

LAYANG LAYANG: AN EMPIRICAL STUDY ON SCUBA DIVERS' SATISFACTION

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Scuba diving is a burgeoning special interest tourism product in Malaysia. Layang Layang Island in the middle of the South China Sea is one of the world's most exciting diving destinations known for its hammerhead sharks among the diving community. This study is a pilot survey aimed at measuring divers' satisfaction with Layang Layang. One hundred self-administered questionnaires were given out to divers on the last day of their stay in September 2004. Ninety-eight questionnaires were returned and analyzed. The results show that divers are generally Europeans, older, first timers, experienced, of high education and near equality between the sexes. The overall satisfaction is very high. The main contributors to diving satisfaction are underwater nature and the comfort and ease of access to dive sites. Divers are less satisfied with the provision of marine life education facilities, rental equipment, lodging, and the lack of other activities. It is suggested that in order to ensure divers' satisfaction, the management should appropriately manage divers' expectations by providing accurate information about Layang Layang using the most satisfactory diving variables in the marketing message. The resort at the same time should ensure that the natural features of the island are sustainable, because they are the reasons for divers' visits. Future research should improve on the questionnaire design and the size of diver sample population.

Key words: Layang Layang; Scuba diving; Satisfaction; Hammerheads

Introduction

Layang Layang Resort is situated in the middle of the South China Sea, 300 km off the northwest coast of Sabah. During the last decade, the island has been attracting divers from all over the world especially those with a special interest to encounter hammerhead sharks. This article examines a pilot

survey on divers' satisfaction with Layang Layang. A description of Layang Layang Island and the Layang Layang Resort operation is given. It is followed by a review of general literature on scuba diving around the world and in Malaysia. The main attributes of divers' satisfaction is then discussed together with literature on satisfaction. Research justification and objectives are presented. A brief de-

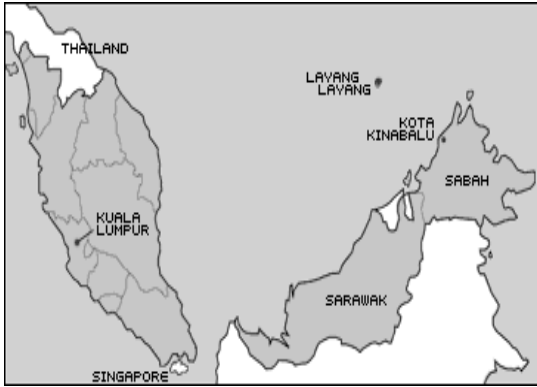


Figure 1. Location of Layang layang Island in Malaysia. Source: <http://www.layanglayang.com/introduction.asp>

scription of methodology is explained and followed by a detailed presentation of the results. Before drawing conclusions, a discussion on the important research findings will be given.

Layang Layang: One Island, One Resort

In 1978 a Malaysian senior government official visited part of the Spratly islands and claimed Swallow Reef (Layang Layang) as a part of Malaysia. The island was originally a small sand bank in the deep blue sea of the South China Sea (Fig. 1). The

first reclamation work was carried out from 1985 to 1989 using fill material brought by barge from the mainland. The island was further built up with the construction of sea walls from 1991 to 1994. Now Layang Layang is extended to the size of 1.2 km × 200 m. It is fringed by 13 coral atolls linked together over 7 km long and 2 km wide, creating a relatively calm center lagoon with two main channels from the sea (Fig. 2).

The atoll features a 2000-m sheer drop around its rim. Its waters are warm (22–32°C) and the visibility averages 30–60 m. The deep water and pristine walls attract many big fish like Napoleon Wrasse, Manta Ray, Giant Humphead Wrasse, Hawkbill Turtles, Dog Tooth tuna, and several species of sharks. The excellent visibility allows inspection of varieties of soft and hard corals growing healthily into much deeper water. Layang Layang is also a stop for several species of migratory birds. Despite the beauty of the island's underwater features, Lawrence Lee, the marketing manager of the resort, claimed that the constant presence of the migratory Hammerhead sharks, which are sighted between the months of April to September, served as the main attraction of the island to divers around the world.

In 1982 a Royal Malaysian Navy Base was set up in Layang Layang. However, in 1991, a resort was constructed on the island, consisting of 15 bedrooms and two suites. Flight service was first provided by

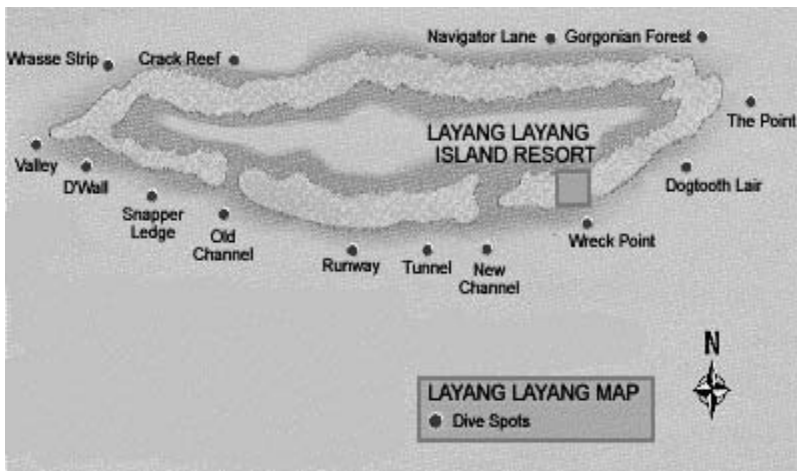


Figure 2. Layang Layang atolls. Source: http://www.abcmalaysia.com/tour_malaysia/sbh_dive_ils.htm

Malaysian Airlines to Layang Layang in 1993 using Twin Otters with seat capacity of 8–12 passengers. The island was also frequented by live-aboard vessels that had to endure 18 cruising hours to the area from the nearest mainland. The resort was upgraded in 1995 and taken over by the Reliance tour company. Layang Layang, once remote and forbidding, now is easily accessible by an hour's flight from Kota Kinabalu.

