

## **CHAPTER FOUR**

### **RESEARCH METHODOLOGY**

#### **4.0. INTRODUCTION**

This chapter describes the methodology and the procedures applied to achieve the objectives of this research. Chapter sections include: research design, justification of sustainability indicators measures, discussion of the coastal zones and beach resorts sample design, participant groups, development of the instruments, the on-line survey, data collection procedures, and data analysis procedures.

The primary goals of this research are to, first, identify differences in the perceived environmental and sustainability attitudes between American and Egyptian designers, managers, and visitors; second, develop a sustainable design model to assist designers as well as other decision-makers in achieving sustainability in the planning and design processes of coastal resorts; and third, provide government officials with a procedural framework to assist in the establishment of better building regulations and planning rules based on sustainable design principles. The developed model links two sustainability relevant concepts that are critical to the long-term success of beach resort developments - sustainability indicators and carrying capacity.

#### **4.1. THE RESEARCH DESIGN**

The following 10 steps were taken during the research process. Each step is described in detail with supporting justification when needed. Figure (4-1) illustrates the flow of the steps connecting the theoretical concepts with the practical and analytical study components.

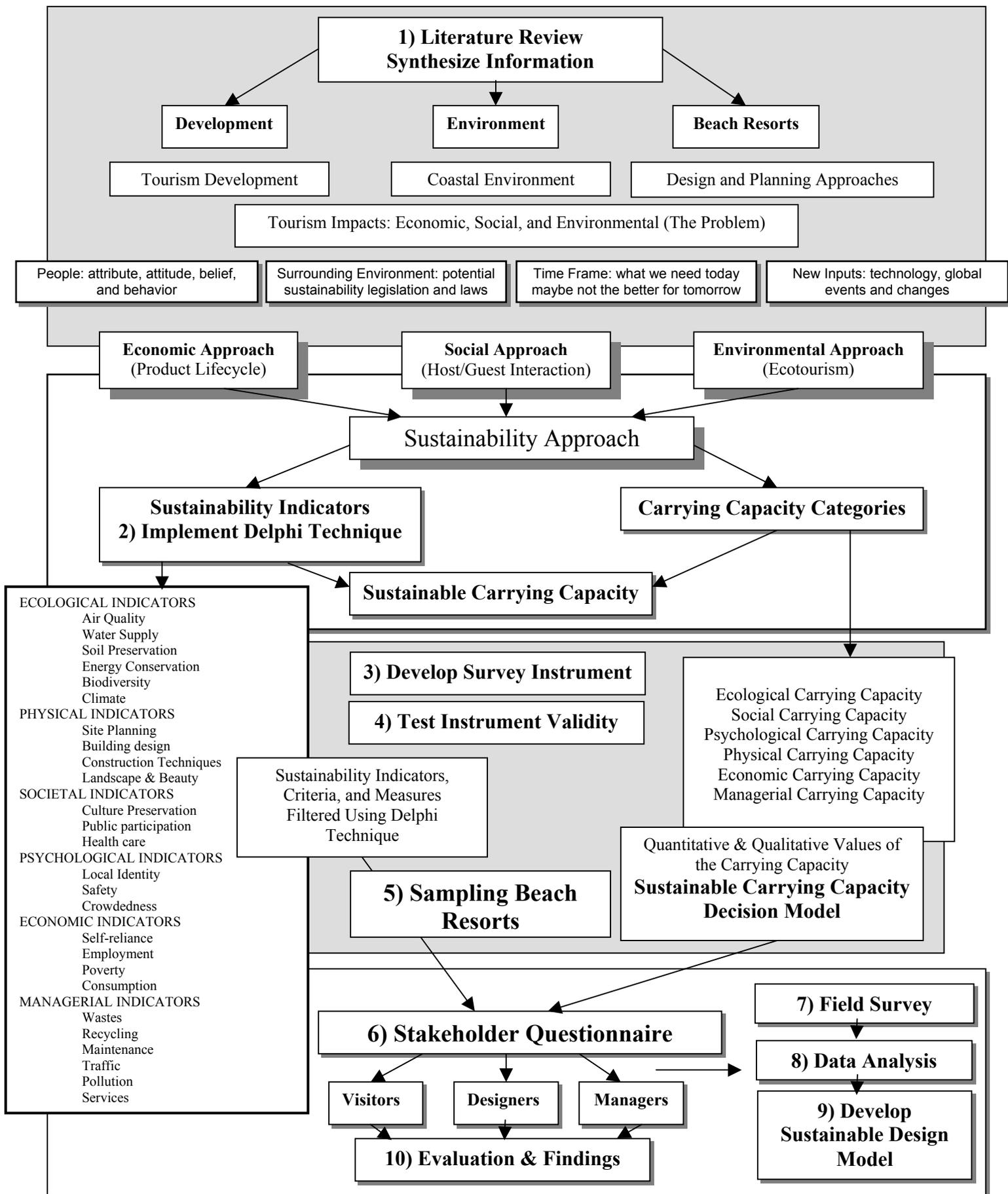


Figure (4- 1): Organization of the study

#### **4.1.1. Step 1: Conduct Literature Review and Synthesize Information**

A comprehensive literature review of existing research was conducted to develop the study's theoretical base, identify sustainability indicators, and identify carrying capacities. The goal of the literature review was to summarize the accumulated state of knowledge and to highlight important issues that research had left "unresolved" (Cooper, 1982, p. 292). This review brings readers up-to-date on the state of the knowledge on the research issues and suggests areas that need more research. The literature review; a) is organized around and related directly to the thesis or research questions; b) synthesizes results into a summary of what is and is not known; c) identifies areas of controversy in the literature; and d) formulates questions that need further research. It includes, not only the collection of pertinent information, but the analysis, synthesis, and interpretation of the significance and implications. The literature review includes historical sources, yet acknowledges the most recent thinking and research about the issue, with references from "experts" in the field. This information can help key individuals and groups improve efforts, make enlightened decisions, and provide credible information (Worthen & Sanders, 1987).

For this study, a comprehensive literature review of existing research was conducted to: 1) develop the study's theoretical base, and 2) identify sustainability indicators, and 3) identify carrying capacities for developments, including coastal resort development. The review of literature provides support to the notion that beach resorts experience changes in sustainability levels with different carrying capacity thresholds. The feasibility of this notion and how it can be applied to enhance developments' performance and quality are investigated.

