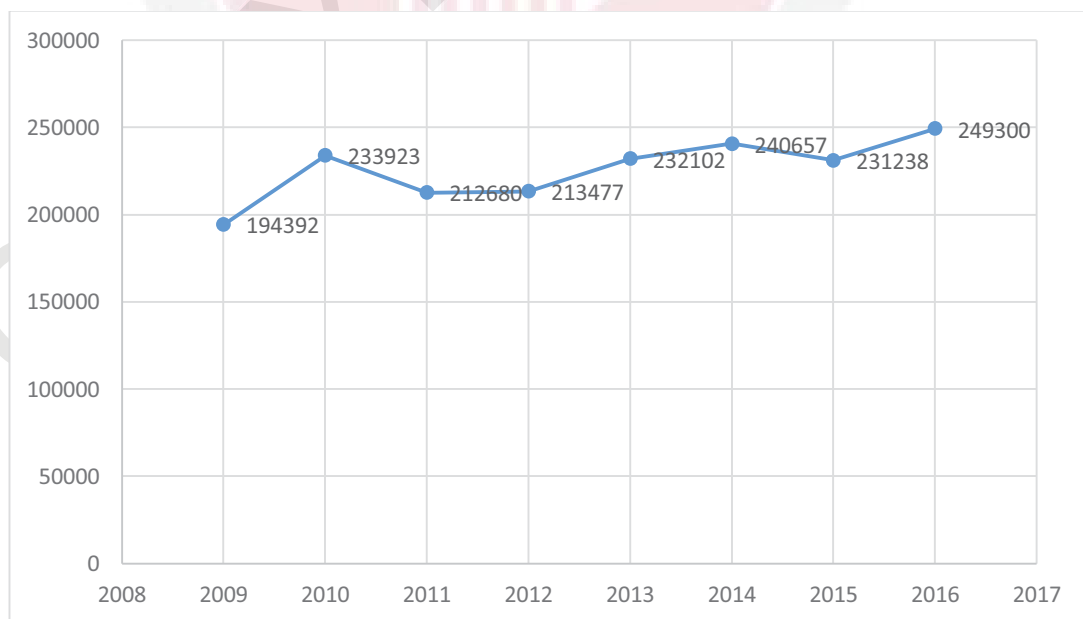


strategies should focus on addressing the local threats that can help to reduce the effects of global threats. (Islam et al., 2013; 2017; Ng et al., 2017).

However, the inclusion of tourism activities in Malaysian Marine Parks might be causing environmental degradation. In Malaysia, the establishment of Marine Parks is legally forced on the community as opposed to the referendum style implemented in other countries. This has resulted in a lack of cooperation and coordination among the Federal government, the State government, and the community. A conflict might transpire between the policy makers and tourism stakeholders due to difference in interests and values on the management of MPAs (Curran & Agardy, 2004; Laurance et al., 2012).

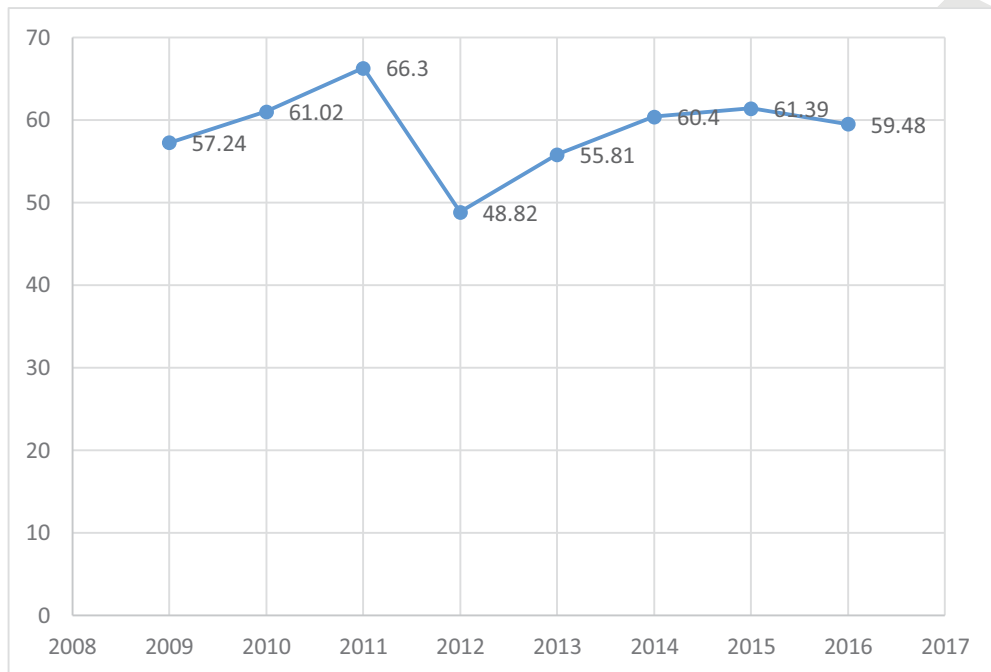
For example, in the Tioman Island Marine Park (TIMP), the policy makers (Federal government and State government) are having a clash in governing the areas. The Fisheries Department, which is currently under the Ministry of Natural Resources and Environment (MNRE) manages the Marine Parks (marine area), while the Tioman Development Authority (TDA), which is under the jurisdiction of State Government of Pahang manages the land area (Kuar, 2006).