Layang Layang Resort is the only diving operator and hotel accommodation available on the coral atoll. The three-star hotel was built out of tropical hardwood and architecturally modeled after a lighthouse. It offers the comforts of an international hotel including air-conditioning and private bathrooms with hot water showers. There are 82 rooms and four suites divided among six buildings, a freshwater pool, and a restaurant with Asian and Continental cuisines. All rooms are equipped with televisions, refrigerators, and private balconies.

Scuba diving is the predominant sport in Layang Layang. All dive sites around the atoll can be reached within 10 minutes. Layang Layang Resort has a dive center with a fleet of 10 catamarans. The dive center provides scuba diving facilities such as aluminium tanks, Bauer KAP180 compressors, BCDs, regulators, fins, masks, booties, weights, and belts. In order to minimize the impact of scuba diving activities on the environment, the resort practices a strict environmental conservation policy and obliges all divers to agree to its Reef Conservation Policy set up under its environmental Conservation Program. The resident PADI (Professional Association of Dive Instructor) dive center has friendly and experienced dive masters, equipment for rent, and a full range of dive courses. The resort also offers other activities like snorkeling, bird watching, jetty walk, massage, and snooker.

The resort is operated by 40–45 staff, of which almost 90% are locals. The resort is closed for 3 months during the northeast monsoon (November to January). In this period, only a small number of staff (around 4–6) stay behind to carry out maintenance work in the resort such as painting and gardening. Approximately 80% of the staff are on contract basis during the tourist season. The staff are well trained from various services, and the majority of divers are pleased with their friendly, helpful, and attentive attitudes.

The resort makes several efforts to reduce environmental impact of tourism development on the island. Among the efforts are the planting of trees, grass, and flowers, an excellent waste management system for both its biodegradable and nonbiodegradable items, a proper sewage system, the recycling of papers and towels, and less polluted use of boat engines. Divers are strictly prohibited from touching corals and wearing gloves and are advised to minimize the use of sun block and sun tan lotion.

Scuba Diving

Scuba diving is an adventurous holiday activity due to a strong danger element attached to the pursuit (Ewert, 1989). It is also a form of special interest tourism as most divers take their holiday primarily for scuba diving (Tabata, 1992). The water sport was born in 1943. In that year, Jacques Yves Cousteau and a Paris engineer called Emile Gagnan succeeded in inventing valves fitting to small high-pressure liquid cylinders to create the aqua-lung, or scuba (self-contained underwater breathing apparatus), giving divers unprecedented movement and time underwater (Moran, 1997).

Today scuba diving has become one of the fastest growing sports as well as among the fastest growing markets for special interest tourism in the world (Bennet, 2003; Dignan, 1990). Scuba diving is now a multibillion dollar industry because it is estimated that up to 1 million people become certified divers each year (Bennet, 2003).

According to PADI¹ and Mundet and Ribera (2001), diving is very much a male-dominated sport (72%). However the gap is gradually reducing as females constitute 34.3% in the SCUBA diving survey by O'Neill, Williams, MacCarthy, & Groves (2000), 35% of the membership of the British Sub Aqua Club, and 35.2% among Sipadan divers (Musa, 2002). It was also initially taken up more by young divers (average age of 30.8 years) as reported by *Skin Diver* (1987) in Tabata (1992). However, the later statistics show increasing age among divers: 35.3 years (*Skin Diver*, 1989, in Tabata, (1992), 34.9 years (Musa, 2002), and 36 years (PADI). Dignam (1990) explained that this is due to the advances in technology that have made scuba diving less demanding and allow older and less fit individuals to take up the sport. Scuba diving accidents and fatali-

ties have also decreased over the years. In the report by DAN (Divers Alert Network) diving accidents and fatalities have reduced from 0.03% in 1991 to 0.02% of divers in 1992 (Richardson, 1995).

Around the world many studies have been conducted on scuba divers (Bennet, 2003; Davis, 1993; Ditton, Osbourn, Baker, & Thailing, 2002; Edgardo & Marivel, 2004; Mundet & Ribera, 2001; Musa, 2002; O'Neill et al., 2000; Rice, 1985; Richardson, 1995; A. B. Roupheal & Inglis, 2002; T. Roupheal & English, 1995; Tabata, 1992; Walters & Samways, 2001). In terms of divers' motivations, Rice (1985) classifies divers into "hard core," "tourist," and "potential." "Hard core" divers appreciate flora and fauna and the challenges of all diving conditions. "Tourist" divers include diving as part of their holidays, and "potential" divers are novices who want to try scuba diving. Tabata (1992) views divers on an "adventure" and "educational" spectrum. "Adventure" divers seek excitement, while "educational" divers want to learn about marine scenery. A survey by PADI reveals that 81% of divers take up the sport to seek adventure while 71% want to be with nature (Richardson, 1995).

Impact of scuba diving activities is perhaps most studied by the various researchers (Bennet, 2003; Davis, 1993; A. B. Roupheal & Inglis, 2002; T. Roupheal & English, 1995; Walters & Samway, 2001). Davis (1993) noted that scuba diving activity in Australia does little harm to coral reefs as compared with natural causes. However, he warns that there may be a critical level above which divers' activities begin to create significant and irreversible biological damage. His view was supported by Bennet (2003), who conducted the scuba diving study in Phuket on 632 divers. Bennet states that while impacts from individual divers may be minor, the cumulative impacts of many divers may be substantial.

A. B. Roupheal and Inglis (2002), however, make other observations. In their study of impact caused by recreational divers in the Great Barrier Reef, they found that repeated use of coral reef dive sites does not necessarily lead to cumulative deterioration in their condition. They suggest divers need to be taught about scuba diving-appropriate behaviors and set the numerical limits and distance to the coral reef. Dive operators could also do more to promote "environmentally friendly" behavior such as a short com-

mentary, staying a safe distance from the coral and making photographers aware of their actions (T. Roupheal & English, 1995).

