



Physical environmental impacts of island tourism development: A case study of Pangkor Island

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Abstract

It is readily accepted that island destinations and nature based settings are fragile in encountering the physical environment impacts induced by tourism development although this still depends very much on such variables as the intensity of the development, the intensity of activities and the background of the visitors. This study analysed Pangkor Island residents' perception of physical environment impacts induced by tourism development in particular with regard to perceived biodiversity issues. A total of 268 respondents was sampled in a field questionnaires survey. The finding revealed that the majority of local residents who were largely dependent tourism for their were gravely concerned with the physical environmental impacts of the tourism development, in particular, with respect to scuba diving and snorkeling activities. The negative environmental impacts were perceived to be largely due to the lack of experience on the part of guest snorkelers and the intensity of the snorkeling activities at certain sites.

Keywords: biodiversity issues, island destinations, Pangkor Island, tourism development, physical environmental impacts, residents' perception

Introduction

Water based tourism like islands, lakes, rivers, coastal, water basins and maritime is considered everlasting market for tourism industry due to the rich natural resources and the picturesque view. In line with the idea of establishing the maritime boundaries as one of world class tourist spots, considerable amount of investments have been allocated for developing islands and coasts of Malaysia (Mohamad & Mohamed, 2014). According to Othman and Mohd Rosli (2011, p. 12), four islands of Malaysia (Langkawi Island, Pangkor Island, Perhentian Island and Tioman Island) have been internationally recognized for their potentials in attracting tourists as well as being '...an important catalyst for entrepreneurial development and small businesses performance'. This phenomenon also has been shown that the significant increase in positive pattern of tourists' arrival in general and visitors to marine park in particular (Arabamiry et al., 2013). The notable changes gained from and benefits of tourism industry development are viewed to be experienced at the expense of physical (environmental) impacts. This is supported by Puczko and Ratz (2009, p. 458) emphasis on the effects of unsustainable and mindless tourism activity and development on the '...increasing stress on destinations and in negative changes in the destinations' physical (environmental), economic and socio cultural characteristics'. In addition to Puczko and Ratz's (2009) statement, this paper takes forward the scholar Dokulil's (2014, p 82) argument on the complexity relationship between impacts of tourism and physical environment of a destination due to many activities can lead to adverse (physical) environmental effects (that) are linked with the construction of general infrastructure such as roads and airports and of tourism facilities'. Echoing the aforementioned

statement, this paper focuses on examine the perceptual physical environment impact among the Pangkor Islanders specifically on biodiversity issues.

Literature review

According to Mustapha et al. (2013, p. 107), tourism industry has slipped from prominence position as a result of ‘...economic downturn and decline in popularity of commodity products’. This is due to the quality of the products and the experience gained by the visitors which may lead to the decline growth as well as other possible factor like economic downturn. Tourism industry in Malaysia has shown approximately 5.0% growth rate annually since 2007 in average (Ghaderi et al., 2012). According to Wong (1993), islands of Malaysia were initially recognized in 1990s and since, they have provided Malaysia ‘...with a competitive advantage in long-haul market [targeting individuals who preferred the 3S concept as their relaxation gateway]’ (Fathilah et al. 2011, p. 90). The basic notion of indulging in island-based tourism is outlined by Stydilis et al. (2007, p. 955) who stated that islands emphasize on ‘...the characteristics of separateness and difference ...given people’s desires for the difference while in pursuit of leisure, different climates, physical environments and culture ...to further the attractiveness of islands as tourism destinations’.