The clash between government policies might be harmful to the marine ecosystem since the state government wants to develop the tourism sector to gain more tourist arrivals that have been deemed stagnant in the recent years (Sun Daily, 2017). Recently, the policy makers have proposed to build an airport at the island and open a long boardwalk that will connect two villages to gain more arrivals of high-income tourists (Bernama, 2017).

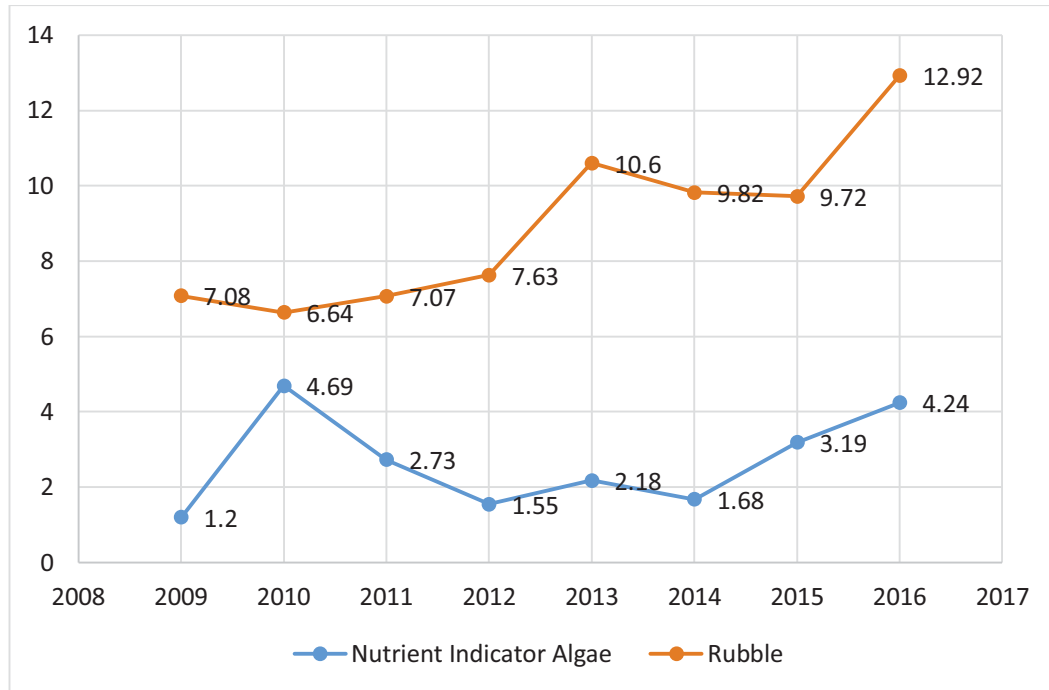


**Figure 1.1 : Tioman Marine Park Tourist Arrival Source: Malaysia Marine Park Authority Source: Malaysia Marine Park**

Tourism in the TIMP has been stated to reach its maximum capacity over the years (Figure 1.1). The proposed project, if implemented, might transform tourism development in the island radically and affect the implementation of MPAs in the surrounding areas. Even though the percentage of live coral coverage in the TIMP is higher than the overall average of Malaysian Marine Parks (Figure 1.2), the percentages of Nutrient Indicator Algae and rubble have been increasing from year to year (Figure 1.3).