Photographers and the less experienced divers were also seen to have collided more with the corals in the study conducted by Walters and Samways (2001) on 222 divers in a South African coral reef. In managing the sustainability of scuba diving activities, Edgardo and Marivel (2004), in their study on the Tubbataha Reef in the Philippines, discovered that scuba divers are willing to pay user fees as their support for conservation in protecting coral reefs.

Scuba diving satisfaction research was conducted by O'Neill et al. (2000) and Musa (2002). O'Neill et al. (2000) measured diving service quality using the importance/performance model, while Musa (2002) measured divers' satisfaction with Sipadan Island using SERVPERF concept, which will be highlighted later. Among other interesting studies were Ditton et al. (2002), who identified attitudes and reef management preferences of sport divers in offshore Texas waters in the US, and Mundet and Ribera (2001,) who examined the demographic characteristics of divers at the Spanish resort L'Estartit.

Three studies have been conducted on divers in Malaysia (Lim, 1997; Lim & Spring, 1995; Musa, 2002). The first two studies assessed carrying capacities in Tioman Island and Payar Island, respectively, while the last study, as mentioned earlier, examined the satisfaction of divers with Sipadan. Lim and Spring, who interviewed 67 divers and 10 dive operators in Tioman Island, observed a noticeable gap between divers' knowledge of marine conservation and their conduct. On the other hand, among 53 divers interviewed by Lim (1997) on Payar Marine Park, most divers were aware of environmental sensitivity, and as reported by dive masters, the awareness was translated into actions. However, both studies were conducted based on limited samples.

Musa (2002) interviewed 314 divers in a captive atmosphere of Sipadan, one of the world's premier dive spots, in order to examine divers' satisfaction and the impact of tourism development on the island. The majority of divers came from Japan (27.7%), Britain (13.2%), Malaysia (12.6%), Korea (8.7%), and Switzerland (6.5%); 64.8% of divers were male and 35.2% were female. The average age of divers, as mentioned earlier, was 34.9 years. Sev-

enty-one percent of divers had higher qualifications than high school. The majority of divers (69.0%) were experienced and 31% were novices. The majority of divers were first-timers in Sipadan (70.4%) while 29.6% were repeat divers. The majority of divers (79.9%) came to Malaysia solely for scuba diving and the average length of stay was 6.6 days. Using a 9-point Likert scale, 97.8% of divers rated their experiences as "satisfied" to "extremely satisfied" (mean = 2.01). Using a 5-point Likert scale, the top five satisfaction variables were marine life (1.35), friendly/helpful staff (1.45), good buddies (1.47), water temperature (1.48), and easy dive access (1.55). Divers were gravely concerned with haphazard tourism development, crowding, and the worsening of underwater visibility.

In the study of divers' satisfaction the most important consideration is diving attributes. Various studies across continents have been conducted to determine the conditions that are the most favorable to diving. Table 1 shows the summary of the top five attributes for diving among divers from various selected studies from different countries.

The list shows that the diver community moved away from the diver-as-hunter philosophy in the 1970s (spear fishing) to diver-as-benign-observer philosophy in the 1980s and 1990s. This indicates the increasing awareness of marine conservation issues. Well into the 21st century diving attributes consist of the whole diving experience and operation, as noted in the study by Ahmad Salih (2002) (Table 1). Salih sampled 240 divers from various atolls in the Maldives. Divers were mainly repeat divers (80%) but were rather concerned with the rapid disappearance of big ocean pelagic life. However, the information in Table 1 reveals things that

remained constant. "Marine life" and "good visibility" are the most important attributes in scuba diving. Hence, diving operators and marine and coastal development should not jeopardize these natural resources as scuba diving is mainly dependent on them.

Divers' Satisfaction

Most researchers agree that satisfaction is a function of congruency between the needs, motivation, and preferences that form expectations, and the actual experience gained from the activity (Bultena, 1969; Miller, 1977; Pizam, 1978; Ryan, 1995). The definitions place "expectation" and "outcome of certain experience" as two important components of visitor satisfaction. If the actual experience matches or is better than expected, satisfaction will be achieved. On the other hand, dissatisfaction results from unmet expectation. Satisfaction/dissatisfaction is judged by individual attitudes. Attitude according to Moutinho (1987) is a predisposition, created by learning and experience, to respond in a consistent way to a product. Attitude and expectation can be modified via further information and learning.

According to Tribe and Snaith (1998), there are three main research instruments that have been developed to analyze the concepts of quality and consumer satisfaction. These are importance-performance, SERVQUAL (service quality), and SERVPERF (service performance). Following the pilot survey on tourists in Varadero, Cuba in 1998, Tribe and Snaith developed the fourth instrument called HOLSAT (holiday satisfaction).

Importance-performance instrument measures expectation in the form of importance and this will

Table 1
The Top Five Scuba Diving Variables From Selected Studies Around the World

| Somers (1979) USA | Matheusik (1983) Canada | Tabata (1987) Hawaii | Lim and Spring (1995) Malaysia | Davis et al. (1996) Australia | Musa (2002) Sipadan | Salih (2002) Maldives |
|-------------------|-------------------------|----------------------|--------------------------------|-------------------------------|--------------------------------|-----------------------|
| Coral reef | Visibility | Marine life | Visibility | Marine life | Marine life | Staff professionalism |
| Wreck | Geology | Visibility | Dive masters | Visibility | Friendliness and helpful staff | Safety |
| Photo | Marine life | Photo | Good operators | Not crowding | Good buddies | Marine diversity |
| Ice diving | Safety | Calm | Marine life | Easy access | Water temperature | Boat size |
| Spear fishing | Easy access | Current | Coral reef | Cost | Easy dive access | Equipment quality |

Source: Musa (1998) and Salih (2002).

be measured against the actual performance of the variables. However, Tribe and Snaith (1998) argue that it is the emphasis on "importance" that diminishes the usefulness of the importance–performance analysis, as tourists may not attach importance to some of the items because of the nature of the destination.

