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Environmental Planning For Sustainable Urban Development

Integrated Approach for Sustainability Assessment of Tourism Development in Sharm El-Sheikh

PhD Thesis

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Introduction

The concept of sustainable tourism development originally came into tourism vocabulary in the late 1980s when countries, especially in Europe, began to recognize the adverse impacts of unorganized and unplanned tourism on the physical and socio-cultural environments of tourist destinations. Like its parent concept, opinions on sustainable tourism development are polarized between ecological sustainable tourism development (the view held by resource protectionists or preservationists) and economic sustainable tourism development (the view of resource consumers). An evaluation of the sustainability of tourism is ultimately an assessment of tourism's impacts on the economic, socio-cultural and physical environments which in turn involves the determination of the various carrying capacities.

According to recent statistics, the environmental impact of tourism development is of serious concern. In some popular destination, the natural attractions of the area have been damaged or destroyed due to overbuilding and irresponsible development.

The tourism and recreation industry is confronted with serious and difficult choices about its future. The decisions made now will for decades affect the environment, lifestyles and economic opportunity of residents in tourism destination areas. Many of these decisions are irreversible because once communities lose the character that makes them distinctive and attractive to nonresidents, they have lost their ability to vie for tourist-based income in an increasingly global and competitive marketplace. A try to establish the carrying capacity of a tourism destination may facilitate to understand when the resource limits are reached or outgrown so as to assess the sustainability of the tourism development of this area.

Here…. This research takes as its task to address the broad problem of tourism development consequences on eco-system environment. It describes a systematic integrated approach synthesizing different techniques for sustainability assessment of touristic coastal areas.

Research Hypothesis

Urban environment is not a simple or predictable unit at any scale it is more like a 'complex system', where many parts constantly interact and organize themselves into evermore intricate patterns. We live in an on-going circular environment which each action is based on current conditions, such actions affect conditions, and the changed conditions become the basis for future action. There is no beginning or end to the process. People are interconnected. Many such loops are intertwined. Through long cascaded chains of action, each person is continually reacting to the echo of that person's past actions as well as to the past actions of others.

Looking at coastal areas as complex systems opens the door to better understanding how they can evolve, organize and regenerate themselves which leads us to explore in depth

the prospects for sustainable solutions to practical urban problems; (linkage and synergies between each environmental, economic and social sector). To that end, it is proposed to use an integrated systems approach.

Planning in terms of managing the future, in a suitable manner of communities complex system, requires different methods and changed paradigm from traditional planning. A new conception of planning is needed, which is based on new integrated approaches with new tools. Such tools are needed on the interface between the short-term and long-term, the quantitative and the qualitative, and the certain and the uncertain. The integrated approach of such planning may help in understanding the various pieces of the puzzle without isolated examinations.

This approach is meant to be a useful tool in developing long-term integrated vision of coastal areas.

A hybrid Spatio-Temporal System has been designed to operate such integrated assessment of Sharm El-Sheikh tourism development (2002-2020). This system consists of three integrated systems:

- System Dynamics (simulation system),
- Geographic information system; GIS (spatial system), and
- Spatial Multi-criteria Decision Analysis (evaluation system).

Objectives

It is aimed to develop integrated planning analytical tool, such as an assessment model of sustainability for a certain area having specific environmental aspects (as *Sharm El-Sheikh*) and development potentials; (*tourism industry)*. This tool allows problem identification by a simulation of the interactions among social, economic and environmental stocks and flows (cause-effect analysis), which enables generating different scenarios for prospected future development. In conjunction with multi-criteria analysis and sustainability evaluation techniques; *weighing attributes and ranking preferences*, it can be possible to assess *development* alternatives (scenarios) from sustainability criteria perspective**.**

Our specific objectives, in this research, are twofold.

> First, we seek to structure an integrated model of Sharm El-Sheikh where dynamic feedback relations of socio-economic conditions and environmental impacts are simultaneously and consistently incorporated. A combination of tools will be used to explore such relations to provide seeds for policy thought.
>
> Second, is to evaluate different scenarios of Sharm future development using multi-criteria decision analysis.

