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University of Alberta

Environmental Quality and Tourism Development in the Seychelles: An Application of the Stated Preference Method

by

Yasmin G. Rahemtulla 

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Science

in

Agricultural Economics
Department of Rural Economy

Edmonton, Alberta
Spring 1998

University of Alberta

Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommended to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled **Environmental Quality and Tourism Development: An Application of the Stated Preference Method** submitted by Yasmin Gillian Rahemtulla in partial fulfillment of the requirements for the degree of Master of Science in Agricultural Economics.

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ABSTRACT

The purpose of this study is to choose and develop an appropriate demand model which reflects nature-based tourist decision-making process which in turn can be used to value nature-based tourism in the Seychelles. The information provided by such a model should then be able to guide sustainable tourism planning.

A number of different tourism demand models are available to value tourist demand for ecological destinations. Among the possible models to choose from are the typical trip model based on revealed preference (RP) data and the stated preference (SP) models based on stated choice survey methods. Each model provides different degrees of flexibility and information quality.

The stated choice model has been used in both the tourism and the recreation literatures. Historically in the tourism domain, this model has primarily been used as a marketing tool while recently in the recreation literature, it has been used to calculate willingness to pay values for environmental goods and services and for sustainable development planning. This research study is unique in that it uses a stated choice model to provide information for both ecotourism marketing and sustainable tourism planning.

The stated choice model's ability to analyse tourism demand is examined and weighed against the RP model of demand. The stated choice method's flexibility, its resemblance to real life decision making and its adherence to random utility theory make it an appealing alternative in the forecasting of nature-based tourism. Moreover, its marketing and sustainable development planning implications serve to further enhance the appeal of the model.

A stated choice survey was designed with 16 choice sets to determine the value tourists place on several environmental and tourist attributes. Using a RUM

framework, a multinomial model of tourist destination choices was developed and welfare impacts resulting from environmental degradation and other tourist attribute changes were estimated. Calibration and simulations were also used to predict tourist demand to given tourism development scenarios. Tourists were segmented into three markets representing geographical origins. Expected values derived from econometric and calibration analysis suggest that market segmentation is a significant method of increasing the precision of benefit values derived from tourists and their experiences. The results show that French tourists value marine quality more than Germans or other markets while Germans are more likely to choose destinations based on high wildlife quality. Furthermore, the results of this study serve to illustrate the potential of the stated choice model to value the economic benefits and marketing of eco-tourism prospects in ecologically rich regions.

ACKNOWLEDGMENTS

There are many people who have made this thesis possible. First, I would like to thank Dr. Terry Veeman for introducing me to environmental economics and to the department and Dr. Vic Adamowicz for constantly challenging and motivating me but most of all for supporting my endeavor to pursue this research. I have also been very lucky to have made some wonderful friends in the department: Jeji, my amazing office mate and friend and of course Fiona and Godfrey my constant coffee buddies!

Across to the Seychelles, I would like to thank my dear friends Tinaz, Denise, Shirley, Serge and André whose tremendous help made this research project successful. I would also like to thank Air Seychelles and the airport staff for their cooperation and assistance.

Finally I would like to thank my family. My sister Jennifer for her encouragement but most of all my parents for their relentless support, love and faith and above all for giving me the opportunity to extend my horizons both culturally and intellectually. Your sacrifices have been greatly appreciated.

Thank you all.

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CHAPTER 1 INTRODUCTION

Tourism can be defined as "the system or industry catering to tourists and comprising of attraction, accommodation, access and advertising" (Marsh 1994, p. 25). It is one of the largest global economic activities. In 1994, there were 531 million tourism arrivals around the world with an associated economic activity amounting to US$ 413 billion (WTO 1995). According to Smith (1978), tourism can be classified into several categories depending on its focus and activities. These include, ethnic, cultural, historical, environmental and recreational. For most countries, especially for LDCs, tourism is primarily nature-based. For example, African countries attract many international tourists with their wildlife while small island states do so with their pristine beaches, sun and sea. In short, tourism in many countries is based on selling undisturbed natural environments and associated activities.

Tourism can have significant positive impacts on local economies through increasing and diversifying employment opportunities, infrastructure improvements and financial gains (Persaud and Douglas 1996). However, it can also have adverse impacts. For example, it increases the consumption of resources, and in developing countries where resources are scarce, equity issues can arise between provision for locals and tourists. Tourism also takes up space, destroys natural land by creating new infrastructure and buildings and upsets natural ecosystems. Furthermore, it increases waste and litter production and often leads to increased local prices. Therefore, while tourism gains are attractive, they may be short term and should be measured against long term socio-economic disadvantages like overcrowding, competition for resources and environmental problems. For a more extensive discussion on environmental consequences of tourism, refer to Mathieson and Wall (1982), Pearce (1989; 1983) and Andereck (1995).

Once tourism dependence becomes established as in most LDCs, it becomes difficult to curtail tourism expansion, even when environmental degradation becomes evident (March 1987). That is, there is always a danger that the direct economic benefits associated with tourism and recreation will overshadow the less obvious values of nature protection. This is because the economic benefits are reaped immediately, yet protection is a long term benefit. However, it must be recognised that decisions made now will for decades affect the lifestyles and economic opportunity of

residents in tourism destination areas. Many of these decisions are irreversible because once these countries lose the character that makes them distinctive and attractive to non-residents, they have lost their ability to vie for tourist-based income in an increasingly global and competitive marketplace (McCool 1995). Hence, balancing development with environmental protection is critical in these countries. This has propelled the concept of sustainable development.

Sustainable development can be defined as meeting the needs of present generations without compromising the needs of future generations (Brundtland Report 1987). It recognises the limited nature of environmental resources, intergenerational equity issues and the need to evaluate trade-offs, both for current generations as well as between resource use and environmental quality now and in the future (Dixon *et al* 1995). This concept is often tied to sustainable use, referring to the notion that careful and sensitive economic development is possible without degrading or depleting natural resources needed by the present and future generations (Burr 1995).

In the tourism and recreation context, sustainable development is frequently associated with discussion of ecotourism and nature-based tourism (Boo 1990; Whelan 1991). These sustainable tourism approaches recognise that tourism can negatively impact the natural resource base of a destination. As a result Eagles (1995, p.26) defines sustainable tourism as " tourist use of natural environments where long term benefits, continuous environmental protection and local community development are inherent". Reinforcing this idea, Butler (1990, p.40) says

> Tourism is an industry, a form and agent of development and change. It has to be recognised as such. Controlled and managed properly it can be non or low consumptive use of resources and can operate on a sustainable basis. However, if developed beyond the capacity of the environment, the resource base, and the local population to sustain it, it ceases to be a renewable resource industry.

According to Eagles (1995), the key to achieving sustainable tourism lies in the understanding of its market. That is, understanding the place, goods, consumer preferences, demand, available opportunities, and the enterprise of selling and buying. McCool and Watson (1995) support this saying that identifying important tourist values and analysing the trade-offs rationally can help guide the industry towards sustainable tourism. In addition, tourism and recreation use always lead to some level of

impairment in natural systems. Therefore another important issue is how much change is acceptable (McCool and Watson 1995).

This research project focuses on the Seychelles archipelago, a group of islands highly dependent on tourism. Its main objective is to examine consumer preferences so that they can be used to create a sustainable tourism industry for the Seychelles. Previous tourism analysis in the Seychelles has looked at the macro-economic impact of tourism expenditure using input-output analysis (Archer and Fletcher 1994) . These impacts were assessed according to visitors' countries of origin. While this study served to illustrate the linkages between country segments expenditure and the macro economy, it failed to assess tourism demand for the Seychelles. Therefore, this research project identifies the benefits tourists derive from interactions with the environment and how those perceived benefits can be measured. This information can then clarify the linkages between benefits sought, recreation behaviour and money expenditures (McCool 1995). It can also aid in making a better system to manage both the environmental and social impact of tourism by informing agencies about the consequences of alternative paths of economic development, resource protection and enhancement of quality of life. In essence, the results obtained from this research can complement those derived from Archer and Fletcher's (1994) macro-economic analysis of Seychelles tourism to give a richer understanding of the tourism industry in the Seychelles. In turn, they can guide tourism policy and marketing strategies.

The Seychelles islands' economy relies primarily on nature tourism. As a result, sustainable tourism practices are essential if long term benefits to the country are to be continued. Consequently, this research project examines some of the underlying issues surrounding the implementation of such a practice.

Organisation of Thesis

This thesis starts with a brief socio-economic background of the study area and highlights the need for this research. Chapter 3 begins with a short literature review on tourism demand methodologies with emphasis on stated choice experiments. This is followed by the theoretical basis of the random utility model and a short section on the theory of welfare measurement. Chapter 4 outlines data collection and entry. In chapter 5, three multi-nomial logit models representing three different market

segments are estimated. The results are reported and analysed together with welfare and market share impacts to given policy scenarios. In the final chapter, implications of the research are put forward and future research possibilities in the area are outlined.

CHAPTER 2 SEYCHELLES SETTING

2.1 Profile of the Seychelles

Physical and Socio-economic Background of the Seychelles

The Seychelles are a group of islands situated in the Indian ocean, four degrees south of the equator. There are 41 granite islands and 74 coral islands. The country has a total land area of approximately 455.3 square kilometres which are scattered over a vast expanse of the Indian Ocean. Its EEZ (exclusive economic zone) is estimated to be more than one million square km. The population, at the last census, was close to 68,000 and is mainly concentrated on the main granite islands of Mahé, Praslin, and La Digue. The capital is Victoria which is located on the main island of Mahé where the international airport and seaport are located. In 1994, the GDP per capita was estimated at US$5, 000 (World Bank, 1994).

Table 2.1
Summary of the Seychelles Economic Activity Based on Natural Resources

Sector	Value* (Seychelles Rupees millions)	% of GDP	% of Total Foreign Exchange Earnings
Agriculture	55.0	2.2	
Forestry	1.9	0.1	
Fishing	244.7	9.70	13.2
Licenses	51.45		
Exports			
Fresh/Frozen	12.8		
Canned Tuna	169.78		
Shark Fins	2.43		
Frozen Prawns	10.9		
Tourism			
Tourism Related Activities	426	16.9	
Tourism Expenditure Estimate	696		37.5

Source: Management and Information Systems Division and Central Bank of Seychelles 1996
* US$=SR.5.21, Sterling £=SR. 8.40.

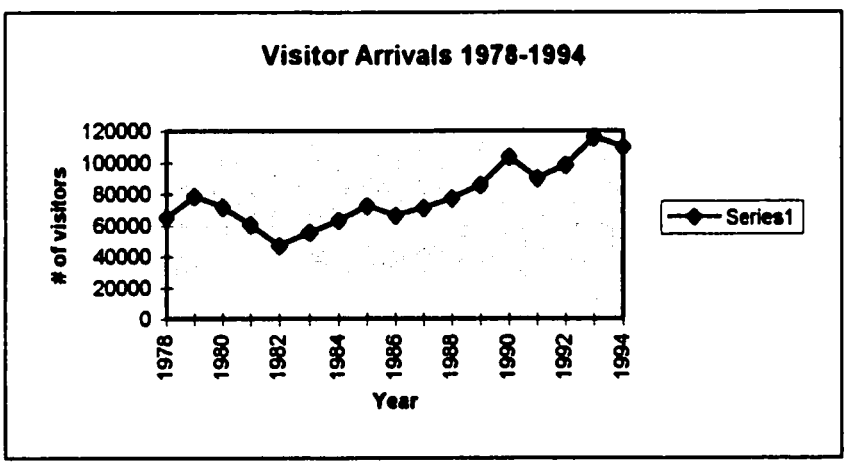
The economic resources of the Seychelles are traditionally linked to the fishing and tourism industries while the agriculture and forestry sectors are not well developed. Table 2.1 summarises the country's economic activity based on natural resources. In 1996, commercial fishing amounted to approximately 51.45m

Seychelles rupees (SR) (US$9.9m) in fishing licenses and in fish exports SR133m The tourism expenditure estimate was SR.696m (US$133m). More specifically, after hotels (the largest tourist expenditure), excursions accounted to SR.59.9m (US$11.5m) in local cash expenditure by visitors (MSID, 1996). Such excursions would involve visiting the marine and nature parks. The economic importance of tourism can also be seen in the employment framework. In 1994, hotels employed 3,145 workers (10% of total workforce); restaurants 488, and tourism related services 1,093 which constituted approximately 18% of the total work force (MSID, 1996). In brief, the socio-economic importance of the tourism industry to the Seychelles cannot be over emphasised.

Tourism Policy of the Seychelles

The Seychelles is one the most isolated groups of islands in the world offering high quality beach holidays based on year round sunshine, lush vegetation and coral beaches. Furthermore, its unique wildlife and pristine state attracts many nature lovers trying to " get away from it all". International tourism has increased dramatically since the opening of the airport in 1972 with 1996 visitor arrivals estimated at 130,955 compared to 3,175 in 1972 and with 81% of tourists originating from Europe. In 1996, direct revenues from tourism amounted to approximately 38% of the country's GDP.

Figure 2.1: *Growth of Seychelles Tourism*



As a result, the Seychelles Government has for a long time acknowledged the value of the country's natural environment to the tourism industry. Consequently, its

tourism policy has been guided by the need to protect the very asset on which the economy depends. This has come in the form of limiting the number of visitors entering the country through the number of beds available (setting a carrying capacity), curtailing development in environmentally sensitive areas and creating protected areas for unique fauna and flora. More specifically, out of the total land mass of 455 square km, 46% has been designated as national parks, reserves or protected areas (see Table 2.2). A further 228 square km of marine area has been designated as marine national parks for the conservation of marine ecosystems. In addition, all development projects (tourism related or not) have to undergo an environmental impact assessment and different levels of development have been allocated to specific islands depending on the fragility of the island ecosystem.

Another way in which the Seychelles has managed to limit its environmental degradation has been its policy to stay away from " mass tourism" which characterises the European beaches of southern France or Spain. This has largely been aided by high travel expenses needed by tourists to visit the country. As a result, its tourism strategy has relied on targeting high spenders rather than volume to generate income.

Several levels of tourism development exist in the Seychelles. In essence, this corresponds to the zoning idea often found in protected areas management practices. That is, specific islands are restricted to a certain level of development or none depending on the sensitivity of the ecosystem of that island. For example, "heavy" development is restricted to the two biggest islands of Mahé and Praslin and to some extent La Digue. On these islands, hotels and other tourist infrastructure are present as well as vehicles (to a limited extent on La Digue). On the other hand, Bird and Silhouette have been restricted to a single hotel. The sooty tern colony on Bird and the old growth forests of Silhouette have determined these island's development and carrying capacity. Environmental benefits of these islands are restricted to the few hotel guests. On the other extreme, environmentally fragile ecosystems/ habitats such as Aride or Curieuse are restricted to day excursions only as are islands in the marine parks (except for Cerf). Recently, cruise ships have been allowed to anchor around the Aldabra atoll. This is a rich and very fragile ecosystem and has been compared to the Galapagos islands. Previously, access to the atoll was restricted to scientists. Therefore, environmental impacts to the atoll by the cruise ships are yet to be established.

Despite these seemingly stringent policies towards protecting the environment, the Seychelles has nevertheless been experiencing many adverse environmental impacts. This will be discussed in the next section. More recently, the Seychelles in the face of increased global competition, has undertaken massive tourism projects to induce more tourists to visit the country. This has resulted in the increase of hotels being built, development on fragile outer islands and an increase in cruise ships with future plans to include construction of a marina into the marine park .

Table 2.2: *Protected Areas of the Seychelles*

Island	Name of Park(s)	Entrance/ Excursion Fee (Seychelles Rupees)	Conservation Value
Mahé	St. Anne Marine National Park Port Launy Marine National Park Baie Terney Marine National Park Mourne Seychelloise National Park	250 --- --- Free	Marine life Hiking trails, forests
Silhouette	Silhouette Island Special Reserve	Free	Old growth forests
Aride	Aride Island Special Reserve	---	Largest colonies of Lesser Noddy and Roseate Tern; Wrigth's Gardenia
Praslin	Valley de Mai	40	Coco de mer forest/ Seychelles Black Parrot
La Digue	La Veuve Special Reserve	Free	Mature coastal woodland/ wetland habitat for Black Paradise Flycatcher
Cousin	Cousin Island Special Reserve	395/ Half day	Seychelles Brush Warbler & endemic land birds; sea birds / hawksbill turtles
Curieuse	Curieuse Marine National Park	445/ Full day	Marine life/ Giant tortoises/ rare plants
Aldabra	Aldabra Special Reserve	Cruise Ship only	Giant tortoises; turtles; marine life/ World Heritage Site

Source: Lundin C. and O. Linden (1995)

Environmental Degradation in the Seychelles

Recently, concern has been raised in the Seychelles over negative environmental effects induced by mismanaged tourism development and urban pressures (Lundin and Linden, 1995). The ocean and coastal environment of the

Seychelles are valuable assets. Like all tropical island states, the coastal zone of the Seychelles has a large economic and social value. Hence, such natural capital has to be managed carefully.

Environmental degradation in the Seychelles is now becoming a reality. First, tourism development has been blamed for anchor damage to reefs by tourist pleasure boats and sale of marine souvenirs such as coral. "Research on the marine area of Beau-Vallon bay where tourism development is concentrated has shown evidence of organic contamination of water and deterioration of the coral reef " (Cuet *et al* 1989, p.24). Corals of the St. Anne Marine National Park which receives approximately 30,000 tourists a year are degraded with algae smothering the coral due to nutrient pollution as well as from reclamation. Furthermore, overfishing has led to a decrease in diving experience and the increase in cruise ships are envisaged to lead to further problems. In addition, construction of walls, piers and roads have led to coastal and soil erosion. Tourism development on some of the fragile outer coral islands have also led to adverse environmental effects.

Scarcity of flat land and the increase in population are other factors contributing to the rapid environmental degradation of the country. For example, reclamation has led to siltation of reefs (de Silva 1986) and destruction of live coral (Vine 1972). Although mitigation strategies have been implemented in further projects, reclamation continues as housing and infrastructure needs increase. Beach and plateau sands have traditionally been used as construction material. Excessive extraction of 35,000 tons/year have been cited (Lunin and Linden 1995). Sand extraction has contributed to the recession of beaches. The removal of sand decreases the available supply to renourish the beach. The rate of replenishment is slow, so over abstraction can lead to erosion, recession and obliteration of the beaches. "Large scale removal of sand, especially from Sand Cays which are still in dynamic movements could lead to disappearance of parts of or even whole islands" (Lunin and Linden 1995; p.38). The Seychelles has a relatively large protected natural area (43% of total land area) which attracts tourists. Stress on these areas and species/ecosystems multiplies as population increases and demands for goods and services increase, leading to conflicts between social demand for infrastructure and economic dependence on fisheries and tourism.