**Figure 1.2 : Live Coral Coverage Percentage in Tioman Marine Park**



**Figure 1.3 : Nutrient Indicator Algae and Rubble Percentage in Tioman Marine Park**

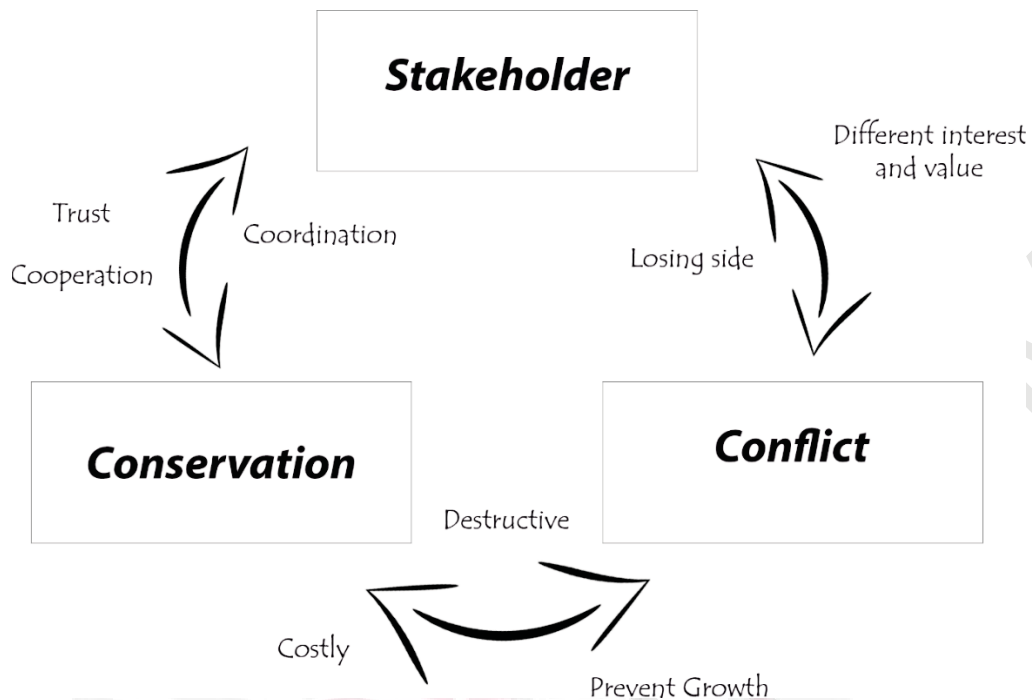
With the possibility of increased tourist arrivals and tourism development in the area, the sustainability of the TIMP might be put into questions. The conflicts between tourism development and environmental sustainability in Malaysian Marine Parks are getting complicated, as some tourism stakeholders believe that the governing policy of the parks are not tailored to their needs to achieve advantage in competitiveness, and this might burden the management of the protected areas (Lambas and Ricci, 2014). The community perceived the Marine Parks as establishments that reduce the human, financial, and environmental resources, and this outcome is inconsistent with the main purpose of the establishment of the Marine Parks (Lambas and Ricci, 2014).

To achieve the MPA initiatives successfully, an efficient marine protected area that satisfies the needs of conservationists, management, and business providers must be established. MPAs need to have untouched habitats that please the conservationist while tourists can admire the panorama, and tourism suppliers can still have a competitive advantage. This objective can only be achieved with an effective MPA management (Song and Chuenpagdee, 2014). However, it is difficult for the MPA management to manage its protected areas since tourism in the MPAs can conflict with the conservation initiatives due to the distinct economic focus that contrasts with the conservation attention restricted to the areas (Wilson et al., 2009; Mohd Shahwahid et al., 2013).

