ENHANCING TOURISM LOGISTICS SUCCESS TO SUSTAINABLE TOURISM INDUSTRY DEVELOPMENT

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Abstract

Nowadays, tourism has become a significant industry in Thailand's economy. After COVID-19 epidemic, growth rate and number of tourists to Thailand is continuously decreasing. However, nowadays, Thai government attempts to boost tourism industry and enhance tourism competitiveness. Koh Lan is a beautiful case study of Thai tourism today. It is an island just out from the beaches of Pattaya City, 100 kilometers away from Bangkok. This study applies principles of logistics management to the tourism industry under the hypothesis that moving tourists from Pattaya to Koh Lan more efficiently and effectively, including providing an effective transport networking system, increase and support tourism on Koh Lan. The objective is to examine an appropriate demand forecast model for tourism on Koh Lan. The result from this examination uses for logistics planning, and developing infrastructure systems and facilities, including strategies for transport networks and logistics systems to support the future growth of tourists into the next decade. Data is collected from secondary and primary sources. The questionnaire is distributed to 350 potential participants, with 245 questionnaires being returned, for a 70 percent return rate. 28 tourists are interviewed. Validity and reliability are examined using statistical methods and experts. The result reveals that a time series would be an appropriate model for a demand forecast. Tourism logistics on Koh Lan has not been integrated as seamless. Foreign tourists are majority group to generate high revenue. They have high expectation to effective logistics system to ensure sufficiently safe, security, comfort and affordable. However, tourism industry on Koh Lan will be increasingly growing up in the next decade. This study shows that effectively designed infrastructure systems and facilities are required to support sustainable tourism on Koh Lan. Finally, reverse logistics system for garbage disposal management needs to be effectively utilized. Rapidly increasing garbage and pollutions are a problematic issue for logistics related to a sustainable, green, eco-friendly environment.

Keywords: Tourism, Logistics, Island, SERVQUAL, Sustainable Development

1.0 INTRODUCTION

Nowadays, tourism has become a significant industry to Thailand's economy. It generates high revenues as compared with the revenues from exporting, but the value of those revenues must be weighed against other factors. Koh LAN coral island (commonly known as Koh LAN) is an important and popular tourist destination, just out from the beaches of Pattaya City, in Chonburi province. However, ever-increasing tourism has created problems in Koh LAN related to the sufficiency of its infrastructure systems and facilities. These problems include growing demand on natural resources and an escalation of environmental pollutants. Further, these problems are pointing to a lack of effective logistical planning and management.

This study applies principles of logistics management to the tourism industry under the hypothesis that moving tourists from Pattaya to Koh LAN more efficiently and effectively, including providing an effective transport networking system, would increase and support the tourism on Koh LAN. A demand forecast (for tourism into the next decade) was statistically calculated in order to provide recommendations for the improvement of infrastructure systems and facilities. The use of logistics in the tourism industry is currently recognized as a strategic tool for enhancing tourist satisfaction in relation to lower travel

costs, one-stop services, other conveniences and safety. However, the research study (Briguglio, L. 1995; Bryden, J.1973) shows that tourist destinations, especially islands, typically fail to understand how to apply a logistics concept as well as how to put logistics strategies into action.

The objective is to examine an appropriate demand forecast model for tourism on Koh Lan. The result from this examination uses for logistics planning, and developing infrastructure systems and facilities, including strategies for transport networks and logistics systems to support the future growth of tourists into the next decade. This study also examines other logistical issues, for example applying logistics to existing and future tourist facilities, and using a reverse logistics system for garbage management.

2.0 LITERATURE REVIEW

This study reviews the literature related to the role of tourism (and in particular, eco-friendly tourism) to the economic growth. The studies (Butler, D. Harrison and W. L. Filko eds. 1996) show that tourism is main engine to drive sustainable economic growth. However, they point out that tourism planning, and developing infrastructure systems and facilities, including strategies for transport networks and logistics systems to support the future growth. It also considers the adoption of logistics management in the tourism industry, especially island tourism. Two relevant sources (Acharya, A. 1995; Briguglio, L. 1995; Bryden, J. 1973) point out that logistics management contributes to the success of sustainable tourism development. These sources also review definitions of logistics and logistics management as they pertain to sustainable development of tourism.