#### **4.1.2. Step 2: Implement Modified Delphi Procedure**

The Delphi approach was devised by Olaf Helmer and his colleagues at the Rand Corporation in the early 1950s as a means to gather expert views, and to determine the extent of expert consensus regarding the future (Copa, 1981; Cunico, 1974; Taylor, 1992). Hundreds of sustainability indicators were identified in the synthesis of research conducted on the topic. These indicators were filtered to those indicators viewed as most critical to coastal zone and beach resort development. The primary sources for these indicators were: Church and McHarry, 1994; *Guiding Principles of Sustainable Design*, 1996; *Hannover Principles (Design for*

*Sustainability*), 1992; *Head Sourcebook for Sustainable Design and Resource Guide to Sustainable Landscape*; *Sustainability Indicators: Report of the Project on Indicators of Sustainable development (Moldan and others)*, 1997; *Our Common Future*, 1987; and *The 21st Agenda*, 1992.

A two-round modified Delphi procedure was used to generate responses and achieve consensus from a select sample of nationally recognized subject matter experts in sustainable design and planning. The results of this process contributed to the main efforts toward establishing validity for the included sustainability indicators. A Delphi procedure was selected as the most appropriate method for attaining consensus by an international panel of subject experts. A select panel of respondents was given the list of sustainability indicators gleaned from the literature. Through controlled feedback with each round, carefully considered group opinions were formulated.

Twelve experts completed the two rounds; six experts each from Egypt and the United States. Round one began with a list of sustainability criteria. The panel was asked to identify sustainability criteria common and important to beach resort development and to generate new criteria for areas listed. Upon the return of the round one response, the criteria identified by the expert panel were categorized into general indicator themes based on carrying capacity aspects. The themes emerged from an examination of the common responses in round one. Efforts to eliminate duplication are made by editing and modifying the responses. Round two presented the themes and criteria generated from round one. The respondents are asked to assign a weighted value to the relative importance of each indicator within the themes as they related to beach resort sustainability. Sustainability indicators are presented in Table (4-1) below. The first column presents the initial list of 24 indicators, and the second column presents the final list of 34 indicators that were developed and selected by the expert panel using the Delphi procedure.

**Table (4- 1): Delphi Procedure Results**

Initial Sustainability Indicators	Final List of Sustainability Indicators
1. Efficient use of resources	1. Air Quality
2. Energy conservation	2. Water Quality and Supply
3. Water preservation	3. Soil Quality & Land Management
4. Air quality	4. Energy Conservation
5. Land and soil preservation	5. Biodiversity
6. Social values	6. Terrestrial Wildlife
7. Psychological values	7. Aquatic Wildlife
8. Cultural resources conservation	8. Natural Vegetation
9. Economic development	9. Natural Characteristics of the Site
10. Recycling & waste management	10. Atmospheric and Climate Characteristics
11. Pollution control	11. Streams / Drainage ways
12. Ecological biodiversity	12. Sand Dunes
13. Meeting needs locally	13. Historic Sites Preservation
14. Healthcare and safety	14. Cultural Resources Preservation
15. Natural factors use	15. Local Customs and Traditions
16. Transportation	16. Local Social, healthcare, education, crime
17. Involvement in decision-making	17. Local Environment Identity
18. Sustainable construction techniques	18. Safety and Security
19. Materials selection	19. Local Custom and Beliefs
20. Hazards control	20. Local Architecture, Styles, and Forms
21. Site planning considerations	21. Efficient Use of Resources
22. Built environment formation	22. Waste Management (e.g., sewage, garbage)
23. Landscape design	23. Reuse and Recycling Practices
24. Equity-social/spatial	24. Traffic and Transportation
	25. Pollution Control (noise, dust, foul odors)
	26. Use of Non-Toxic Materials/ Product
	27. Self-reliance on Site Resources
	28. Productivity and Over-consumption
	29. Development Integration
	30. Local Economy and Employment
	31. Public Participation and Decision Making
	32. Beach Quality and Organization
	33. Maintenance Quality Programs
	34. Services, Facilities, and Activities

It should be noted that there will always be some uncertainty about the validity of sets of indicators, since quantification of sustainability at this level inherently requires projections into the future. The researcher categorized the indicators identified by the expert panel into six

general themes based on carrying capacity aspects. The Delphi survey form with the cover letter is included in the Appendices.

### **4.1.3. Step 3: Develop Stakeholder Survey Instruments**

The surveys were developed in two formats: a written (paper and pencil) format and a on-line Web format. The written survey was provided in both English and Arabic. The survey protocols are available in the Appendices.

#### **4.1.3.1. Survey Content**

Surveys were developed for three stakeholder groups: Designers/Planners, Managers/Owners, and Visitors. The content of the surveys for Designers/Planners and Managers/Owners were similar in content. This similarity allowed the researcher to more easily compare stakeholder group responses and draw conclusions about each group. Each survey contained 29 questions including both Likert-style questions and open-ended questions. Respondents were given several opportunities to expand on their responses or to add to the choices provided by the researcher. Each of these surveys had four areas of interest: 1) environmental concerns, 2) sustainable design and development, 3) carrying capacity thresholds, and 4) background information (participant demographics).

The first section, the environmental concerns section, addresses the respondents' perceptions concerning:

- extent of environmentally sensitive development applications at a national level
- significance of sensitive design/management to solve environmental problems in coastal developments.
- environmental issues encountered in the design and management of coastal resorts
- level of environmental sensitivity in the resorts designed or managed by the respondents
- level of concern about environmentally sensitive design and management by certain groups/individuals
- importance of responding to the natural environment elements (i.e. vegetation, wildlife) in design and management
- importance of responding to cultural environment elements (i.e. local architecture, local customs) in design and management
- effectiveness and constraints of laws and regulations governing coastal resort development

The second section, sustainable design and development, addresses the respondents perceptions concerning:

- level of awareness of sustainable development
- importance of certain criteria to achieving sustainability (natural resources, human resources, built environment, and services and management)
- level of sustainable practices in current coastal design and management
- importance of incorporating sustainable practices into current coastal design and management
- use of sustainable practices
- level of concern about sustainable development by certain individuals/groups
- obstacles to practicing sustainable design and management
- reasons for not using sustainable design and management principles
- importance of certain practices in achieving sustainable coastal resort development (i.e. recycling, ecological integrity, energy technology)

The third section, carrying capacity thresholds, addresses the respondents perceptions concerning:

- familiarity with and use of the concepts of carrying capacity, product life cycle, and ecotourism as tools for achieving sustainable design and management
- importance of five capacity thresholds in achieving sustainable development (physical-facility, social, economic, economic, psychological, and ecological capacities)

Section four gathers background information (participant demographics) on the respondents. Several of the demographics were common to the designers/planners and managers/owners surveys including: profession, length of overall experience, number of employees (office size), education level, age, citizenship, and gender. Designers were also asked about their length of experience in coastal resort design. Managers were asked about the number of coastal resorts managed and the size of the resort currently managed.