According to Lundin (1995), the crux of the problem of biodiversity loss in the Seychelles has been the inability of the country to build a strong, wide based and long term conservation management program. Constraints of the country include, small population which limits its human resources or lack of expertise and a small budget for conservation which currently is not being reinvested into the environment. For example, visitor fees in national parks are not used directly for conservation.

In short, the Seychelles is experiencing economic, social and ecological conflicts. That is, tourism, the country biggest foreign exchange earner, and social demands such as the needs for more housing and infrastructure have had negative environmental or ecological impacts on the country, putting in danger fragile ecosystems and the welfare of the country.

2.2 The Tourism-Environment Conflict and Sustainable Development

The above sections have highlighted the country's economic dependence on tourism and thus on the environment. However, they have also shown the adverse environmental impacts which are now inflicting the country, putting its long term tourism prospects into jeopardy. Furthermore, the above sections have served to illustrate the growing conflict arising between development (both tourism and non-tourism related) and environmental preservation. Hence, the challenge for the Seychelles is to integrate the environment and development in such a way as to produce the economic and social benefits from development while still yielding environmental protection benefits. It is this development-environment conflict that has initiated the concept of sustainable development.

Sustainable development implies development which does not compromise the livelihood or income of future generations. So, in the context of the Seychelles, this would imply protecting and investing in the resources which fuel the tourism industry, namely the environment. In order to plan for sustainable tourism, public decision makers need to recognise the economic value of natural areas (Kaltenborn 1996). Therefore, this study aims to provide more insight into the tourists' value for the Seychelles environment and their trade-offs between environment and other tourism factors. This information can then be used to allocate scarce resources more efficiently and help the Government manage its tourism industry in a more sustainable manner.

One of the growing areas in sustainable tourism literature is ecotourism. This type of tourism incorporates both a strong commitment to nature and to a sense of social responsibility. It focuses on exploiting tourism's potential for conservation and development and averting its negative impacts on ecology, culture and aesthetics (Western 1996). While ecotourism is well established in many developing countries, its applicability to the Seychelles is still being assessed. In some respects, this study will also be able to assess the potential of such tourism.

CHAPTER 3 MODELLING TOURISM DEMAND

3.1 Introduction

There exist many empirical studies on the analysis of factors affecting international tourism demand (see Crouch (1994) for a comprehensive bibliography on past studies). Furthermore, empirical literature on vacation behaviour have followed one of two forms. The first approach uses time series data and has been most commonly used. It has been applied to analyse travel flows between countries. While such models enable the analysis of trends, they are less useful for demand forecasting purposes and hence were considered to be redundant for this study (Crouch 1994). Alternatively, tourism demand can be modelled using cross-section data. This type of analysis has been used to investigate changes in the pattern of demand across countries and hence is appropriate for this research of analysing destination choice among individuals. However, microeconometric models on individual tourism behaviour have been limited (Eymann and Ronning 1997; Van Soest and Kooreman 1987; Morely 1994; Schulmeister 1981). Instead, empirical studies have mostly been macroeconomic in nature.

Microeconometric models of tourists' destination choice can also be based on either revealed preference (RP) or stated preference (SP) data. Such approaches refer to the manner in which individual preferences are obtained for economic analysis. RP data is based on actual individual behaviour while SP methods directly ask respondents for their preferences to given hypothetical situations. According to Crooch (1994), most tourism demand studies have only modelled actual demand. That is, models have been based on revealed preference data. Suppressed demand (potential or deferred) studies have largely been ignored. However, it is this type of demand that needs to be examined for forecasting and sustainable development planning purposes and hence for this study. In addition, econometric forecasting models in the tourism and recreation literature have largely been restricted to regression models and to the travel cost model which have come under great criticisms (Crouch 1993; Summary 1987).

Since natural environments are becoming popular outdoor recreation sites among tourists, tourism planners have to be aware of the benefits that these nature-based tourists are seeking in order to be more effective in marketing and in provision

of services (Silverman *et al* 1995). Countries like the Seychelles which attract this type of tourism rely heavily on the provision of environmental amenities such as swimming and wildlife viewing which are not allocated through markets. As a result, economic analysis and forecasting of demand for such ecological tourist destinations require environmental quality data which are often difficult to model using traditional revealed preference (RP) methods.

This chapter will briefly examine the limitations and weaknesses imposed by RP models. Alternative demand models based on stated preference (SP) methods are then presented. The chapter will illustrate the flexibility and appropriateness of stated choice experiment for forecasting and analysing demand for nature-based tourist destinations. Finally, the SP model used in this analysis is presented followed by a brief discussion on the calculation of welfare measures.

3.2 Using RP Models to Forecast Demand

Most tourism demand analyses have relied on data derived from direct observation and measurement of actual tourism behaviour known as revealed preference (RP) data. Thus, econometric RP models of tourist demand have been plentiful but have mostly been used in a macroeconomic framework. Currently, few empirical studies exist on the microeconomic analysis of international tourist demand. Moreover, microeconometric RP models of tourism demand are largely found in the recreation literature and have mostly been centred on the travel cost model (TCM) model (Bockstael *et al* 1987; Watson *et al*, 1993). Brown and Henry (1989) used TCM to value the viewing of elephants by tourists in Kenya, Bell and Leeworthy (1990) valued the benefits of Florida beaches by tourists, Grandstaff *et al* (1986) estimated the willingness to pay for Lumpinee Public Park in Bangkok, Thailand, and Edwards (1986) used a hedonic framework to estimate the demand for wilderness preservation in the Galapagos by tourists. As a result, this section will briefly examine the strengths and weaknesses of using observational data for forecasting tourist demand and for addressing the various questions considered in this research.

The travel cost method is an indirect approach to valuing non-market goods and was developed specifically to value outdoor recreation. In brief, the TCM uses travel cost as a proxy for price of travel. It says that demand for a recreation site is based on the travel cost to the site. Hence, assuming that travelling is costly, and cost

increases with distance, then it follows that visitation rate (hence demand) diminishes as the cost of visitation increases (Randall 1994). The traditional TCM (Hotelling and Clawson 1982) values only one site being considered by tourists. By establishing visitor use rates for recreationists at different distances from the site, visitation rates are analysed as a function of the travel cost price, environmental site attributes and socio-economic characteristics of the recreationists to estimate the demand curve. While this sounds appealing for analysing tourist demand for a site, many concerns have been raised with this framework (see Cesario and Knetsh 1973; McConnell and Strand 1988; Fletcher *et al* 1994; Randall 1994; Englin and Shonkwiler 1995).

However, over the years, the basic TCM has evolved and been extended to encompass a variety of modelling frameworks. This has included the hedonic TCM (for case studies, see Brown and Mendleson 1987; Brown and Mendleson 1991; Wilman 1984; Bockstael *et al* 1987) and more recently the discrete choice TCM (Bockstael *et al* 1991) modelled in a random utility model (RUM) framework (McFadden 1974; Ben-Akiva and Lerman 1985).

These discrete choice RP demand models explicitly incorporate both the relevant substitution and site quality effects that influence recreationists' choices regarding where and how often to recreate (Adamowicz 1994, 1995; Clawson 1994; Hanneman 1987). Implicit in the structure of such multi-site demand models is an assumption regarding how recreationists (in this case, tourists) reallocate visits when faced with quality changes at a given site/destination (Caulkins *et al* 1986). The model treats the choice of sites as an explicit function of site characteristics and deals explicitly with choosing one site/destination among many. In essence, RUM represents a more realistic decision making process to analyse tourist behaviour, making it a very appealing framework for researchers.

The use of this RUM framework has served to mitigate many difficulties found in the hedonic and conventional travel cost models. At the same time, other advantages of RP models exist which make them an attractive method for forecasting demand for ecological tourism destinations. First, estimation of demand and welfare measures are based on observable behaviour. RP also generates welfare measures based on what people do and it can estimate the demand for a specific site and link environmental changes to that demand (Peters *et al* 1995). As a result, forecasting demand and welfare estimates are argued to be more accurate than SP models.

However, despite the ability of the RUM framework to address certain key issues from conventional TCM, difficulties with the RP data still remain. First, tourism demand analysis using this data are restricted to variable ranges found to have existed in the past. Morley (1994, p.8) says, "parameter estimates are conditional on these ranges and extrapolation of new conditions is of uncertain validity." This is a serious restriction if one wants to forecast the impact on tourism demand of an extreme change in environmental quality such as total extinction of a species or extensive marine pollution caused by massive development projects. Such forecasts provide valuable information for sustainable tourism planning and for effective marketing strategies. Second, it can be difficult to obtain sufficient variation over the revealed data period. This is especially true for environmental attributes which tend to vary minimally. As a result, the impact of these variables cannot be reliably modelled. Third, revealed preference data often suffer from collinearity among attributes. This is often the case with environmental attributes, tourist attributes and with variables included in the travel cost variable. This econometric problem precludes the isolation of factors affecting choice (Adamowicz 1994) and Adamowicz (1992) says, "separation of these attributes is necessary for policy analysis" and in turn can produce more effective marketing strategies. Further methodological problems with RP tourism models arise in the form of data availability and accuracy. That is, modellers frequently use consumer price indices to reflect prices of tourism services since travel price indices are rarely available (Crouch, 1994). Data on airfares are also often difficult to obtain and are complicated by the variety of fare types. In brief, these data problems make it difficult to estimate parameters reflecting the proper trade-off ratios which can be used to guide tourism development (Kroes and Sheldon, 1988).

This section has identified the appeal of RP models. Their use of observed behaviour combined with the RUM framework make them very attractive for tourism demand estimation but restrictive for demand forecasting. The section also briefly discussed the inherent problems and limitations RP poses for forecasting tourism demand for "ecological" destinations and hence this research study. They include data shortcomings and inability to measure passive-use values. The next section looks at the increasing use of stated choice experiments (CE) and how they are better suited to forecasting nature-based tourist destinations.

3.3 Using Stated Choice Method to Forecast Demand

Another approach that can be used in analysing demand for ecological tourist destinations is stated preference (SP) methods. This approach directly asks respondents about their preferences through use of surveys. SP's appeal lies in its flexibility and ability to mitigate or eradicate the very difficulties found in RP models cited in the above section. First, SP analysis is not restricted to past variable ranges. Hence, SP can be used to analyse the response of individuals to attribute ranges not presently available. This is exactly what is needed to help forecast tourism demand for the Seychelles which in turn can guide sustainable tourism planning. Second, SP can avoid measurement error and colinearity effects common in RP data (Adamowicz *et al* 1994; Crouch 1994). Finally, SP techniques unlike RP methods can be used to measure non-use values (Pearce 1991; Freeman 1994).

The SP technique with the greatest potential for economic analysis and forecasting of international tourism demand is the stated choice experiment. This section will now examine the appeal of an econometric model based on this data.

3.4 Stated Choice Experiment Method

Until recently, stated choice experiments have been restricted to and used extensively in the marketing, transportation and psychology literature (Batsell and Louviere 1994; Hensher 1994). They arose from conjoint analysis which was developed by Luce and Tukey (1964) in the psychometrics literature and later adapted by Paul Green and others (Green 1974; Green and Srinivasan 1978; Green, Carroll and Goldberg 1981) in the marketing literature. "The conjoint method involves decomposing a composite good into its constituent attributes, surveying respondents regarding their relative preferences for alternative bundles when multiple attributes are varied simultaneously, and quantifying marginal rates of substitution between attributes" (MacKenzie 1992; p.179).

Briefly, conjoint analysis methods use data from simulations of consumers' decision making. They allow the researcher to focus on the individual's decision-making process directly, putting questions in a behavioural context of choice. The researcher can control the alternatives presented for consideration, tailoring them to address the issues important to the particular research objectives and ensuring variables range over a suitable field. Multiple observations are gained from each

respondent, and with appropriate design, an experiment can be framed to obtain data in an efficient manner (Bates 1988).

In conjoint analysis, there exists three main response formats to obtain individual preferences: rating, ranking and choice. In the ranking approach, the respondent is asked to rank all commodity descriptions/combination of attributes in order of preference. By contrast, the rating format requires respondents to rate each commodity description in the set on an integer scale[1] which can then be transformed to a utility scale by making further assumptions. Finally, the choice response format asks individuals to choose a single preferred combination of attributes from the alternatives in the set (Bates 1988). For this demand analysis, it is this type of response that is elicited and is referred to as the choice experiment approach. Furthermore, Mackenzie (1993) questions the informational efficiency of the ratings format and the reliability of the responses obtained from the ranking format.

Choice Experiments (CE) ask respondents to choose from alternative bundles when multiple attributes are varied simultaneously. These combinations of attributes make up specific situations that are selected from the universe of possible situations (Adamowicz *et al* 1995).

Econometric models based on SP data have mostly been restricted to the recreation domain. However, there are strong reasons for basing models of international tourism demand on this type of data (Adamowicz 1994; Mackenzie 1992; Morley 1994; Hensher *et al* 1994). Adamowicz *et al* (1995) cite several reasons for the attraction of choice experiments. First, stated CE asks respondents to choose from a set of alternative destinations made up of different attribute situations. This question posed by CE is analogous to the problem facing potential holiday makers. That is, in reality, holiday makers assess a variety of potential destinations before finally choosing one which fulfils their "criteria". The response format also allows data to be modelled in a discrete choice framework and hence RUM which appeals to many researchers. Furthermore, in the case of damage to a particular attribute, compensating amounts of other goods rather than monetary compensation can be calculated. This implies that tourism planners can examine how much tourists are willing to trade off environmental quality for other attributes like development or service.

CE also minimises many biases often plaguing surveys. That is, CE can decrease strategic behaviour and 'yea-saying'. The former occurs when respondents deliberately shape their answers to influence the study's outcome in a way that serves their potential interest. In CE, this is avoided since respondents are being asked to choose from various scenarios and making it difficult for them to behave strategically. With respect to 'yea-saying', attribute levels change over the sets of choices and hence it will not be clear which choice is morally the correct one.

CE's success in analysing demand in marketing and tourism fields further strengthens its suitability to estimate and forecast tourist demand for ecological destinations. CE and other variants such as ranking and rating response formats have been extensively used in the tourism field to market destinations and to evaluate tourists' perceptions and preferences and in marketing to analyse demand for new products. While CE has been used in the tourism field, it has rarely been used in an econometric framework to analyse tourism demand. Morley (1994) applied CE to analyse the choice of destinations by tourists from Kuala Lumpur given variations in tourist prices. This study then provides insight to the derivation of the destination choice set facing tourists. Furthermore, according to Adamowicz *et al* (1994), estimating the value of a change in environmental quality or other relevant tourist attribute is analogous to the problem in marketing research of estimating demand for new products or services.

In brief, CE's strengths lie in its ability to link three important components of this research. Namely, it allows demand estimation of environmental goods and services, analysis of tourism demand and finally it provides information for marketing strategies. These elements when combined can be used to create a sustainable tourism plan. In other words, more precise tourism development with environmental preservation while at the same time marketing the attributes most desirable to tourists will ensure long term tourism benefits.

Whilst CE methods have many appealing traits, they also have some problems. For example, defining the choice set of all available alternatives is not an easy task. This can be especially difficult in the case of tourists where their choice set can be very large. Having said that, Morley (1994) cites Woodside and Lysonski (1989) who suggest that in a general model of traveller destination choice, potential

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[1] An example of this would be 1=very undesirable...10=very desirable

tourists only seriously consider up to seven destinations. Therefore, " to include more than eight alternatives can seriously compromise the reality of the task asked of the respondents" (Morley 1994, p.9).

Selection bias is also a problem of surveys and experiments carried out at destination or recreational sites. The sample of respondents cannot be representative of potential travellers to the destinations. This is because those who might have chosen the destination under some circumstance, but did not under the existing circumstances, are excluded from the sample. It is therefore necessary to sample or experiment at the origin of the tourists.

Despite these problems, the CE approach appears to be the most suitable method for addressing the questions posed by this research. The following sections will now present this method in more detail.

Statistical Design of CE

The statistical design of a choice experiment is not an easy task. The purpose of an experimental design is to define the combination of the levels of all the factors included in the experiment in such a way that they are completely uncorrelated between the alternatives.

According to Hensher (1994, p.113), " a good experiment is one which has a sufficiently rich set of attributes and choice contexts, together with enough variation in the attribute levels necessary to produce meaningful behavioural responses in the context of the strategies under study". He identifies the following steps in the construction of an experimental choice design.

1. Identification of the set of attributes
2. Selecting the measurement unit of each attribute
3. Specification of the number and magnitude of attribute levels
4. Experimental design
5. Survey instrument design

The first step requires focus groups and vigorous pre-testing to identify the important attributes that will help meet the objective of the study. Step 2 refers to the metric of the attribute. For example, if congestion is an attribute, how does one measure it? It can be in terms of number of people or vehicle, time spent waiting in a queue etc. In step 3, "magnitude" refers to the range of the levels. Hensher (1994,

p.115) says that " one should be extremely cautious about choosing attribute levels which are well outside the range of both current experiences and believability. For existing alternatives, one should construct a range which contains the level currently faced by an individual, no matter how the attribute is measured, and define it as one of the levels in the design. When new alternatives are being evaluated, making the attribute levels believable becomes the primary consideration. This minimises the potential for hypothetical bias. In short, the first three steps attempt to describe the choice context in the form of attributes and is the most important element of a stated preference study. That is, presenting respondents with information that they can understand and respond to is critical.

The fourth step is the source of the appeal of the choice experiment approach. The purpose of an experimental design is to define the combinations of the levels of all the attributes included in the experiment in such a way that they are completely uncorrelated between the alternatives. In other words, the attributes are designed in such a way that they are orthogonal to each other and hence eliminate any collinerarity between the alternatives. Given this objective, the total number of alternatives which could be defined is a function of both the number of attributes and the number of levels is incorporated into the exercise. However, respondents can only evaluate a fairly limited number of alternatives at a time before fatigue (though debatable) can set in, so a statistical design incorporating all possible combinations of all levels of each attribute known as a full factorial design can only be used if there are few attributes and levels (Kroes and Sheldon 1988). However, this is hardly ever the case in environmental evaluation.