It is important to understand a clear and concise concept of logistics from a tourism perspective. Logistics is mostly understood in term of business industries, with only a few research studies done exclusively in relation to tourism (Briguglio, L., R. Butler, D. Harrison and W. L. Filko eds. 1996). People typically relate logistics to transportation or warehousing, particularly connecting it to aspects of material goods or information flow (Butler, R. W. 1980; Theppitak, 2006). As such, logistics is understood as a service-oriented process related to movement of physical and information flow. To apply logistics to tourism, people, or tourists, shall be considered as physical flow from one point to another, and examined in terms of lower costs, higher safety and more convenience through excellent coordination and collaboration (Bowersox, D.J. & Closs, D.J. 1996).

The literature review points out that before logistical planning for tourism infrastructure and facilities can be achieved, there needs to be an accurate demand forecast developed. Demand forecasting for tourism into the next decade is statistically calculated in order to provide improvement for infrastructure systems and facilities, which can in turn support growth and expansion. It also reveals patterns of tourist behavior and other factors influencing travel decisions, as well as identifies problematic issues with tourist destinations (Butler, R. W. 1980; Conlin, M. and T. Baum, eds. 1995).

The literature (Butler, R. W. 1980) also reveals that there is a relationship between adoption of logistics management in the tourism industry and the success of sustainable tourism development. For instance, logistics management can be used to consider

moving people, or tourists, from one point to another point (Theppitak, 2006). Logistics management also provides tools for facilitating how to prepare accommodations, how to build transport networks between and within locations to support sustainable tourism. This study applies a logistical approach to the tourism industry under the hypothesis that moving tourists from Pattaya to Koh Lan more efficiently and effectively, including providing an effective transport networking system, would increase and support the tourism on Koh Lan. Tourism is qualitatively different from the other domains within the Cultural Sector, as it cannot be readily classified as a sector in the traditional sense, i.e., as measured by either particular markets or industrial outputs. Therefore, it is better understood as a demand-driven, consumer-defined activity.

When considering the factors affecting logistics management adoption and implementation in tourism, particularly, tourism on islands, the literature points out the major factors are economic and political realities (Thor, G.G. 1994). The research (Conlin, M. and T. Baum, 1995) highlights the relationship between such factors and the adoption of logistics management, like fluctuating tourist counts a tourist satisfaction.

It concludes there is a literature gap related to the examination of issues related to adoption of logistics management (and its effectiveness) within the tourism industry, and specifically for islands. In particular, there needs to be an examination of the factors contributing to the logistics adoption phase and the factors influencing sustainable tourism development. This study therefore proposes a theoretical framework (Figure 1) derived from a previous study (Theppitak, T. 2006).
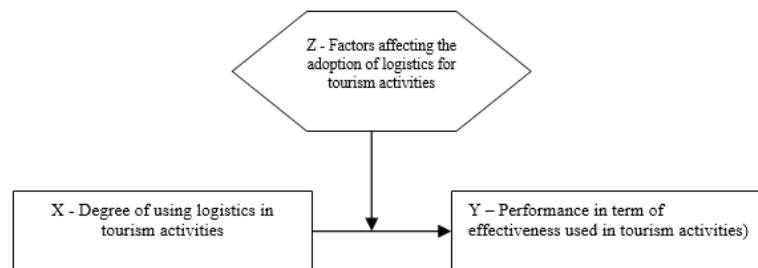

Figure 1: Theoretical Framework of the study

Figure 1 shows the theoretical framework of variables in this study. The study reveals that building a sustainable tourism industry, it needs to provide effective logistics planning and management, consistent with area-based development. Success of sustainable tourism development requires a high priority of adoption of logistics management. The previous research shows that the more adoption of logistics management, the more performance in term of effectiveness is gained for developing tourism. A main objective is to find the way to improve tourist satisfaction.

This study examines relationship between variables (*X, Y, Z*), defining degree of importance to the adoption of logistics techniques as *an independent variable* (V*ariable X*), and defining performance in term of effectiveness of logistics management to tourism industry, in aspect of convenience, safety, security, transport network, infrastructure and facilities on the island, as *a dependent variable* (*Variable Y*).