The third survey was designed for visitors and the public. The content (20 questions) differs in part from the surveys for designers/planners and managers/owners. Again, respondents were given several opportunities to expand on their responses or to add to the choices provided by the researcher. Visitors were asked to share their perceptions about:

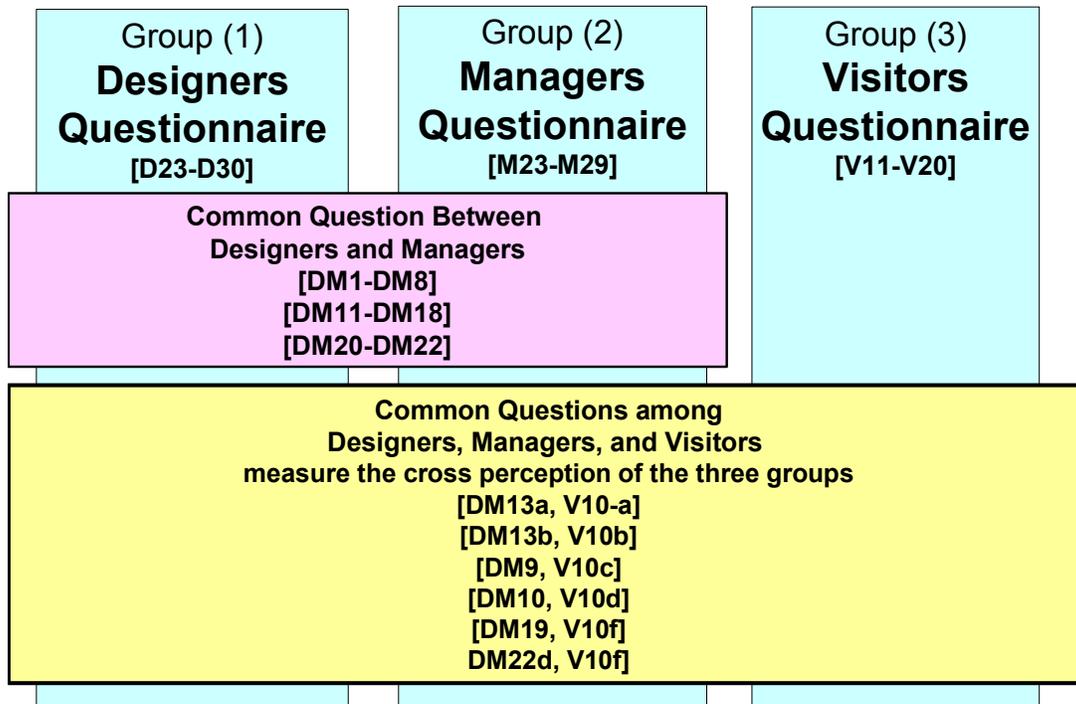
- satisfaction with a resort they had recently visited
- importance of certain factors in choosing a resort to visit (i.e. cost, character, activities)
- importance of coastal resorts being environmentally sensitive

- familiarity with the terms sustainable development and carrying capacity
- importance of certain criteria to achieving sustainability (natural resources, human resources, built environment, and services and management)
- importance of carrying capacity thresholds in achieving sustainable development (physical-facility, social, economic, psychological, and ecological capacities)

Note that questions (e) and (f) are identical to the questions asked of the designers and managers. Background information (participant demographics) was collected on: age, gender, citizenship, education level, number of people visiting with, average length of stay at resort, month of year of resort visit, average daily spending at resort, average yearly income, and main purpose of visit.

#### **4.1.3.2. *Questions distribution***

The three surveys each included some core questions purposely common to the three response groups in order to analyze how these different groups perceive the same issues such as: their perceptions of the importance of the natural environment, cultural environment, and built environment factors as well as their perceptions of carrying capacity. Additional questions were written specifically for each stakeholder group [see Figure 4-2]. For example, the managers/owners survey questions their perception and involvement on sustainability issues and implementation. The visitor/public survey queries beach resorts users on their opinions with respect to what they like most and what they like least about the resorts. Each respondent was asked to answer the questions based on their experience with one particular coastal resort.



**Figure (4- 2): Survey Question Grouping**

The question format contains primarily questions based on a Likert scale of 1-5 with five representing the highest value for the criterion questioned. Some open-ended questions were included to investigate perceptions of certain environmental issues and sustainability aspects. Efforts were made to develop questions that have clear and direct (one way) meanings or interpretations so as to increase the possibility of accurate answers.

#### **4.1.3.4. The Web Survey**

The web survey format was selected for its interactive and dynamic abilities. Web surveys provide survey capabilities far beyond those available for any other type of self-administered survey. They can be developed to provide a more dynamic interaction between respondent and survey than can be achieved in paper surveys. Web surveys were placed on numerous listservs serving environmental, travel, and tourism groups.

Some advantages of self-administered web surveys include: a) people can fill them out at their own speed, taking time to provide a thoughtful complete answer; b) nearly complete

elimination of paper, postage, mail increased survey error and data entry costs; c) potential for overcoming international boundaries as significant barriers to conducting surveys; d) dramatically reducing the close correspondence between sample size and survey costs; and e) elimination of data entry as a separate activity; and reduced cost of surveying each individual (Dillman, 2000). Some of the limitations of an on-line survey are: a) some surveys may be designed with a level of technical sophistication that makes it difficult or impossible for some receivers to receive or understand them; b) many households and people do not have computers and/or e-mail addresses; c) the researcher cannot assume that the respondent has experience taking on-line surveys. Many computer owners have minimal computer skills; and d) security and confidentiality issues associated with on-line technologies can raise issues of trust not yet adequately addressed by researchers.