Located off the coast of the Perak State, Pangkor Island is an 18km land area with a population of approximately 25, 000. Its charm lies in the combination of fishing settlements and resorts, of which, offers the visitors with an exclusive opportunity to observe the fishermen lifestyle while enjoying the quite, beautiful sandy beaches. Given the international recognition towards island tourism, notable investments have been allocated for the purpose of developing Pangkor Island (Ivan, 2014). In Pangkor Island case, it is learned that the tourism development undertaken is directed towards the biodiversity values and potentials where here, Pangkor Island plays an important role in defending and sheltering the coral reefs’ ecosystem (Abdul Razak et al., 2014). Besides biodiversity values, Pangkor Island has been brandished with the low-key tourists destination image, whilst fishing-based activities continue to prosper as the main industry (Othman & Mohd Rosli, 2011).

Despite the benefits and advantages offered by the tourism development, the tourism-related bodies as well as scholars have voiced their concerns over the tourism impacts. Ap (1982, p. 666) has emphasized this by stating that: ‘unless the often unforeseen and thus unplanned effects of tourism development can be controlled, or at least recognized and predicted, then opposition to the development of tourism, particularly in less developed parts of the world, is likely to increase’. To date, it is becoming increasing difficult to ignore the adversity experienced by island-based tourism destinations. Central to the entire discipline of island tourism development is the operation on limited resources; island tourism is bound to face development transformation at the expense of physical, environmental, social, cultural and biodiversity sustainability-related issues, as documented by Bardolet and Sheldon (2008). Zaie and Zaie (2013, p 17) response to Bardolet and Sheldon’s (2008) argument is in the affirmative where in detail, engagement in tourism industry instigated the ‘...creation of infrastructure utilities and amenities, which are not only used by the visitors but become valuable to the local population’. Abdul Razak et al (2014, p TOC-127) who examined the impact of water-based activities on coral reefs indicated that ‘...nearly 60 percent [of the globe’s coral reefs] are at risk due to the actions of humans [and more importantly], scientists have found it difficult to recognize the baseline for what a reef should look like’. In another study, Praveena et al. (2012) added that improper waste disposal system and overdevelopment in coastal zones are few root factors contributing to coral reefs jeopardization.

Research methods

This paper employed self-administered questionnaire survey as the data collection instrument. The data collection instrument was developed in accordance to Sunlu’s (2003) interpretation of environmental

impacts of tourism development (destination landscape, ecosystem management and infrastructure development), and referring to Fredline’s (2006) work for the acceptance towards tourism development (destination image/identity, social interaction). The instrument was divided into the following sections: [1] personal information, [2] tourism development impact and [3] islanders perception towards tourism development. A 5-point Likert scale (1: strongly disagree, 5: strongly agree) was adopted in questionnaire design for all sections, excluding the first section. The second section dealt with six aspects (physical, environmental, cultural, social, quality of life and biodiversity), whilst, the third section sought for the status quo of tourism planning and development in Pangkor Island. The instrument was first tested for validity and reliability where academics (lecturers and students) and public individuals were asked to participate in the pilot study. Results showed that, in average, the instrument was completed within 25 minutes due to the complexity of the structure. Technical terms were omitted and replaced with more practical terms as to help respondents to comprehend the statements. The finalized instrument was first verified by the experts before used for the actual data collection, which undertaken in December 2014. 300 questionnaires were distributed and 290 answered questionnaires were successfully retrieved, which amount to 96.7% response rate. Data cleaning resulted in 268 usable and valid questionnaires for analysis purpose (chi square, factor, correlation, regression, correspondence), which amount to 92.4%. It is within this paper interest to highlight that given the majority of the Pangkor Islanders are engaged in tourism sector in addition to the island’s small size, respondents (Pangkor Islanders) for this paper are 100% of respondents who engaged in tourism sector.

Research findings

This section addressed the physical environmental impacts of tourism industry (PI) (1: accommodation development negatively effects the water habitat, 2: infrastructure development negatively effects the ecosystem, 3: uncontrolled scuba diving activities negatively effects the water habitat, 4: island hopping activities negatively effects the water habitat and 5: snorkeling activities destroys the corals) and the islanders’ opinions toward the physical impacts (OPPI) (6: tourism benefits should be equally enjoyed, 7: a more rapid tourism development is welcomed, 8: more tourists are welcomed, 9: tourism development nurtures the environment, 10: tourism development pays attention to the locals’ needs and 11: tourism development prioritizes input from the locals). These variables were studied in order to examine the following hypotheses: [1] Pangkor Island is facing negative ecology environmental impact caused by the tourism development and [2] the locals’ supports towards the tourism development in Pangkor Island.