However, the purpose of this study is not to identify optimal policies under a central scenario assumed to be correct rather than, it identifies the sources and consequences of the conflict, so that further research may be better targeted and decision makers may become aware of blind spots in current situation.

Methodology

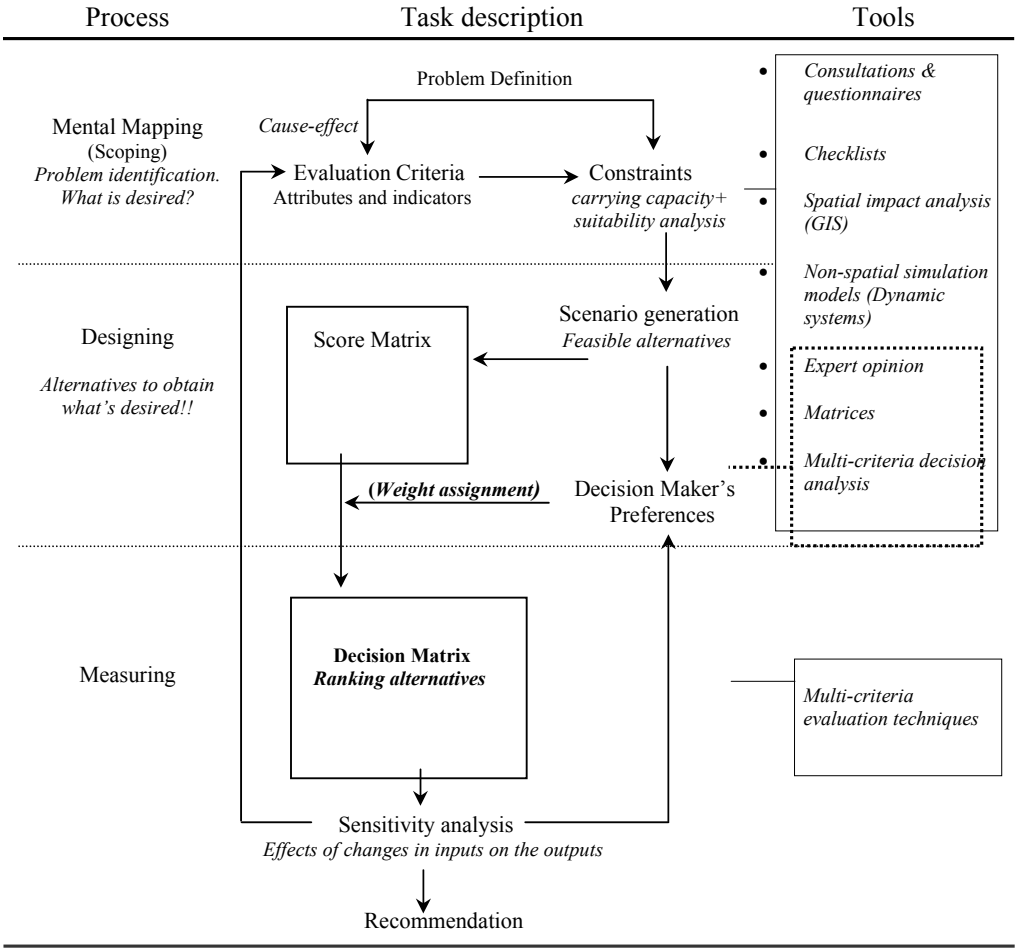
Integrated Assessment; IA, can be viewed as making a puzzle. Every body sees the separate pieces of the puzzle, but the real art is fitting them together in such a manner that a logical whole arises, which is more than the some of the parts. The most important part of IA is that there is no optimal solution of fitting the scientific pieces of the puzzle together. Depending on the underlying perspective, there is a multitude of possible solutions, and there is no standard principal available how to arrive at this set of possible solutions.