The following principles for Web surveys, recommended by Dillman (2000), were followed in the development of the study's Web survey:

- Use a multiple contact strategy similar to mail surveys.
- Personalize the contacts as much as possible.
- Keep the cover letter brief.
- Introduce the survey with a welcome screen that is motivational, emphasizes the ease of responding, and instructs respondents to proceed to the next page.
- Make the first question interesting to most respondents and easily answered.
- Prevent wrap-around text by limiting column width to 70 characters.
- Present each question in a conventional format similar to paper surveys.
- Maintain figure/ground consistency and readability throughout the survey.
- Provide specific instructions on how to make each response.
- Use drop-down boxes sparingly.
- Construct the survey to scroll from question to question unless order effects are a major concern.
- Limit the use of check-all-that-apply and open-ended questions that have caused measurement problems on paper surveys.

This Web format allows the researcher to receive continuous feedback from respondents, and to continue reforming the tool after this research projects ends. Respondents were asked if they would like a copy of the formal report, therefore providing an avenue for extending this research agenda.

#### **4.1.3.3. Reducing Error**

The survey was designed to achieve two objectives: 1) to reduce non-response, and 2) to reduce or avoid measurement error. Efforts were made to reduce four sources of survey error to acceptable levels. The four sources of error in conducting quality surveys are sampling error, coverage error, measurement error, and non-response error (Groves, 1989; Salant & Dillman, 1994). Sampling error refers to the extent to which the precision of sample survey estimates is limited by the number of persons surveyed. Coverage error occurs when the list from which the sample is drawn does not include all elements of the population, limiting or eliminating the chance for some groups being included in the survey. Measurement error occurs when the respondent's answer to the survey question is inaccurate, imprecise, or cannot be compared in any useful way to other respondents' answers. The fourth source of error, non-response error, occurs when a significant number of people in the survey sample did not respond to the questionnaire and have different characteristics from those who did respond (Dillman, 2000).

In this study, error was reduced through steps such as expert review of test questions, piloting the survey, revision of surveys, multiple formats and delivery systems, careful selection of the sample, and efforts to increase response rates. Respondent-friendly survey design has been shown to improve response rates (Dillman, Sinclair, & Clark, 1993). Considerable time was spent creating a survey that was carefully worded and respondent-friendly, and most likely to improve response rates from people who are least likely to respond to surveys. Since design features can also reduce measurement error (i.e. poor layout of questions can cause questions to be overlooked or bias the offered responses) time was spent on layout, format, and presentation. The following part discusses the validity and reliability of the survey instrument.

#### **4.1.4. Step 4: Test Validity and Reliability of Instrument**

##### **4.1.4.1. Validity**

The content validity of the instrument was evaluated by 10 representatives of 5 resort management companies and 5 design firms in the US and Egypt representing professionals in the field of resort management and design. These professional evaluated the content of the questions as well as the wording and the format of the questions. The following questions were asked:

- Have I included all the necessary questions?
- Can I eliminate some of the questions?
- Did I use categories that will allow me to compare responses across groups?
- Does the overall package create a positive impression?

After incorporating the suggested changes into the survey, a small pilot survey was then administered to a representative group of respondents in order to emulate the procedures proposed for the study and answer the following questions:

- Is useful information being obtained from all the questions?
- Will all the words be interpreted similarly by all the respondents?
- Are Likert<sup>12</sup> scale responses to a particular question clustering around certain scores?
- What response rate can I expect?
- Information gathered from the pre-testing and small plot study led to substantial revisions being made in the survey design, including the elimination and adding of survey questions and improved directions.

Comments and suggestions were received from respondents in the pilot survey involving clarity, arrangement, and readability of the questions. These suggestions were considered in revamping the instrument.

#### **4.1.4.2. Reliability**

The reliability of the instrument was tested with a test-retest procedure. In the pretest, the survey instrument was first e-mailed to 36 online participants. After two weeks, the survey instrument was e-mailed to the same individuals to do a re-test of the instrument. The data collected from the test-retest responses were analyzed using the statistical analysis SPSS for Windows to determine if the responses were significantly correlated. The results of this procedure showed significant correlations and that the results of the test-retest procedure were reliable [See Table 4-2].

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<sup>12</sup> A Likert scale of (1-5) was used in the survey with 5=essential or excellent, 4=important or very good, 3=normal or good, 2=less important, and 1=not important.

**Table (4- 2): Test and Retest Analysis of the Instrument**

<b>Variable (Scale)</b>	<b>Number of Scales</b>	<b>Alpha Value</b>
Perceived ecological sustainability indicators	12	0.88
Perceived social sustainability indicators	4	0.77
Perceived psychological sustainability indicators	4	0.79
Perceived physical sustainability indicators	6	0.81
Perceived economic sustainability indicators	4	0.65
Perceived managerial sustainability indicators	4	0.71
Perceived carrying capacity thresholds	6	0.68
Factors that influence visitors choosing a resort to visit	15	0.66
Designers/managers' concern about environmental issues	8	0.64
Designers/managers' concern about sustainable development	8	0.79
Values of carrying capacity, product life cycle, and ecotourism to sustainability	3	0.78
Familiarity with carrying capacity, product life cycle, and ecotourism	3	0.72
Effectiveness of laws and regulations in protecting the environment	2	0.81

Through this test-re-test process the instrument was reviewed according to the results above. This step was useful to identify if there were misleading questions for the participants. The questions with low correlation coefficient were found to be ambiguous. Thus, changes were made to the instrument based on the results of the primarily data analysis.

#### **4.1. MEASURING SCALE**

##### **4.1.1. Validation of the Measuring Scale**

There are two ways to measure sustainability, using qualitative and quantitative approaches. The qualitative approach applies checklists of sustainability criteria to determine to what extent development meets the sustainability criteria. Sustainability criteria attempt to yield concise verbal descriptions of sustainability, but it is not a true evaluation of sustainability.

Rather it is an inventory of a way to conserve our present natural resources. In the quantitative approach, each sustainability criterion and indicator is assigned value and the summation of these values provides the outcome sustainability level. A major methodological problem that is pertinent to coastal zone sustainability is the use of qualitative measurements that are not logically comparable. In addition, there is a complexity and variability of measurement scales and the different conceptual meanings of sustainability criteria and indicators.

Simply, the ultimate value for measuring sustainability for a development project is that the total benefits should be equal or greater than the total costs. However, sustainability is an abstract concept that is difficult to determine empirically, as there is difficulty assigning quantitative values for some of the criteria. While economic values may be assigned with reasonable accuracy, such as total revenue affected directly by the number and the type of tourists, other values, such as social values, ecological integrity, health hazards, or beauty are not quantitative values. The aggregation of impacts, actions, or criteria values into a grand index and present a "magic number" to decision-makers. Such an approach is not appropriate in the case of sustainability or environmental issue evaluation since it does not convey enough detailed information to decision-makers.