Previous studies have shown that improved cooperation and coordination between stakeholders can reduce conflicts, hence increase environmental performance and economic productivity (Gamoran et al., 2012; Vieno et al., 2010). One way to improve cooperation and coordination is for the policy makers and implementing agency to engage the stakeholders in the decision-making process of the policy. This can help the policy makers and implementing agency to improve their relationships with the stakeholders, increase their trusts, and reduce conflicts. Policy makers and stakeholders can also explore alternative solutions to the conflicts. Policy makers can strive to reduce the impacts through technical, educational, and legislative means (Cohen et al., 2012; Falcone & Castelfranchi, 2011; Sako, 1998; Sako and Helper, 1998; Vance-Borland and Holley, 2011). With the participation of stakeholders in decision-making, policy makers can alternatively give financial incentives to the stakeholders that would experience losses in the policy implementations by giving compensations, insurances, or payments for their services in conserving the ecosystems.

However, many barriers can limit the effectiveness of shared solutions through stakeholder engagements. One of the main barriers is the unwillingness of stakeholders to engage in negotiations (Cohen et al., 2012; Vance-Borland and Holley, 2011). Some groups might distrust other groups and think that it is best for their main interests to settle the conflicts through legislation and enforcement (Cohen et al., 2012; Vance-Borland and Holley, 2011). Distrust between one another is the main barrier to collaborations. To encourage negotiations, the third party (policy makers) needs to find a process to build trust among the stakeholders (Bourdieu, 1986a; Cohen et al., 2012; Havard, Brigand, and Cariño, 2015; Nahapiet & Ghoshal, 1998; Stronza and Gordillo, 2008; Vance-Borland and Holley, 2011). To do this, the third party needs to understand the relationships, interactions, and influences that the stakeholder groups have on each other. Figure 1.4 shows the relationship between the stakeholders on their conflicts and conservations.

The approach that takes local stakeholder community perspectives and behaviours into account to achieve the status of good environmental condition could be more meaningful should the Life Cycle Assessment be included as a necessary step to solve the environmental problems. Life Cycle Assessment is one of environmental management tools that can prevent environmental problems, and is also capable of predicting the impacts of tourism on the MPAs. If the Life Cycle Assessment is used, environmental issues such as thinning of ozone layer as well as climate change phenomena such as floods that put the lives of many at risk and affect tourism activities can also be controlled.



**Figure 1.4 : Relationship between stakeholders, conflict, and conservation**

The implementation of MPAs will be at risk if the actors within the distribution channels in the tourism network do not comply with the regulations. Without the stakeholders' interest to protect the environment, the schemes might fail to be fully utilised.

This also adds to the fact that the tourism industry in the Marine Parks might pose a significant environmental challenge. The increasing development of the tourism industry and the increasing number of tourists need to be checked, and actions to prevent the vanishing of marine ecosystems in the parks need to be taken. Policy makers need to formulate proper guidelines and policies in order to balance the pace of tourism development and the conservation activities to ensure sustainability of the marine ecosystem. To have full information on this situation, an environmental impact assessment needs to be done to make sure that all the important factors and variables are taken care of. It is important to do a quantitative research in this area since the carbon footprint of tourism activities needs to be quantified. Quantitative data can help the policy makers in identifying the problems more directly, and mitigation strategies can be done effectively.

### 1.3 Research Questions

The main purpose of this study is to assess the impacts of tourism industry on the environmental and social conditions of the community in the TIMP. To achieve this objective systematically, the study specifically addresses the following research questions:

- What are the impacts of tourism activities on the environment of MPAs?
- What is the pattern of existing relationships between the tourism stakeholders in the MPAs?
- What are the indicators that affect the social capital in the tourism network, and what are the effects of these indicators on the behaviour of the community in the MPAs?

These research questions were answered through statistical analyses based on the collected data. The first research question used Life Cycle Assessment Theory, and the data were analysed using Life Cycle Impact Assessment method. The second research question used the social network theory, and the data were analysed using the Social Network Analysis method. The third research question used the Social Capital Theory, Cultural Capital Theory and Environmental Behaviour Theory, and the data were analysed using the PLS-SEM method. The data were collected through survey questionnaire and the samples are the local tourism stakeholders in the TIMP.