SERVQUAL measures service quality based the gap between consumers' expectations and service perceptions using 22 variables that contain five service elements: reliability, responsiveness, tangibles, empathy, and assurance (Parasuraman, Zeithaml, & Berry, 1985). However, the 22 variables used may not be applicable in the context of scuba diving, as scuba diving satisfaction variables are unique. Tribe and Snaith (1998) state that each holiday destination is unique and deserves the exploration of satisfaction variables of its own and not confined to SERVQUAL's five service elements. It can also be argued that measuring the expectation after the actual experience, the method frequently conducted in SERVQUAL analysis, is inaccurate because the expectation may change after the actual experience.

Tribe and Snaith (1998) developed HOLSAT, which measures tourist satisfaction with a destination as the degree to which a tourist's assessment of the attributes of a destination exceed his or her expectations. Expectation is not defined in terms of importance or as excellence but rather relates to what people were anticipating for a particular holiday experience. However, the double measurement of the expectation and performance again is rather complicated and may confuse the respondents.

Gronroos (1990) proposes the use of the SERVPERF model and this is supported by Cronin and Taylor (1992), who also advocate the dropping of the expectation side of the SERVQUAL analysis in favor of the use of performance only. The measurement is simple and provides the least confusion to the respondents. This study decided to adopt SERVPERF as it is the simplest measure compared with SERVQUAL, HOLSAT, and importance–performance, all of which require expectation and performance measures. Gronroos' (1990) definition of tourist satisfaction as the measurement of the outcome of the actual performance and its perception by consumers will hence be adapted in this study.

Research Objectives

There were five main objectives of this study:

1. to identify the demographic profile of divers on Layang Layang;
2. to measure the overall divers' satisfaction;
3. to determine the main components of divers' satisfaction;
4. to obtain the relevant scuba diving satisfaction variables in Layang Layang; and
5. to guide future management in ensuring divers' satisfaction.

Methodology

The questionnaire was designed to elicit divers' demographic profile and their satisfaction in terms of environmental attributes, services, and facilities. Sixteen satisfaction variables were taken from Musa (2002) in the study on Sipadan. It is the hope that more variables could be obtained from the response given by the respondents to the open-ended questions on the best and worst aspects of divers' visit to Layang Layang and in their comments. During this pilot survey the researcher also made a site visit for a week to the area, in order to experience the diving attributes in Layang Layang. Several informal inquiries were also conducted with divers, the resort managers, and dive masters on what constitutes scuba diving satisfaction with Layang Layang.

The 16 variables chosen can be viewed in Table 6. A 5-point Likert scale was anchored on the variables to measure divers' satisfaction. Divers' overall satisfaction towards their diving experience with Layang Layang was measured using a 9-point Likert scale. As mentioned in the literature section, this study adapted SERVPERF measurement as proposed by Gronroos (1990) and Cronin and Taylor (1992) due to its simplicity. Thus, confusion and respondent bias are minimized.

A total of 100 self-administered questionnaires were given to the resort manager to be distributed for a period of 1 month in September 2004. September was at the end of diving season in 2004, after which the resort would be closed for 3 months due to the monsoon season. During the closure the pilot data would be analyzed and a new set of questionnaires would be made ready for distribution when the resort reopens in 2005. All divers who vis-

ited the resort in the month of September 2004 were requested to take part in questionnaire. Divers were requested to fill out the questionnaire the day before they left the island. One hundred completed questionnaires were returned. However, only 98 responses were suitable for analysis. The data were analyzed as exploratory analysis using SPSS version 13.

Results

In the presentation of the results, the finding will be consistently compared with the Sipadan study (Musa, 2002). In both studies the same instruments were used to gauge divers' satisfaction with their whole diving experience at the resorts. Both islands are internationally reputed as scuba diving paradise. They belong to Malaysia and are located in the north eastern region of Borneo.

The emergence of a new divers' market is exhibited in the statistics of divers' nationality. As shown in Table 2, divers from China constituted the biggest number of divers (13.3%). This was followed by divers from England (11.2%), Germany (9.2%), and Switzerland (8.2%). The finding was markedly

different compared with the study in Sipadan where Chinese divers were not among the top 10 nationalities among divers. In this study, Malaysian divers constituted only 5.1% compared to the Sipadan study (12.6%).

Scuba diving is fast gaining acceptance from female divers, as 46.9% of divers were female and 53.1% of divers were male. The diver male/female ratio seems to have reduced further compared to the Sipadan study where 64.8% were males and only 35.2% females.

The majority of divers (38%) were within the age of 40–49 years; 31% were between 30 and 39 years of age, while 14% were 20–29 years of age (Table 3). The average age of divers was 38.5 years. Divers seemed to be older compared to Sipadan divers where the majority (41.6%) were from the 30–39 age group with an average age of 34.9 years. Regarding education, 39.8% of divers had university degree qualification, 26.5% had postgraduate degree qualification, and 17.3% completed high school or lower. This latter finding was lower than the Sipadan result in which 21.6% of divers completed high school and lower. The majority of divers in Layang Layang (51%) considered themselves as experienced divers, while 37.8% were intermediate. Only 8.2% of divers considered themselves as novices. Diving experience was lower compared to Sipadan divers, of whom 69% were experienced and 31% were novices.

Referring to Table 4, 34.7% of divers discovered information about Layang Layang from friends. Dive magazines and travel agents were the popular sources of information for 20.4% and 19.4% of divers, respectively. Only 7.1% of divers gathered knowledge about the island from the Internet. However, when making arrangements for the trip, 49.0% of divers

Table 2
Divers by Nationality in Layang Layang

| Nationality | Frequency | Percent |
|--------------|-----------|---------|
| China | 13 | 13.3 |
| England | 11 | 11.2 |
| Germany | 9 | 9.2 |
| Switzerland | 8 | 8.2 |
| France | 7 | 7.1 |
| Holland | 6 | 6.1 |
| Canada | 6 | 6.1 |
| Malaysia | 5 | 5.1 |
| Australia | 4 | 4.1 |
| USA | 4 | 4.1 |
| Russia | 3 | 3.1 |
| Japan | 3 | 3.1 |
| South Africa | 3 | 3.1 |
| Italy | 3 | 3.1 |
| Belgium | 3 | 3.1 |
| Norway | 2 | 2.0 |
| Portugal | 2 | 2.0 |
| Hong Kong | 1 | 1.0 |
| Singapore | 1 | 1.0 |
| Spanish | 1 | 1.0 |
| Denmark | 1 | 1.0 |
| Finland | 1 | 1.0 |
| Namibia | 1 | 1.0 |
| Total | 98 | 100.0 |