Analysis on respondents’ database provides the following details: [1] majority of respondents are school certificate holders (male 57.6%, female 58.8%), [2] 45.9% respondents engaged in food and beverages sector, followed by 45.5% engaged in tourism attractions sector, [3] 55.6% male respondents are single and 50.9% female respondents are married, [4] 70.5% respondents have been observing the tourism development progress in and the impacts on Pangkor Island for at least 5 years, [5] 22.4% respondents are the only household member who engaged in tourism industry and [6] 67.9% respondents were born in Pangkor Island.

Table 1. Chi square results

Variables	PI
[1]	$X^2(5, N = 268) = .579, p = .989$
[2]	$X^2(5, N = 268) = 2.087, p = .837$
[3]	$X^2(5, N = 268) = 3.500, p = .623$
[4]	$X^2(5, N = 268) = 1.854, p = .869$
[5]	$X^2(5, N = 268) = 8.476, p = .205$

Variables	OPPI
[6]	$X^2(5, N = 268) = 6.480, p = .372$
[7]	$X^2(5, N = 268) = 12.364, p = .054$
[8]	$X^2(5, N = 268) = 12.545, p = .051$
[9]	$X^2(5, N = 268) = 13.813, p = .032$
[10]	$X^2(5, N = 268) = 9.035, p = .172$
[11]	$X^2(5, N = 268) = 6.481, p = .371$

Chi square analysis was run to identify the difference in perception between locals who have observed the tourism development impacts for at least 5 years and those who have observed the tourism development impact for more than 5 years. From Table 1, it is learned that only variables [1] and [9] were affected by the number of years of tourism development progress. This suggests that the remaining variables are facing immediate consequences of tourism development, thus, this should be of interests to the tourism-related bodies.

Table 2. Factor analysis results

Variables	PI	Variables	OPPI
	1		1
[1]	.700	[6]	.686
[2]	.799	[7]	.897
[3]	.802	[8]	.802
[4]	.840	[9]	.500
[5]	.739	[10]	.833
		[11]	.727

Extraction Method: Principal Component Analysis
 Rotation Method: Varimax with Kaiser Normalization

The rationale of factor analysis is to provide insights on factors that explain the variance of variables in Table 1 and the 5-point Likert scale employed for hypotheses 1 and 2. The KMO and Bartlett’s Test for PI was .736 and accounted for 60.48% of the variability in all 5 variables, whilst OPPI’s KMO and Bartlett’s Test was .827 and accounted for 74.08% of the variability in all 6 variables. Assessing Table 2, all variables for PI and OPPI accounted into one component. From Table 3, it is learned that only variable [4] was correlated with the remaining PI’s variables (excluding variable [1]). That is to say, consequences of negative impacts of these variables will accumulate the gravity of negative impacts on variable [4]. In case of OPPI (Table 4), variables [6] and [8] were observed to be correlated with the remaining variables. Therefore, attention should be given to these variables particularly their interconnection with variable [7].