When a full factorial design generates too many alternatives, the number can be reduced by adopting a "fractional factorial design" , so that only a selection of all possible combinations is presented to the respondents, but analytically at the expense of the number of interactions that can be estimated. This is achieved at a cost. Namely, some statistical efficiency is lost and the analyst has to assume that certain interaction effects among the attributes are not statistically significant (Hensher 1994). However, if the number of alternatives specified by this design is still too large, a blocked design can be used in which systematically different exercises are given out to different groups of respondents (Kroes and Sheldon 1988). Since researchers want to minimise respondent fatigue and provide respondents with alternatives "within the

limits of human processing" (Louviere and Timmermans 1990, p.12), it is most likely that blocked designs will be favoured. The last step concerns the execution of the survey, and as in CV plays an important role. It is generally agreed that face to face interview are the best way to conduct surveys.

This section has examined the SP method of choice experiment and has illustrated the versatility of this method in environmental valuation. Choice experiments can easily be used to examine the impact of tourist variables together with environmental attributes on tourist destination choice without affecting the ability to identify separate effects. In short, the section has shown the advantages, the power and flexibility of choice experiments in the recreation literature. Moreover, CE's success in the marketing and tourism literature strengthens the argument for its appropriateness for this research study. That is, CE links non-market evaluation, tourism and marketing analysis. The following sections will now present the econometrics of the CE model used in this research analysis.

3.5 Econometrics of the CE Model

Models of demand based on CE data are consistent with random utility theory and hence can be modelled using a discrete choice framework. Recently discrete choice modelling has been favoured among environmental economists to analyse demand for environmental goods. This section briefly outlines the background of random utility models (RUM). In addition, the framework and estimation of the multi-nomial logit model used in this research analysis are presented. Finally, calculation of welfare measures from these models is briefly discussed.

Discrete Choice Theory and RUM

Models of demand based on stated preference data use the random utility model (RUM) framework (Adamowicz 1994; Morley 1994; McKenzie 1992) which is based on discrete choice theory. Discrete choice refers to a consumer choosing discrete quantities of a good or service from a set number of alternatives (Ben-Akiva and Lerman 1985). In the case of holiday destinations, consumers can only visit one site or destination at a time and hence this implies that each commodity (site) in the alternative set can only take on a value of 1 or 0 (1 if the site is visited and 0 otherwise). This in turn means that the "max" utility problem of consumer demand

theory can have "corner" solutions and hence the usual maximisation techniques to derive demand curves become redundant (Ben-Akiva and Lerman 1985; Maddala 1991; Morton *et al* 1994). The difference then between choice theory and consumer theory is that the former deals with utility functions directly instead of deriving them.

Discrete choice theory relies heavily on the theory of the indirect utility function. Consider the following utility function with *n* alternative sites in the choice set:

$$U=(x_1,...x_n,q_1,...q_n,Z) \quad (1)$$

where: x_i = goods/site which are mutually exclusive ; $i = 1...n$

q_i = environmental quality

Z = numeraire good

For any site *i*, let q_i be associated with x_i. According to consumer demand theory, a consumer wants to maximise U subject to his/her budget constraint or income (M). This can be written as:

$$\text{Max } U=(x_1,...x_n,q_1,...q_n,Z) \qquad \text{s.t} \qquad \Sigma P_i x_i \leq M \text{ and } x_i.x_j = 0 \quad (2)$$

where $x_i.x_j = 0$ implies that the goods or sites are mutually exclusive. That is, an individual cannot go to two sites at the same time, hence $x_i=1$ or $x_i=0$. In this case, frequency of visits to a site is not relevant as would be in a traditional TCM (Ben-Akiva and Lerman 1981). This then becomes a physical discrete choice model and can be transformed into an indirect utility model using consumer demand theory to give:

$$V_i^*(q_i, m-p_i, x_i^*) \quad (3)$$

Equation (3) is called a conditional indirect utility function since it is conditional on choosing site *i*. It is this type of utility function on which random utility models are based.

Random Utility Models

In RUM, site choice is a function of differences in utility between two sites in the choice set. Underlying the random utility model (RUM) are several structural and behavioural assumptions (Ben-Akiva 1985). First, each site is modelled as a bundle of objective and perceptive attributes. Second, all individuals are faced with a choice among discrete, quantity, quality differentiated alternatives and are assumed to make their

decision based on the premise that the utility of going to chosen site *i* is greater than the utility of going to any other site *j*. In other words, trips are taken independently and sites are mutually exclusive. Third, the behavioural assumption that all individuals are aware of all sites in the set of available alternatives (C_n) is made.

As stated above, individuals are assumed to be rational in that they choose the alternative with the highest utility subject to a budget constraint. However, it has been noted that errors with utility maximisation arise and are not known to the analyst with certainty (Ben-Akiva and Lerman 1985; McFadden 1991). Hence, utility in RUM is assumed to be a random function and modelled as a conditional indirect utility function and takes the form given by equation (4)[2] below.

$$U_i = V_i(X_i) + \varepsilon_i \qquad (4)$$

It comprises an objective or systematic component (V_i) of the measured variables (X_i) and a random or error component (ε_i) which cannot be determined. Four main sources of the random component have been cited in the literature. They include "unobservable" factors which affect choice such as taste, unobserved attributes, measurement error in the explanatory variables entering the systematic component of the function and model specification errors (Bates 1988; Ben-Akiva and Lerman 1985). The systematic component of the utility function generally contains variables or attributes on which individuals make their decision.

The stochastic element in the RUM implies that it cannot with certainty determine which site will be chosen by an individual, leading to understanding the behaviour of choice probabilities (Louviere 1996). Therefore, assuming that an individual is maximising his/her utility, then the probability (Pr) of an individual choosing to visit site *i* over site *j* out his choice set (C_n) is defined as the probability that V_i is greater than V_j for all $i \neq j$ and can be expressed as equation (5). Given the random utility function of equation (4), equation (5) can then be rewritten to give equations (6) and (7) which are cumulative distribution functions.

$$Pr(i \mid C_n) = Pr[U_m \geq U_{jn} ; \forall j \in C_n; i \neq j] \qquad (5)$$

$$Pr(i \mid C_n) = Pr[(V_i + \varepsilon_i) \geq (V_j + \varepsilon_j) ; \forall j \in C_n ; i \neq j] \qquad (6)$$

$$= Pr[V_i(.) - V_j(.) \geq \varepsilon_i + \varepsilon_j ; \forall j \in C_n ; i \neq j] \qquad (7)$$

[2] $U_i=1$ {if $U_i^* = \max(u_i^*, \ldots U_n^*)$ otherwise $Y_i=0$}

where $V_i(.) - V_j(.)$ is the difference in utility between sites *i* and *j*.

One of the main problems with RUM arises when dealing with certain socio-economic variables such as age, income, and education. More specifically, these variables do not vary for each individual as they make choice alternatives for each trip. Hence, when difference in utility is calculated, they are eliminated and as a result are often excluded from the systematic component of the utility function of equation (4) (Adamowicz 1995). To show this, consider the indirect utility functions for two sites *i* and *j* as expressed in equation (8) where M is income and P_i is price or cost to visit site *i*.

$$V_i = \alpha + \beta(M-P_i) \quad \text{and} \quad V_j = \alpha + \beta(M-P_j) \tag{8}$$

Taking the difference between the utilities for site *i* and site *j* as stated by random utility modelling yields:

$$\begin{aligned} V_i - V_j &= [\alpha + \beta M - \beta P_i - \alpha - \beta M + \beta P_j] \\ &= \beta P_j - \beta P_i \\ &= \beta(P_j - P_i) \end{aligned} \tag{9}$$

However, if such variables provide contribute significantly in the decision of site choices, then this model raises a serious issue on model misspecification. Having said this, attempts have been put forward to combat this problem. Socio-economic variables can be incorporated into the model as an interaction variable such as (travel cost/ income) or (travel cost x age) or even having quadratic income terms (Adamowicz 1995; Peters *et al* 1994).

Despite these difficulties Fletcher *et al* (1990) give two main reasons for the appeal of RUM. First, since site choice is a function of site attributes and travel cost, policy-makers can use the information gained from such a model to manage or market the site more efficiently. Second, welfare measures for these models can be calculated with relative ease and hence increase the likelihood of examining attribute changes.

Theoretical Framework of the Multi-nomial Logit Model

The multi-nomial logit model (MNL) is a specific type of RUM and is an extension of the binary choice model where the dependent variable can assume only two values (McFadden 1991). So in the latter case, individuals are faced with two site choices while in the MNL, they are faced with more than two site alternatives. The MNL model

can be attributed to Luce (1959), a mathematical psychologist who made assumptions on the choice probabilities rather than the disturbances (Ben-Akiva and Lerman 1985).

In order to estimate a random utility model, a distribution on the error terms must be specified. Different assumptions about the distribution of the stochastic components within the sample population lead to different discrete choice models. Assuming that all of the ε_i in the choice set (C_n) are independently and identically distributed with a Weibull[3] distribution (Freeman, 1993), the following mutinomial logit model is formed. The model expresses the probability of individual *k* choosing site *i* on trip *t* and can be defined as:

$$Pr(i) = \frac{e^{V_{ik}}}{\Sigma_j e^{V_{jk}}} \quad ; \qquad \forall\, i \in C_n;\ i \neq j \tag{10}$$

$$V_{ik} = \beta_1(X_1) + \beta_2(X_2) + \ldots + \beta_3(X_3) \tag{11}$$

$$V_{ik} = \beta' \mathbf{X}_{ik} \quad \text{and} \quad V_{jk} = \beta' \mathbf{X}_{jk} \tag{12}$$

Assuming the functional form of V_{ik} (the systematic component of the utility function) to be linear-in-parameters (see equation (11) and in vector form see equation (12)), then equation (10) can be rewritten to give:

$$Pr(i) = \frac{e^{\beta' X_{ik}}}{\Sigma_{j \in Cn} e^{\beta' X_{jk}}} \quad ; \qquad \forall\, i \in C_n;\ i \neq j \tag{13}$$

where $\mathbf{X}_{ik}$ and $\mathbf{X}_{jk}$ are vectors describing the attributes of alternatives *i* and *j* for individual *k*.

As was mentioned above, a necessary condition for the MNL is the IIA property. This states that for a specific individual, the ratio of the choice probabilities for any two alternatives is entirely unaffected by addition or depletion of alternatives (Ben-Akiva 1985; Carson *et al* 1992). Therefore, according to Freeman (1993), care must be taken in specifying the choice set to avoid violation of this property. If this property is violated, it can lead to "odd and erroneous predictions" (Ben-Akiva 1985). Carson *et al* (1992) suggest using several ways to avoid this problem and still remain

[3] Weibull distribution is also known as the Type I extreme value (Gumbel) distribution and implies that the error terms are logistically distributed (Freeman, 1993).

in the logit framework. These include using the "Mother logit" specification (McFadden, Tye and Train 1977) which allows the attributes of one alternative to influence the utility of another alternative but unfortunately has some theoretical drawbacks. Second, the often used nested MNL (Ben-Akiva 1985; Maddala 1991) and a third approach is to parameterise the model so that the IIA property holds. The multi-nomial probit (MNP) model is also another alternative to avoiding the IIA problem. This model is identified by the residuals ε_i in the RUM having a multivariate normal distribution. However, the multi-nomial probit can only be applied for a small number of alternatives (at most three or four) because the computations involve evaluating multiple integrals (McFadden 1991; Carson *et al* 1992).

Estimation of MNL

The MNL model described above provides the basis for the experimental choice process. Using this expression for probability of choice, the parameters of the model can then be estimated using maximum likelihood techniques. In brief, the likelihood function outlined by Ben-Akiva and Lerman (1985) is given by equation (14) below and for the entire sample is formed by multiplying together all the expressions for the likelihoods for individuals (Train, 1986).

$$L^* = \prod_{n=1}^{N} \prod_{i \in C_n} Pr_k(i)^{Y_{ik}} \qquad (14)$$

Where Y_{ik} = {1 if individual *k* chooses *i* , and 0 otherwise}

Pr_k (i) is the probability of choosing site *i*

Transforming equation (14) into a log likelihood function gives the following:

$$\mathcal{L} = \sum_{n=1}^{N} \sum_{i \in C_n} Y_{ik} \left(Pr_k(i) \right) \qquad (15)$$

$$= \sum_{n=1}^{N} \sum_{i \in C_n} Y_{ik} \left(\beta' X_{in} - \ln \sum_{j \in Cn} e^{\beta' x_{jk}} \right)$$

The maximum likelihood technique finds the vector β from equation (13) such that the logarithm of L* (L) is maximised. Furthermore, McFadden (1976) shows that the log of L* is concave, so that a unique maximum potentially exists (Watson *et al* 1993).

Using ML estimation yields an estimate of β that is consistent, asymptotically normal and asymptotically efficient (Watson *et al* 1994). Moreover, the maximum likelihood estimate of β is useful in that it theoretically implies that the sum of all the choice probabilities for alternative *i* (summed over all individuals in the sample) equals the actual number in the sample that choose *i* (Ben-Akiva and Lerman 1985).

Estimated coefficients from the MNL model can then be used to calculate per trip welfare measures for different policy scenarios as discussed in the following section.

Welfare Measures for RUM

Welfare measures are obtained by converting changes in utility into a monetary measure. Their derivation is due to Small and Rosen (1981) and extended by Haneman (1982; 1984) for the RUM framework. In the context of benefit cost analysis, welfare measures provide researchers with a reference point from which the benefit component of the decision making process can be analysed.

There exist three welfare measures: consumer surplus (CS), compensating variation (CV) and equivalent variation (EV). Consumer surplus is derived from the ordinary (Marshellian) demand curve and is never used for RUM welfare estimation. This is because RUMs provide estimates of conditional indirect utility function parameters. As a result, determination of CV is possible (Peters *et al* 1994). CV measures the amount of money that is needed to be given/removed to bring an individual back to his/her original utility. Similarly, EV attempts to measure the amount of money that must be added or removed from an individual at the initial scenario to make him/her as well off as at the new utility level. In addition, simultaneous attribute changes can be carried out to give unique solutions. Differences between EV and CV depend on the size of the surplus and income elasticities. However, CV appears to be favoured in the recreation literature (Freeman 1979; Branden and Kolstad 1991; Adamowicz 1995; Peters *et al* 1995).

The discrete choice model (RUM) allows the calculation of per trip welfare measures of parameter changes. Hanemann (1982;1984) extended welfare measures to include the stochastic nature of the measure. Since the error component in RUM makes it a probabilistic model, welfare measures associated with this kind of model will require taking the expected value of the indirect utility function. The parameters of the

indirect utility function are then used to calculate the welfare measures. If the multinomial logit form of the RUM is chosen, then the compensating variation of a quality change of destination *i*, conditioned on the individual choosing destination *i* would be given by the following (Haneman 1984):

$$CV = -\frac{1}{\mu}\{\ln \Sigma \exp(V_i^0) - \ln \Sigma \exp(V_i^1)\} \quad (16)$$

where the summation is over all the alternatives and μ is the income coefficient or the marginal utility of income. The term $1/\mu$ converts the change in utility to a money measure of welfare. In addition, V_i^0 is the level of utility of the initial state and V_i^1 is the level of utility in subsequent state (or after the policy or development has been introduced). The impact of the quality change is summed over all destinations in the choice set (C_n). Because environmental attributes are included in the underlying utility function of the holiday destinations changes will result in some welfare impacts to the holiday maker.

μ is the marginal utility of income and is assumed to remain constant. Hanemann (1981;1982) shows that marginal utility of income is β, the coefficient on the travel cost parameter estimated in the random utility model. To show this, consider the following indirect utility function:

$$V_i = \beta(Y - TC_i) + \alpha(\mathbf{Q}) \quad (17)$$

Where α and β are parameters to be estimated, Y is income, TC_i is travel cost to destination *i* and **Q** is a vector of quality attributes. The marginal utility of income is obtained by partially differentiating the indirect utility function with respect to Y as shown in equation (18) which yields the coefficient on travel cost.

$$\partial V_i / \partial Y = \mu \quad (18)$$

3.6 Summary

This chapter began with a brief overview of the literature surrounding international demand models. This was followed by the strengths and deficiencies of RP methods and how SP techniques can mitigate these problems. Flexibility of SP techniques was also discussed with reference stated choice experiment and other variants. Although SP methods such as ranking has been used extensively in the tourism-marketing domain, the attractiveness of stated choice experiment was examined and

concluded to be the best technique in the forecasting of demand for nature-based destinations. The stated choice experiment's ability to eliminate collinearity among attributes, to extend the range of variables beyond those currently observed in real environments and to study the effects of changing values of variables one at a time make it very appealing alternative and an appropriate method for examining tourist destination choices. Furthermore, its success in the marketing and tourism fields enhances the method's suitability for this research. In other words, the stated choice experiment method not only allows for non-market valuation but also for the development of marketing strategies for the Seychelles tourism industry.

The chapter also discussed the basis of the MNL model. It began with a brief definition of discrete choice theory and how it is linked to RUMs. Random utility models were identified to be probabilistic choice models created by the random component in the utility function. Site choice using RUM is a function of differences between the utility of two sites. The random component was justified on the basis that the researcher does not know with absolute certainty the true maximised utility of an individual. Problems with this type of model were presented such as the elimination of socio-economic variables when utility differences are taken. When the distribution of the error terms in the RUM is given as a Weibull distribution, the RUM takes the form of a logit model. Properties of MNL models were discussed and in particular the IIA property. Solutions to eliminate the restrictions imposed by this property were presented in the form of alternatives models like nested MNL and probit. Estimation of MNL using ML technique was also discussed. Finally, calculation of welfare measures for RUM was discussed which incorporated the probabilistic aspect of MNL models.

CHAPTER 4 DATA SET DESCRIPTION

4.1 Survey Sample

The purpose of this analysis is to examine the trade-offs tourists are willing to make between environmental quality, development and 'traveller attributes'. This information helps define the demand for Seychelles tourism and how future tourist development and marketing strategies should proceed. An appropriate choice experiment was developed to mimic the actual choices faced by holiday makers in the real world (Adamowicz 1994). Data for this analysis were obtained using SP survey methods. The survey consisted of two parts. The first section asked respondents socio-economic details (income, age, nationality, profession), their image perception of the Seychelles, and whether they had previously visited the destinations presented in the choice experiment. The second part involved a choice experiment where respondents had to choose between four tropical holiday destinations or not holidaying at all. Two versions of the survey were used and randomly distributed among tourists arriving in the Seychelles during the period of February-April 1997. Initially, an in flight survey was conducted but low response rate dictated using another approach.[4] Hence, face to face interviews with tourists on their arrival were subsequently conducted. Surveys were given per couple or family. In total, 500 surveys were handed out. Taking language barriers into consideration, the survey was translated from English into German, French and Italian to ensure respondent comprehension. These languages were felt to be understood by residents of the Seychelles' four biggest markets, namely UK, France, Italy and Germany. A copy of the English survey is included as Appendix D and final response rates used for this study are show in Table 4.1 below. Approximately 80 surveys per language were handed out.

