ENVIRONMENTAL SERVICE QUALITY FOR MALAYSIAN MARINE PARKS: TOURIST SATISFACTION COMPARATIVE ANALYSIS

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Abstract: This research intends to evaluate the importance and satisfaction level of tourists in regard to the environmental service quality offered by marine parks, namely Tioman Island Marine Park (TIMP), Redang Island Marine Park (RIMP), and Payar Island Marine Park (PIMP). The measurement of importance and satisfaction is based on mean analysis of both the importance mean (estimated/expected mean) and perceived mean (satisfaction mean). The difference between these mean values signifies gap value. In explaining the existence of difference, the gap analysis in this research is assisted by the paired t-test analysis. If the result is significant, this indicates that the tourists get what they expected from their visits. However, if the result is not significant, it must be ascertained as to whether their visits fulfilled their expectations or otherwise. Research results show that all tourists express the importance of and satisfaction towards the environmental service quality offered by all the three marine parks, i.e. TIMP, RIMP and PIMP. Overall, all the marine parks are important and satisfying. Nonetheless, there is a difference between the mean values in the gap analysis and the paired t-test. Gap analysis shows that the mean values for most of the environmental service quality under study are negative for TIMP, but positive for RIMP, PIMP and for the overall marine parks. This indicates that when the three marine parks are evaluated separately, tourist satisfaction differs. However, in general, most of the tourists are satisfied with the environmental services offered. The tourist overall satisfaction index shows that the highest satisfaction goes to RIMP at 86.8 percent, followed by TIMP at 70.3 percent and PIMP at 67.0 percent.

KEYWORDS: Tourist Perception, Environmental Attributes, Environmental Service Quality, Tioman Island Marine Park, Redang Island Marine Park and Pagar Island Marine Park

Introduction

A marine park is a protected area of the sea that is zoned 2 nautical miles measured from the low tide point. It is surrounded by islands that are gazetted and zoned as coral reefs sanctuary. Currently, in Malaysia there are 40 islands have been gazetted as marine parks and are centralised under the management of marine parks namely, Pulau Tioman Marine Park, Pulau Redang Marine Park, Pulau Payar Marine Park, Mersing Marine Park and Labuan Marine Park. Each of the marine park management has the role in managing and administering the surrounding gazetted islands.

The gazettement of marine parks means that activities that will endanger the marine parks' resources will be banned. However, in order to manage and ensure the marine parks are in their natural condition at all times, a large amount

of funding is needed. Thus, the marine parks are turned into tourist destinations as part of an effort to raise funds; as long as the tourism-related activities will not destruct and disrupt the marine parks' natural habitat. In order to ensure that tourism will not harm these marine parks, laws under the Fisheries Act 1985 are enforced. Among the activities allowed are scuba diving, snorkelling, photography, swimming, fish feeding and other eco-friendly activities (Abdul Khalid & Mohd Najib, 2003).

With the establishment of the Malaysian marine parks and existence of systematic management system, not only the marine resources have been well managed, but the record on tourist arrivals to the Malaysian islands is more organised. Referring to Table 1, it can be seen that the inflow of tourists is increasing. This means that more and more tourists are attracted to the islands' unique beautiful surroundings.

Table 1: Number of Tourists to Malaysia Marine Park, 1995-2008.

Year	Pulau Payar			Pulau Redang			Pulau Tioman		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
1990	1993	1675	3668	577	130	707	t.d	t.d	t.d
1991	3361	2250	5611	3938	787	4725	t.d	t.d	t.d
1992	4165	5293	9458	4930	431	6061	t.d	t.d	144256
1993	5620	7418	13038	6413	1235	7648	t.d	t.d	163602
1994	11983	20192	32175	6379	1970	8349	t.d	t.d	107036
1995	23484	46935	70419	18690	4035	22725	t.d	t.d	119064
1996	25254	65053	90307	26988	7755	34743	t.d	t.d	94273
1997	23174	67993	91167	30258	5940	36198	t.d	t.d	89792
1998	19869	67423	87292	30274	7282	37556	t.d	t.d	91208
1999	16557	66689	83246	39449	7559	47008	t.d	t.d	89313
2000	19944	86836	106780	43390	9244	52634	72383	128206	423229
2001	28027	89514	127541	65539	8041	73580	127675	115377	484121
2002	56259	77516	133775	56263	8041	64304	127675	100925	465587
2003	44291	70393	114684	71654	7563	79217	128676	44111	381072
2004	36282	98900	135272	111225	31251	142476	184238	64787	559862
2005	19607	74492	94099	98863	24296	123159	83857	98651	444627
2006	26043	86605	112648	93546	41552	135098	75806	83573	463458
2007	24580	86049	110629	112844	38553	151397	73688	75312	149000
2008	23298	72773	96071	129532	22929	151824	-	-	189000
Total	365913	935177	1311180	708376	167112	876188	800310	635630	4120500

Note:　(a)　Number of foreign tourists
　　　　(b)　Number of domestic tourists
　　　　(c)　Total number of tourists
　　t.d -　Not available
Source : Unpublished Data by Department of Marine Parks, Malaysia 2010.