In this research, new planning tools will be used introducing an integrative approach for Sharm El-Sheikh sustainability assessment case study. The emphasis will be on the development process of integration of dynamic simulation models and the sustainability evaluation techniques, used for such assessment.

The integrated approach for Sharm sustainability assessment consists of three main feed back processes:

1- Mental Mapping Phase
2- Designing Phase
3- Measuring Phase

The processes, its tasks and the utilized tools, constitute the methodology of the integrated assessment, are illustrated at the following table



The basic tool for geographical analysis is GIS, while it's a powerful spatial analysis tool; it's still *frozen in time. GIS* can't be used for analyzing the economic, ecological and social sustainability (*changing in time process*). Changing in time process can be simulated using System Dynamics, *(originated in the 1960s with the work of Jay Forrester and his colleagues in the Sloan School of Management at the Massachusetts Institute of Technology)* where environmental, social and economic aspects can be generated as dynamic models for cause-effect analysis over time. System Dynamics is *frozen in space* system (*non-spatial modeling*). Multi-criteria Decision Analysis will be used to evaluate both spatial and non-spatial events based on the criterion values and the decision maker's preferences with respect to a set of evaluation criteria.

In Sharm El-Sheikh study we have formulated the causal connections between socio-economic demands and ecological impacts. For convenience, we have presented first a simplified view of the overall model "Sharm Complex System" subsequently; we have discussed matters of model and simulation features, data and measures, scenario generation and finally, presented simulation results.

Assessment Method:

1. The dynamic simulation modeling language of VENSIM software has been used for modeling and simulating Sharm tourism development behavior.

2. By using VENSIM, stock-flow diagram has been constructed and followed by the cause-effect analysis among module parameters.

3. Four Sharm stock-flow modules have been aggregated to form what is called Sharm Simulation Model (SHASIMO)

4. Model parameters' values have been estimated by studying previous Sharm present, 1985-2002, development trend.

5. SHASIMO, for 1985-2002 period, has been run to confirm the dynamic hypothesis (simulation result should match the collected data for Sharm of this time bounds "reference Mode")

6. SHASIMO has been used to simulate Sharm behavior under five different scenarios, depend on different Sharm stakeholders' preferences:

- *SCUBA Divers (Natural conservation) scenario*
- *Hotel Owners (Labors' accommodation) scenario*
- *Local Municipality (Reactive policy) scenario*
- *Tourism Investors (One big resort for south Sinai) scenario*
- *Business Extremes (Sharm business as usual) scenario*

7. To evaluate the consequences of a scenario, from sustainability point of view, an evaluation criterion has been established (assumed). Each scenario has effects on the socio-economic and ecological development of Sharm El-Sheikh; these effects comprise the basic notion of the policy evaluation criteria

8. To deduce the most preferable "suitable" areas in Sharm for future tourism development, Sharm area has been divided into six spatial sectors; Nabq, Ras-Nasrani, Sheik-Coast, Naama, Elhadaba, and Elmayia. Carrying capacities of these areas are in difference. Sectors' potentials to acquire more tourism activities have been articulated by forming a suitability analysis, using GIS

9. Three spatial multi-criteria evaluation methods have been conducted to assess carrying capacity of diving sites, reefs at risk and potentials of development of Sharm sectors respectively

10. By introducing strength and weak points of each development scenario and initiating the preferable development sectors in Sharm, a comprehensive vision, of future development of Sharm El-Sheikh, could have depicted.

Results:

This study gives a new integrated approach for environmental planning and offers an empirical modeling system applied for sustainability assessment in Sharm El-Sheikh. Such approach provides analysts and/or planners with several relevant and development options, aiming at identifying the sources of development conflicts so that decision makers may become aware of blind spots in current situation and consequences of proposed actions or measures.

SHASIMO is a complex model. Complexity arises from the many interactions and feedbacks between its modules. The system behavior of SHASIMO, however, can be relatively simple, because it enables the inclusion of linkages, interactions and feedbacks at each possible level, which leads to a more advanced form of integration. Nevertheless, the art is to keep the balance between simplicity and adequacy in terms of scientific representation of knowledge.