[4] Pre-testing of in flight surveys showed low response rate. In 3 flights to the Seychelles from Europe, only 15 surveys were returned

Table 4.1 : Final Survey Response Rates

Survey Language	Version 1	Version 2	Refusals (%)		Nationality	# of Respondents
Italian	10	8	77.5		British	20
German	26	22	30		German	57
French	22	29	37.2		French	43
English	41	27	15		Italian	18
					Swiss	7
Total	*99*	*95*			South African	5
					Scandinavian	14
					American/Canadian	7
					Other	14

4.2 Design of Stated Choice Experiment

Choice Set

Designing a choice experiment is not an easy task and involves determining a set of decision attributes and levels to represent their variation in the real situation (Adamowicz *et al* 1994), determining the choice set or the number of alternative destinations from which respondents have to make a decision and ensuring the tasks are not too long, too difficult or lack sufficient realism and credibility (Carson *et al* 1994). This CE design was aided with discussions with travel agents, marketing representatives for Seychelles Tourism Office, scientists, frequent travellers and tourism literature.

One of the hardest tasks with the design of a CE is defining the choice set of all available alternatives. In the case of tourists, their choice set can be very large. However, Woodside and Lysconski (1989) suggest that in a general model of traveller choice, potential tourists can only seriously consider up to seven destinations. Therefore, "to include more than eight alternatives can seriously compromise the reality of the task asked of the respondents" (Morley 1994, p.9). Carson *et al* (1992) and Louviere (1988) reinforce this saying that a CE should not have more than four alternatives since respondents find it very hard to complete the task. In this study, the Maldives, Mauritius and the Caribbean were identified as alternative competitive destinations for the Seychelles. According to travel agents and marketing representatives, the Seychelles attracts beach tourism with wildlife being secondary. In addition, the Seychelles is marketed as an exclusive "far away" island destination with potential visitors to the islands often assessing other islands in the same region. Holiday brochures were also used to help determine the final choice set for this study.

On this basis, the alternative tropical/beach holiday destinations were identified. In addition to these four alternative holiday destinations, respondents could also choose not to holiday at these destinations giving five alternatives in the choice set. This "base" alternative (Louviere 1988) did not have any attribute combinations and is a realistic alternative. Furthermore, inclusion of this alternative allows respondents to indicate that under the circumstances described in the choice set, they would prefer to not holiday at any of these alternatives shown. Carson *et al* (1992) support this alternative since they feel it may enhance task realism by making the set of alternatives more akin to the "typical" holiday decision and "may help estimate market penetration, making it mandatory to consider whether consumers purchase the product" (Carson *et al* 1992, p.358). In addition, this CE design also held the attribute levels of the Maldives and Caribbean alternatives constant from choice set to choice set. This was justified on the basis that having more than two alternatives with varying attribute combinations increases the difficulty of the choice task and the statistical design of the CE. Furthermore, these alternatives were given attribute combinations that reflected their actual levels/state making the task less confusing for the respondent and at the same time delimiting more precisely the possible interpretations of modelling results (Carson *et al* 1992).

Attributes and Levels

Relevant variables that influence traveller choices and relevant ranges of these variables (levels) were identified *a priori* using discussions with travel agents, marketing representatives, scientists and tourism literature. Furthermore, as the number of attributes and levels increase so do the difficulty of the task and the number of respondents needed for proper statistical analysis, contributing to the number of attributes that were finally used in this study. These were identified to be cost of holiday, beach development, marine quality, presence of unique wildlife, type of lodging and state of local prices. Since the Seychelles attracts beach tourism and some nature tourism, environmental quality attributes such as beach development, marine quality and wildlife were deemed relevant. Other attributes can be referred to as 'traveller attributes'. That is, once the type of holiday is decided, potential visitors look at other factors that differentiate one destination from the other. In this case, value for money was identified to be an important decision factor. A lodging attribute

was included to assess how future tourist accommodation should proceed and whether it played an important role in the decision making process of potential visitors. Each attribute had discrete levels that provided measures of attributes affecting the holiday maker's enjoyment. In this analysis, all attributes except marine quality and wildlife had four levels. The attributes and corresponding levels used in this analysis are listed in Table 4.2.

Table 4.2: *Attributes and Levels Used in the Choice Experiment*

Attribute	Levels	Description of Discrete Levels
Travel Cost	Level 1 Level 2 Level 3 Level 4	Less than £900 £900 - £1,300 £1,300 - £2,000 More than £2,000
Marine quality	Level 1 Level 2	State 1: Undamaged reefs, large fish population; pristine beaches, clear water State 2: Damaged/dead reefs, fish rarely observed; beaches with coarse sand
Wildlife	Level 1 Level 2	Unique fauna and flora No unique fauna and flora
Beach development	Level 1 Level 2 Level 3 Level 4	None Little Moderate Heavy
Local Prices	Level 1 Level 2 Level 3 Level 4	High but good value for money High but poor value for money Low but poor value for money Low and good value for money
Lodging	Level 1 Level 2 Level 3 Level 4	Small exclusive hotel Large exclusive hotel Nice hotel Self catering

Statistical Design

The purpose of an experimental design is to define the combination of all the levels of all the attributes included in the experiment in such a way that they are completely uncorrelated between the alternatives. The statistical design of this choice experiment was based on two alternatives (since three of the five were held constant) with six attributes and their corresponding levels described in Table 1. The combination of attribute levels used in this experiment followed that of McLeod's study (1992) and consisted of sampling from the entire $(2^2 \times 4^4) \times (2^2 \times 4^4)$ x (2 versions)

factorial in such a way that all parameters of interest could be estimated with a reasonable degree of statistical efficiency (Adamowicz 1994). Necessary and sufficient conditions to estimate parameters of MNL can be satisfied by selecting the smallest, orthogonal main effects[5] design from this larger factorial. In this case, the smallest orthogonal main effects design consisted of 32 alternatives which were blocked into two versions of 16 choice sets and given to two groups of respondents. In addition to translating the survey, a glossary detailing the attributes and levels was also used to help respondents complete the choice experiment tasks successfully.

4.3 Effects Coding

Qualitative categorical data can cause statistical interpretation problems and hence need to be transformed so they are usable within an economic and statistical framework. This is done by using effects coding (Louviere 1988). This coding produces estimates which allow for variation between attribute levels and allows the coefficients to be integrated as marginal utilities associated with the particular level (Mcleod 1995). Furthermore, Adamowicz *et al* (1994) cite several reasons for the use of effects codes in the analysis of design experiments instead of 1,0 dummies. First, 1,0 dummies confound the alternative-specific constant with the effects of interest whereas effects codes orthoganalise the attribute effects to the constant. Second, effects codes contrast the parameter estimates with one of the levels; whereas 1,0 dummies contrast the estimates with the constant. Finally, interactions defined from effects coded columns are orthogonal to their respective main effects and other estimable interaction effects; whereas 1,0 coded dummies are not.

Application of effects coding starts by subtracting one level from each attribute and creating variables from the subsequent levels. So if an attribute has m levels of variation, then the number of variables after effect codes transformation equals m-1. Hence, attributes which have four levels are reduced to three variables and those with two levels are reduced to one. The variables created by attributes from Table 4.2 are listed in Table 4.3. The base case is the level which is omitted and is represented by

[5] "A main effects design is one in which only strictly additive variance components can be estimated, assuming that all interactions equal zero" (Adamowicz *et al*, 1994; p.278). See Louviere and Timmermans (1990) for a more comprehensive review on design strategies for preference experiments.

the negative sum of the other levels. The base level is assigned -1 for all columns representing the remaining levels. Each column contains a 1 for the level represented by the column and a -1 for the base. The interpretation of the these parameters is that the base level takes the utility of the negative of the sum of the estimated coefficients and each other level takes the utility associated with the coefficient (Adamowicz *et al* 1994).

Table 4.3: *Variables with Effects Coding*

Variable Name	Effects Coding	
TCOST	Total cost of holiday. Not entered using effects coding.	
NODEVT	If Devt = None, Devt = (Little) or (Moderate) Devt=Heavy*	then DEVT1= 1 DEVT1= 0 DEVT1 = -1
LITTLEDEVT	If Devt = Little, Devt = (None) or (Moderate) Devt = Heavy*	then DEVT2= 1 DEVT2= 0 DEVT2 = -1
MODDEVT	If Devt = Moderate, Devt = (Little) or (None) Devt = Heavy*	then DEVT3= 1 DEVT3= 0 DEVT3 = -1
MARINE	If Marine= state 1 Marine= state 2*	then MARINE = 1 MARINE = -1
WILDLIFE	If Wildlife=level 1 Wildlife = level 2*	then WILDLIFE = 1 WILDLIFE = -1
PRICEHG	If Prices = High/ Good Value Prices = (High/Poor Value) or (Low/Good Value) Prices = Low/Poor Value*	then PRICEHG = 1 PRICEHG = 0 PRICEHG = -1
PRICEHP	If Prices = High/Poor Value Prices = (High/ Good Value) or (Low/Good Value) Prices = Low/Poor Value	then LOCALHP = 1 LOCALHP = 0 LOCALHP = -1
PRICELG	If Prices = Low/ Good Value Prices = (High/Poor Value) or (High/Good Value) Prices = Low/Poor Value	then LOCALLG = 1 LOCALLG = 0 LOCALLG = -1
LODGE1	If Lodge = Exclusive, Small Hotel Lodge = (Large/Exclusive) or (Nice) Lodge = Self Catering *	then LODGE1= 1 LODGE1= 0 LODGE1 = -1
LODGE2	If Lodge = Large/Exclusive Hotel Lodge = (Small/Exclusive) or (Nice) Lodge = Self Catering	then LODGE2= 1 LODGE2= 0 LODGE2 = -1
LODGE3	If Lodge = Nice Hotel Lodge = (Large/Exclusive) or (Small/Exclusive) Lodge = Self Catering	then LODGE3= 1 LODGE3= 0 LODGE3 = -1

* Base case using effects coding

CHAPTER 5 ESTIMATION RESULTS AND ANALYSIS

5.1 Model Estimation Results

Holiday makers face the problem of choosing one tropical destination in which to holiday on a particular trip from a set of available destinations. Parameters from the models used in this analysis were estimated from the respondent's choice set (C_n) of five hypothetical alternatives, one of which was not to go vacationing at all. Based on the tourists' choices, as well as the associated characteristics of chosen and rejected destinations, a discrete choice model was estimated.

Market segmentation in the tourism area was first examined by Johanson and Peater (1967) and has since been applied extensively in the tourism literature. The latter suggests that different nationalities will have different parameter estimates[6]. Hence, in order to analyse the tourism market more precisely, the survey sample was segmented based on geographical origin: French, German and a composite of the remaining markets. As a result, three MNL models (FRENCH, GERMAN, COMPOSITE) with identical utility specifications were estimated representing the above market segments. Using LIMDEP, version 7.0 (Greene, 1995), the coefficients were estimated by modelling the dependent variable, destination choice against the attribute levels mentioned in Chapter 4 and four alternative specific constants (ALTa, ALTb, ALTc, ALTd). These constants capture the utility which is not explained by the differences in attribute levels. That is, they reflect the difference in utility of alternative *i* from that of *j* when "all else is constant". Furthermore, they can also be used as a crude measure for testing brand effect. In this study, the latter can be defined as a destination being continually chosen by a tourist regardless of changing attribute qualities (good or bad) at that destination. In this tourism context, the destination can be said to have an "image effect".

The socio-economic variable INCOME was also incorporated into these models. Since income is a demographic variable and has no variation across alternatives, it was modelled as a choice specific variable. That is, income was incorporated separately in each utility function for each alternative except the base. Hence four income coefficients are reported in the results (INCOME1, INCOME2,

INCOME3, INCOME4). INCOME1, INCOME2, INCOME3, INCOME4 represent the effect of income on the probability of choosing the Seychelles, Mauritius, Maldives and the Caribbean respectively relative to the base case.

As mentioned in chapter 4, estimation of the models requires that one level is dropped from each attribute. The dropped level represents the base case and signs of the included levels depend on the dropped level since they are relative to the dropped level. In this analysis, level 2 was dropped from marine and wildlife attributes while level 4 was dropped in the following attributes: type of lodging, level of beach development and local prices. The resulting variables are listed in Table 5.1.

The results of the MNL analysis using the choice experiment data are presented in Table 5.1. Each coefficient represents the marginal utility associated with that attribute level. The McFadden R^2 of the German and the composite market models are similar with .074 and .071 respectively while the French model is higher at 0.1014. This is a summary statistic which indicates the goodness of fit of a model and is generally not high in logit models and tends to be lower than traditional R^2 measures (Ben-Akiva and Lerman 1985). Chi-square statistics are also similar across the markets.

While tourism literature have commented extensively on the differing tastes among geographical origins, a taste variation test among market segments may nonetheless be performed to clarify this finding. (See *Appendix B* for discussion of the test).

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[6] For a comprehensive literature review on nationality and tourist behaviour, see Pizam and Sussmann (1995).

Table 5.1: *Estimated Coefficients of Models*

Attribute	Description	COMPOSITE	FRENCH	GERMAN
		Coefficient (T-Stat)	Coefficient (T-Stat)	Coefficient (T-Stat)
ASCs	ASC1 (Sey)	1.48* (5.70)	2.07* (5.87)	1.29* (4.31)
	ASC2 (Mau)	1.01* (4.00)	1.18* (3.50)	0.33 (1.13)
	ASC3 (Mal)	1.72* (6.11)	1.65* (4.13)	1.01* (3.10)
	ASC4 (Car)	1.18 (4.07)	0.70 * (1.87)	0.62* (1.94)
TRAVEL COST		-.001* (-6.58)	-.002 (-6.0)	-.001* (-3.72)
WILDLIFE	Unique	0.37* (6.16)	0.37 (4.49)	0.52* (7.00)
DEVELOPMENT	None	0.51* (5.30)	0.14 (1.01)	0.16 (1.31)
	Little	0.27* (2.50)	0.05 (0.31)	-0.03 (-0.23)
	Moderate	- 0.17 (-1.48)	0.18 (1.10)	0.35* (2.64)
	Heavy	- 0.61	- 0.37	- 0.47
LOCAL PRICES	High/Good value	0.32* (3.18)	0.05 (0.37)	0.32 * (3.34)
	High/ Poor value	-0.38* (-3.38)	-0.81 (-0.55)	-0.42* (-3.13)
	Low/ Good value	0.52* (5.29)	0.22 (1.58)	0.36* (3.13)
	Low/ Poor value	- 0.45	0.537	- 0.26*
MARINE LIFE	State 1	0.41* (6.61)	0.78 * (8.58)	0.27* (3.769)
LODGING	Small/Exclusive	0.17 (1.67)	0.24 (1.67)	0.60* (5.35)
	Large/Exclusive	0.15 (1.52)	0.15 (1.04)	- 0.58* (-4.19)
	Nice	-0.12 (-1.15)	0.02 (0.13)	0.20 (1.61)
	Self-Catering	- 0.20	- 0.40	0.34
INCOME	Income1 (Sey)	0.0007 (0.30)	0.01 (1.60)	-0.01 * (-3.19)
	Income2 (Mau)	-0.002 (-0.71)	0.02* (2.51)	-0.01* (-2.52)
	Income3 (Mal)	-0.01* (-4.7)	0.02 * (2.83)	-0.02 * (-4.51)
	Income4 (Car)	- 0.01 * (-3.48)	0.03 * (3.44)	-0.01 (1.72)
Summary Statistics	$\mathcal{L}(\beta)$	-1858.38	-933.19	-1279.80
	[7]McFadden R^2	0.071	0.014	0.074
	[8]ρ^2	0.151	0.157	0.128
	χ^2	283.94	210.55	205.80
	# of obsev	6 800	3 440	4 560

* Statistically significant at $\alpha = 0.05$ level

Table 5.1 summarises the results of the three market segments. In all models, the alternative specific constants related to the Seychelles (ASC1) and Maldives (ASC3) are found to be highly significant at the 5% level. This indicates that these two destination choices are only partly explained by the differences in attribute levels. Omission of relevant variables is often used to explain such values. However, in this analysis, an alternative explanation can be attributed to brand effect. This would analogous to image effect in the tourism literature. This implies that respondents

[7] McFadden $R^2 = 1 - [L(\beta) / L(\text{constant})]$
[8] $\rho^2 = 1 - [L(\beta) / L(\text{no coefficients})]$

choose a particular destination based on the name of destination and the image it carries regardless of varying attribute levels. ASC1 is very large in the French model compared to the other models. This suggests that for the French, other factors are heavily influencing their decision making or that the image effect is a lot more prominent in this market. In other words, image perception and reputation seem to contribute significantly to destination choice in all of the market segments. Moreover, the high ASC related to the Seychelles (ASC1) is not unusual considering that the survey sample consisted of visitors who had already decided to holiday there. More specifically, for the French market, results show that all ASCs are significant except for the Caribbean. By contrast, the German model reveals that only ASCs related to the Seychelles and the Maldives are significant while in the composite market, all ASCs are found to be significant.

In all three market segments, travel cost is a significant variable and its coefficient sign is negative as postulated by consumer demand theory. The negative sign on the associated coefficients indicate that tourists are less likely to choose a destination if travel cost to that destination increases. Further examination also reveals that Germans are not as sensitive to travel cost changes as the other two markets. In fact, the size of the German coefficient is almost half that of the French and composite markets.

The large positive coefficients on the environmental attributes, wildlife and marine life reflect strong correlation between the probability of choosing a destination and increased environmental quality. The coefficients on WILD and MARINE are positive and statistically significant indicating that destinations with high environmental quality will more likely to be chosen by tourists. That is, clean sea water with healthy marine life and a destination with unique wildlife increase the utility (or enjoyment) of a tourist's holiday and hence the probability of choosing that destination. Although these environmental qualities contribute significantly to the destination choice decision in all three markets, the size of the coefficients differ greatly across the market segments. More specifically, in the French model, marine quality has a large coefficient of 0.78 compared to the German model where the same variable has a coefficient of only 0.27. The wildlife coefficient for the German is 0.52 while the corresponding value for the French model is only 0.38. On the other hand, the composite market model shows that its marginal utilities for marine life and wildlife are both high and approximateiy the

same in magnitude. These contrasting results are not alarming since they appear to reflect the different tastes of the markets as suggested by the tourism-marketing literature.