Tourist arrivals have effectively caused robust and rapid infrastructural development such as the construction of a jetty, accommodations, roads and other basic amenities for tourists. Development and influx of tourists do bring in positive effects to the local economy, but if they are not properly managed and planned, the natural environment will be degraded. Thus, in general, this research is conducted in order to evaluate the level of environmental service quality of the three marine parks, namely the TIMP, RIMP and PIMP. Evaluation is based on tourist importance and satisfaction at these marine parks.

Such kind of research has been carried out by a few researchers (Garyfallos & Evangelos, 2010; Alegre & Jaume, 2009; Tzu-Kuang, *et al.,* 2009; Wang, *et al.,* 2009; Dennis & Axel, 2007; Joanna & Susan, 2007; Larry, 2006; James & Rob, 2003; John & Dimiannah, 2003; Theresia & Kay, 2003). For the case of Malaysia's marine parks, limited studies in this area have been done, thus, it encourages this study to be carried out.

The format of this paper will be in the following sequence: Methodology; Results and Discussion; Conclusion.

Methodology

Research Objectives

Generally, the purpose of this research is to evaluate the quality level of environmental services on the three marine parks mentioned above based on tourist importance and satisfaction. More specific, the research objectives are to:

i)　evaluate the environmental service quality attributes of the three marine parks;

ii)　evaluate the difference among the attributes of the environmental service quality at the three marine parks;

iii)　estimate tourist overall/total satisfaction index;

Evaluation and estimation are done based on the overall tourist perception, that is the perception of domestic tourists as well as foreign tourists at all the three marine parks under study. Environmental attributes evaluated by the tourist are ; i) quality of marine lives, ii) security level, iii) beautiful and clean beaches, iv) crowd level, v) reasonable service cost, vi) multitude of activities, vii) island's natural environmental and viii) sufficient tourist services

Analysis and Data Collection

This research employs the primary data obtained from a survey done on all tourists both domestic and foreign at the TIMP, RIMP and PIMP. The survey on 596 respondents was done randomly and obtained during the peak season between the months of April to June.

In order to achieve the objectives given above, a few analyses are conducted, namely:

i) Evaluation of environmental service-quality attributes

    Evaluation towards the environmental service-quality attributes offered at the three marine parks is done based on mean analysis. Mean analysis indicates the tourist importance and satisfaction towards environmental attributes and the environmental service quality offered. The mean values are obtained through the tourists' responses on the four-point Likert scale – 1-very unimportant/very unsatisfactory, 2-not important/not satisfactory, 3-important/satisfactory, and 4-very important/very satisfactory. If the mean value is between 3 and 4, this means that the tourists agree that the attributes and environmental service quality offered are important /satisfactory. However, if the mean value is between 1 and 2, it means otherwise.

ii) Evaluation of the difference in the environmental service-quality attributes

    In order to evaluate the difference in the environmental service-quality attributes at the three marine parks, a gap analysis is conducted. In this analysis, the difference between the tourist importance mean and satisfaction mean will be compared. Importance mean refers to the tourist expectation mean before a trip is made, while satisfaction mean is the tourist perception mean after a trip is made (John & Damiannah, 2003). In reality, sometimes there is a difference in value between these means.

The difference in value between the estimated/expected mean and the perceived mean indicates gap value (Jaana & Susan, 2006). Detail is per equation below:

Gap Value = Perceived mean – estimated/expected mean

In the event that the gap value is positive, it means that the tourists' actual experience from the environmental service quality attributes offered is at least the same or more than their expectations, but if otherwise, the gap value is negative (Joanna & Susan, 2007; Joan & Damiannah, 2003).

The paired t-test is also employed so as to fulfil this research's second objective. This test is done in order to determine as to whether the gap (difference in mean values) that existed is significant or otherwise. Statistically, the paired t-test is to test the following hypotheses.