As some influential factors, such as economic and political factors, are significant to the adoption of logistics strategies that sustainably develop or enhance tourism on the island. These influential factors are defined in the framework as *an intervening variable,* (Variable Z), which affects both the independent variable (V*ariable X*) and the dependent variable (V*ariable Y)*. It is therefore assumed that the level of such influencing factors has a direct correlation to the degree of importance placed on the adoption of logistics strategies, as well as to the effectiveness of any logistical technique used on the island.

3.0 RESEARCH METHODOLOGY

This study designs research approaches to achieve the research questions and objectives. It initially conducts *a literature review* related to the role and patterns of tourism in logistics perspective, including the examination of problems and obstacles that occur while traveling on an island. It also explores the use of logistics management in the tourism industry. The objective of this study is to investigate the relationship between variables related to the adoption of logistics management for tourism on an island, as well as the effectiveness of logistics management for building sustainable tourism.

An interview technique is used jointly with questionnaire surveys and in-depth interviews in order to obtain relevant issues and in-depth information from logistics users, providers and regulators on Koh LAN. The data collection period takes two months.

3.1 Research Questions

The study explores the number of tourists travelling to Koh Lan in last ten years to examine statistical tools for appropriate demand forecasting. It also develops logistical models to provide sufficient infrastructure and facilities, including developing transport between mainland and island, as well as within the island. It also examines issues related to reverse logistics for the management of a growing garbage problem on the island. To answer the above issues, the study defines the following questions:

1. What is the definition of tourism logistics in term of tourism industry?
2. How to design and develop infrastructure and facilities to support tourism businesses on Koh LAN in the future?
3. What are factors affect to designing and implementation of logistics management on Koh LAN?
4. What are efficiencies and effectiveness for sustainable tourism development on Koh LAN?

3.2 Research Hypotheses

Based on these research questions, tentative hypotheses examine a relationship between the adoption of logistics management and the effectiveness of improving tourism on a specific island. The study reveals that the more logistics management is adopted within an island, the more its tourism industry growing up. This study therefore explores the relationship of the variables under following the hypotheses.

H_1 = There is a correlation between the degree of availability for logistic techniques for tourism, (i.e., transport, infrastructure and facilities), and the effectiveness of such techniques to enhance tourism.

H_2 = There is relationship between factors that influence the adoption of logistics management and the effectiveness of logistics management to enhance tourism.

3.3 Population & Sampling Procedure

Eisenhardt (1989) states that selection of an appropriate population controlled extraneous variation and helped to define the limits for generalizing the findings. This study uses quantitative research by applying inferential statistics, by using a small number of parts of the whole population (a sample) to make inferences, judgments and conclusions about that population (*Zikmund, 1997*).

This study uses the number of tourists who traveled to Koh Lan during January through April 2020. 350 questionnaires are randomly distributed for the sampling. After several months, there are 245 questionnaires returned, for a response rate of 70 per cent. This study also interviews 28 tourists to gain their opinions related to tourism logistics on the island.

3.4 Validity and Reliability

The form of the questionnaire is perceptual Likert scales (*Rossi et al., 1983*), where targeted samples are asked to rate each item on a five-point scale, ranging from strongly disagree to strongly agree. If a variable is related to a complex concept (*Fowler, 1984*), it is covered using multi-items, with its value corresponding to the mean value of the scales. In determining measurement properties of the constructs uses in the statistical analysis, reliability and validity are assessed (*Dick and Hagerty, 1971*), by using respectively Cronbach's alpha and principal component analysis.

The designer of the questionnaire is based on literature review and interviews from a panel of experts in tourism industry. The reliability analysis of scale for this research instrument yields favorable results. The construct exhibits a high degree of reliability in terms of its coefficient alpha. The alpha value for the overall questionnaire is *0.92*. Sources in the literature (*Nunnally and Bernstein (1995); Anderson and Gerbing (1988)*) recommends that a value of reliability at 0.70 is acceptable, however, those over 0.80 are considered good (*Sekaran, 2000*).

Validity is also considered, relating to the content, criterion and construct (*Zikmund, 1997*). Content validity cannot be determined statistically, but only by the experts and by referring to the literature. The researcher examines over 40 works published over years related to tourism logistics management. Criterion validity is concerned with the predictive nature of the research instrument to obtain the objective (e.g., the existence of logistics and supply chain strategies). Construct validity is measured as to whether a variable is an appropriate operational definition of the construct or not (*Pearson, 1901*).