The approach proposed in this study that can be applied to solve this problem is the disaggregating of impacts, capacities, or actions into components, and the evaluation of each component without re-aggregating it into a grand index. Instead, graphic representations of the correlation between dependent variables of carrying capacities and the independent variables of sustainability indicators are presented to provide decision-makers with a visual image of capacity control / sustainability improvement. The applicability of this approach from a decision-making point of view provides policy-makers with a broad perspective for each individual entity.

#### **4.1.2. JUSTIFICATION FOR THE APPLIED MEASUREMENT**

In the proposed decision model, measuring sustainability suggests that sustainability criteria are classified into quantitative measures from which a correlation between acceptable levels of carrying capacities and the degree of sustainability can be measured. Carrying capacity limits tend to validate sustainability implications. The difficulty in assessing sustainability is in determining values for sustainability criteria and indicators. Carrying capacity as a measuring

tool has the potential of transforming the qualitative values of sustainability into quantitative ones.

#### **4.1.5. Step 5: Selection of Sample Sites and Participants**

Sampling is a useful and efficient way to draw inferences to larger populations. Choosing a sampling scheme is a major decision in this type of research design. In the case of the research in this dissertation, a selective sample is the most appropriate sampling scheme to produce the most reliable results.

Two countries, the US and Egypt, were selected for study. This selection provides the opportunity for comparison between a developed and developing country. Also, Egypt is the native country of the researcher. Within each country 5 major coastal zones were selected. Coastal zones in the US included: Florida, California, Hawaii, the Carolinas, and collectively the other eastern coastal states. Coastal resorts zones selected in Egypt were: The North Western Coast, Hurghada, Sharm El Sheikh, Ras Sudr, and El Ein El Sokhna. These zones were selected to represent the variety of coastal destinations in each country. The following section describes each resort zone. This description is intended to provide the reader with an understanding of the characteristics and variety of the selected destinations.

##### ***4.1.5.1. Egyptian Coastal Destinations:***

###### **1. North Western Coastal Zone (NCZ)**

The North Western Coast stretches 560 km long with a total area of 20,000 km, representing 2% of the total Egypt area. The Egyptian government initiated the development of this area in 1979 along with the development of Magaweesh Village on the Red Sea coast. An increase in demand for accessible and available services at domestic recreation areas resulted in the development of 115 tourist villages along the North Western Coast. The Northwest Coast represents 60% of recreational beach tourism demand in Egypt (Atwa, 1993). Alexandria is the heart of the North West Coast graced by numerous Hellenistic and Roman relics from the age when it was the cultural capital of Europe. It remains a popular holiday resort for Egyptians. Its fine beach resorts and warm climate give it the potential for great recreational tourism (EMT,

2001). There are many resort destinations developed in the area including El Alamein (where World War II relics are on view), the resort of Sidi Abdel Rahman, a secluded bay with clear waters and a selection of villas and hotels, and the outstanding beach at Al-Abyad and Ageebah cove, surrounded by beautiful scenery. Currently, a total of almost 121 private locations are being developed for beach resorts besides the three models executed by the Ministry of Construction (EMT, 2001).

## **2. Hurghada, Red Sea Coastal Zone (HCZ)**

Hurghada is located in the western coast of the Red Sea, 400km (250 miles) south of Suez. Until a few years ago, Hurghada was a small fishing village, today, it has become the foremost international tourist center for snorkeling, diving, and aquatic sports such as windsurfing, sailing, deep-sea fishing, and swimming. The unique underwater gardens offshore are some of the finest in the world, and the warm waters are ideal for many varieties of rare fish and coral reefs. This zone of Red Sea coast is still under development, and many new hotels and other construction are taking place (EMT, 2001).

Since the 1980s tourism development within the vicinity of Hurghada and Safaga cities has experienced intense development in three centers separated by buffer zones. They are: South Hurghada center; Sahl Hasheesh center; and Ras Abu Soma center. The South Hurghada is the most developed center at present since it includes the existing tourism developments of Jasmine Village, Coral Beach Village and Swiss Village. Five further villages are under construction. (TDA, 2001)

## **3. Sharm El Sheikh Coastal Zone, South Sinia (SCZ)**

Sinai is located in the North East of Egypt. Throughout the ages, it has served as a maritime link between the East and the West. Sinai enjoys many tourism potentials with historic, religious, ecological and natural attractions. Sinai's resort destinations include Sharm el-Sheikh, Dahab, Neweiba and Arish. Ras Mohammed, the southernmost point of the peninsula, is the site of the world's most northerly mangrove forest. Sharm el-Sheikh is one of the most accessible and developed tourist resort communities on the Sinai Peninsula. There are small, intimate hotels with modern designs, as well as larger hotel complexes belonging to International chains. Located just north of Sharm, Na'ama Beach is developing into a resort town of its own. Most

hotels at Na'ama Bay have their own, private beaches with comfortable amenities. Shark's Bay is also nearby along with several diving centers.

#### **4. Ras Sedr, Suez Gulf Coastal Zone (RCZ)**

Ras Sedr coastal zone stretches for 95 km along the eastern coast of the Suez Gulf. This tourist area has a distinctive place in the annals of history. The area has consequently become a tourist destination that has long been luring travelers and writers since the days of Herodotus 24 centuries ago. Tourism development assets of the area are varied: mild climate, beaches overlooking seawaters, mountains, valley, natural water springs, and unique flora and fauna.

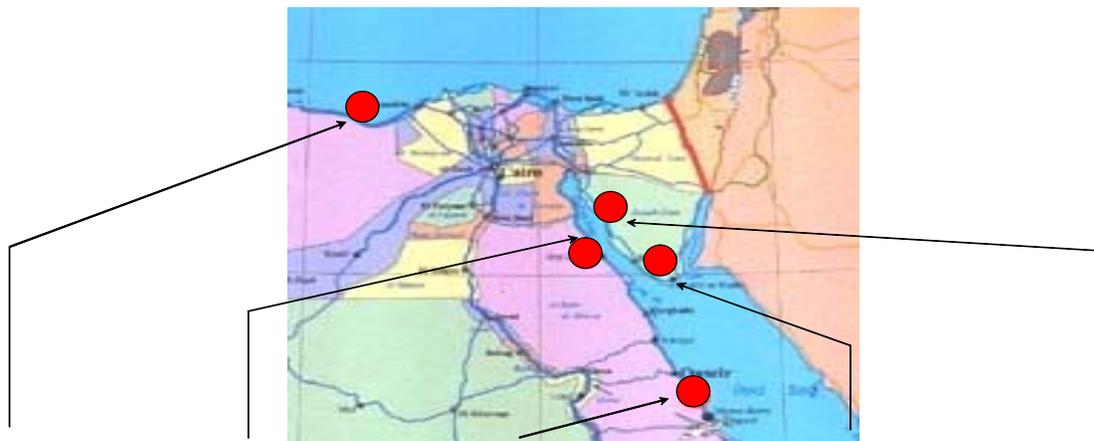
The area was a station on the path of the exodus of Moses and Israelites from Egypt. Its passages were also the scene of many religious events and incidents described in holy books. In the last two decades, the area has been recognized as a distinguished tourism destination.