Whilst the above environmental attributes play a significant role in beach and nature tourism demand, the effect of beach development on destination choice is less clear in this analysis. In the French segment, development coefficients are statistically insignificant indicating that this market is neither more or less likely to choose a destination based on the level of development. On the other hand, this attribute has some importance in the composite market. In the latter, NODEVT and LITTLEDEVT are found to be significant and have positive coefficients indicating that limited beach development yields increasing marginal utilities. Therefore, tourists from this market segment are more likely to choose destinations with . However, following the German model, signs on the coefficients vary making it difficult to interpret these results with exactness.

Non-environmental attributes were also included in the model and their significance in destination choice analysed. The results show that local prices are significant variables in predicting holiday destination choice for the German and composite models only. More specifically, results show that good value for money have relatively large positive coefficients and are highly significant. This indicates that given a destination has good value for money, tourists from these markets are more likely to choose that destination. Moreover, as expected, this probability of choosing a destination is even higher when local prices are low. More importantly, this result suggests that high local prices are not a deterrent to tourism demand as long as they provide value for money. This is reinforced by the negative sign on *the High Price/ Poor Value for money* coefficient and on the dropped level or base case (*Low Price/ Poor Value*) in the German and composite segments. Recall that the coefficient on the base case can be calculated by summing the negative of all the coefficients corresponding to the remaining levels of the attribute. In this case, the coefficients for the base case for the German and composite models respectively are -0.26 and -0.45. In the French model, coefficients for this attribute are all statistically insignificant. In short, local prices are significant tourism demand variables for the German and composite markets while the French do not view this to be a relevant factor in their decision making.

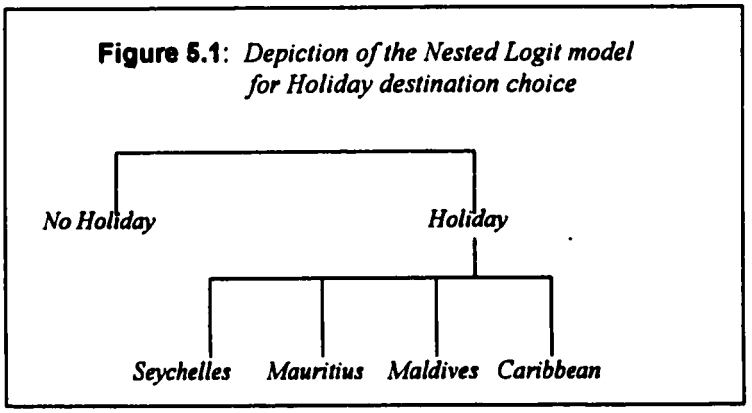
Type of lodging was another non-environmental attribute included in this analysis. T-statistics for this attribute are all statistically insignificant in the French and composite segment models. This suggests that type of accommodation has little influence in destination choice. However, t-statistics for the German model do reveal that the size of an exclusive hotel plays some role in determining holiday destination choice. The positive sign on the *Small/Exclusive* variable implies that such accommodation is preferred by the German market and hence increases the likelihood of the German market choosing that destination while the negative sign on a large exclusive hotel will decrease the probability of the destination being chosen.

Results also show that in the French segment, as income increases, the probability of choosing all alternatives increase while the reverse holds for the German market and to some extent the composite market. It is difficult to rationalise these results. Perhaps, the French view these alternatives as high income destinations while the German and other markets would rather visit an alternative destination not in this choice set given an increase in income. In the German model, INCOME1 is significant and negative indicating as income increases, the probability of Germans choosing the Seychelles decreases. Across the markets, INCOME3 is significant indicating that income effects the probability of choosing the Maldives.

Nested MNL Models

Nested MNL models were estimated for each market segment and used to test for violation of the IIA property. The nested logit models in this analysis had two levels: first, the decision to holiday or not holiday and second, the destination choice decision. The NMNL models for the two levels are depicted in Figure 5.1 below and the results reported in Table 5.2.

Figure 5.1: *Depiction of the Nested Logit model for Holiday destination choice*



Testing for the violation of the IIA property was conducted by testing if the inclusive value (HOLIDAY) in the NMNL models was significantly different from one. Inclusive values connect the levels of the hierarchy in the decision tree with each other in the sense that the attributes of the lower level attributes influence the choice at higher levels (Evers 1990). That is, it is possible that the decision to holiday or stay at home (or to go to an alternate destination not shown in the choice set) will be influenced by the utilities associated with destinations which can be chosen later. The corresponding test statistics are not in the critical value range and hence the null hypothesis is not rejected. As a result, the parameter of the inclusive value in all models are not significantly different from one. This implies that the IIA property is not violated and hence the simple MNL models can be used reliably to analyse tourists' holiday decision making process.

Table 5.2: *Results of Nested Models for the Three Market Segments*

Variable Name	Description	COMPOSITE Coefficient (T-Stat)	FRENCH Coefficient (T-Stat)	GERMAN Coefficient (T-Stat)
ASC	ASC1 (Sey)	1.85 (0.99)	1.39 (2.87)	0.34 (1.05)
	ASC2 (Mau)	1.31 (0.98)	0.65 (1.39)	-0.56 (-1.62)
	ASC3 (Mal)	1.86 (0.98)	1.17 (2.30)	0.14 (0.40)
	ASC4 (Car)	1.29 (1.0)	0.32 (0.71)	-0.19 (-0.61)
TRAVEL COST		-0.001 (0.0002)	-0.001 (-5.59)	-0.0007 (-3.82)
WILDLIFE	Unique	0.37 (0.06)	0.36 (4.39)	0.52 (7.23)
DEVELOPMENT	None	0.51 (0.10)	0.17 (1.24)	0.11 (1.06)
	Little	0.27 (0.11)	0.06 (0.40)	-0.02 (-0.13)
	Moderate	-0.16 (0.12)	0.13 (0.82)	0.36 (2.88)
LOCAL PRICES	High / Good Value	0.31 (0.10)	0.05 (0.33)	0.37 (3.53)
	High / Poor value	-0.38 (0.12)	-0.08 (-0.62)	-0.41 (-3.20)
	Low / Good Value	0.52 (0.10)	0.23 (1.71)	0.33 (3.10)
MARINE LIFE	State 1	0.41 (0.06)	0.75 (8.12)	0.25 (3.67)
LODGING	Small/Exclusive	0.17 (0.10)	0.22 (1.57)	0.55 (5.27)
	Large/Exclusive	0.15 (0.10)	0.15 (1.12)	-0.55 (-4.13)
	Nice	-0.12 (0.11)	.02 (0.15)	0.19 (1.92)
HOLIDAY		0.82 (0.39) (-0.47)[9]	1.63 (0.49) (1.13)[9]	1.97 (0.43) (2.24)[9]
McFadden R^2		.065	.089	.068
ρ^2		.254	.268	.223

Results from the nested models are consistent with those from the non-nested models. That is, significant variables in the nested models resemble those in the non-nested models. McFadden R^2 values for the German and composite nested models are slightly lower while the same statistic for the French model reflects a much higher

[9] t-statistic to test if coefficient is significant from one; t-stat = (β) - 1/ se(β)

pseudo R^2 value of 0.08 compared to 0.1 in the non-nested model. This suggests the nested model increases the explanatory power of the French decision making process.

5.2 Calibration and Welfare Analysis

As global competition increases, public decision makers are constantly finding ways to attract more tourists to the Seychelles. This has generally come in the form of development of new hotels and most times at the expense of environmental quality which in turn can effect the Seychelles' main foreign exchange earner - tourism. Consequently, welfare analysis can help show the impact of tourism policy scenarios to this sector. In addition, the models can be calibrated to existing market shares and with attribute changes, calibration can show the shift of markets to alternative destinations. In order for the Seychelles to maximise its market share, it is important for tourism officials to know what new tourism policy alternatives would offer.

The estimated MNL models describe the behaviour of the three market's choice surface and can be used to forecast the expected market choices of the sample for any tourism scenario interest (Louviere 1988). In this analysis, impacts of attribute changes on tourism demand for the Seychelles were assessed in two ways: the predicted change in market shares through calibration techniques and monetary impact through welfare measures. The latter generates monetary values per trip per person given a change in attribute levels. A negative sign signifies a loss in income while a positive sign a gain. The direction of the signs also corresponds to a lower or higher probability of choosing that destination given the attribute change. The welfare measures can also be interpreted as the tourist's WTP for that attribute.

Tables 5.3, 5.5 and 5.6 show the respective welfare and market share impacts of a change in the current attribute levels for the Seychelles, keeping all else constant. The base case for all choice alternatives reflect the current attribute levels and are shown in Tables 5.4a and 5.4b. In the case of the "none" alternative, all attribute levels are set to 0. Since the aim of this analysis is to determine the factors affecting tourism demand in the Seychelles, attribute changes were only simulated in the Seychelles alternative, keeping attribute levels for all remaining alternatives constant.

Table 5.3 shows the median welfare measures for various tourism scenarios. The results reveal larger welfare measures for the German market relative to the other market segments. This suggests that in general, the German market is willing to pay a

larger amount for tourism benefits relative to the other markets. Closer examination reveals that the French experience a greater welfare loss given marine degradation relative to wildlife disappearance while the opposite holds for the German market. The latter experiences a larger welfare loss of £79 given wildlife destruction compared to £50 in welfare loss in marine pollution. These figures suggest that the Germans value wildlife more than the French and marine life less than the French.

The models generate tourists' expected holiday destination choices. These predicted choices can be calibrated to tourists' observed choices. Such calibration procedures are *ad hoc* but provide ways to maximise external validity by relating output of stated preference models directly to observed choice behaviour (Louviere 1988). Examples of calibrating stated preference predictions can be found in Kocur *et al* (1982) and Louviere and Kocur (1983). In this study, the predicted choices Pr(*i*) of each model (French, German, Composite) generated by equation (10) were calibrated to actual visits from each of these market segments to the five alternative choices. The calibrated models were then used to forecast the redistribution impact of the actual market shares and to calculate the monetary impacts given a tourism development scenario.

More specifically, calibration implies adding some α_i to the indirect utility function V_i (.) vector such that it sets the probabilistic choice model equal to the actual observed visits to each alternative *i* (λ_i) in the base case. The modified utility function and model are expressed in equations (19) and (20).

$$V_i = \alpha_i + \beta_i X_i \tag{19}$$

$$Pr(i)_{adj} = \frac{e^{\alpha i + \beta' X_{ik}}}{\Sigma_{j \in Cn} e^{\alpha + \beta' X_{jk}}} = \lambda_i \quad ; \forall j \in C_n; i \neq j \tag{20}$$

where $Pr(i)_{adj}$ is the adjusted probability of choosing alternative *i* given α_i

λ_i is actual percentage of the total market segment (market shares) who visited alternative *i*

Using equation (20), changes in λ_i can be predicted when current attribute levels of the Seychelles are changed. Furthermore, substituting equation (16) for (19), corresponding welfare measures can be calculated using the standard CV formula given below. These results are summarised in Tables 5.3 and 5.4.

$$CV = -\frac{1}{\mu}\{\ln \Sigma \exp(V_i^0) - \ln \Sigma \exp(V_i^1)\} \quad (21)$$

Tables 5.5 and 5.6 summarise the changes in market shares and welfare impacts to a given attribute level change in the Seychelles alternative (see *Appendix 2* for graphs of simulations). Examination of the results show that in all scenarios, impacts on Seychelles tourism demand from all market segments can be substantial. For example, a development project which eradicates all unique wildlife in the Seychelles is forecasted to cause a fall in German tourists choosing to visit the country by approximately 6%. These tourists reallocate their holiday decision choice by going to the alternative destinations . This results in an increase of Germans choosing to visit Mauritius, Maldives and the Caribbean by 1.2%, 1.7% and 2.9% respectively with approximately the same number of Germans choosing the "none" alternative. The 6% fall in the Seychelles market share is a significant loss considering that the initial market share is 9%. This implies that only 3% of total Germans travelling abroad will now choose to visit the Seychelles if there is no unique wildlife in the country. Furthermore, the welfare impact for this scenario is a loss of approximately £79 for every German tourist considering this choice set. This welfare measure states how much German tourists are willing to pay to prevent a loss of unique wildlife. It can also be interpreted as the value/monetary satisfaction of unique Seychelles wildlife to a typical German tourist. In addition, the change in market shares can be used to calculate the expected change in total expenditure in the Seychelles generated by the tourists. The average visitor to the Seychelles spends approximately SR.413 (US$79; £49) per day and the average length of stay is 9.7 days. So multiplying these figures by the change in the number of Germans visiting the Seychelles yields a loss of SR.53m (US$10m; £6.3m) in total tourist expenditure to the country given the disappearance of the country's wildlife.

Response in the French and composite markets vary in intensity depending on the scenarios. In the above scenario, loss of unique wildlife in the Seychelles also causes a fall in French and "other" travellers choosing to visit the Seychelles by approximately 3% and 0.6% respectively. Like the German impact, these changes in the Seychelles market shares are serious when they are examined relative to the base case shares. More specifically, if the Seychelles no longer has unique wildlife, only 2.7% of total French travellers and 0.52% of other travellers would now choose to visit

the country. Table 5.6 shows the expected loss in total expenditure from these changes.

In all three markets (French, German and composite), the fall in visits to the Seychelles is marked by increases of tourists choosing the other alternatives or substitutes. Examining this shift in destination choice reveals some interesting substitution patterns. First, regardless of tourist, the greatest shift from the Seychelles alternative is always to the Caribbean. In the discussed scenario, the market shares for this alternative increased by 2%, 3% and 0.5% in the French, German and composite models. Second, the Mauritius and Maldives alternatives are treated very differently among the three markets. The change in Maldives market share is always higher for the German tourists while the change in Mauritius market share is always higher for the French and composite markets. This implies that the Maldives is a more favourable substitute for the Germans while Mauritius is for the French and composite markets. This reflects the differing tastes in the markets. Possible explanation for the French market shifting to the Mauritius alternative could be attributed to the country's connection to the French during the colonial period. One possibility of the Germans favouring the Maldives might be attributed to the similarity in image to the Seychelles, making it a closer substitute than Mauritius.

The greatest impact difference among the three segments can be seen in the accommodation changes. That is, a shift from small hotels to large exclusive hotels in the Seychelles causes a fall of 6% in the German market and only 0.5% in both the French and composite markets. This implies that only 3% of total German tourists will now choose to visit the Seychelles. With a welfare impact of SR.117 (US$22; £14) per person per trip, this yields a loss of approximately SR.237m (US$45; £28m) to the Seychelles tourist expenditure from all markets.

Briefly looking at another scenario where local prices in the Seychelles are now perceived to be low but poor value for money, the calibrated models project an increase of 4% in French travellers now choosing to holiday at this destination. Examining this figure in more detail shows that 3% of the French holiday makers who chose the Caribbean, 0.2% who chose the Maldives and 0.4% who chose Mauritius would now choose to visit the Seychelles. However, the Seychelles market shares for the German and composite markets fall by 3.8% and 0.6% respectively. Once again, these contrasting results serve to illustrate the different tastes in the markets. Namely,

they imply that the French are more sensitive to price levels while other markets are to quality and value for money. Converting the increase in the number of French tourists visiting the Seychelles for this given scenario into the total tourist revenue would yield a gain of approximately SR.76m (US$15m) for the Seychelles. However, the fall in the other segments yields a net fall in total tourist expenditure to the Seychelles of SR.142m (US$27m).

Finally, it should be mentioned that the model presented in this study can also be used to predict holiday choices in a competitive and dynamic environment. In reality, holiday destinations are constantly competing against each other to maximise their share of the limited tourism market. This is often accomplished by modifying the tourism attributes which attract tourists and making them more appealing. Thus, the above simulations be may extended and performed to the competing alternatives. Current levels of the attributes in the alternative destinations may be changed and the corresponding shifts in destination choice assessed. Such simulations are valuable in that they can provide additional information to the Seychelles tourism managers by indicating the predicted movement in tourist choices given attribute changes in the alternative destinations. Managers can then simulate potential counteractive changes to the Seychelles attributes which would possibly prevent or minimise market share loss.

5.3 Summary

This chapter has presented estimated results for three market segments generated by the probabilistic choice models. Such segmentation allows better understanding of differing tastes in these markets. Furthermore, the results showed how different regions made different holiday destination choices. This can be very helpful in forecasting Seychelles tourism demand from these regions more precisely and hence help in marketing strategies or what Eagles (1995) calls "market targeting".

In the first section, estimated coefficients were examined and found to be in the postulated directions. In brief, the French market appears to place more emphasis on marine quality than on any other attribute when deciding on a destination. In addition, the image of the Seychelles (brand effect) is also very large in this market. By comparison, the German market responds far more to attribute changes than the French and tends to value wildlife more highly than the marine environment.

In the second section, predicted impacts generated by the calibrated models were analysed. Important results surfaced in terms of how each market reacted to a specific scenario and how their destination choices changed. Furthermore, welfare measures were calculated. Combining these welfare measures with market share changes generated by the calibrated models, total expenditure impacts to the Seychelles were calculated. Such impacts have serious implications for the future of tourism planning in the Seychelles.