3.5 Data Collection

This study collects data in *two* following dimensions: first, a *literature review* is conducted in various fields related to tourism logistics management. Secondly, *survey method* is used to examine the relationships between variables and to answer research questions. Before designing and developing the questionnaire, the researcher interviews experts, including the director and officers of Koh Lan. Tourists and entrepreneurs of Koh Lan are also included to gain more insights and understanding about the realities of the island.

The questionnaire is conducted in Thai and English languages. First, pre-testing is carried out with thirty-six tourists. This testing measures Cronbach's alpha (α) at 0.92. There are some minor changes required to items of questionnaires, e.g., some ambiguous wording, shortening for long sentences, etc. Three weeks later, the second pre-testing is conducted at thirty-five companies from within the Koh Lan population, with Cronbach's α equaling 0.925. These results reveals that the research instrument has a highly acceptable degree of reliability.

The questionnaire is then used for eliciting data from the attitudes and perceptions of tourists on Koh Lan. The questionnaires, applying a five-point Likert-type scale, are randomly distributed to create samplings. In each sampling, the tourist is asked to evaluate and rate on a five-point Likert-type scale the degree of relative importance given to logistics activities and tourism effectiveness, ranging from 1 = strongly disagree, to 3 = Neutral, to 5 = strongly agree.

In order to collect data with a sufficiently high response rate from respondents, the following research strategies are accomplished using a face-to-face interview style: Data is collected through channels, and included a response rate for each distributed channel obtained (Table 1); 270 questionnaires are distributed in two major groups, 350 Thai tourists and 28 foreign tourists. 245 questionnaires are completed and returned by respondents, for a 70 percent rate of return.

3.6 Data Processing

After questionnaires are returned, they are classified by their sources, including coding and editing to make ready for data entry (*Zikmund, 1997*). The SPSS for Window version 10.0.5 is used to analyze the data. The content analysis is used for processing from in-depth interview information.

4.0 FINDING RESULTS

During having surveyed in the study is in Covid-19 epidemic situation. Conducting surveys with tourists in Koh LAN over several months, it reveals that most of these tourists well supports the rationale of this survey. The survey covers demographical data related to attitudes and behaviors of tourists when visiting Koh LAN, including examining hypotheses. Implications related to transport systems, logistics infrastructure and facilities are discussed.

Table 4.1 Gender of Sampling

Gender	Percent
Male	56.8
Female	43.2
Total	100.0

Table 4.1 shows the gender of respondents. Male tourists make up the greatest number of respondents in the sample at 56.8 percent, followed by female tourists at 43.2 percent. The study represents real information for tourism on Koh LAN and showed that the male tourists are the major target.

Table 4.2 Age of Sampling

Age (years)	Percent
13 – 20	25.2
21 – 28	38.7
29 - 36	12.6
37 – 44	9.9
45 – 52	6.3
Over 52	7.2
Total	100.0

Table 4.3 represents the age of targeted tourists visiting the island. The result shows that 63.9 percent are between the ages of 13 to 28 years. Most of them, or 38.9 percent, has age between 21 and 28 years. Secondly, 25.2 percent has an age between 13 and 20 years. The figure shows that the major targeted groups of tourists on Koh Lan are now adolescent and young adults.

Table 4.3 Nationality of Sampling

Nationality	Percent
ASEAN	86.2
European	11.3
American	1.3
Australian	1.3
Total	100.0

Table 4.3 shows the nationality of tourists. The survey reveals that most tourists came from ASEAN countries, 86.2 percent. Of this number, 68.2 percent are Thai tourists, with the remainder coming from other Asia countries (e.g., China, Taiwan, and South Korea) at 18 percent collectively. The result also shows a smaller percentage of tourists coming from western countries, especially European tourists. This result reflects those Thai tourists currently make up the major tourist group.

Table 4.4 Marriage Status of Sampling

Status	Percent
Single	68.5
Married	27.9
Divorced	3.6
Total	100.0

Table 4.4 shows marriage status of tourists. The result reveals the major tourist group, at 68.5 percent, was of single status. Only 27.9 percent of surveyed tourists are married. The result indicates that infrastructure and facilities on Koh Lan should be considered accordingly, to support relevant activities, behaviors and lifestyles.