With the completion of the first version of SHAISMO the description of important economic, ecological and social relationships in the tourism industry of Sharm-el-Sheikh is possible. Due to a lack of data and/or knowledge, not all components could have been based on exact scientific information. Nevertheless, a first step is made that already offers a good tool to, at least, sketch future developments under certain assumptions. The current prototype version of SHASIMO needs further improvements. Database concerning diving attractiveness, précised reefs damage rate and its impact on tourism demand should be enhanced. Impacts' indicator measures of some relevant factors like the relation between the decrease of natural landscaping areas and its impact on tourism demand rate, needs to be found. Profound surveys regarding social module e.g. *Social index threshold and tourists' satisfaction* should be intensively conducted.

One of the major lessons drawn from Sharm case is that active dissemination is needed to ensure an adequate usage of scenarios by the stakeholders involved. Participatory methods, forming scenarios, are able to integrate quantitative with qualitative knowledge.

Qualitative knowledge (soft variables) cannot (yet) be grasped by IA models. In this way, participatory methods can complement IA models and scenarios.

The most innovative aspects of integration in this study are in the integration of "Data Transfer" among attributes of ecological and economic as well as social features; where all of these features are connected in one dynamic complex model. Second, the combination of system dynamics and GIS which allows spatially explicit modeling results. Nevertheless, both approaches are in some way contradictionary, GIS stores complexity in independent spatial layers, whilst system dynamics reduces complexity by defining dynamic flows between stocks of resources. Last but not least, the use of this modeling system for planning purposes by combining it with a multi-criteria analysis approach.

Overall, Integrated Assessment models face a prosperous future, because the world around us is becoming increasingly integrated in its social, economic, environmental and institutional activities. The complex dynamics of these strongly interacting processes force us to think and act in a more integrated manner, a process in which IA models are indispensable tools. However, much work remains to be done with regard to management of uncertainty in IA models, quality control and quality enhancement of IA models, and improving the communication between IA modelers and their clients.

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Chapter 1

INTRODUCTION

The sustainable development concept came about sometime in the mid-80s and was formalized at a conference of the World Commission on Environment and Development (WCED), better known as the Brundtlant Commission, in 1987. The WCED's Brundtlant Report defines sustainable development as: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". (WCED, 1987). The definition encompasses 2 basic dimensions: development to meet intra- and inter-generation human needs, and the resource limitations that constrain efforts to meet these needs (Hunter, 1995). This two-dimensional perspective pervades growth management literature and has resulted in a continuum of sustainability paradigms ranging from one extreme of economic development at all costs to the other of resource protection at all costs. Pro-environment groups argue against any economic development that degrades the quality of the environment while pro-development groups insist that economic survival in a competitive world demands that environmental concerns must take a back-seat.

No universally accepted definition or consensus has yet been reached and the debate between the disparate groups is still ongoing. The basic underlying philosophy of sustainable development, however, is simple: balancing economic growth with conservation of the environment through the creative and careful use of limited resources.

1-A Sustainable Tourism Development

The concept of sustainable tourism development originally came into tourism vocabulary in the late 1980s when countries, especially in Europe, began to recognize the adverse impacts of unorganized and unplanned tourism on the physical and socio-cultural environments of tourist destinations. Like its parent concept, opinions on sustainable tourism development are polarized between ecological sustainable tourism development (the view held by resource protectionists or preservationists) and economic sustainable tourism development (the view of resource consumers). To date, there is no universally accepted interpretation although various models have evolved such as "alternative tourism", "appropriate tourism", "community-based tourism", "eco-tourism", "ethical tourism", "green tourism" and "responsible tourism. These forms of sustainable tourism are advocated as replacements for existing ineffective methods and directions of tourism development. Current literature on sustainable tourism is abound with conflicting interpretations and views on the usefulness of the concept as the following review will demonstrate.