Table 5.3

*Median Welfare Measures (Seychelles rupees per trip/ per person)**

Attribute Change/ scenario in Seychelles only (all else remaining constant)	FRENCH MODEL	GERMAN MODEL	COMPOSITE MODEL
Increase in Travel Cost £1,100	-87.67	-144.40	-19.33
Increase in Travel Cost £1,550	-212.38	-402.28	-48.97
Eradication of Wildlife	-177.96	-662.00	-46.62
Decrease in Marine Quality	-269.30	-420.74	-49.98
Large Exclusive Lodging	-28.62	-712.40	-46.04
Increase to Heavy Development	-114.75	-360.86	-52.16
No Development	32.14	-200.59	24.36
Low Prices/Good Value for Money	96.35	-444.70	19.82
Low Prices but Poor Value for Money	252.55	-228.48	-47.63
High Prices but Poor Value for Money	-181.61	-685.36	44.77
Heavy Development, Decrease in Environmental Quality, Large Hotels	-333.86	-999.77	-85.34

* US$= SR.5.21 ; £ Sterling =SR.8.4

Table 5.4a : *Base Case Descriptions for Destination Choices*

DESTINATION	TRAVEL COST (£)	WILDLIFE	MARINE LIFE	LODGING	LOCAL PRICES	DEVT
Seychelles	900	Unique	Good	Small/ Exclusive	High/Good Value	Little
Mauritius	900	Unique	Good	Large/ Exclusive	Low/Good Value	Moderate
Maldives	900	None	Good	Small/ Exclusive	Low/Good Value	Little
Caribbean	900	None	Good	Large/ Exclusive	Low/Good Value	Moderate

Table 5.4b: *Base Case Descriptions in Effects Coding*

Attribute & Description	Attribute Levels- Base Case (Current Situation)				
	Seychelles*	Mauritius	Maldives	Caribbean	None
CONSTANT	1	1	1	1	0
TRAVEL COST	900	900	900	900	0
WILDLIFE	1	1	-1	-1	0
DEVELOPMENT					
None	0	0	0	0	0
Little	1	0	1	0	0
Moderate	0	1	0	1	0
LOCAL PRICES					
High/Good Value	1	0	0	0	0
High/Poor Value	0	0	0	0	0
Low/Good Value	0	1	1	1	0
MARINE	1	1	1	1	0
LODGING					
Small/Exclusive	1	0	1	0	0
Large/Exclusive	0	1	0	1	0
Nice	0	0	0	0	0
INCOME	5	5	5	5	0

* Changes in Attribute levels for this destination only

Table 5.5

Calibration and Changes in Market Shares

	Market	Seychelles	Mauritius	Maldives	Caribbean	None
Base case Actual Market share[10] (%) λ_i *(tourist numbers)*	French	5.579 *(25 048)*	21.4668	4.2617	68.68836	0.003546
	German	9.072768 *(20,601)*	19.10342	26.91837	44.9016	0.0038
	Other	1.091348 *(84 852)*	3.244931	1.001094	94.65826	0.004
		Change in λ_i Market Share of tourists (%)*				
Change in Attribute	**Market**	**Seychelles**	**Mauritius**	**Maldives**	**Caribbean**	**None**
Decrease in Marine Quality	French	-4.36	0.99	0.20	3.17	0.000136
	German	-3.62	0.75	1.07	1.80	0.0003
	Other	-0.61	0.02	0.01	0.58	2.64×10^{-5}
Eradication of Unique Wildlife	French	-2.86	0.65	0.13	2.08	0.0001
	German	-5.76	1.20	1.70	2.87	0.0004
	Other	-0.57	0.02	0.01	0.55	2.52×10^{-5}
Increase in Travel Cost (£ 1,550)	French	-3.42	0.78	0.15	2.18	0.0001
	German	-3.46	0.72	1.02	1.72	0.0002
	Other	-0.60	0.02	0.01	0.57	2.64×10^{-5}
Increase In Travel Cost (£1,100)	French	-1.40	0.32	0.06	1.02	5.2×10^{-5}
	German	-1.23	0.26	0.36	0.61	8.7×10^{-5}
	Other	-0.24	0.01	0.002	0.23	1.04×10^{-5}
Heavy Development	French	-1.83	0.42	0.08	1.33	6.8×10^{-5}
	German	-3.10	0.64	0.91	1.54	0.0003
	Other	-0.64	0.02	0.01	0.61	2.81×10^{-5}
No Development	French	0.51	-0.12	-0.02	-0.37	-1.91×10^{-5}
	German	1.68	-0.35	-0.50	-0.83	-0.0001
	Other	0.30	-0.01	-0.003	-0.28	-1.31×10^{-5}
Large Exclusive Hotel	French	-0.46	0.10	0.02	0.33	1.7×10^{-5}
	German	-6.22	1.29	1.83	3.09	0.0004
	Other	-0.56	0.02	0.01	0.53	2.45×10^{-5}
High Price/Poor Value For Money	French	-3.14	0.70	0.13	2.32	0.0001
	German	-5.97	1.24	1.76	3.0	0.0004
	Other	-0.55	0.02	0.01	0.52	2.41×10^{-5}
Low Price/Good Value For Money	French	1.63	-0.360	-0.64	-1.20	-7.82×10^{-5}
	German	0.36	-0.07	-0.11	-0.18	-2.53×10^{-5}
	Other	0.24	-0.01	-0.002	-0.23	-1.07×10^{-5}
Low Price/Poor Value For Money	French	4.20	-0.36	-0.17	-3.10	-0.0002
	German	-3.83	0.80	1.13	1.91	0.0003
	Other	-0.58	0.02	0.01	0.56	2.57×10^{-5}

***Results have been rounded up to two decimal places**

[10] Source: World Tourism Organisation Statistics, 1994

Table 5.6
Summary of Expected Impacts

Market	Base case of Actual # of tourists visiting the Seychelles
French	25 048
German	20 601
Composite	84 852

Change in current attribute levels of the Seychelles	Market	Expected change in # of visitors choosing Seychelles	Welfare measure per person/trip for each market (SR)*	Change in Total Seychelles Expenditure (SR millions)*	Change in total Seychelles expenditure (ALL MARKETS) SR .millions*
Decrease in Marine Quality	French German Composite	-12 134 -8 222 -47 509	-269.64 -420.67 -49.98	-49.20 -33.3 -192.63	-275.13
No Unique Wildlife	French German Composite	-7 960 -13 091 -44 372	-178.08 -662.00 -47.04	-32.27 -53.1 -179.91	-265.28
Travel Cost = £ 1,550	French German Composite	-9 527 -7 860 -46 551	-212.52 -402.28 -48.72	-38.63 -31.9 -188.75	-259.28
Travel Cost = £1,100	French German Composite	-3 896 -2 790 -18 371	-87.36 -144.40 -19.32	-15.80 -11.3 -74.49	-101.59
Development = Heavy	French German Composite	-5 085 -7 040 -49 666	-115.08 -360.86 -52.08	-20.62 -28.5 -201.38	-250.5
No Development	French German Composite	1 414 3 800 23 042	32.76 -200.59 24.36	5.73 15.4 93.43	114.56
Large Exclusive Hotel	French German Composite	-1 266 -14 100 -43 204	-28.56 -712.40 -46.2	-5.13 -57.17 -175.17	-237.47
High Price /Poor Value for Money	French German Composite	-14 100 -13 568 -42 582	-181.44 -685.36 44.52	-57.16 -55.0 -172.65	-284.81
Low Price/ Good Value for Money	French German Composite	7 300 810 18 839	96.35 444.70 20.16	29.6 3.2 76.38	109.18
Low price/Poor Value for Money	French German Composite	18 900 -8 700 -45 228	254.52 -228.48 -47.88	76.6 -35.3 -183.38	-142.08

* US$= SR.5.21 ; £ Sterling =SR.8.4

CHAPTER 6 CONCLUSION

6.1 Research Objective and Findings

This research study developed and used a decision-making model to better understand tourist behaviour. This study was designed to examine the economic benefits of Seychelles tourism under possible changes in environmental quality and other tourism attributes which would then help develop a sustainable tourism policy for the country.

A multi-nomial logit model was used to examine the discrete choice problem of choosing between four alternative destinations or not holidaying at all. The alternative destinations were represented by the Seychelles and three competing destinations. Using data from CE surveys, three segmented models were developed. Welfare calculations and calibration procedures were also presented.

The results of this research study provide insight into the underlying choice behaviour of nature-based tourists as well as estimated impacts of various tourism policies on demand for the Seychelles. The CE's flexibility and its resemblance to real life decision making makes it an attractive method for this research. It allows the analyst to extract more information from each respondent and reactions to combinations of attributes that are unobserved in revealed preference data. This type of data also makes it possible to model demand for new alternatives without making strong assumptions on model structure that are required when revealed preferences for existing alternatives are used (Ben-Akiva and Lerman 1985). Moreover, it allows tourism planners to assess tourism demand in terms of trade-offs between attributes. Welfare economics allowed estimation of the welfare impact of various environment-related pollution and tourist-related initiatives.

This analysis leads to the conclusion that tourism demand can be forecasted using the CE method. Moreover, it also reveals that segmenting models into different groups allow for better understanding of the whole market and thus for more precise marketing. The research also provided economic benefits of Seychelles tourism under possible changes in environmental quality and other tourism attributes. In brief, this research has also illustrated how CE can be applied successfully to address a variety tourism and development management problems. It was applied to analyse preferences for Seychelles tourism policy alternatives, to predict holiday choice

behaviour by relating CE predictions to actual choices and to predict holiday choices in a competitive environment. The CE model has been shown to be a powerful marketing tool for the tourism industry, capable of identifying and valuing tourists' needs and developing appropriate programmes and strategies to reach them.

6.2 Limitations

Despite the wide analytical and empirical scope of the CE model presented in this research, several limitations should be mentioned. These limitations primarily arise from the nature of CE and the sample used. First, there exists some sample bias. More specifically, the tourist sample for the research was restricted to tourist arrivals in the Seychelles, and hence tourists who had already decided to visit the country. As a result, preference in destination choice may be bias in the CE. To minimise bias, the sample should have consisted of potential travellers at the origins interested in nature-based tourism. However, the large costs involved make such survey administration impractical. Hence, most research of this nature are usually limited to convenience samples as in this study.

Second, the relatively large number of attributes, levels and alternatives used in this CE design led to a lengthy and complex survey where respondents had to evaluate sixteen choice sets. As a result respondent fatigue is possible. This could have been rectified by further blocking the design, creating four versions consisting of eight choice sets. However, this would have to be compensated by a larger sample size for valid analysis. Moreover, given the limited time for survey administration for this research, trade-offs had to be made between CE design and sample size.

Third, the estimated welfare measures do not take the ASC association into account. In this study, the ASCs were used as a crude measure for brand or image effect. Such effects are thought to be predominant in holiday decision making and consequently need to be studied more.

Another limitation of tourist surveying concerns language barriers. In order to ensure respondents' understanding of a survey, translations are often necessary when the sample consists of international tourists. However, translations are costly and hence are often restricted to few languages only. In this study, the CE was translated into four languages. Therefore, the tourist sample for this research was restricted to those who could understand the (translated) surveys. Moreover, some concepts may

be difficult to translate or may have different connotations for different countries. This can be minimised by the use of pictures, graphs or computer generated environmental scenarios to illustrate the attribute levels and may be combined with text for added clarity.

Finally, in this study, forecasting the demand for Seychelles tourism was based on only the six attributes included in the choice experiment. However, it is important to realise that other important factors that influence destination choice may not have been taken into account. For example, in the recreation and tourism literature, availability/length of vacation time and past experiences (good or bad) are also thought to influence destination choice.

6.3 Future Research

This thesis used a choice experiment to elicit preference data from tourists in the Seychelles. CE unlike RP models is subject to hypothetical bias since preferences are based on hypothetical situations and not real observed behaviour. As a result, demand and welfare estimation results may be overstated/understated and should be used with some caution. Recently, an alternative model has been suggested which combines the specific "attractiveness" of RP and CE preference data discussed in chapter 3. It has been proposed that since both CE and RP models follow a RUM framework, they can be estimated jointly. Hence exploiting the information in each source and in turn providing richer results (Adamowicz *et al* 1994; Swait and Louviere 1993; Swait *et al* 1994; Hensher and Bradley 1993). In RP models, the measures of attributes of the "real" alternatives are entered in the objective component. Therefore, given a similar set of attributes (one based on CE design and the other based on actual conditions), the two data sets can be "stacked" to estimate the joint model (Adamowicz *et al* 1994).

Another shortcoming of the model presented in this research concerns the elimination of socio-economic variables in RUM. As was discussed previously, constant variables such as income and age "drop out" of random utility models when differences between utility functions are calculated. However, income is considered to be an important determinant in choosing a holiday destination and as such should be incorporated. Several attempts have been put forward to resolve this issue. They include interacting such variables with the travel cost variable and using a more

complicated model specification. The latter has resulted in difficulties with welfare calculations since the marginal utility of income would no longer be constant. Estimation of the compensating variation welfare measure requires that the marginal utility of income remains constant.

Another area worth considering for future research concerns model segmentation[11]. This thesis segmented the tourist sample according to geographical origin creating three models. Hence, marketing can be tailored to a specific country's taste preferences. However, Eagles (1995) suggests that marketing and managing for successful sustainable tourism requires segmenting the entire market into the different nature-based tourism niches or user types (for the Seychelles, that would be scuba diving, bird watching, ecotourism, beach, etc.). This idea is also supported by Adamowicz (1994, p.12) who goes on to say that such segmentation can " provide broad enough response surface to allow for accurate benefit transfer calculations". Given that respondents are asked about their activity interest, the tourist sample can then be segmented into the different niche markets and the respective demand estimated and analysed. This segmentation implies that more precise information can be obtained for the different users or niche markets. In turn, this enables more efficient marketing strategies targeted at these specific users. Furthermore, price-setting for the different nature-based activities would be more accurate and representative of the true value to these specific users. An alternate method of market segmentation frequently used in the tourism and marketing literature is factor analysis. This technique identifies segments or groups based on attitude. A final note on market segmentation involves the possibility to incorporate different tastes in the specifications of the utilities. That is, it may be better to proceed with separate market segment models which have different model specifications (Ben-Akiva and Lerman 1988).

A further area that should be explored is the potential of nested MNL models for analysing tourist demand. While such models are fairly complex, they can provide further insight into the decision making process of tourists. Eymann and Ronning (1997) used a three-level nesting structure to analyse the determinants of individual choice among destinations and vacation activities. The first level consisted of the

[11] For market segmentation studies in the tourism area, see De la Beaumelle, 1976; Schidhauser, 1977; Lang, 1976; Woodside and Ronkainen, 1978.

decision to go on vacation or not. The second level then distinguished the alternative vacation purposes (beach, adventure, sightseeing, etc.). These were then split into subsets of regions.

A further area open for research is the need to calculate non-use values of the Seychelles environment. Calculated benefits in this study were for use values only (activities based on environment). Evaluating all development projects involves conducting cost benefit analysis (CBA). Thus, for true environmental benefits and costs, non-use values should be considered. This in turn would ensure proper sustainable tourism development.

Finally, attempts to incorporate image destination and perceptions in destination choice models should be considered. It is generally agreed that favourable impressions of a tourist area will increase the probability of that area being chosen. That is, it is realistic to assume that tourists do not have perfect information regarding the quality of attributes to destinations. Hence, constructing a RUM based on perceived quality of attributes may resemble true destination choice behaviour. In addition, a comparison between objective and perceived quality measures may prove to be useful to tourism planners (Morton, 1994). Furthermore, previous experiences (bad, good) also contribute to holiday destination choice and should be investigated.. Hence, incorporating perception of tourist attributes and past experiences in the CE model might prove to be a valuable marketing tool. Goodrich (1978) used an attitude model to analyse the relationship between preferences for and perceptions of vacation destinations while and Hahti and Yavas (1980) used pairwise profile comparisons. However, as in most tourism studies, rating and ranking methods were used. Recently, McLeod (1995) analysed perception of environmental quality in discrete choice model. Such study in a tourism context should be examined.

6.4 Summary

Despite the caveats mentioned, this study has nonetheless illustrated the appeal of using a stated choice econometric model to analyse international tourist demand. While certain problems and limitations with this model still remain, this study nonetheless provides a basic foundation for future applications in sustainable tourism planning and development.

With respect to the Seychelles, this research has shown the vulnerability of the country's tourism industry and welfare to adverse environmental quality changes and other tourist attributes. In the final analysis, the Seychelles tourism industry will have to target their marketing to the different nature tourism niches if they are to survive in a fierce competitive market. Furthermore, if future generations of the Seychelles are to continue to reap the tourism benefits, more consideration will have to be paid to the economic values tourists place on the country's environment. Ultimately, the economic sustainability of the Seychelles will lie in the ability of public policy makers to recognise the economic value associated with the Seychelles environment and in turn integrate these values at all levels of public decision making.

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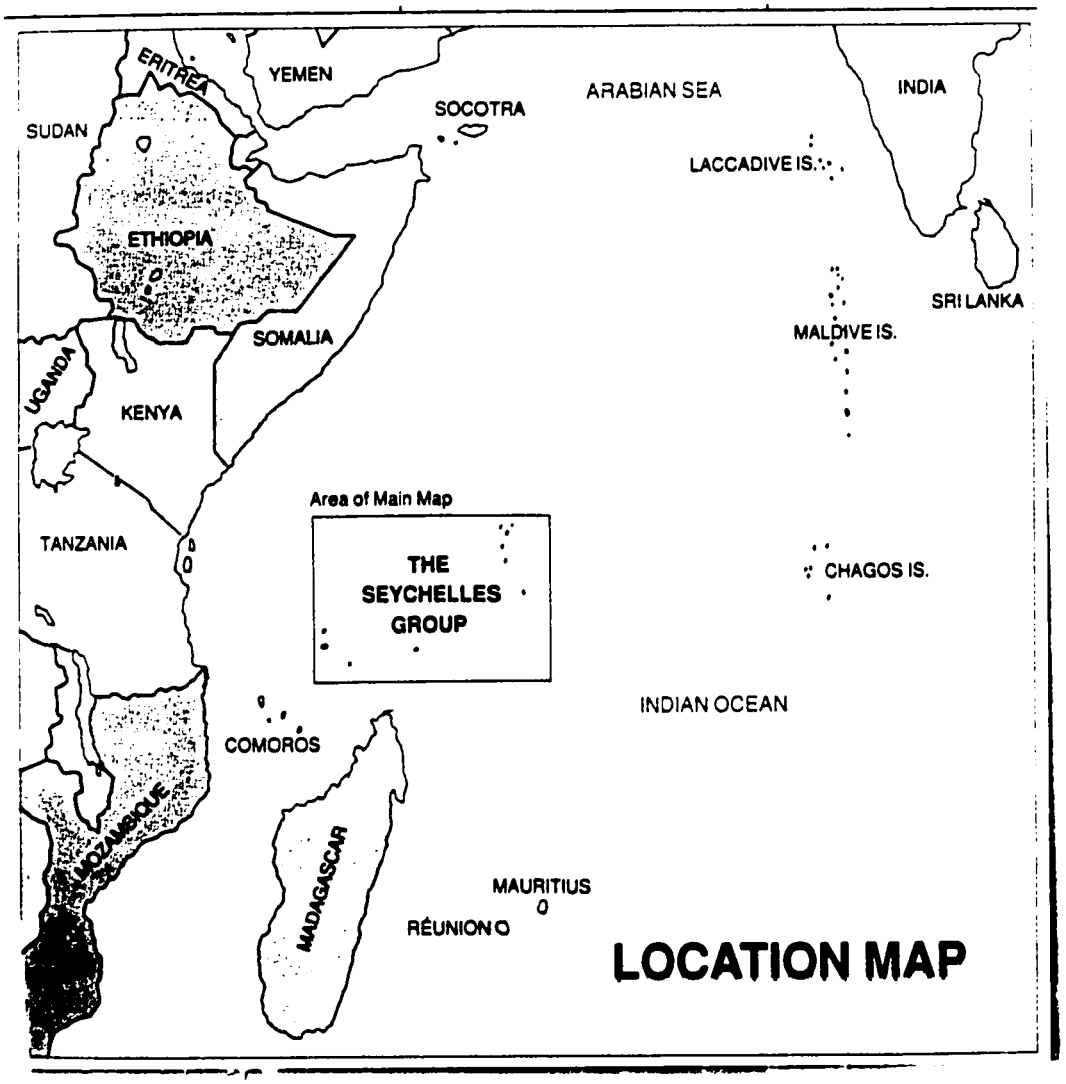
APPENDICES

APPENDIX A: *Map of the Seychelles*[*]



[*] SOURCE: Amin, Willets and Skerrett (1994) *Journey through Seychelles.*, Camerapix Publishers International, Nairobi

APPENDIX B[13] : Test of Taste Variation

According to Ben-Akiva and Lerman (1985), it is possible to test for taste variations across market segments. This is accomplished by using the likelihood ration test comprised of the summation of the maximum log likelihoods across the market segments and log likelihood for the model using the full data set.