Table 4.5 Educational Level of Sampling

Educational Level	Percent
Secondary	7.2
High School	9.9
Continuing Ed	20.7
Bachelor	46.5
Post-graduate	12.6
Total	100.0

Table 4.5 shows educational level of tourists. The result reveals that most of tourists or 87.4 percent have educational level lower than a bachelor's degree, and 12.6 of them are at postgraduate level. The results point to relevant expectation levels regarding lifestyles, traveling activities, facilities and infrastructure on Koh LAN.

Table 4.6 Occupations of Sampling

Occupation	Percent
Private employee	47.7
Student	30.6
Farmer	9.9
Unemployment	6.3
General employment	5.4
Total	100.0

Table 4.6 shows the occupations of tourists visiting on Koh LAN. The result reveals that major tourist groups are private employees (47.7 percent) and students (30.6 percent), for a combined total of 78.3 percent. This information points to a corresponding approach to infrastructure and facilities, which should be prepared and developed on Koh LAN to facilitate these targeted groups.

Table 4.7 Average Income of Sampling

Income	Percent
Lower 5,000	20.7
5,001 – 10,000	23.4
10,001 – 15,000	12.6
15,001 – 20,000	7.2
20,001 – 25,000	3.6
Higher 30,000	9.0
Total	100.0

Table 4.7 represents the average incomes of tourists. The study reveals that average income of most tourist groups, or 63.9 percent, is lower than 20,000 baht. The greatest number, or 23.4 percent, has income between 5,000-10,000 baht. This income data should facilitate researchers to design and develop proper infrastructure and facilities on Koh LAN, consistent with targeted tourists' income.

Table 4.8 Frequency of travel to Koh LAN per tourist (excluding current trip)

Frequency of Travel to Koh Lan (x times)	Percent
1	22.4
2 - 3	44.8
4 - 5	19.0
More than 5	13.8
Total	100.0

Table 4.8 reveals the frequency of travel to Koh LAN per tourist (excluding their current trip at the time of the questionnaire). The result shows that most tourists, or 44.8 percent, had traveled to Koh LAN several times. Only 22.4 percent of them has traveled there only one time. This frequency of tourism to Koh LAN reflects an overall perception of satisfaction for tourists in Koh LAN.

Table 4.9 Traveling period to Koh LAN

Period of Traveling	Percent
January – March	13.6
April – June	16.9
July – September	1.7
October – December	67.8
Total	100.0

Table 4.9 shows traveling period to Koh LAN. The corresponding question asks which month of the year tourists most liked to travel to Koh LAN. The result reveals that most tourists, or 67.8 percent, visiting during October-December. This period defines a peak seasonal period of tourism.

Table 4.10 Traveling behavior of tourists

Nature of Travel	Percent
Come alone	6.3
Come with friends	71.2
Come with family	19.8
Come with tour/training/seminar	2.7
Total	100.0

Table 4.10 reveals traveling behavior of tourists. The survey indicates that the greatest percentage of tourists, or 71.2 percent, came with their friends. Only 19.8 percent travels with family. This information will help facilitate relevant designs and patterns of transport, as well as for infrastructure and facilities to support sustainable tourism on the island.

Table 4.11 Number of people per tourist group

Number in group	Percent
1-5	58.6
6-10	22.5
11-15	16.2
16-20	0.9
More than 20	1.8
Total	100.0

Table 4.11 reveals the number of people per tourist group. The greatest number of tourists or 58.6 percent identifies that their group has one to five tourists. Next, 22.5 percent of them identifies six to ten tourists per group. This information points to how building infrastructure and facilities should be built consistent with targeted tourist groups.

Table 4.12 Pattern of vehicle transport to Pattaya City (for tourism to Koh LAN)

Vehicle (from Pattaya City to Koh Lan)	Percent
Bus	30.6
Personal car	33.3
Tourist bus	17.1
Motorcycle	1.8
Other	17.1
Total	100.0

Table 4.12 shows the pattern of vehicle transport to Pattaya City for purpose of tourism in Koh Lan. The survey shows that most of the tourists, or 33.3 percent, traveled to Pattaya City by personal car, 30.6 percent of them visiting by bus, and 17.1 percent by tourist bus, respectively.