Table 3
Divers by Age in Layang Layang

| Age | Frequency | Percent |
|--------------------|-----------|---------|
| 40–49 years | 38 | 38.8 |
| 30–39 years | 31 | 31.6 |
| 20–29 years | 14 | 14.3 |
| 50–59 years | 12 | 12.2 |
| 60 years and above | 2 | 2.0 |
| Under 19 | 1 | 1.0 |
| Total | 98 | 100.0 |

Table 4
Information Source of Layang Layang

| Source | Frequency | Percent |
|----------------|-----------|---------|
| Friends | 34 | 34.7 |
| Dive magazines | 20 | 20.4 |
| Travel agents | 19 | 19.4 |
| Dive stations | 6 | 6.1 |
| Internet | 7 | 7.1 |
| Others | 12 | 12.2 |
| Total | 98 | 100.0 |

Table 5
Overall Satisfaction Among Divers

| Satisfaction | Frequency | Percent |
|----------------------------|-----------|---------|
| Lowly satisfied (1–3) | 3 | 3.1 |
| Moderately satisfied (4–6) | 4 | 4.2 |
| Highly satisfied (7–9) | 89 | 92.7 |

made it via tour or travel agents, 20.4% via dive stations or clubs, and 19.4% by self-arrangement. There were 40.8% of the divers who made the trip with their partners or spouses and 20.4% with friends; 15.3% of the divers traveled with a dive group while only 16.3% traveled alone. The majority (89.8%) of divers were first-timers on Layang Layang and only 10.2% were repeat divers to the resort. This finding was different from Sipadan where first-timers were much lower in percentage (70.4%).

There were 46.9% of the divers in Layang Layang that could be considered as “hard core” divers as categorized by Rice (1987), in that they came solely to dive at Layang Layang. This was markedly different from Sipadan divers where 79.9% of divers were “hard core” divers. There were 42.9% of divers who combined their holiday to Layang Layang with some other Malaysian destinations; 73.5% of divers stayed in Layang Layang for 5–7 days and 11.2% stayed for a period of 8 days.

Even though the main attraction of Layang Layang is the sighting of hammerhead sharks, only 66.3% of divers did see them. Another 32.7% of divers left the island without a glimpse of the sharks. The great majority of divers (87.8%) wish to return and only 10.2% stated that they did not wish to return.

Overall diver satisfaction was measured using a 9-point Likert scale and the scores were categorized as Lowly Satisfied (1–3), Moderately Satisfied (4–6), and Highly Satisfied (7–9). The result (Table 5) shows that 92.7% of the divers surveyed were in the Highly Satisfied category and only 3.1% were Lowly Satisfied. The level of overall satisfaction was lower compared with Sipadan, where 97.8% of divers rated their experience as Highly Satisfied. A chi square test was performed and each category of satisfac-

tion was significantly different [$\chi^2(2) = 152.313$, $p = 0.000$]. The majority of divers (79.6%) stated that the diving experience in Layang Layang met their expectation while 17.3% said that it did not.

Empirical analysis on diver satisfaction was performed in which respondents were asked to rate their satisfaction towards the 16 elements that relate to diving satisfaction attributes, using a 5-point Likert scale anchored from Strongly Dissatisfied to Strongly Satisfied. Descriptive statistics obtained from this analysis are shown in Table 6. In this table the result of a t -test for mean difference for each satisfactory attribute is also presented. The result shows that for each variable the mean was significantly different with very high t -value.

The above findings indicate that divers were most satisfied with the state of “coral reef” (mean = 4.62887), “water temperature” (mean = 4.61053), “boat services” (mean = 4.51546), “marine life” (mean = 4.50515), and “access to dive sites” (mean = 4.48421). The findings match the result of

Table 6
 t -Test for Mean Difference of Satisfaction Variables

| Variable | Mean | SD |
|------------------------------------|---------|---------|
| Coral Reef | 4.62887 | 0.48562 |
| Water temperature | 4.61053 | 0.57046 |
| Boat services | 4.51546 | 0.5793 |
| Marine life | 4.50515 | 0.56132 |
| Access to dive sites | 4.48421 | 0.61650 |
| Underwater landscapes | 4.43750 | 0.6123 |
| Front desk services | 4.34021 | 0.6104 |
| Transport and transfer arrangement | 4.23469 | 0.84708 |
| Underwater visibility | 4.18557 | 0.83329 |
| Accommodation | 4.14737 | 0.7714 |
| Safety measures | 4.01149 | 0.72327 |
| Weather | 4.01020 | 0.87926 |
| Rental equipments | 3.95833 | 0.7425 |
| Food/dining | 3.88542 | 0.73799 |
| First-aid facilities | 3.54688 | 0.83437 |
| Marine life educational facilities | 3.30986 | 0.8382 |