H_0: Non-existence of difference between the perceived mean and estimated/expected mean towards the attributes/ environmental service quality before and after trips

H_1: Existence of difference between the perceived mean and estimated/expected mean towards the attributes/environmental service quality before and after trips

Non-existence of difference between the tourist perceived mean and the estimated/expected mean toward the attributes/environmental service quality, is because the tourists' experience during their trip to the three marine parks is exactly as expected by them. This means there is a failure to reject the null hypotheses[1]. However, if there is a difference between the means, the gap analysis will be referred to in order to determine as to whether the said difference is positive or negative. This is done so that a conclusion on the tourist satisfaction can be drawn as to whether their experiences are as they expected or otherwise.

iii) Evaluation of Tourist Overall/Total Satisfaction Index (TSI)

    This index measures the overall satisfaction of the tourists with their trips. For this

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 Fail to reject the null hypotheses if the p-value is more than $\alpha = 0.05$, and not otherwise

purpose, the scale is constructed as shown in equation 1 below:

$$\text{TSI} = 99 \left[\frac{S - MIN}{MAX - MIN} \right] + 1 \quad \text{---- (1)}$$

where, S is the overall satisfaction level, MIN and MAX are the minimum and maximum value of Likert scale for each variable respectively. If the index value is high, then the overall/total satisfaction is high; but if otherwise, then the tourist overall/total satisfaction index is low, meaning that the tourists' overall/total satisfaction is low (Alegre & Jaume, 2009). The usage of the overall/total satisfaction index is to compare the indices of tourist overall/total satisfaction at all the three marine parks situated in Peninsular Malaysia.

Results and Discussion

Respondent Demographic Analysis

Based on the respondent demographic analysis (refer Table 2), it is found that there is no obvious difference in gender of the tourists visiting the TIMP with 52.8 percent of the tourists male and 47.2 percent female. At the RIMP, it is found that 58.5 percent are male tourists and 41.5 percent are female tourists. As for the PIMP, male tourists (58.5 percent) exceed the female tourists (41.5 percent).

Majority of the tourists who visit the marine parks are those in the age ranged between 21 to 30 years old (54.0 percent). This is followed by those between 31 to 40 years old (21.0 percent). As for those who ages above 41 and below 21 years old, they only recorded small percentages ranging from 1 to 9 percent only.

In terms of marital status, 60.6 percent of the tourists visiting the marine parks are still single. Meanwhile, 38.0 percent are married and 1.3 percent are widowers/divorced.

It is found that the tourists are separated into two groups of education level. Most of the tourists are diploma/degree holders (69.3 percent) and the rest are still schooling up to secondary school at 30.7 percent.

Evaluation Analysis and Environmental Service-Quality Attributes Difference (Gap) Mean

Based on importance mean analysis and tourist satisfaction mean toward the environmental

service quality, it is found that the TIMP mean value exceeds 3. This indicates that tourists visiting TIMP are satisfied with their visits. However, gap analysis shows that there is a difference between the expected mean and the tourist real mean where all the gap test values are negative except for the fishermen's village attribute. The paired t-test also indicates the existence of a significant difference between the expected mean and the real mean towards the quality of the environmental service. This indicates that, even though the tourists are satisfied with the environmental service quality offered by TIMP, their actual satisfaction is lower than their expectation before visiting this marine park. This can be observed in Table 3.

Table 4 indicates the level of tourist satisfaction at the RIMP where the importance mean and tourist environmental service-quality satisfaction mean values also exceed 3. This indicates that all the tourists are satisfied with their visits. Gap analysis shows the existence of a difference between the expected mean and tourist real mean whereby all the gap test values are positive. The paired t-test also shows the significant existence of a difference between the estimated mean and real mean of the environmental service quality. This shows that the tourists are satisfied with the environmental service quality offered by RIMP and their satisfaction level is high.

PIMP has almost the same analysis result with the RIMP whereby the importance mean and tourist satisfaction mean of the environmental service quality have values exceeding 3. This indicates that all the tourists who visit the marine park are satisfied with their visit. Gap analysis indicates the existence of a difference between the expected mean and the tourist real mean where all the gap test values are positive. The paired t-test also indicates the existence of a significant difference between the expected mean and real mean of the environmental service quality. This shows that tourists are satisfied with the environmental service quality offered by PIMP and their satisfaction level is high. This can be seen from Table 5.

Overall Analysis and Estimated Tourist Satisfaction Index

Overall, the analysis found that the tourist importance mean and satisfaction mean toward the environmental service quality exceed 3. This indicates that all tourists who visit the marine

Table 2: Demographics of Marine Parks Tourist.