Table 4.13 Pattern of overnight stays in Koh LAN

Overnight Stay on Koh Lan	Percent
Yes	13.0
No	87.0
Total	100.0

Table 4.13 indicates the pattern of overnight stays in Koh LAN. The survey shows that most of the tourists, or 87.0 percent, they are not stay overnight. The tourists point out that proper infrastructure and facilities for overnight stays in Koh LAN are unavailable and/or inconvenient. Only 13 percent of surveyed tourists indicate that they stay overnight in Koh LAN, typically for a long weekend or special holiday.

Table 4.15 Type of Accommodations

Type of accommodation	Percent
Hotel	25.8
Resort	58.1
Private Residence	16.1
Total	100.0

Table 4.15 shows the types of accommodation on Koh LAN. The greatest number of tourists, or 58.1 percent, choose to stay at resorts. Next, 25.8 percent of them choose a hotel, and 16.1 percent stay at private residents. This information reveals tourists' expectations regarding the pattern of accommodations on Koh LAN.

Table 4.16 summary relationship between variables

Type of variable		Sig.	P-Value
Independent	Dependent		
X	Y	0.000	0.752
Z	X	0.001	0.6580
Z	Y	0.000	-0.589

After testing the hypotheses, the result shows significant relationships between the tested variables. It reveals that there is a strong relationship between the use of logistics management for tourism (X) and building tourist satisfaction in terms of lower costs, safety, comfort and convenience (Y). Further, it also shows that there is a strong relationship between the factors affecting the adoption of logistics strategies in terms of economic conditions and political situations (Z), and the level of importance placed on using logistics management (X). Importantly, these factors are shown to have a negative relationship to the increase of tourist satisfaction.

5.0 RESEARCH DISCUSSION AND IMPLICATION

The result reveals interesting implications for the future development of transport systems, logistics infrastructure and facilities on Koh LAN. The study initially examines the definition and role of logistics in the context of tourism. The major components of a logistics system are discussed. It studies how tourists' travel behaviors can be utilized to design and develop transport, infrastructure and facilities on Koh LAN. It also identifies how other influencing factors affect the design and implementation of logistics management on Koh LAN, which, in turn, affects sustainable tourism there.

5.1 What is the definition of tourism logistics?

The findings reveal relevant patterns and trends of tourism on Koh LAN. The results identifies that the direction for development of tourism on Koh LAN are unclear and uncertain. There needs to be an application of logistics principles to create and develop sustainable tourism. The key question is what is a relevant definition of logistics in the context of tourism? Theppitak (2005) states in a definition that logistics is "the process of planning, organizing and controlling the flow of materials and services from origin to the end point to satisfy all stakeholders." Therefore, logistics in the context of tourism would be defined as "the management of the flow of materials (including tourists, capitals, and technology) and information." In this definition, people are being considered as "goods," being moved from point to point. Transport system(s), between mainland and the island, as well as within the island, would need to be designed to support the move of tourists in terms of lower costs, safety, comfort and convenience.

To support and foster more and better tourism on the island, infrastructure (e.g., electricity, water and telephone) must be readily available. Also, future tourist facilities (for all travel activities and including currently undeveloped areas) must be well planned and organized. These facilities should include hotels and other accommodations. If tourists are the goods, then hotels and resorts can be considered as warehouses or distribution centers. Proper demand forecasts of tourist behaviors and lifestyles are critical. In-depth and accurate logistics is the only proper way to prepare for future tourist accommodations, facilities and traveling activities.

Tourism logistics also includes reverse logistics activities. Reverse logistics can be defined as the management of the flow of materials or information back to a desired point. This methodology covers the management of garbage, or unusable materials, by tourists. Normally, there are many methods to manage garbage, with different costs occurring, including non-monetary costs like pollution. This study can also be used logistically to incentive and support sustainable, more eco-friendly tourism on Koh LAN.