Let N_g denote the sample size of market segment g = 1,...,G, where G is the number of geographical market segments and

$$\sum_{g=1}^{G} N_g = N \,, \tag{22}$$

where N is the full sample size used in this study. The null hypothesis for no taste variations across the geographical market segments is

$$\beta^1 = \beta^2 = \ldots = \beta^G \tag{23}$$

where β^g is the vector of coefficients of market segment g. The likelihood ratio test statistic is given by

$$\lambda_{LR} = -2\left[\mathcal{L}_N(\beta) - \sum_{g=1}^{G} \mathcal{L}_{Ng}(\beta^g) \right] , \tag{24}$$

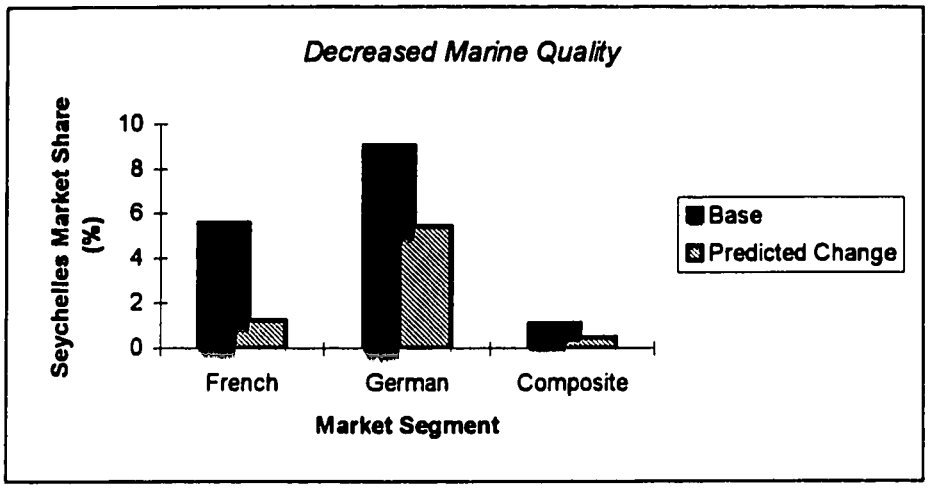
where $\mathcal{L}_N(\beta)$ is the log likelihood for the restricted model that is estimated with the full data set and $\mathcal{L}_{Ng}(\beta^g)$ is the maximum likelihood of the model estimated with the g th subset of the data. This test statistic is χ^2 distributed with the degrees of freedom equal to the number of restrictions,

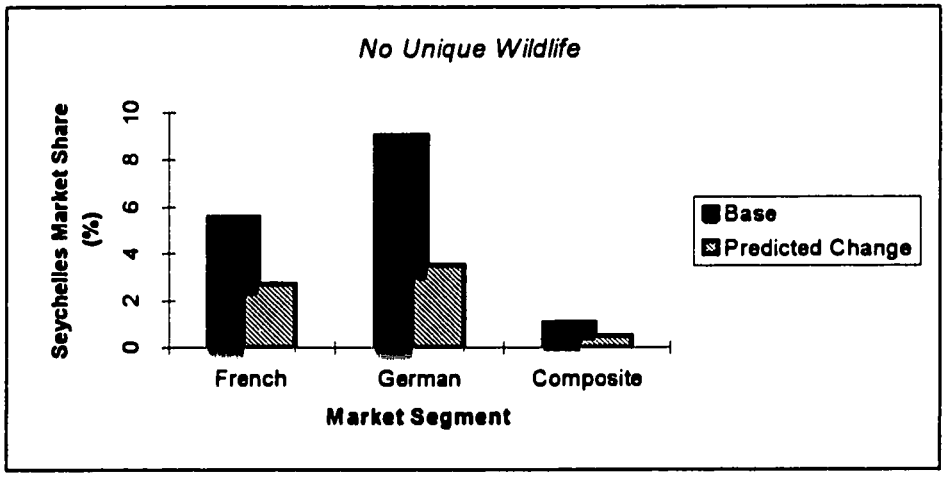
$$\sum_{g=1}^{G} K_g - K \,, \tag{25}$$

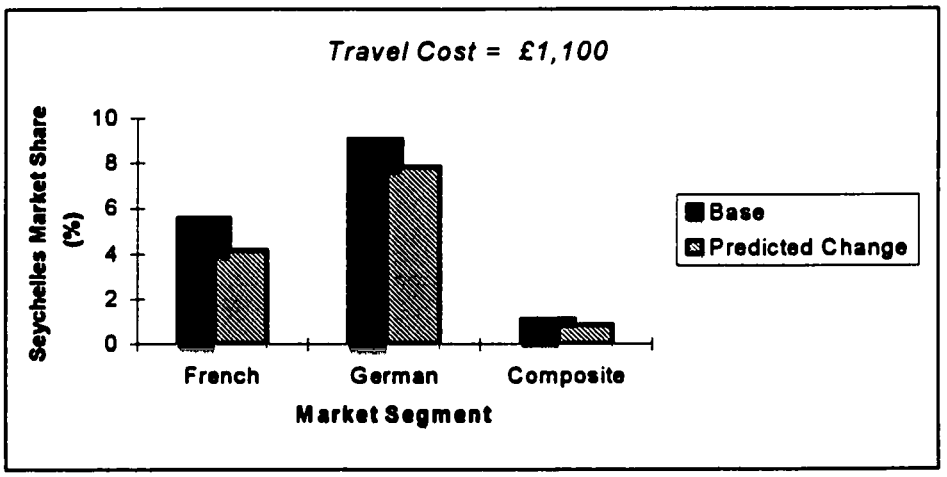
where K_g is the number of coefficients on the g th market segment model. Rejection of the equality of coefficients across the market segments implies that differences among the market segment coefficients are significantly different and hence tastes do exist among the different market segments and segmentation of data is thus valid.

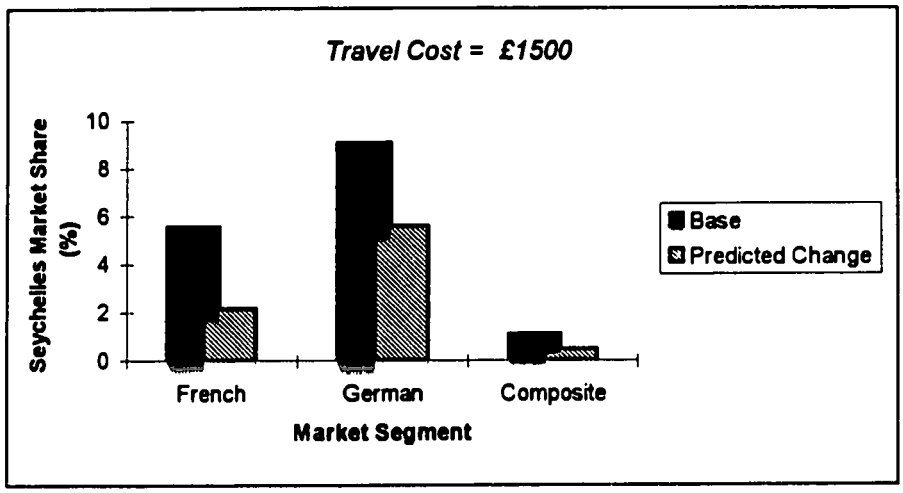
[13] This discussion closely follows Ben-Akiva and Lerman (1985) , page. 194

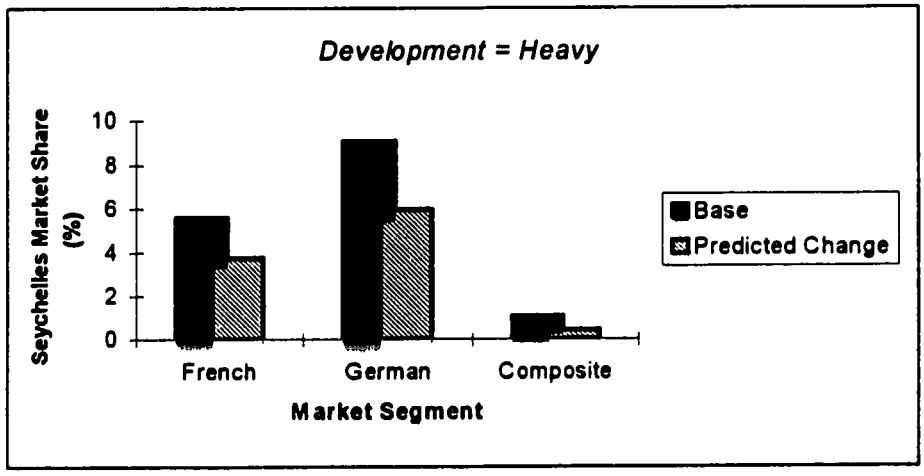
APPENDIX C : *Graphs of Simulations*

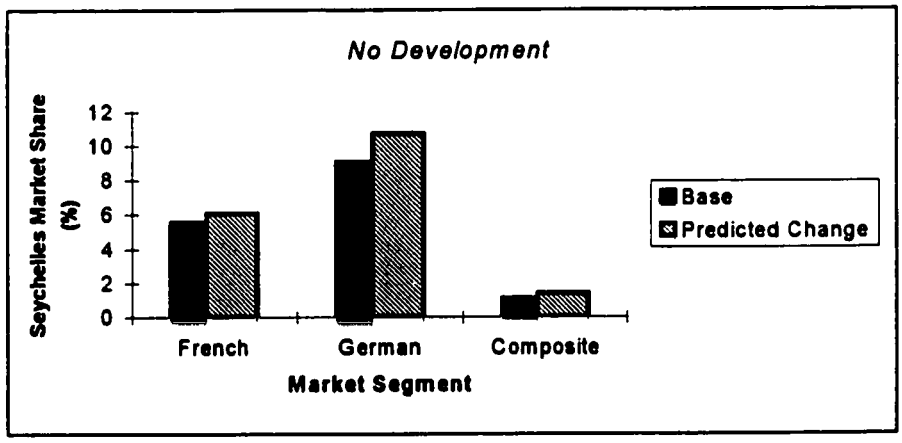


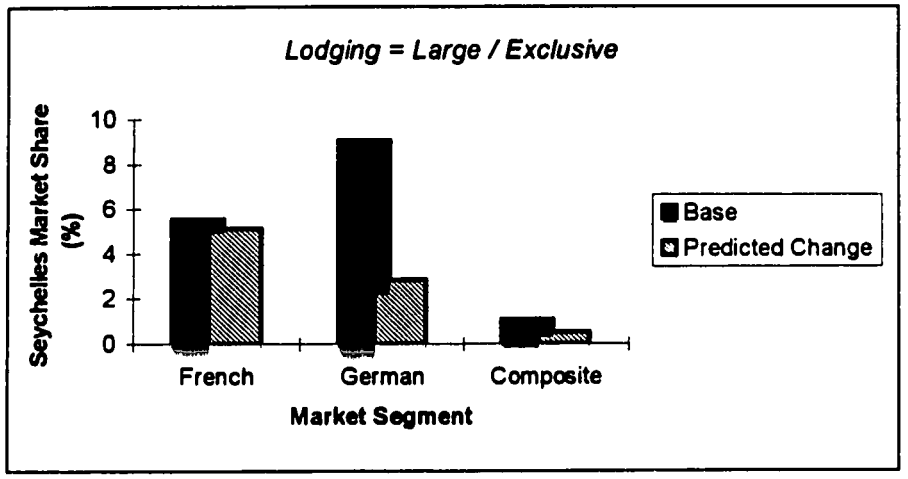


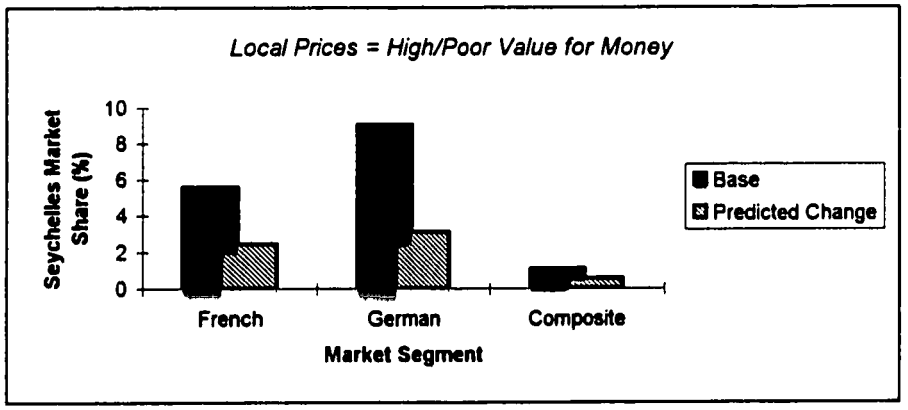


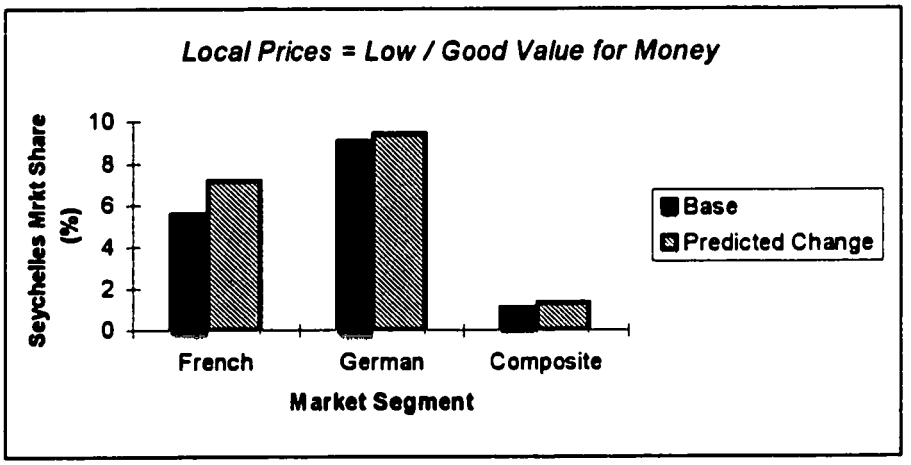

Travel Cost = £1500
Seychelles Market Share (%)
10
8
6
4
2
0
French
German
Composite
Market Segment
Base
Predicted Change

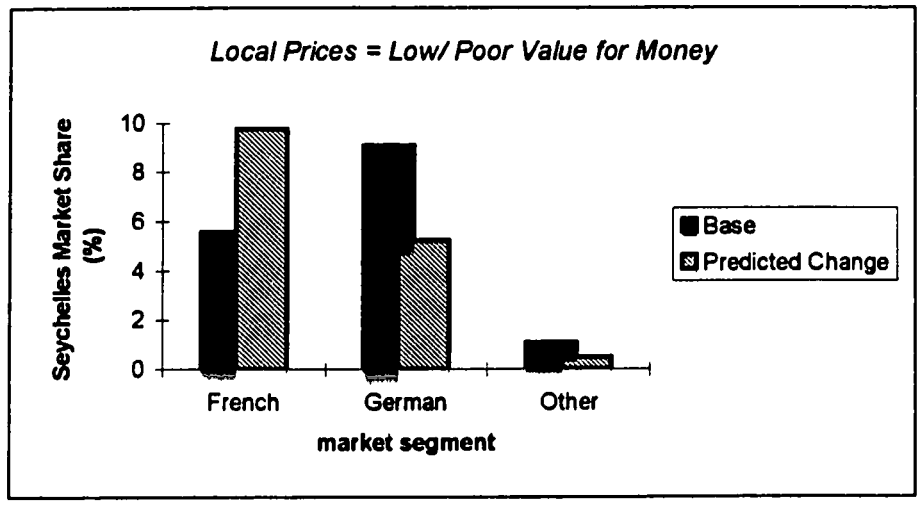

Development = Heavy
Seychelles Market Share (%)
10
8
6
4
2
0
French
German
Composite
Market Segment
Base
Predicted Change


No Development
Seychelles Market Share (%)
12
10
8
6
4
2
0
French
German
Composite
Market Segment
Base
Predicted Change


Lodging = Large / Exclusive
Seychelles Market Share (%)
10
8
6
4
2
0
French
German
Composite
Market Segment
Base
Predicted Change


Local Prices = High/Poor Value for Money
Seychelles Market Share (%)
10
8
6
4
2
0
French
German
Composite
Market Segment
Base
Predicted Change


Local Prices = Low / Good Value for Money
Seychelles Mrkt Share (%)
10
8
6
4
2
0
French
German
Composite
Market Segment
Base
Predicted Change


Local Prices = Low/ Poor Value for Money
Seychelles Market Share (%)
10
8
6
4
2
0
French
German
Other
market segment
Base
Predicted Change

APPENDIX D

Copy of English Survey, Version 2.

University of Alberta
Edmonton

Canada T6G 2H1

Department of Rural Economy
Faculty of Agriculture, Forestry, and Home Economics
Y.G. Rahemtulla, Graduate Student
Phone:(403)492-4603, Fax: (403) 492-0268

Dear Respondent,

I am a graduate student at the University of Alberta, Canada where I am researching the role of environmental quality in attracting tourists to the Seychelles.

Critical to my research is the survey of tourists going to the Seychelles and Mauritius. The survey consists of two parts. The first asks general questions and opinions. You are not obliged to answer all the questions and may skip any that you wish. The second part requires that you complete a "choice experiment" which involves choosing between four tropical island destinations. The survey takes approximately 15-20 mins to complete and is entirely voluntary. All responses will be completely confidential.