Table 7
Cross-Tabulations of Satisfaction Variables With Overall Satisfaction

| Variable | Low Satisfaction | | Moderate Satisfaction | | High Satisfaction | | Total <i>N</i> |
|------------------------------------|------------------|------|-----------------------|------|-------------------|-------|----------------|
| | <i>N</i> | % | <i>N</i> | % | <i>N</i> | % | |
| Underwater visibility | 3 | 3.2% | 4 | 4.2% | 88 | 92.6% | 95 |
| Front desk services | 3 | 3.2% | 4 | 4.2% | 88 | 92.6% | 95 |
| Marine life | 3 | 3.2% | 4 | 4.2% | 88 | 92.6% | 95 |
| Boat services | 3 | 3.2% | 4 | 4.2% | 88 | 92.6% | 95 |
| Coral reef | 3 | 3.2% | 4 | 4.2% | 88 | 92.6% | 95 |
| First-aid facilities | 2 | 3.1% | 3 | 4.7% | 59 | 92.2% | 64 |
| Underwater landscapes | 3 | 3.2% | 4 | 4.3% | 87 | 92.6% | 94 |
| Accommodation | 3 | 3.2% | 4 | 4.3% | 87 | 92.6% | 94 |
| Access to dive sites | 3 | 3.2% | 4 | 4.3% | 87 | 92.6% | 94 |
| Water temperature | 3 | 3.2% | 4 | 4.3% | 86 | 92.5% | 93 |
| Rental equipment | 2 | 4.2% | 1 | 2.1% | 45 | 93.8% | 48 |
| Transport and transfer arrangement | 3 | 3.1% | 4 | 4.2% | 89 | 92.7% | 96 |
| Food/dining | 3 | 3.2% | 4 | 4.3% | 87 | 92.6% | 94 |
| Marine life educational facilities | 3 | 4.3% | 3 | 4.3% | 64 | 91.4% | 70 |
| Weather | 3 | 3.1% | 4 | 4.2% | 89 | 92.7% | 96 |
| Safety measures | 3 | 3.5% | 4 | 4.7% | 79 | 91.9% | 86 |

the Sipadan survey where nature and dive access were among the most important attributes to diving. The relatively lower satisfaction variables were “marine life educational facilities” (mean = 3.30986), “first-aid facilities” (mean = 3.54688), “food/dining” (mean = 3.88542), and rental equipment (mean = 3.95833). These findings were again similar to the Sipadan survey as all three items were rated within Lowly Satisfied variables.

The cross-tabulation of the percentage of respondents within each category of the satisfaction level for all the 16 variables is presented in Table 7. The results show that the percentages of respondents for all variables were mostly in the high-level category. Nonparametric Kruskal Wallis test was performed on these data and the result is presented in Table 8.

Referring to Table 8, it appears that not all means were significantly different among the different satisfaction levels. The different means were observed among the variables of “underwater visibility” ($p = 0.043$), “marine life” ($p = 0.029$), “boat services” ($p = 0.015$), “access to dive sites” ($p = 0.017$), and “safety measures” ($p = 0.034$). These imply that the means for the five variables could significantly distinguish the different levels of satisfaction.

Further cross-tabulation between level of satisfaction and other variables such as the sighting of hammerhead sharks, divers’ experience, gender, educa-

tion level, and nationality shows that the mean for each variable among the three levels of satisfaction was not significant (Table 9).

An exploratory factor analysis was performed on the 16 variables of satisfaction attributes and five factors emerged with eigenvalues of 4.828, 1.673, 1.327, 1.054, and 1.034, respectively. The factors were identified as “service,” “lodging and food,”

Table 8
The Kruskal Wallis Analysis for Divers’ Satisfaction Variables Within the Different Satisfaction Levels

| Variable | Chi Square | <i>df</i> | <i>p</i> |
|------------------------------------|---------------|-----------|--------------|
| Underwater visibility | 6.314* | 2 | 0.043 |
| Front desk services | 4.457 | 2 | 0.108 |
| Marine life | 7.083* | 2 | 0.029 |
| Boat services | 8.417* | 2 | 0.015 |
| Coral reef | 2.814 | 2 | 0.245 |
| First-aid facilities | 0.297 | 2 | 0.862 |
| Underwater landscapes | 2.075 | 2 | 0.354 |
| Accommodation | 2.890 | 2 | 0.236 |
| Access to dive sites | 8.197* | 2 | 0.017 |
| Water temperature | 3.827 | 2 | 0.148 |
| Rental equipments | 0.385 | 2 | 0.825 |
| Transport and transfer arrangement | 4.857 | 2 | 0.088 |
| Food/dining | 3.954 | 2 | 0.138 |
| Marine life educational facilities | 4.047 | 2 | 0.132 |
| Weather | 0.866 | 2 | 0.649 |
| Safety measures | 6.779* | 2 | 0.034 |

Table 9
The Kruskal Wallis Analysis of Overall Satisfaction and Others

| Variable | Chi Square | df | p |
|---|------------|----|-------|
| Did you see hammerhead sharks? | 2.258 | 2 | 0.323 |
| How do you rate your self as a diver? | 3.540 | 2 | 0.170 |
| What is your gender? | 1.231 | 2 | 0.540 |
| Your age? | 1.775 | 2 | 0.412 |
| What is your highest educational level? | 0.927 | 2 | 0.629 |
| Nationality | 3.386 | 2 | 0.184 |

“environment,” “safety facilities,” and “underwater nature.” The result is shown in Table 10.

Each variable loaded significantly on the appropriate factor (>0.45), supporting the construct validity of the scales used. For the variable that loaded significantly in more than one factor, the higher and more suitable loading was considered. The reliability of variables in each factor was then analyzed and Cronbach alpha for each of them was obtained. The result is shown in Table 11.

The relative importance of the five factors in influencing divers’ overall satisfaction was obtained using linear regression. The means of each of the

Table 11
Reliability of the 16 Variables of Diver Satisfaction

| Factors | No. of Variables | Reliability Coefficient (Cronbach Alpha) |
|-----------------------------|------------------|--|
| Factor 1: Service | 4 | 0.804 |
| Factor 2: Lodging and food | 2 | 0.648 |
| Factor 3: Environment | 3 | 0.561 |
| Factor 4: Safety facilities | 3 | 0.773 |
| Factor 5: Underwater nature | 4 | 0.674 |

five factors were the independent variables while overall satisfaction was the dependent variable. The results revealed in Table 12 show that “underwater nature” was the most significant with *t*-values of 1.815. Thus, of all the variables of underwater nature, which are included in “marine life,” “coral reef,” “underwater landscapes,” and “water temperature” were the most important variables that determined the overall satisfaction of divers in Layang Layang.