	TIMP n = 165	RIMP n = 231	PIMP n = 200	Total Sample n = 596
Gender (%)				
Male	52.8	58.5	58.5	53.52
Female	47.2	41.5	41.5	46.48
Race (%)				
Malay	43.0	35.5	57.0	44.8
Chinese	3.0	16.5	13.0	11.6
Indian	1.8	0.9		0.8
Kadazan	0.6			0.2
Others		0.9		0.3
Foreigners		46.3	30.0	42.3
Age (%)				
< 21	3.0	7.8	16.5	9.39
21 – 30	54.5	58.0	49.0	54.02
31 – 40	23.6	21.6	18.0	20.97
41 – 50	13.9	8.2	9.5	10.23
51 – 60	4.2	3.0	7.0	4.69
>60	.6	1.3		0.67
Marital Status (%)				
Single	57.6	68.0	54.5	60.57
Married	38.8	32.0	44.5	38.08
Divorcee/Widower Female	3.0		0.5	1.00
Divorcee/Widower Male	.6		0.5	0.33
Education Level (%)				
Not schooling	.6	0.9	0.5	0.67
Primary school	2.4	0.4	2.5	1.67
Secondary school	20.0	19.0	38.0	25.67
Diploma/Degree	76.4	73.2	59.0	69.29
PHD/MASTER	3.0	6.5		2.68
Income (%)				
< 1000	8.0	18.2	14.7	11.84
1001 – 2000	25.3	25.7	22.1	24.61
2001 – 3000	18.4	17.6	14.0	16.82
3001 – 4000	22.9	8.8	6.9	12.15
4001 – 5000	8.0	10.1	6.9	8.72
> 5001	17.2	19.6	45.4	25.85

Source: Economic Survey Instrument for Protected Area, 2009.

Table 3: Tourist Evaluation on the Level of Environmental Service Quality at the Tioman Island Marine Park (TIMP).

Attributes	Expected Mean (SD)	Perceived Mean (SD)	Gap	t-test
1. Abundance and assortment of corals	3.4424 (0.78)	3.1212 (0.69)	-0.32	4.812**
2. Abundance and assortment of fishes	3.4909 (0.75)	3.2061 (0.59)	-0.28	4.832**
3. Clean and clear water	3.6121 (0.71)	3.1939 (0.53)	-0.42	6.565**
4. Peaceful island	3.4848 (0.73)	3.2000 (0.49)	-0.28	4.249**
5. Clean unpolluted beaches	3.6303 (0.67)	2.9758 (0.62)	-0.65	8.871**
6. Untouched terrestrial flora and fauna	3.4242 (0.73)	3.1636 (0.56)	-0.26	4.101**
7. Fishermen's village	2.8970 (0.89)	3.0303 (0.68)	0.13	-0.926

*$p<0.05$
**$p<0.00$

Table 4: Tourist Evaluation on the Level of Environmental Service Quality at the Redang Island Marine Park (RIMP).

Attributes	Expected Mean (SD)	Perceived Mean (SD)	Gap	t-test
1. Abundance and assortment of corals	3.3636 (0.775)	3.7749 (1.047)	0.411	4.648**
2. Abundance and assortment of fishes	3.4156 (0.752)	3.8268 (0.976)	0.411	5.039**
3. Clean and clear water	3.5455 (0.749)	3.8485 (0.946)	0.303	3.657**
4. Peaceful island	3.3853 (0.748)	3.7922 (0.991)	0.407	4.739**
5. Clean unpolluted beaches	3.5584 (0.707)	3.6537 (1.092)	0.095	1.066
6. Untouched terrestrial flora and fauna	3.4502 (0.701)	3.8225 (0.857)	0.372	4.812**
7. Fishermen's Village	3.0043 (0.857)	3.8658 (1.109)	0.862	10.86**

* p<0.05
** p<0.00

Table 5: Tourist Evaluation on the Environmental Service Quality at the Payar Island Marine Park (PIMP).

Attributes	Expected Mean (SD)	Perceived Mean (SD)	Gap	t-test
1.Abundance and assortment of corals	2.9400 (0.466)	2.9400 (0.466)	1.495	21.267**
2. Abundance and assortment of fishes	4.4500 (1.159)	3.0350 (0.441)	1.415	22.701**
3. Clean and clear water	45.000 (1.107)	3.000 (0.530)	0.500	23.318**
4. Peaceful island	4.5000 (1.102)	2.9600 (0.499)	1.540	19.870**
5. Clean unpolluted beaches	4.5000 (1.125)	2.9850 (0.464)	1.515	23.605**
6. Untouched terrestrial flora and fauna	4.5250 (1.102)	3.0300 (0.424)	1.495	22.027**
7. Fishermen's village	4.5950 (1.022)	4.9050 (0.536)	-0.310	40.672**

* p<0.05
** p<0.00

Table 6: Tourist Evaluation on TIMP, RIMP and PIMP's Environmental Service Quality.