Cooper, Fletcher, Gilbert and Wanhill take a simple inter-generation approach and view sustainable tourism development as essentially a trade-off between present and future needs of tourism (1993). Butler splits hairs and adds to the confusion by differentiating between "sustainable development in the context of tourism" and "sustainable tourism development" (1993). He defines the former as: "..... tourism which is developed and maintained in an area (community, environment) in such a manner and at such a scale that it remains viable over an indefinite period and does not degrade or alter the environment (human and physical) in which it exists, to such a degree that it prohibits the successful development and well-being of other activities and processes." Although recognising the temporal or inter-generation dimension, he ignores other elements that interact with tourism, and takes a narrow view of sustainable tourism: "tourism which is in a form which can maintain its viability in an area for an indefinite period of time."

Wheeler is sceptical of the usefulness of the concept at the macro-level and argues that sustainable tourism is relevant only at the individual project level (1992). He states: "what we have at best are small-scale, isolated examples of "success"- micro solutions to what ..... remains a macro problem". Mckercher holds the view that sustainable tourism involves leveraging economic sustainability with ecological sustainability and that it is particularly critical for forms of natural or resource-based tourism which are highly susceptible to severe impacts (1993). Hunter's view is somewhat similar although he emphasises the quality of experience of hosts and guests. (1995). Cronin (1990) and Manning and Dougherty (1995) adopt a view that is reminiscent of the proverbial "golden goose". Cronin says: "In the case of the tourism industry, sustainable development has a fairly specific meaning- the industry's challenge is to develop tourism capacity and the quality of its products without adversely affecting the physical and human environment that sustains or nurtures them." (Cronin, 1990).

Albeit confusing, a common thread runs through the various definitions and interpretations. For one, there is shared understanding and agreement that tourism has the potential to create, enhance and/or deplete the perceived "value" of a destination and, therefore, cannot afford to destroy the very resources that have caused it to thrive in the first place. This suggests that tourism must be responsibly and effectively managed for it to be sustainable. From a host perspective, responsible and effective planning, development and management of tourism is, therefore, obligatory if a balance of higher order economic, social, cultural and ecological objectives is to be achieved. Too, guests or tourists have a responsibility to respect the needs and aspirations of host destinations. The problem then lies with the many and conflicting perceptions of value attached to a destination by hosts and guests, both of which have stakes in the destination. These perceptions are in turn influenced by their different value systems which also vary at different points in time and place.

Responsible and effective tourism planning and management involves an understanding of the current and future needs of both hosts and guests and prioritizing them on the basis of core values. For example, in Bali, the Hindu philosophy of Tri Hita Karana or the trilogy of God, Community and Nature permeates every aspect of Balinese life. The inherent values of this philosophy are manifested in the planning, development and management of tourism in the island. Any tourism activity with the potential to harm or destroy these values or their manifestations in the natural, built and socio-cultural environments, although economically attractive, are viewed with disdain and disregarded by planners. What binds the diverse groups that make up the host community is Hinduism and the respect of the ruling authority whether this be a banjar (village) head or the province's governor. A case in point was the hue and cry over the planned golf resort

adjacent to one of Bali's holiest Hindu temple in Tanah Lot (Ford, Tan, 1994). Although newspapers reported that locals were demonstrating against the desecration of their temple's holiness due to the golf resort's proximity, it was noted that local commercial enterprises were situated even closer to the holy temple. Discussions with Balinese religious authorities revealed to the local government authorities that the problem was not religious but a socio-economic one- growing local discontent with yet another intrusion of non-Balinese investment. The matter was finally resolved by Bali's governor himself who reminded locals of the need for harmony between God, nature and the community. Another case in point is the implementation of the village tourism concept, a three-prong tourism strategy to promote the Balinese culture in a controlled fashion, empower banjar (village) heads, and equitably distribute tourism's benefits which, before then, were largely enjoyed by communities in Bali's southern coast.