During the survey, the researcher discovered some scuba diving satisfaction variables that could be added for the future questionnaire design. These are listed in Table 13. In addition to the 16 variables listed in Table 6, Table 13 contains another 16 addi-

Table 10
Factor Analysis of Divers’ Satisfaction Variables

| Variable | Components | | | | |
|------------------------------------|--------------|--------------|-----------------|----------------|-----------------------|
| | 1 (Service) | 2 (Lodging) | 3 (Environment) | 4 (Facilities) | 5 (Underwater Nature) |
| Underwater visibility | 0.309 | 0.098 | 0.668 | -0.044 | 0.038 |
| Front desk services | 0.590 | 0.471 | 0.012 | 0.235 | 0.048 |
| Marine life | -0.002 | 0.041 | 0.239 | 0.345 | 0.546 |
| Boat services | 0.446 | 0.390 | 0.410 | 0.246 | 0.189 |
| Coral reef | 0.113 | 0.007 | -0.054 | 0.030 | 0.898 |
| First-aid facilities | 0.461 | -0.024 | -0.177 | 0.650 | 0.113 |
| Underwater landscapes | 0.502 | 0.015 | 0.246 | 0.236 | 0.468 |
| Accommodation | 0.206 | 0.790 | -0.017 | 0.107 | -0.061 |
| Access to dive sites | 0.360 | 0.380 | 0.441 | 0.028 | 0.147 |
| Water temperature | 0.305 | 0.247 | 0.342 | -0.086 | 0.490 |
| Rental equipment | 0.708 | 0.008 | 0.149 | 0.043 | 0.195 |
| Transport and transfer arrangement | 0.711 | 0.148 | 0.150 | 0.126 | -0.010 |
| Food/dining | -0.013 | 0.794 | -0.015 | 0.067 | 0.116 |
| Marine life educational facilities | 0.092 | 0.089 | 0.017 | 0.789 | 0.048 |
| Weather | -0.017 | -0.213 | 0.813 | 0.122 | 0.129 |
| Safety measures | 0.059 | 0.339 | 0.366 | 0.656 | 0.144 |
| Eigenvalue | 4.828 | 1.673 | 1.327 | 1.054 | 1.034 |

Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalization. Rotation converged in 6 iterations.

Table 12
Linear Regression on the Relative Importance of the Five Factors

| Factor | Unstandardized Coefficients | | | | |
|----------------------|-----------------------------|-------|-------------------------------|----------|----------|
| | B | SE | Standardized Coefficient Beta | <i>t</i> | <i>p</i> |
| (Constant) | 6.990 | 1.600 | | 4.369 | 0.000 |
| F: Service | 0.146 | 0.324 | 0.058 | 0.453 | 0.652 |
| F: Underwater nature | 0.668 | 0.368 | 0.217 | 1.815 | 0.073 |
| F: Facilities | 0.013 | 0.210 | 0.007 | 0.063 | 0.950 |
| F: Food and lodging | 0.148 | 0.214 | 0.076 | 0.689 | 0.492 |
| F: Environment | 0.061 | 0.253 | 0.027 | 0.240 | 0.811 |

Dependent variable: Overall satisfaction.

tional variables, which gives a total of 32 variables to be used for future questionnaire design.

Discussion

It is evident from the pilot survey among divers in Layang Layang that divers' demographic profiles have slowly changed. Even though most divers are still predominantly European, the emergence of the Eastern market, especially from China, warrants special attention. These divers may be relatively inexperienced and require different needs and services compared with European divers. The percentage of female divers is also increasing to be almost equal with male divers. Thus, scuba diving no longer can be stereotyped as a male-dominated sport, which was claimed by PADI and Mundet and Ribera (2001). Equipment technology should cater for the relatively smaller size of female divers.

Divers are also getting older compared with other studies conducted around the world (e.g., Musa, 2002; *Skin Diver* in Tabata, 1992). Several reasons may have contributed to this phenomenon. Firstly, it may simply now be that the general population is aging. Secondly, as indicated by Dignan (1990) that scuba diving technology is improving each year and by Richardson (1995) that the dive fatality rate is almost negligible, these factors may have encouraged the participation of older divers. Thirdly, scuba diving in Layang Layang is quite expensive compared with other destinations like the Maldives, Sipadan, and the South Pacific. Thus, only the relatively stable economic individual could afford to take the trip, and these people are normally older.

Compared to the Sipadan study (Musa, 2002), divers in Layang Layang seem to be relatively less experienced. This should alert the management to tighten the safety measures during every dive. These safety measures are not just to avoid fatality but are

Table 13
Scuba Diving Satisfaction Variables in Layang Layang

1. Underwater visibility
2. Front desk services
3. The beauty of the fish species
4. The dive boat services
5. The beauty of the coral reefs
6. First-aid facilities at the resort
7. Beauty of the underwater geological features
8. Comfort of the resort accommodation
9. Length of boat trips to dive sites
10. Sea water temperature
11. Rental dive equipment
12. Transport and transfer arrangements
13. Quality of the food
14. The overall dining facilities
15. Marine life educational facilities at resort
16. The weather during my stay
17. The staff's concern about diving safety
18. Professionalism of the dive masters
19. Diver crowding at some of the dive sites
20. Problems with underwater currents
21. Attentiveness/helpfulness of general staff
22. My experience with my dive buddies
23. The amount I learned here about marine life
24. Degree to which I improved my diving skills
25. The underwater knowledge of dive masters
26. Levels of noise on Layang Layang
27. The beauty of Layang Layang's scenery
28. Value for money of Layang Layang diving
29. Availability of other recreational facilities
30. Selection available at souvenir shop
31. Dive briefings before each dive
32. The organization of water entries and exits

also necessary to prevent damage to the coral reef. As noted earlier by Bennet (2003), even though the impacts from individual divers may be minor, the cumulative impacts of many divers may be substantial. Other than less experienced divers who may require special supervision while diving, Walters and Samways (2001) and T. Roupael and English (1995) stress that photographers are another group of divers who have been observed frequently colliding with the coral reef.