Table 3. Correlation analysis results for PI

Medium strength correlations
[1] – [2]: ($r = 0.690, n = 268, p = .000$)
[2] – [4]: ($r = 0.509, n = 268, p = .000$)
[3] – [4]: ($r = 0.692, n = 268, p = .000$)
[4] – [2]: ($r = 0.509, n = 268, p = .000$)
[4] – [3]: ($r = 0.692, n = 268, p = .000$)
[5] – [4]: ($r = 0.666, n = 268, p = .000$)

Table 4. Correlation analysis results for OPPI

Strong strength correlations
[6] – [7]: ($r = 0.771$, $n = 268$, $p = .000$)
[7] – [11]: ($r = 0.772$, $n = 268$, $p = .000$)
[8] – [7]: ($r = 0.864$, $n = 268$, $p = .000$)
[8] – [10]: ($r = 0.746$, $n = 268$, $p = .000$)
[10] – [11]: ($r = 0.892$, $n = 268$, $p = .000$)
Medium strength correlations
[6] – [8]: ($r = 0.665$, $n = 268$, $p = .000$)
[6] – [9]: ($r = 0.586$, $n = 268$, $p = .000$)
[6] – [10]: ($r = 0.665$, $n = 268$, $p = .000$)
[6] – [11]: ($r = 0.593$, $n = 268$, $p = .000$)
[7] – [9]: ($r = 0.571$, $n = 268$, $p = .000$)
[8] – [9]: ($r = 0.661$, $n = 268$, $p = .000$)
[8] – [11]: ($r = 0.665$, $n = 268$, $p = .000$)

From Table 5, it is observed that variable [4] presented a higher influence on variable [3], compared to variable [5]. At this point, it can be said that the scuba diving activity acted as a dominant factor contributing to biodiversity issues, followed by snorkeling activity. Results for OPPI indicated the interconnectivity between variables [6], [7], [8] and [9]; of which, addressed the importance of tourism benefits distribution and acceptance towards more tourism development at the expense of effective environmental management (Table 6). At a greater extent, results for variable [9] could be read as an indicator for a need to balance between tourism development and the destination’s environmental longevity. Further compounding this issue was the realization of challenges in balancing the tourists and locals’ consumption of environmental resources.

Table 5. Regression analysis results for PI

• [1] is 48.9% explained by [2]: $\beta = .665$, $t(268) = 12.351$, $p .000$
• [2] is 56.2% explained by [1]: $\beta = .561$, $t(268) = 12.351$, $p .000$
• [3] is 51.7% explained by [4]: $\beta = .596$, $t(268) = 9.756$, $p .000$
• [4] is 63.9% explained by [3]: $\beta = .446$, $t(268) = 9.756$, $p .000$
• [5] is 45.4% explained by [4]: $\beta = .617$, $t(268) = 9.400$, $p .000$

Table 6. Regression analysis results for OPPI

• [6] is 63.2% explained by [7]: $\beta = .774$, $t(268) = 7.857$, $p .000$
• [7] is 88.3 % explained [8]: $\beta = .444$, $t(268) = 11.874$, $p .000$
• [8] is 79.3% explained by [7]: $\beta = .788$, $t(268) = 11.874$, $p .000$
• [9] is 49.0% explained by [8]: $\beta = .664$, $t(268) = 7.568$, $p .000$
• [10] is 87.2% explained by [11]: $\beta = .557$, $t(268) = 16.028$, $p .000$
• [11] is 79.6% explained by [10]: $\beta = .889$, $t(268) = 16.028$, $p .000$

The following correspondence analysis sought to seek the dependency level between profiles construct (observation on tourism development impacts: at least 5 years and more than 5 years; types of tourism sector engaged: tourism attractions and services) and variables studied (Tables 7, 8, 9 and 10). Results presented in Tables 7 and 8 stressed the following: tourism industry should put in practice pragmatic long-term planning as the gravity of negative impacts on biodiversity accumulates overtime, destination carrying capacity should be of interest to the appointed bodies though the locals welcome a higher tourists' arrival and the locals' opinions should be addressed in structuring the tourism planning and management. Against this statement, this paper supported hypothesis 1 and rejected hypothesis 2.