#### **5. EL Ain El Sokhna Great Cairo Coastal Zone (ACZ)**

The areas of Ain El-Sukhna and Zafarana emerged in the 1940's as popular destinations that are easily accessible and conveniently close to Cairo (114 km) and other main urban centers and communities. As resort areas, they offer a unique combination of moderate climate year round and picturesque landscape that stunningly combines mountains, and sandy beaches and turquoise waters with mystic desert. It was not considered as a holiday destination until the 1980s but gradually reached a large scale by the mid 1990's. Its territory extends along the Red Sea shoreline for 60 km. The area is known for its mild climate and sunshine all year-round; varied vegetation as well as animals, and a good share of more than 200 migrating types as well as more than 150 resident birds. In 1998, there were only nine hotels operating in the area with a total capacity of 1,600 rooms. By the year 2002, projects under construction will be completed and these numbers will increase to 20 hotels and 3,500 rooms. By the year 2012, the area is expected to encompass some 40 hotels and 7,000 rooms. It is also predicted that services such as restaurants, cafeterias, fuel stations, and recreation projects such as playgrounds, sports courts, water game parks and shopping centers will increase (TDA, 2001).

**Project Selection for the Egyptian Resorts**

The generation of the Egyptian sample was accomplished by using information gathered about resorts in the Mediterranean Sea and Red Sea coastal zones obtained from the Egyptian Hotel Guide (1997), governmental authorities (EEAA and TDA), resort design consultant offices, meetings with individual experts, visits to resort sites, as well as on-line governmental official sites. Projects not located within the coastal zone or classified as hotels were excluded. Only those identified as recreational beach resorts and located on the front water were included. The Egyptian beach resort zones included a variety of the older developed zones (NCZ, HCZ), newer developed zones (SCZ), and zones under development (RCZ & ACZ). Ten individual projects identified from each of the five destinations were included for a total of 50 Egyptian projects. The map below (Figure 4-3) shows the individual beach resorts included in this study.



<b><u>NORTH COAST</u></b>	<b><u>SOKHNA</u></b>	<b><u>HGURGADA</u></b>	<b><u>SHARM</u></b>	<b><u>RAS SUDR</u></b>
Marsa Matroh	Mena Oasis	Golden 5 City	Sanafir	Rural Osis
Maraquia	Lotus Bay	El-Gouna	Sonesta	Blue Bay
Alexandria	La-Guna Beach	Sendbad	Taba Paradise	Marlin Beach
Al Arish	AL-Doom Valley	Royal Palace	Movenpick	Romance
Marina	Canari Beach	Sheraton	Al-Gharandal	Swan Bay
Alobied Village	Lotus Bay	Coral Garden	Sofenel	Palmera
Andalosia	Tulip	Marlin Inn	Kanabish	Nekhela Paradise
Cinderella	Sonata Resort	Paradise Sinia	New Tiran	Nozha Beach
Miami Islands	Windsor	Helton Sharm	Helnan Marina	Regina El-Sokhn
Palm Beach	Palmera	El-Ein Resort Bay	Sheraton	Esperanza

**Figure (4- 3): Beach Resort Projects, Egypt**

#### ***4.1.5.2. American Coastal Destinations***

##### **1. Florida Coastal Zone**

No other state and very few countries boast such an abundance of Florida beaches. The 825 miles of sandy coastline fronting the Atlantic Ocean and the Gulf of Mexico are one of Florida's most valuable natural resources. Florida's beaches are serving several important functions, each being vital to maintaining the health of Florida's economy and environment. The coastal sandy beach system is home to hundreds of species of plants and animals lives, migratory, resting, foraging and nesting. There are over 30 animals considered rare inhabit the beach and adjacent habitats. Beaches are also used heavily by humans. Florida's beaches have attracted 14 million people to the state, 75% of which live within ten miles of the coast (State of the Coast Report, 1996). Both tourists and residents come to the beaches to relax and enjoy the sights and sounds of its natural beauty. Others visit the beaches and nearby waters to engage in boating, fishing, diving, and other recreations. Florida's beaches are an integral part of the state's economy, attracting tourists from around the world. Beach tourism generates about \$15 billion a year to the state's economy (FSDEP, 2001; State of the Coast Report, 1996).

##### **2. California Coastal Zone**

California is the most visited state in America (10.6%). California hosted an estimated 293 million domestic and international travelers in 2000. Travel and tourism expenditures in 2000 amounted to an estimated \$75.4 billion. Beach and waterfront activities are the second most popular expenditure based activity. The travel and tourism industry provides 5.8% of the state's \$1.3 trillion economy. The central coast region is located between the San Francisco Bay Area and Southern California includes many of the more popular California beaches, such as Monterey and Santa Barbara (California Tourism, 2001).

##### **3. Hawaii Coastal Zone**

One of the Hawaiian most popular tourist destination is the island of Oahu (Waikiki Beach and Honolulu) has 112 miles of shoreline and about 130 beaches and local beach culture thrives here. Kailua Bay in Oahu has been voted #1 in the USA for swimming, walking,

sunbathing and a number of water sports. Maui, the valley isle, has over 120 miles of shoreline and 4 major resort areas. The Big Island, Hawaii, has great beaches, lush resorts, world famous fishing, and the world's most active volcano, Kilauea. Kauai, the garden isle, has the greatest number of beaches per mile of coastline (a total of 40 on the island). Lanai, a tiny island, provides calm and beautiful Hulopo'e Beach. Molokai, only 10 miles wide and 38 miles long, provides sailing, kayaking, and other water sports indicative of Hawaii (Harrington, 2001).