5.2 How can tourists' behavior be effectively used to design and develop infrastructure and facilities on Koh LAN?

Table 5.1 Expectations & perceptions of transport system patterns between Pattaya and Koh LAN

Issues	Importance Level	Satisfaction Level	GAP
1. Frequency of speed boats between Pattaya and Koh Lan	3.81	3.64	0.17
2. Service Fee of speed boats between Pattaya and Koh Lan	3.79	3.36	0.43
3. Safety of speed boats between Pattaya and Koh Lan	3.88	3.51	0.37
4. Rules of Conduct for speed boats between Pattaya and Koh Lan	3.77	3.52	0.25
5. Convenience of speed boats between Pattaya and Koh Lan	3.78	3.53	0.25
6. Service Fee of ferry between Pattaya and Koh Lan	3.90	3.75	0.15
7. Safety of Ferry between Pattaya and Koh Lan	3.95	3.71	0.24
8. Rules of Conduct for ferry between Pattaya and Koh Lan	3.77	3.63	0.14
9. Service quality of the above factors for traveling to Koh Lan	4.07	3.86	0.21

Table 5.1 represents levels of importance and satisfaction with various transport systems between Pattaya City and Koh LAN (an eight-kilometer distance). The result reveals tourists' satisfaction and expectations with these transport systems. Normally, tourists have two choices of transport to the island: ferry or speed boat. The result showed that tourists have intermediate expectation levels of service quality (e.g., convenience, safety and fee) for speed boats and ferries. After actually traveling to Koh Lan, they had satisfactory levels lower than their expectation levels. With speed boat services, fees and safety were the main sources of dissatisfaction. For ferry boat services, convenience and safety were the main sources of dissatisfaction.

Table 5.2 Importance and Satisfaction Levels with Accommodation on Koh LAN

Issues	Importance Level	Satisfaction Level	GAP
1. Comfort and convenience of accommodation	3.87	3.57	0.3
2. Cleanliness of accommodation	4.07	3.64	0.43
3. Rental fees and costs of accommodation	3.86	3.50	0.36
4. Safety and security of accommodation	4.20	3.61	0.59
5. Beauty and atmosphere of accommodation	4.09	3.87	0.22
6. Convenience of transport to accommodation	3.98	3.56	0.42
7. Time duration of stay in accommodation	3.73	3.60	0.13
8. Other services or facilities in accommodation (i.e.breakfast, swimming pool)	3.77	3.39	0.38
9. Expectation and satisfaction level for accommodation in total	3.94	3.68	0.26

Table 5.2 represents tourists' levels of importance of and satisfaction with accommodations on Koh Lan. The result revealed that tourists had high expectation levels for accommodations and related services, especially in regards to safety and security, cleanliness, and the atmosphere of an accommodation. The survey found that beautiful atmosphere and cleanliness were factors with which tourists were most satisfied. However, other factors, like more facilities and services, as well as fees, were issues of dissatisfaction. In conclusion, tourists had high expectation levels for services related to accommodations on the island, and are satisfied with these services to an intermediate level.

Table 5.3 Expectations and perceptions of travel destinations on Koh Lan

Issues	Importance level	Satisfaction level	GAP
1. Number of travel destinations on Koh Lan	3.80	3.69	0.11
2. Variety of activities at travel destinations on Koh Lan	3.70	3.58	0.12
3. Beauty and atmosphere of travel destinations	4.08	3.92	0.16
4. Ease and comfort in accessing travel destinations	3.95	3.60	0.35
5. Cleanliness and sanitation of travel destinations	4.05	3.55	0.50
6. Safety and security of travel destinations	4.01	3.62	0.39
7. Natural environment and local culture	3.89	3.73	0.16
8. Total importance and satisfaction levels for travel destinations	3.94	3.74	0.20

Table 5.3 represents the levels of importance and satisfaction tourists have for travel destinations within Koh LAN. Surveyed tourists revealed they had high expectation for travel destinations in respect to beauty and atmosphere, cleanliness and safety, and that they were satisfied with these aspects of the island. However, they indicated some dissatisfaction with cleanliness and sanitary system, as well as some concern for the safety of security systems used at some travel destinations.