#### **1.4 Research Objectives**

The general objective of this study is to assess the impacts of tourism on the environment and the social behaviour of the community in Tioman Island Marine Park (TIMP). From the problem statement, it has been highlighted that social capital plays an important role in the sustainability of MPAs in Malaysia. Thus, three specific objectives have been specified as follows:

1. To assess the environmental impacts of tourism activities in the TIMP.
2. To identify the actors involved in the tourism industry in the TIMP and map their network based on their relationships, interactions, and influences.
3. To investigate the relationship between social capital and environmental behaviour in the TIMP.

This thesis addresses these challenges by increasing the understanding of the links between social, economic, and ecological systems operating in the MPAs. It uses a case study approach that covers three villages in the Tioman Island Marine Park (TIMP) in Pahang, Malaysia. The stakeholders are representatives from the supply side of tourism, such as the government, industry, and community sectors. The final goal of this thesis is to improve the achievement of MPAs in sustainability as well as to refine the pedagogical knowledge in park management. The idea of improving the sustainability of MPAs was addressed in the three essays that made up the thesis.

The first essay assesses the impact of tourism activities in the TIMP by using the Life Cycle Assessment Theory. This assessment is capable to provide new insights into environmental impacts, and is beneficial for the policy makers in planning and monitoring tourism activities in the protected areas. Each of the assessment cases'

(transportation to/from the island, accommodation, snorkelling activities, waterfall trekking activities) impacts on human health, ecosystem quality, and resources will be analysed.

The second essay maps the social network of stakeholders in the MPAs to achieve better understanding of the overall pattern of relationships among the actors in the MPAs' distribution channels in the tourism network. The purpose of this essay is to show the current social network of stakeholders, interests, and participations in MPAs. The social network study focused on the patterns of discrete ties (interaction network and material network) for the three villages on the island, and how these patterns can be used to manage the tourism distribution channels of the island.

Finally, the third essay investigates the relationship between social capital and environmental behaviour in the TIMP and examines the impact of cultural capital in mediating the relationship between social capital and environmental behaviour. The combination of these three essays proved that social capital has different impacts on the management of MPAs and its implementation. Thus, these three essays contribute to an important area of research in the field of tourism in MPAs.

### **1.5 Significance of the study**

This thesis has taken a case study approach, which allows for an in-depth analysis of the aspects in focus. It is hoped that through this study, the policy makers and important stakeholders understand that their involvement in implementing the MPAs' regulation will enhance the island's sustainability overall. This is because the Marine Parks in Malaysia have long been plagued by haphazard rapid development, lack of environmental conservation, poor enforcement, and lack of motivation amongst the tourism operators, and tourists have contributed considerably to the environmental degradations on the islands (Ahmad, 2003). Awareness on sustainable development can create more innovative MPAs management.

This study contributes in several ways. To answer the study's research questions, the research began by conducting a comprehensive review of literature related to MPAs. The literature review covers regional, national, and global studies on MPAs. This study found that there are limited studies on this theme in the South East Asian region, and very few studies on MPAs in Malaysia. To-date, only a few studies in Malaysia have examined the MPAs, and there is no study in Malaysia that has assessed the environmental impacts of tourism and social network of the stakeholders in a marine park.

This study addresses the environmental and social issues in the TIMP in a comprehensive manner. The views and opinions of stakeholders like local Marine Park management authority, Tioman Development Authority (TDA), and heads of local communities were taken into consideration.

There is also insufficient empirical evidence in the literature on the perceived impacts of social and cultural capital toward the environmental behaviour in Marine Parks at the national and global levels. There is a limited number of literatures on the social network of tourism in Marine Parks and Life Cycle Assessment on tourism in Marine Parks. Hence, this study contributes to addressing the local and global lack of literature with respect to stakeholders' view in tourism, especially in Malaysia.

The findings of this study could have implications on the National Marine Park Policies. The research findings could help the government and policy planners to determine future policy direction by offering important inputs in reviewing and analysing the possible impacts of existing policies on Marine Park conservation. This would specifically help to minimise the conflicts between stakeholders due to environmental constraints and increase the performance efficiency of Marine Park management. Furthermore, the findings of this study would assist policy makers to formulate better marine diversity conservation policies through the designation of MPAs. The contribution of this study in shaping the future of society depends on how policy makers, intellectuals, economic agents and citizens will decide to orientate the research and use its results.