1-B Tourism sustainability Assessment

An evaluation of the sustainability of tourism is ultimately an assessment of tourism's impacts on the economic, socio-cultural and physical environments which in turn involves the determination of the various carrying capacities. Herein lies sustainable tourism's Achilles' heel. While conceptually simple and intuitively appealing, its practice is fraught with problems relating to impact measurement and evaluation. Butler identifies three main difficulties when attempting to evaluate the sustainability of a tourism development (1993). Firstly, there is a lack of consensus on what constitutes a sustainable tourism product in terms of sustainability and carrying capacity indicators. He points out that current indicators such as visitor arrivals and stay patterns are insufficient and inadequate and that there is a need to assess the product's ability to fulfill the needs and desires of visitors. One can also add that such a uni-dimensional approach ignores the effects of the product and tourists on the socio-cultural and physical environments. Even if such impacts are measured, there is the added difficulty of assigning weights to each type of impact. Smith echoes Butler's concern when he says:

"What is not helping the analyses of impacts is the lack of proper information of the impacts and their circumstances. In addition, the uncertainty of the structure and interrelations of impacts, beyond obvious primary levels, is not generally understood. Even if sufficient data were available, methods of analyzing the web of secondary and tertiary impacts in terms of their economic, social and environmental consequences do not exist. No way has been devised to satisfactorily compare and weigh all factors common to a given situation. How are higher incomes compared with loss of traditional values? What weight should be given to the loss of aspects of the natural environment or to the improved well-being of tourists? (Smith, 1990, pp. 201-202).

The second difficulty identified by Butler (1993) relates to who should decide on or influence sustainability indicators for a destination. Does the national, regional or local tourism planning authorities decide? One may also include the problem of deciding who should evaluate the indicators as, obviously, different people have different agendas. The host group is not a single monolith with common objectives and interests but consists of various parties who are impacted both by visitors and tourism developments in distinct ways. Whose interests should then reign supreme- the national or regional government, commerce groups, environmentalists, economists, sociologists, surrounding residents…….?

Finally, Butler (1993) notes that current indicators lack predictive power. They evaluate a tourism product at a single point in time and do not provide information required to

evaluate future effects. For example, while visitor arrival growth trends may indicate a destination's popularity, it does not help in evaluating whether the situation will continue in the future.

With these and other difficulties, it is not at all surprising that little attention is paid to sustainable tourism. Arrol (1993) comments that governments or developers are not willing to invest in the protection of the environment because the economic costs of the protection or clean-up can be measured in money terms unlike benefits of environmental improvements. Furthermore, the preoccupation with return on investment and profit by developers, and the top priority given to boosting foreign exchange earnings by developing countries constitute two major restraining forces.

Many impact measurement techniques have been proposed and employed but none of them have gain universal acceptance as it is believed that they are either too generic or specific, and beset with the problems covered above. Wong (1993, pp. XI) noted three impact measurement guidelines that have existed for coastal tourism since 1985. Inskeep proposes a matrix evaluation technique which can be employed in the planning phase although he notes that its effectiveness is limited by qualitative and quantitative inputs (1993, pp. 95-96). Other techniques include Getz's cost/benefit analysis for evaluating impacts of event tourism (1994), Gunn's (1994) tourism condition indicators, and a host of others explored by Nelson, Butler and Wall (1993). Green & Hunter (1995, pp. 126) criticise existing environmental impact assessments (EIA) as lacking a multi-disciplinary approach and that such studies are biased towards only measuring impacts on the natural environment.

Challenge

According to recent statistics, the environmental impact of tourism development is of serious concern. In some popular destination, the natural attractions of the area have been damaged or destroyed due to overbuilding and irresponsible development.

The tourism and recreation industry is confronted with serious and difficult choices about its future. The decisions made now will for decades affect the environment, lifestyles and economic opportunity of residents in tourism destination areas. Many of these decisions are irreversible because once communities lose the character that makes them distinctive and attractive to nonresidents, they have lost their ability to vie for tourist-based income in an increasingly global and competitive marketplace. A try to establish the carrying capacity of a tourism destination may facilitate to understand when the resource limits are reached or outgrown so as to assess the sustainability of the tourism development of this area.

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