Table 5.4 Expectations and perceptions of transport (and related logistics) in Koh LAN

Issues	Importance level	Satisfaction level	GAP
1. Comfort and availability of transport to Koh Lan	3.82	3.69	0.13
2. Comfort and availability of transport in Koh Lan	3.83	3.51	0.32
3. Safety for transport system to Koh Lan	3.95	3.61	0.34
4. Costs and expenses of traveling to Koh Lan	3.90	3.54	0.36
5. Costs and expenses of traveling in Koh Lan	3.86	3.40	0.46
6. Volume of vehicles (cars, motorbikes) in Koh Lan	3.83	3.49	0.34
7. Total importance and satisfaction levels for transport	3.87	3.66	0.21

Table 5.4 represents the levels of importance and satisfaction tourists place on transport (and related logistics) while visiting Koh LAN. This study asked the tourists to rate the transport systems from Pattaya City to Koh LAN, as well as the transport systems within

Koh LAN, in various relevant areas. Most of the tourists indicated high expectations related to safety and the expense of transportation. The study also found that they were mostly satisfied with the availability and comfort of transport systems to Koh LAN. However, they were somewhat dissatisfied with the safety of transport systems to Koh LAN. When considering the transport system within Koh LAN, tourists had high expectations for price standardization, as well as for comfort and availability of transport. But they were dissatisfied to actually find a lack of price standardization of transport within Koh LAN.

Table 5.5 Expectations and perceptions of infrastructure and facilities in Koh LAN

Issues	Importance level	Satisfaction level	GAP
1. Infrastructure in Koh Lan (e.g., electricity, water, telephone)	3.90	3.52	0.38
2. Problem solving when infrastructure systems beak down	3.83	3.56	0.27
3. Costs and fees for services of infrastructure	3.91	3.32	0.59
4. Total expectation and satisfaction level for infrastructure and facilities	3.90	3.56	0.34

Table 5.5 represents the levels of importance and satisfaction tourists placed on infrastructure and relevant facilities in Koh LAN**.** When considering the infrastructure required for supporting tourism on the island, it includes electricity, water, and internet systems. Survey results reveals that most of the tourists (more than 75 percent) does not stay overnight in Koh LAN, but rather they move to stay overnight in Pattaya City. They have high expectations for the affordable expenses and availability of tourism infrastructure in Koh LAN. But they are dissatisfied with the actual fees charged for services and the availability of infrastructure.

In summary, the main research finding reveals that

- Adopting logistics planning and management with tourism (X) has a strong positive relationship to building and enhancing tourist satisfaction (Y).

- Influencing factors (Z; economic, social, and political) have a correlating relationship to the use of logistics management (X).

- Influencing factors (Z) also affect the travel behavior and attitude of tourists and tourist satisfaction (Y).

- Finally, influencing factors (Z) can strongly affect the effective degree of adoption and implementation of logistics planning and management (X). Effectively, these factors are uncontrollable variables for the tourism industry.

6.0 CONCLUSION

The results conclude that using a logistics concept for tourism industry, especially on a coral island, would increase effective, sustainable, eco-friendly tourism. A demand forecast of tourism for the next ten years must be considered to effectively design and develop logistics system to smooth flow patterns for future tourists, along with providing sufficient and

appropriate logistics infrastructure and facilities. This study points out that a seasonal time series would be an appropriate model of demand forecasting. In the next decade, tourism in Koh LAN would increase to twice growth in term of number of tourists. This result must be taken into consideration for designing transport (and related logistics systems) from Pattaya City to Koh LAN. Before Covid-19 epidemic, more than 3,500 trips a day, by ferry and speed-boats, are used in travel to Koh LAN. Effective design for future infrastructure systems and facilities must support sustainable tourism in Koh LAN. Likewise, development plans for new travel destinations must include an appropriate plan for managing environmental pollution. Finally, garbage disposal management could be effectively planned using a reverse logistics system, as rapidly increasing garbage has become a problematic issue related to the logistics of maintaining a green, eco-friendly environment. Interesting, moving patients or sick person from the island to mainland hospital is new issue. Time waste during moving or transporting is a critical issue. This study provides valuable information for stakeholders, especially top management of Pattaya City and the Tourism Authority of Thailand, as to the planning and development of infrastructures and facilities for islands, and specifically Koh Lan. Logistically planned transport management can facilitate growing tourist travel to and from Koh LAN, providing hotel, resort and residential-accommodation owners with consistently increasing demand, while also preventing the unrestrained destruction of natural resources and environments on the island. This study leads to the conclusion that strategic and integrated logistics management is required, with active participation from all relevant stakeholders.

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