The majority of Layang Layang divers are first-timers. Marketing efforts should be stepped up in order to increase repeat divers. Divers in Layang Layang are also less "hard core" by Rice's (1987) category compared with Sipadan divers. A great number of tourists combine their trip to Layang Layang with other parts of Malaysia. A creative diving package combination with other attractions in Malaysia may encourage tourists to stay longer.

Word of mouth is still the main marketing achievement for Layang Layang. The majority of divers in Layang Layang receive knowledge regarding the island from friends. This result was also observed in the studies of Sipadan (Musa, 2002) and the Spanish resort L'Estartit (Mundet & Ribera, 2001). This fact signifies the importance of improving divers' satisfaction variables such as service quality, facilities, and nature, because a satisfied customer will definitely recommend Layang Layang to their friends.

The marketing team should regard every diver as potential marketing personnel. Other important sources of marketing media that deserve attentions are dive magazines and travel agents. The low level of Internet usage alerts the marketing team to review the current website information and relevancy. The marketing management may also need to provide more appealing commission for travel agents because half of the diving arrangements are made by them. Scuba diving is very much a social trip. Almost half of divers travel with their partners or spouses and one in five travels with their friends. Perhaps some creative activities that strengthen the social experience among divers are worth considering in order to enhance the overall diving experience in Layang Layang.

Even though a considerable number of tourists see hammerhead sharks, 3 out of 10 divers do not. Because expectation management is important, as stated by various authors (e.g., Bultena, 1969; Miller,

1977; Pizam, 1978; Ryan, 1995), in order to satisfy the customers the overemphasis of marketing using hammerheads might need to be reconsidered. On the other hand, in this study, because the level of satisfaction was not significantly related to the sighting of hammerhead sharks, the motivation may not be a strong predictor to satisfaction. In fact, 9 out of 10 of divers stated that their diving experience in Layang Layang met their expectation.

As expected, the overall satisfaction with Layang Layang is overwhelmingly excellent. However, the level of satisfaction is not as high as what had been recorded among divers in Sipadan. Sipadan offers more attractions through its beaches, forest cover, and underwater landscape. In Layang Layang, divers are most satisfied with underwater features such as "coral reef," "water temperature," and "marine life." They are also satisfied with the process of reaching the dive sites based on high mean satisfaction values on "access to dive sites" and "boat services." All these variables are the strength of Layang Layang that could be used as the main marketing messages. However, similar to the Sipadan study, some aspects that may require improvement are "marine life educational facilities," "first-aid facilities," "food/dining," and "rental equipment."

Kruskal Wallis test using chi square reveals that the means of satisfaction variables of "underwater visibility," "marine life," "boat services," "access to dive sites," and "safety measures" significantly distinguished the different levels of satisfaction. Management should address the important role of these variables accordingly as they significantly influence the level of satisfaction. Factor analysis of all 16 satisfaction variables reveals five distinct factors and these are "service," "lodging and food," "environment," "safety facilities," and "underwater nature." The linear regression analysis of the various satisfaction factors reveals that "underwater nature" is the most significant. Thus, all variables that construct the underwater nature ("marine life," "coral reef," "underwater landscapes," and "water temperature") require careful and sustainable management, as they are the main determinant of divers' satisfaction in Layang Layang. This finding is not a surprise as most diver satisfaction variables relate to the above features (Table 1).

In the response to the open-ended question of the best aspect of divers' visit to the island, the underwa-

ter features are highly noted. The majority of divers state that the best aspects of their visits are the variety of beautiful marine life, the beauty of the coral reef, underwater landscape, and the excellent underwater visibility. Easy access to dive sites and friendliness of staff are also among the best aspects of Layang Layang Resort. On the other hand, in response to the open-ended question of Layang Layang's worst aspects, many divers complain of the noisiness of the non-sound proof rooms, the absence of beaches and other activities, and the poor quality of food. Divers request that more activities and facilities be provided, especially for their last day when they cannot dive. Among the suggestions given are to provide spa facilities, artificial beaches, and fishing.

There are several limitations of this survey. Firstly, the sample was too small and only sampled during the month of September. Thus, the results cannot really be generalized as representative of divers in Layang Layang for the year. Secondly, the questionnaire was only provided in English. Because a considerable number of divers were from non-English-speaking countries, respondent bias cannot be ruled out. The use of only 16 satisfaction variables is by no mean exhaustive because many other variables could have been included in the survey. In future study, the emphasis should be focused in the designing of the questionnaire using more extensive scuba diving satisfaction variables. Attempts should be made to reduce ambiguity of the items, and nonstandardized wordings and scales should be used. A larger and more representative sample size should be targeted in order to obtain better and more reliable results for statistical analysis. More items on the facilities should be included in view of the less favorable feedback from the respondents.

Conclusion

Malaysia has emerged as one of the most attractive scuba diving destinations in the world. Layang Layang Island, which is situated off the mainland of Sabah, is famous for its hammerhead sharks. This pilot survey on divers' satisfaction with Layang Layang reveals that divers are mainly European, increasing in age, almost equal in gender, of high educational achievement, and experienced in diving. Divers rate a high satisfaction level with their diving experience in Layang Layang. The most impor-

tant contributors to diving satisfaction in Layang Layang are the underwater features and how comfortable and easy it is to get to the dive sites. Divers are less satisfied with some aspects of facilities such as rental equipment, marine educational facilities, food and dining, lodging, and the lack of other activities. It is recommended that the Layang Layang Resort should use the strength of its most satisfying diving attributes for the creation of accurate marketing messages. Realistic messages will create an achievable expectation, which then could easily be fulfilled by the resort. However, management may need to make a continuous effort in managing the resort in a sustainable way, especially when the main satisfier variables are of underwater nature. The resort may need to improve the provision of better rental equipment facilities, marine life educational facilities, rooms, and other alternative activities. Future questionnaires on Layang Layang require the improvement of questionnaire design and the achievement of a better representative sample.

Note

¹ PADI, the Professional Association of Dive Instructor, is one of the major dive training agencies. This agency certifies two thirds of new divers in the US, and one half of new divers throughout the world. More than half a million divers were certified by PADI alone in 2000 (PADI, 2002).

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