This thesis can help policy makers to understand how to educate the stakeholders and convince them of the benefits on doing business in a sustainable manner by joining in the efforts. With joint knowledge and awareness among the stakeholders, there would be greater levels of acceptance and more favourable perceptions of the Marine Park Authority.

## **1.6 Limitations of the Study**

This study is limited in ways that suggest opportunities for future research. Although there are 42 MPAs in Malaysia, this study is specific to only one Marine Park island, namely the Tioman Island Marine Park (TIMP) due to logistical reasons. However, this site was selected because the Tioman Island has been hailed as one of the ten most beautiful islands in the world (Tahir, 2008). It is the only marine park island that has its own development authority, called the Tioman Development Authority (TDA).

With an authority overseeing the island, it is anticipated to have a better management system and facilities in comparison to other islands (Yahaya Ibrahim, 2006). Tioman is the only marine park island in Malaysia that has been recognised as a duty-free island. Such clash of policies between tourism development and conservation initiatives make Tioman Island one of the best sites to do an assessment regarding the issues presented in preceding paragraphs. However, it might not be reasonable to conclude that the findings of this study are representatives of all marine parks in Malaysia.



## 1.7 Thesis Outline

This thesis is structured as follows:

Chapter 1 provides the introduction and background of the study. It explains the problem statement and the objectives of the study. The importance of the study is then elaborated. A section on the organisation of the research study is also provided for easy referencing. The last section concludes this chapter.

Chapter 2 reviews all the relevant literature related to Marine Protected Areas (MPAs). It reveals the issues and common discussions on MPAs. This review presents the challenges and constraints faced by the development of the protected areas. This chapter also introduces MPAs in Malaysia and its implementation.

Chapter 3 reviews all the relevant literature related to this study. It reveals issues and discussions on the environmental and social aspects of the development of the MPAs. This is followed by a discussion on the literature, which is relevant to the social capital theory, cultural capital, and environmental behaviour. Overall, the literature review highlights the importance of assessing the environmental and social behaviour of the MPAs' network.

Chapter 4 explains the research paradigm adopted in the three essays that make up this study. This chapter also discusses the research methodology employed for each essay, followed by a presentation of the process involved to collect the data.

Chapter 5 assesses the impacts of tourism activities on the TIMP by using the Life Cycle Assessment Theory. This assessment is capable to provide new insights on the environmental impacts, which is beneficial for the policy makers in planning and monitoring tourism activities in the protected areas. The advantage of the LCA method is that it is a rational and comprehensive approach to evaluate the environmental impacts in each stage of a product's system.

Chapter 6 shows the current social network of stakeholders, and their interests and participation in MPAs by applying the SNA. The social network study focused on the patterns of the discrete ties (interaction network and material network) for the three villages on the island and how these patterns could be used to manage tourism in the island. In using the Social Network Theory for the framework of distribution channels in the tourism network, this study makes a significant theoretical contribution to the literature on Marine Park management and stakeholders' perception.

Chapter 7 investigates the perceived impacts that social capital dimensions have on environmental behaviour in the TIMP. This chapter also examines the perceived impacts of cultural capital in mediating the relationship between social capital and environmental behaviour. It is hoped that this study could give some insights into the practice of pro-environmental behaviour among the stakeholders in the Marine Parks of Malaysia. In using the Social Capital Theory and the Cultural Capital Theory for the framework in determining the environmental behaviour, this study makes a significant theoretical contribution to the literature on Marine Park management and stakeholders' perception.

Chapter 8 offers a discussion of the key findings and future research paths for better and sustainable MPAs implementation, and the conclusions from this study.

## **1.8 Conclusion**

This chapter provides a research blueprint for the entire thesis. It began by explaining the background of the study, emphasising on the problem statement, followed by the research questions and objectives. Then, it highlighted the significance of the study and the study limitations. Finally, the thesis outline was presented. The next chapter focuses on the background relating to MPAs and its implementation in Malaysia.

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