Table 7. Correspondence analysis results of observation on physical impacts (PI)

Profiles construct	PI	Pangkor Island
5 years	[1]	Agree = .378
> 5 years		Agree = .660
5 years	[2]	Agree = .355
> 5 years		Agree = .498
5 years	[3]	Agree = .390
> 5 years		Agree = .542
5 years	[4]	Agree = .374
> 5 years		Agree = .380
5 years	[5]	Agree = .319
> 5 years		Agree = .444

Table 8. Correspondence analysis results of observation on physical impacts (OPPI)

Profiles construct	OPPI	Pangkor Island
5 years	[6]	Agree = .479
> 5 years		Agree = .589
5 years	[7]	Agree = .477
> 5 years		Agree = .479
5 years	[8]	Agree = .534
> 5 years		Agree = .477
5 years	[9]	Agree = .431
> 5 years		Strongly agree = .243
5 years	[10]	Agree = .442
> 5 years		Strongly agree = .250
5 years	[11]	Agree = .416
> 5 years		Strongly agree = .251

For the purpose of analysis, this paper only examined water-based and nature-based tourism attractions; and services provided for water-based tourism activities. In case of PI, Tables 9 and 10 displayed similar pattern for tourism attractions and services. At this point, results further highlighted the importance of revisiting the present tourism activities' planning in order to structure a more pragmatic approach, for the purpose of revitalizing the biodiversity. Meanwhile, similar pattern was observed for OPPI where here, results asserted the significant influence of managing the water-based and nature-based tourism attractions, in ensuring the biodiversity sustainability (Tables 9 and 10).

Table 9. Correspondence analysis results of types of tourism sector engaged (PI)

Profiles construct	PI	Pangkor Island
Tourism attractions	[1]	Agree = .345
Services		Agree = .429
Tourism attractions	[2]	Agree = .325
Services		Agree = .400
Tourism attractions	[3]	Agree = .345
Services		Agree = .316
Tourism attractions	[4]	Agree = .316
Services		Agree = .350
Tourism attractions	[5]	Agree = .307
Services		Agree = .444

Table 10. Correspondence analysis results of types of tourism sector engaged (OPPI)

Profiles construct	OPPI	Pangkor Island
Tourism attractions	[6]	Agree = .504
Services		Agree = .500
Tourism attractions	[7]	Agree = .474
Services		Agree = .429
Tourism attractions	[8]	Agree = .517
Services		Agree = .476
Tourism attractions	[9]	Agree = .384
Services		Agree = .450
Tourism attractions	[10]	Agree = .397
Services		Agree = .500
Tourism attractions	[11]	Agree = .383
Services		Strongly agree = .400

Conclusion

This paper concluded that all the discussed variables refer to foundation aspect of tourism development. More importantly, referring to regression results, the perception towards the perceptual biodiversity issues in Pangkor Island was stimulated by the following variables: negative impacts of accommodation development and scuba diving activity on water habitat, acceptance towards more tourism development and locals' participation in tourism development planning. To this paper, the aforementioned variables might be considered as the benchmark of the extent of tourism industry development shall taken place in a particular tourism destination, in order to maintain the longevity of that particular tourism destination. Despite the fact that other islands in Malaysia are probably facing the similar physical impacts of tourism development, it is of important to realize further compounding this situation was the fact that these islands are responding to the issue at a different phase of lifecycle. This may suggest the pressing need of implementing a specific regulation/policy that is best suited for each island. In detail, regulations and policies made for the other islands of Malaysia can be used as a development guideline for Pangkor Island; nevertheless, the implementation should be monitored and complied with matters that are only related, to a certain level.

Additionally, a number of theories have been long utilized to study the relationship between perceptions, attitudes and tourism impact, for example, the Theory of Reasoned Action, the Social Exchange Theory, the Butler's Lifecycle Theory, the Community-based Tourism Theory and the development theories (such as Modernization, Dependency and Alternative). As some of these theories

exclude the social values and beliefs, this study suggests complementing these theories with the Integrated Threat Theory. This is given the importance of evaluating how people judge threats and whether their judgments are real or just a perception.

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