#### **4. North and South Carolina Coastal Zone**

The Carolinas include North Carolina & South Carolina that are famous for outstanding golf course and beautiful natural beaches. North Carolina beach resorts have become a choice destination for vacationers and retirees from around the world. Carolina provides variety of recreational opportunities on the Brunswick Isles and the Cape Fear Coast. South Carolina beach resorts extent from Myrtle Beach and the Grand Strand, to the laid-back atmosphere and history of the low country of Charleston, to the resorts of Hilton Head. With a temperate year-round climate and recreational opportunities galore, coastal Carolina is a prime spot to vacation or retire. From condos to private villas, the region's has a fine array of island resorts and beach communities (Coastal Carolina navigator, 2001).

#### **5. Other Coastal State Destinations**

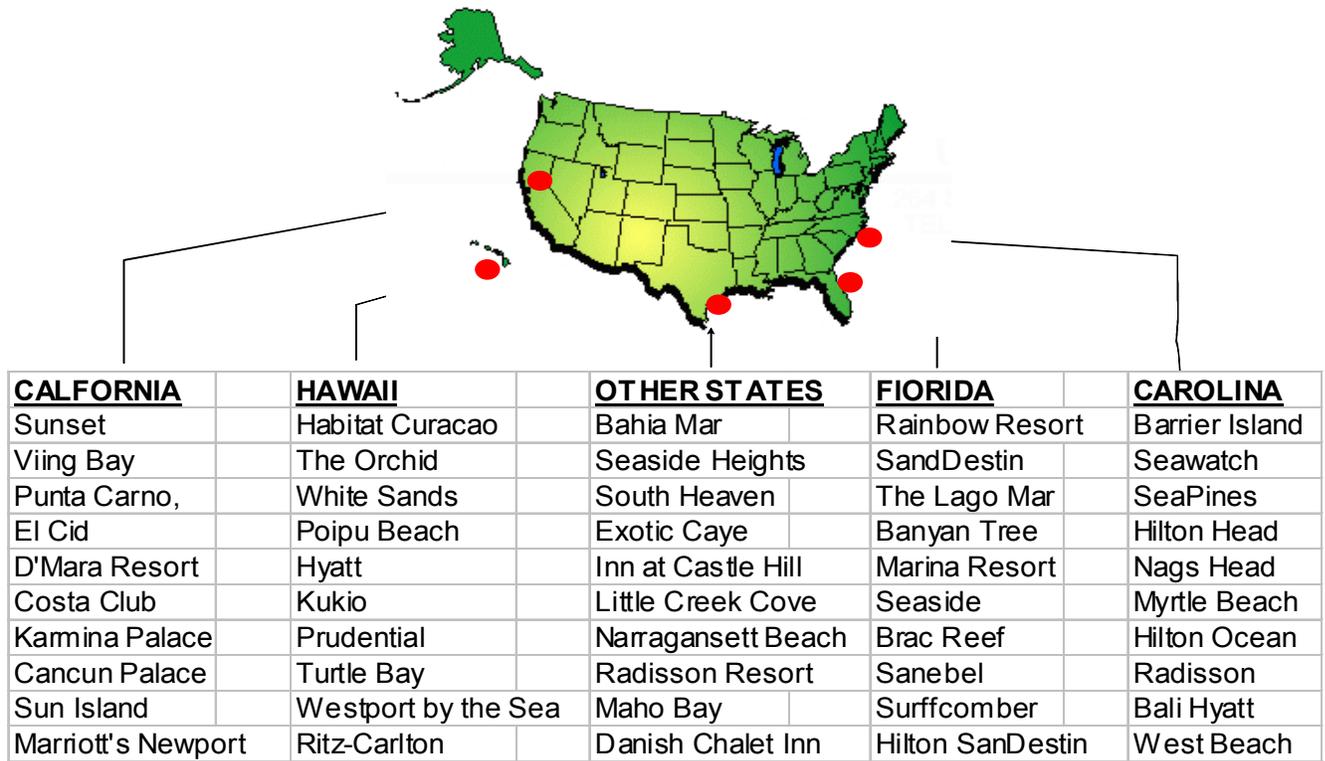
Many US States with great beach resort destinations were included in this study including sites from Georgia to Maine. There are 19 coastal states including Washington, Oregon, and California on the west coast, Maine, Rhode Island, Connecticut, New Hampshire, Massachusetts, New York, New Jersey, Delaware, Maryland, Virginia, South Carolina, North Carolina, Georgia, Florida, Texas, and the Hawaiian Islands. The US coastal localities beach accommodations include Bed and Breakfasts, motels, and hotels that provide great outdoor adventures and beach recreational opportunities. According to the National Oceanic and Atmospheric Administration (NOAA), Fourteen of the 20 largest US cities are in the coastal zone, reports NOAA, and population density along the East, West, and Gulf coasts will have increased from 187 people per square mile in 1960 to 327 by 2015 - three times the national average.

### **Project Selection for the American Resorts**

The United States as a country possesses long shorelines along the Atlantic Ocean, Pacific Ocean, and its gulfs, bays, and lakes, resulting in a large number of beach resorts. The researcher made several attempts to come up with a group of sites that are representative of the United States beach resorts. The RCI Beach Resorts Directory, States Tourism Department database, Atlas maps, and beach resorts websites were searched to compile the site list. For the purposes of this study, the American resorts selection was limited to states best known for recreational coastal tourism only. Using the “RCI Directory of Resorts”, Hotels directory, and net search tools online resort guides such as [www.reortlocator.com](http://www.reortlocator.com), [www.hotelstravel.com](http://www.hotelstravel.com), [www.resortsonline.com](http://www.resortsonline.com), etc., projects classified as resorts and located in a coastal zone were selected. A list of fifty American projects were recognized. By using Street Map 2001 software only the beach resorts within the coastal cities or towns were selected. For example, California’s coastal zone (See Figure 5-5) includes 6 coastal counties (North Coast, San Francisco Bay Area, Central Coast (Monterey), Counties Los Angeles, Orange, and San Diego). This comprehensive selection procedure resulted in huge numbers of resorts.



**Figure (4- 4): California Coastal Regions**



**Figure (4- 5): Beach Resort Projects, United States**

An investigation of the most popular beach resort areas in each coastal state was conducted. This search narrowed the selection but the numbers were still too large. Finally, the search was narrowed to selected resorts in the 4 most popular coastal states (California, Florida, Hawaii, the Carolinas), and an additional ‘Other’ group made up of 8 popular coastal resort areas. The list of these resorts is presented in figure (5-6).