The beaches, wildlife and marine life of tropical islands are among the most beautiful in the world and are enjoyed by many every year. This project will be help guide public decisions on future development on these islands. Your support is therefore invaluable in helping to preserve the islands' natural environment for future visitors and local people.

In appreciation of your help, a draw will be held to win a copy of Adrian Skerett's magnificent book on the Seychelles with photographs of the islands' breathtaking natural environment. If you wish to enter the draw, please fill out the form at the end of the questionnaire. This form will be torn off *before* the responses are examined so that your anonymity will be preserved.

I will be happy to answer any questions you may have concerning the project or the survey on arrival to the Seychelles/Mauritius and you may phone at (Seychelles) 22 50 66 or email at yrahemtu@gpu.srv.ualberta.ca .

I thank you for your time.

Sincerely,

Yasmin Rahemtulla
M.Sc. Student

PART I. GENERAL INFORMATION

1. What Month are you flying in?

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

jan feb March April May June July Aug Sept. Oct. Nov. Dec.

2. What is your final destination? Mauritius☐ Seychelles☐ Both☐

3. Was this your first choice? Yes☐ No☐

4. Length of Holiday. 1wk☐ 10 days☐ 2 weeks☐ more 2wks☐

5. a) Purpose of Visit: Business☐ visiting family☐ Holiday☐

b) If this is a HOLIDAY trip, why did you choose this destination for a holiday?

☐Nature tourism (hiking, viewing of wildlife such as birds, turtles etc.)

☐Beach tourism (snorkelling, scuba diving, swimming, deep sea fishing..)

☐Cultural tourism (visiting museums, local customs)

☐Shopping

c) If you ticked BUSINESS or VISITING FAMILY , please DO NOT continue with the rest of the survey .

6. Which of the following holiday destinations did you consider for this holiday?

☐Seychelles ☐ Maldives ☐ Madagascar ☐ Reunion Island

☐Mauritius ☐ Comores ☐ Kenya ☐ Caribbean

☐Cuba ☐Far East ☐Other(please specify)_____

7. a) Have you ever been to the Seychelles before?

☐YES ☐NO.

b) Have you ever been to Mauritius before?

☐YES ☐NO.

c) Have you ever been to the Maldives before?

☐YES ☐NO.

d) Have you ever been to the Caribbean before?

☐YES ☐NO.

8. What is your nationality? _____

9. What is your Age? Please tick one of the categories below.

☐ 18- 20 ☐ 20-30 ☐ 30-40 ☐ 40-50 ☐ 50-60 ☐ 60-70 ☐ +70

10. What is your occupation? Please tick one of the categories below

☐ Manager and administrator

☐ Professional Occupation

☐ Associate professional and technical occupations

☐ Clerical and secretarial occupations

☐ Craft and related occupations

☐ Personal and protective services occupation

☐ Sales

☐ Plant and machine operatives

☐ Other occupations

11. Which of the following categories best describes your household's annual income *before taxes*? Please tick one category.

☐£0-£10,000 ☐£15,001-£20,000 ☐£30,001-£40,000 ☐£50,001-£75,000

☐£10,001-£15,000 ☐£20,001-£30,000 ☐£40,001-£50,000 ☐ + £75,001

PLEASE READ THE GLOSSARY OF TERMS BEFORE COMPLETING THE REST OF THE SURVEY.

13. Based on all the information available to you (from previous visitors, brochures, travel agent etc.), please select the description which most closely matches your expectations of your chosen destination.

Wildlife	☐ Many unique fauna and flora easily observed in and out of nature parks ☐ No unique fauna or flora ☐ I don't know
Marine Life	☐ Undamaged coral reefs, large fish population with many species; pristine beaches; clear water ☐ Damaged or dead reefs, fish rarely observed, coarse, sandy beaches ☐ I don't know
Local prices	☐ High Local Prices but good value for Money ☐ High Local Prices but poor value for Money ☐ Low/cheap local prices but poor value for money ☐ Low Local Prices and good value for money ☐ I don't know
Beach Development and level of congestion	☐ None ☐ Little ☐ Moderate ☐ Heavy ☐ I don't know

PART II: Choice of Holiday Destination (VERSION 2)

In this section you will examine 16 different scenarios which offer you the choice of holidaying at 4 different destinations **or** not going on holiday at all. Please assume that the 4 destinations presented in each scenario are the **only** destinations that you can choose from for this holiday trip. I would like you to indicate for each scenario which destination you would choose if any given your **CURRENT** lifestyle (i.e. income level; preferences etc.).

The enclosed information sheet entitled "Glossary of Terms" provides detailed information about the terms used in this survey. Please read them before proceeding with this section of the survey.

Example

Suppose after examining the descriptions of the Seychelles, Mauritius, the Maldives and the Caribbean below, you feel that you would take your holiday at one of these destinations and you prefer the Maldives. You indicate this choice by ticking the box under the Maldives column as shown below.

a) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked ?

FEATURES OF DESTINATION	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	less than £900	less than £900	£900 – £1,300	less than £900	
Unique Wildlife	No unique fauna or flora	Unique fauna or flora	No unique fauna or flora	No unique fauna or flora	I WOULD NOT CHOOSE
Beach Dev't & Congestion	Heavy	Moderate	Little	Heavy	ANY OF THESE HOLIDAY DESTINATIONS
Local Prices	HIGH but GOOD VALUE for money	LOW and GOOD VALUE for money	LOW and GOOD VALUE for money	HIGH but GOOD VALUE for money	
Marine Life	STATE 2	STATE 1	STATE 1	STATE 1	
Lodging	self catering	small exclusive hotel	small exclusive hotel	Nice hotel	
	☐	☐	☑	☐	☐

Tick ONE and only one Box

Please complete all 16 of the scenarios that follow. Missing any of these questions will not allow proper analysis of your choices!

1) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per Person	+£1,800	+£1,800	£ 900 - £ 1,300	less than £900	
Unique Wildlife	No	Yes	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY
Beach Dev't & congestion	Moderate	Moderate	Little	Heavy	
Local Prices	HIGH but POOR VALUE	LOW but POOR VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 1	STATE 2	STATE 1	STATE 1	
Lodging	small exclusive hotel	Large luxury hotel	small exclusive hotel	nice hotel	
	☐	☐	☐	☐	☐

Tick ONE and ONLY one box

---

2) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	£900 or less	£900- £1,300	£900 - £1,300	less than £900	
Unique Wildlife	No	Yes	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY DESTINATIONS
Beach Dev't & congestion	Little	Little	Little	heavy	
Local Prices	HIGH and GOOD VALUE	HIGH but POOR VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 1	STATE 2	STATE 1	STATE 1	
Lodging	Nice hotel	Large luxury hotel	small exclusive hotel	Nice hotel	
	☐	☐	☐	☐	☐

Tick ONE and ONLY one Box

3) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	£1,300 - £1,800	+£1,800	£900 - £1,300	less than £900	
Unique Wildlife	Yes	Yes	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY DESTINATIONS
Beach Dev't & congestion	None	Heavy	Little	heavy	
Local Prices	LOW but GOOD VALUE	HIGH but POOR VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 1	STATE 1	STATE 1	STATE 1	
Lodging	large luxury hotel	self catering	small exclusive hotel	Nice hotel	
	☐	☐	☐	☐	☐

Tick ONE and ONLY one Box

---

4) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	£900 - £1,300	£1,300 - £1,800	£900 - £1,300	less than £900	
Unique Wildlife	No	Yes	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY DESTINATIONS
Beach Dev't & congestion	Heavy	heavy	Little	Heavy	
Local Prices	LOW but GOOD VALUE	HIGH but GOOD VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 1	STATE 2	STATE 1	STATE 1	
Lodging	large luxury hotel	Nice hotel	Small exclusive hotel	Nice hotel	
	☐	☐	☐	☐	☐

TICK one and ONLY one box

5) Assuming the following holiday destinations were the ONLY FOUR destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	£900-£1,300	£900 - £1,300	£900 - £1,300	less than £900	
Unique Wildlife	Yes	Yes	No	No	I WOULD NOT CHOOSE
Beach Dev't & congestion	Heavy	Little	Little	Heavy	ANY OF THESE
Local Prices	LOW but POOR VALUE	LOW but POOR VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	HOLIDAY DESTINATIONS
Marine Life	STATE 1	STATE 1	STATE 1	STATE 1	
Lodging	self catering	Large luxury hotel	small exclusive hotel	Nice hotel	
	☐	☐	☐	☐	☐

Tick ONE and ONLY one Box

6) Assuming the following holiday destinations were the ONLY FOUR destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	£900 -£1,300	£1,300 - £1,800	£900 - £1,300	less than £900	
Unique Wildlife	No	No	No	No	I WOULD NOT CHOOSE
Beach Dev't & congestion	Heavy	Heavy	Little	Heavy	ANY OF THESE
Local Prices	HIGH but GOOD VALUE	HIGH but POOR VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	HOLIDAY DESTINATIONS
Marine Life	STATE 2	STATE 2	STATE 1	STATE 1	
Lodging	Self catering	small exclusive hotel	small exclusive hotel	Nice Hotel	
	☐	☐	☐	☐	☐

Tick ONE and ONLY one Box

7) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	£1,3000 - £1,800	£900 or less	£900 - £1,300	less than £900	
Unique Wildlife	No	Yes	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY DESTINATIONS
Beach Dev't & congestion	None	None	Little	Heavy	
Local Prices	LOW and POOR VALUE	LOW and GOOD VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 1	STATE 2	STATE 1	STATE 1	
Lodging	self catering	small exclusive hotel	small exclusive hotel	Nice hotel	
	☐	☐	☐	☐	☐

Tick ONE and ONLY one Box

8) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	£1,300 - £1,800	+£1,800	£900 - £1,300	less than £900	
Unique Wildlife	Yes	No	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY DESTINATIONS
Beach Dev't & congestion	Little	Heavy	Little	Heavy	
Local Prices	HIGH but GOOD VALUE	HIGH but GOOD VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 2	STATE 1	STATE 1	STATE 1	
Lodging	self catering	large luxury hotel	small exclusive hotel	Nice hotel	
	☐	☐	☐	☐	☐

Tick ONE and ONLY one Box

9) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	+£1,800	less than £900	£900 - £1,300	less than £900	
Unique Wildlife	Yes	No	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY DESTINATIONS
Beach Dev't & congestion	Heavy	Little	Little	Heavy	
Local Prices	LOW and GOOD VALUE	HIGH but POOR VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 2	STATE 1	STATE 1	STATE 1	
Lodging	small exclusive hotel	small exclusive hotel	small exclusive hotel	Nice hotel	

☐ ☐ ☐ ☐ ☐

Tick ONE and ONLY one Box

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10) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	+£1,800	+£1,800	£900 - £1,300	less than £900	
Unique Wildlife	No	No	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY DESTINATIONS
Beach Dev't & congestion	Heavy	Heavy	Little	Heavy	
Local Prices	LOW but POOR VALUE	LOW and GOOD VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 2	STATE 2	STATE 1	STATE 1	
Lodging	Nice hotel	self catering	small exclusive hotel	Nice hotel	

☐ ☐ ☐ ☐ ☐

Tick ONE and ONLY one Box

11) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	+£1,800	less than £900	£900 - £1,300	less than £900	
Unique Wildlife	Yes	Yes	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY DESTINATIONS
Beach Dev't & congestion	Heavy	None	Little	Heavy	
Local Prices	LOW and GOOD VALUE	HIGH but GOOD VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 1	STATE 1	STATE 1	STATE 1	
Lodging	Nice hotel	Nice hotel	small exclusive hotel	Nice Hotel	
	☐	☐	☐	☐	☐

Tick ONE and ONLY one Box

12) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	£900- £1,300	£900 -£1,300	£900 - £1,300	less than £900	
Unique Wildlife	Yes	No	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY DESTINATIONS
Beach Dev't & congestion	Heavy	None	Little	Heavy	
Local Prices	HIGH but POOR VALUE	LOW and GOOD VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 2	STATE 1	STATE 1	STATE 1	
Lodging	Large luxury hotel	Self catering	small exclusive hotel	Nice hotel	
	☐	☐	☐	☐	☐

Tick ONE and ONLY one Box

13) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	less than £900	£900 - £1,300	£1,300 - £1,800	less than £900	
Unique Wildlife	Yes	No	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY DESTINATIONS
Beach Dev't & congestion	None	Heavy	Little	Heavy	
Local Prices	LOW but POOR VALUE	LOW but POOR VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 2	STATE 1	STATE 1	STATE 1	
Lodging	Nice hotel	Nice hotel	small exclusive hotel	Nice Hotel	

☐ ☐ ☐ ☐ ☐

Tick ONE and ONLY one Box

14) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	less than £900	£900 - £1,300	£900 - £1,300	less than £900	
Unique Wildlife	No	No	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY DESTINATIONS
Beach Dev't & congestion	None	None	Little	Heavy	
Local Prices	Heavy	HIGH but POOR VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 2	STATE 2	STATE 1	STATE 1	
Lodging	small exclusive hotel	Large luxury hotel	small exclusive hotel	Nice hotel	

☐ ☐ ☐ ☐ ☐

Tick ONE and ONLY one Box

15) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	less than £900	£1,300 - £1,800	£900 - £1,300	less than £900	
Unique Wildlife	Yes	Yes	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY DESTINATIONS
Beach Dev't & congestion	Little	heavy	Little	Heavy	
Local Prices	HIGH but POOR VALUE	LOW but GOOD VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 1	STATE 1	STATE 1	STATE 1	
Lodging	small exclusive hotel	small exclusive hotel	small exclusive hotel	Nice hotel	
	☐	☐	☐	☐	☐

Tick ONE and ONLY one Box

16) Assuming the following holiday destinations were the **ONLY FOUR** destinations available when you were making your decision for this holiday, which one would you have picked .

	SEYCHELLES	MAURITIUS	MALDIVES	CARIBBEAN	
Total Cost per person	£1,300- £2, 000	£900 or less	£900 - £1,300	less than £900	
Unique Wildlife	No	No	No	No	I WOULD NOT CHOOSE ANY OF THESE HOLIDAY DESTINATIONS
Beach Dev't & congestion	Little	Little	Little	Heavy	
Local Prices	HIGH but POOR VALUE	LOW and POOR VALUE	HIGH but GOOD VALUE	LOW and GOOD VALUE	
Marine Life	STATE 2	STATE 2	STATE 1	STATE 1	
Lodging	Large luxury hotel	Nice hotel	small exclusive hotel	Nice hotel	
	☐	☐	☐	☐	☐

Tick ONE and ONLY one Box

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END OF SURVEY

Thank you for your co-operation

****

PLEASE COMPLETE THE FOLLOWING FORM IF YOU WISH TO BE ENTERED FOR THE DRAW TO WIN ADRIAN SKERRET *ET AL'S* BOOK ON THE SEYCHELLES.

THE FORM WILL BE TORN OFF <u>BEFORE</u> THE SURVEY IS EXAMINED.

NAME:_____

ADDRESS_____

_____

_____**COUNTRY**___

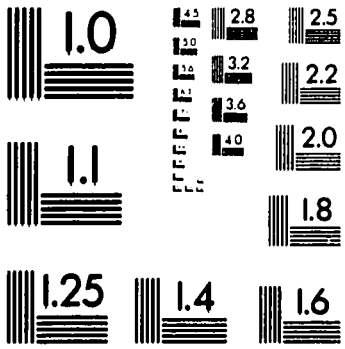
_____

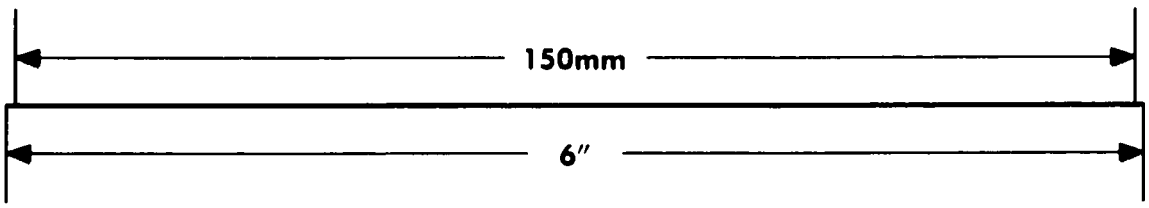
Glossary of Terms

PLEASE FAMILIARISE YOURSELF WITH THE TERMS LISTED BELOW BEFORE PROCEEDING WITH THE REST OF THE QUESTIONS IN THE SURVEY.

Feature	Description
TOTAL COST PER PERSON (£)	Total cost per person, double occupancy of a 2 week holiday. Includes return airfare, accommodation, breakfast and dinner only
LOCAL PRICES	**Local prices** -Domestic price for excursions; souvenirs, eating out; groceries **Good value for money** -Quality of service is just what is expected or more than expected given the local price. You would use the service again and/or recommend it to others. **Poor value for money** -Quality of service is less than expected given the price. You would NOT use the service again and/or recommend it to others.
UNIQUE WILDLIFE	**No unique fauna and flora**- No rare animals or plants but the usual tropical vegetation and animals that are seen on all tropical islands. **Unique fauna and flora** - Animals and plants seen ONLY in that country in nature parks and reserves while hiking, in botanical gardens or on specific islands. E.g. Birds, tortoises.
MARINE LIFE	**State 1 - Undamaged State (U/D)** - Undamaged Reefs; Large fish population with many species; other marine animals observed (turtles, sharks); good under water visibility; fine white sandy beaches **State 2 (Damaged state)** - Damaged/dead reefs; fish and other marine animals rarely or never observed, very few species of fish; poor under water visibility; coarse sand or "dirty" coloured sand
TYPE OF LODGING	**Large luxury Hotel** - Full facilities limited to hotel guests, many restaurants, casino. (+20 rooms) **Nice Hotel** - Medium Grade Hotel with standard facilities **Small Exclusive Hotel** - (10-12 beds); **Self Catering Apartments/ Bungalows**
BEACH DEVELOPMENT & CONGESTION	**None** - No hotels/restaurants on beaches. Very few visitors. **Little** - 1 small hotel (10-12 rms.) / beach No shops. No restaurants. No entertainment except what is provided by the hotel. Beach is limited to hotel guests only OR 1 Restaurant / beach with beach limited to its clients **Moderate** - Few spaced out hotels and small shops. Little entertainment provided at the hotels. Few restaurants and vendors. Visitors include hotel guests and non-hotel guests. **Heavy** - Many hotels/ beach close together. A large variety of restaurants, entertainment, and shops used by tourists and residents. Many visitors to the beach. Hard to find privacy

TEST TARGET (QA-3)





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