Attributes	Expected Mean (SD)	Perceived Mean (SD)	Gap	t-test
1. Abundance and assortment of corals	3.3138 (0.88)	2.8238 (1.10)	0.49	9.481**
2. Abundance and assortment of fishes	3.3893 (0.81)	2.854 (1.11)	0.5353	10.731**
3. Clean and clear water	3.3826 (0.81)	2.906 (1.18)	0.4766	9.262**
4. Peaceful island	3.349 (0.82)	2.8423 (1.11)	0.5067	10.053**
5. Clean unpolluted beaches	3.2416 (0.87)	2.9161 (1.17)	0.3255	5.811**
6. Untouched terrestrial flora and fauna	3.3742 (0.79)	2.849 (1.09)	0.5252	10.774**
7. Fishermen's village	3.9832 (1.11)	2.6023 (0.99)	1.3809	20.402**

* p<0.05
** p<0.00

Table 7: Satisfaction Overall/Total Index.

Destination	Overall Satisfaction Mean (%)	Frequency Distribution of Overall Satisfaction/ (%)				Total
		1	2	3	4	
Taman Laut Pulau Tioman	70.3	0.4	6.4	70.7	22.5	1266
Taman Laut Pulau Redang	86.8	2.4	9.7	69.3	18.5	1242
Taman Laut Pulau Payar	67.0	1.26	5.8	84.7	8.2	1592
Total Overall Index	74.7	4.06	21.9	224.7	49.2	4100

parks are satisfied with their trips. Gap analysis shows the existence of a difference between the expected mean and the tourist real mean where all the gap test values are positive. The paired t-test also indicates the existence of a significant difference between the expected mean and the real mean of the environmental service quality. This shows that tourists are satisfied with the environmental service quality at all the three marine parks situated in Peninsular Malaysia;

and their satisfaction level is high. Please refer Table 6.

The index value of overall/total satisfaction is calculated from the three marine parks under study by applying equation 1 is as shown in Table 7. The index value recorded by RIMP is at 86.8 percent, followed by TIMP at 70.3 percent and PIMP at 67.0 percent. This shows that RIMP scored the highest in the tourist overall satisfaction index. In other words, the satisfaction recorded in terms of environmental service quality offered by RIMP is higher than those of TIMP and PIMP.

Conclusion

Tourist satisfaction is important in evaluating the environmental service quality offered by the Malaysian marine parks. Evaluation done by tourists can be used as a guideline in ensuring the marine parks are always in their natural condition. It can also be employed as guidance for the management of the marine parks in enhancing the environmental service quality offered. This is due to the fact that environmental service quality offered is among the important factors that attract tourists to eco-tourism destinations. Aware of this fact, research has been undertaken in regard to tourist perception towards the environmental service-quality attributes at the TIMP, RIMP and PIMP. For that purpose, surveys were conducted randomly on 596 tourists at the three marine parks' several main locations. This is to find out the actual environmental condition of the islands, besides being used as a guide to the stakeholders or the management of the environment and the marine parks. Research results indicate that, in general, the environmental service-quality attributes at the TIMP, RIMP and PIMP are important to tourists and the majority of them (80-93 percent) feel that the attributes are satisfactory/very satisfactory. This clearly shows that environmental service-quality attributes are very important, able to satisfy the tourists and are still in good/very good condition. Nonetheless, the statistical t-test conducted found the existence of a significant difference in the tourists' perceived mean value before and after their trips to TIMP. The mean value (gap) is negative for all qualities except for the fishermen's village. This indicates that, even though foreign tourists are satisfied with the environmental service quality, it is lower than their expectation except for the fishermen's

village. As for RIMP and PIMP, their positive gap values indicate that the tourists' satisfaction is higher than their expectation. In terms of the tourist overall/total satisfaction index, it is found that its value is higher for the RIMP (86.8 percent), followed by TIMP (70.3 percent) and PIMP at 67.0 percent. In view of the importance of the environmental service quality and how it affects tourist satisfaction, excellent management of the environment needs to be undertaken. This is because excellent management will prevent the degradation of environmental service-quality attributes that are offered to tourists. Of these, the marine parks' charms are the most important.

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