The American sampling process differed from the Egyptian resort sampling for two reasons. First, the American beach destinations and resort projects were numerous, well developed, and in operation for long time. On the other hand, the Egyptian resorts were started within the last 20 years and currently are underdeveloped and limited in number. Second, the availability and accessibility to technological communication tools through Internet connection with American resorts was active and prompt while this was not a possibility for those located at the Egyptian resort destinations.

#### **4.1.5.3. Identification of Participants (Stakeholders)**

The development process involves many stakeholder groups with different objectives such as experienced designers/planners, managers/owners, and visitors/host community. These three groups have experience with resort development, operation, and use, and they can provide valuable input on sustainable resort planning and design. Each group contributes in an effective way to the success of these types of projects.

#### **4.1.6. Step 6: Conduct Stakeholder Surveys**

Specific resorts were contacted to request their participation in the survey component of the study. Both on-line<sup>13</sup> and written (mailed) surveys were made available. The surveys were mailed with a stamped return envelope to 100 participants, fifty designers and fifty managers, 10 from each of the selected coastal zones. The surveys were also e-mailed to several listserv groups that catered to beach resort managers, designers, and visitors.

#### **4.1.7. Step 7: Conduct Field Studies**

The applied component of this study was to examine the field applicability of the sustainable design criteria to coastal resort developments. It is recognized that acceptable sustainable design will be different depending upon various factors such as geographic location. Thus, the study will be restricted to selected resort projects in coastal zones in Egypt and the United States. Various design parameters and statistical applications will be employed to minimize the effects of these limitations on the comprehensive proposed design model.

The methodology of this field study included two steps: a) personal interviews with designers, visitors, and representatives of resort management, and b) site visits. Both (a) and (b) were covered within a survey format. The survey was designed to provide the needed information on how coastal developments currently apply sustainability criteria. Site participants were asked to provide certain descriptive site information to indicate to what extent the application of sustainability exists. The survey format consisted of three main parts: general descriptive information about the resort, questions on sustainable aspects of the project, and

questions regarding the capacity of the site. The general information included; project name, location, total area, and total number of units. The second part of the survey protocol included questions needed to draw an image of the sustainable aspects of the project and to evaluate the extent to which sustainable criteria were identified in the resort design, planning, construction, and operational decisions. Part three requested information on carrying capacities.

In addition to this data, the researcher observed and collected complementary data from site observations, maps, and drawings that were synthesized into different measures of densities and capacities based on the actual site development. The site visits included some data collection to identify some of the sustainable aspects that could be applied to future development. For the purpose of validating the collected data, multiple sources were considered such as site visits, interviewing with some experts in the field, and investigating the agreements and differences with the review of the literature.

#### **4.1.8. Step 8: Analyze Field Study and Survey Data**

The main part of the analysis will identify the relationship between sustainability indicators and the physical carrying capacity of the site for the sample projects. Repeating the use of the instrument to measure this relationship for many projects provides a mean to test the reliability of the instrument. Descriptive statistics (mean, standards deviation, minimum and maximum scores, and rankings) were used determine respondent's priorities for different sustainability criteria and carrying capacity measures.

One purpose of the research is to obtain a statistic that expresses the relationship between the two variables, perceived sustainability indicators and values of carrying capacity thresholds. A correlation was used for this purpose. The criterion variable (sustainability) was to be predicted while the predictor variable (carrying capacity) was the variable from which the prediction is made. Sustainability is obviously dependent on the carrying capacity thresholds. Based on the type of data collected on the site visit, a calculation was made. The measurement on the survey was based on a Likert scale of 1 to 5.

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<sup>13</sup> The on-line survey was developed by the researcher in 1999 in order to expand the number of participants. This survey tool is located at <http://filebox.vt.edu/users/alyahmed> under the research work section.

The types of questions on the surveys indicate a relationship between the criterion (sustainability) and one predictor (the physical carrying capacity of the site). The predictor was determined to be continuous, therefore, based on the primary interest of the study, the degree of relationship, a Pearson Product Moment Correlation, was determined (Howell, 1997).

“r “ is independent of the units of measurement and is a measure of the degree of linearity between x and y (sustainability and carrying capacity).

The main object here is to investigate the nature of this relation rather than to formulate it. A strong correlation means a close relationship between the two measures. One can use that correlation to predict a score on one measure from knowledge of a score on the other measure. It is important to remember that establishing a relationship between two measures does not establish causality. However, an accumulation of correlational evidence can build a credible case for a causal relationship between two characteristics.

The purpose of the second part of the data analysis was to examine the attitudes of three different groups concerning sustainability and the carrying capacity of beach resorts. A quantitative measure was used to examine the differences between these three independent groups. This justified the use of a one-way ANOVA (Howell, 1997). A one-way ANOVA (analysis of variance) designed to test whether means associated with two or more comparison groups differ significantly (at a specific level of confidence  $\alpha$ , usually  $\alpha = .05$ ). The null hypothesis tested by ANOVA was that the population means associated with the comparison groups were equal ( $H_0: \mu_1 = \mu_2 = \mu_3 = \dots \mu_k$ ). The fundamental difference underlying ANOVA was that the significance of differences between group means was judged with respect to the variability of individuals within groups.

#### **4.1.9. Step 9: Develop a Conceptual Sustainable Design Model**

A conceptual sustainable design model was developed that links sustainability indicators and carrying capacity thresholds. The model served as a decision-making tool that can guide stakeholders to achieve their part of sustainability implementation. The model is presented in detail in Chapter 6.

#### **4.1.10. Step 10: Apply Findings to Stakeholder Groups**

The goal was to measure the perception of the aforementioned stakeholders to the applicability of these concepts, so that future policy may be better informed of the gap between the theoretical concepts of sustainability and the real world of implementation, and to recognize the role of the carrying capacity in controlling and monitoring sustainability levels. The recommendations and implications for the stakeholder groups are presented in Chapter 7.

#### **4.2. CHAPTER SUMMARY**

There is little research that investigates the applicability of the sustainability concept in the planning and design of coastal resorts. Further, the issues related to a sustainable coastal development such as carrying capacity have not been addressed in a systematic manner. A gap exists between the theoretical concepts of sustainability and real world developments. There is a clear need for an implementation tool to examine sustainability application and the role that carrying capacity approach within the context of sustainability could contribute in coastal resort developments. This chapter presented the methodological steps taken to complete the research study and to address the concerns outlined above.