

# **Sustainable Leisure Lifestyles**

Destination Gotland (Sweden)

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## **Abstract**

Tourism is one of the world's biggest industries; it accounts for 11% of the global GDP, and is responsible for between 5 to 14% of the world's global warming caused by human activities. Due to the large economic, social and environmental impacts that this activity has, attempts have been made to make it more sustainable. Nevertheless, the focus has traditionally been on the supply side.

Tourism's future trends and the anticipated increase in global environmental concerns present an opportunity to promote better environmental behavior among tourists. This thesis' aim is to gain a deeper understanding of the demand side, by identifying and analyzing the factors (barriers, facilitators, awareness of impacts, available options, among others) that determine the choice of an environmentally preferable option by tourists.

This study focuses on several tourism sub-sectors: transportation, accommodation, activities, and restaurants. Due to data availability, and for the purpose of simplicity, the impacts and the environmental preferable options are seen mainly from an emissions perspective.

Field data was collected using questionnaires to 329 tourists on the Swedish island of Gotland. Data was processed using the statistical program SPSS 15. Frequencies, Spearman's correlation coefficient, chi-square, and logistic regression statistical tools were used in order to identify the factors that significantly influence or predict tourist's choices.

Finally, this study proposes some policy measures in order to encourage tourists' selection of options with less impact on the environment.

Key words: tourists' decision making process, barriers, awareness, facilitators, environmentally preferable option, statistical analysis, chi-square, logistic regression, SPSS, Gotland.



## **Executive Summary**

Traditionally, tourism has been seen as a source of development and economic relief, particularly for developing countries (UN and UNWTO 2008; Simpson et al 2008). Nevertheless, with actual and anticipated increases in tourism activity, questions about the sustainability and real benefits of the tourism industry have been raised (Simpson 2008; Bartholo et al 2008).

Attempts have been made to enhance the potential benefits of tourism activities while reducing their negative impacts. Despite efforts from industry, governments, and locals, there is still a long way to go towards sustainable tourism. Structural (from industry) but also behavioral (from tourists) changes are needed if we intend to make the tourism industry more sustainable (Simpson et al 2008). Research into consumer behavior in relation to tourism is in its early stages; the purpose of this thesis was to contribute to fill this gap. The paper investigates the factors that influence tourism decision making toward the purchasing of environmentally desirable options.

Due to the high impacts of these activities, current research focuses on the study of tourists' decisions regarding transportation (to and from the destination), accommodation, activities, and restaurants. Gossling and Hall (2008) and Becken et al (2003) argue that within the tourism industry there are three activities that are the main contributors to energy consumption and greenhouse gas emissions. Global emissions originating from tourists are estimated to be 75% due to transportation, 21% to accommodation, 3% to activities and 1% to other factors. Restaurants and eating have been categorized inside the transport sector (as food miles), in the accommodation sector (for hotels' cafeterias and restaurants), and in the activities sector. To avoid the problem of allocating restaurants to a specific sector, this study analyzes eating out as a separate sector.

The impacts of the different options within transportation, accommodation, activities, and restaurants are identified. Subsequently, the options are classified according to their impacts, and an environmentally preferable option (EPO) is selected for each one of the four previously mentioned sub-sectors. It is crucial to make clear that the characterization was made from an emissions perspective; economic, biological, or social aspects were identified but not included in the categorization, due to lack of data homogeneity and availability. Some of the factors excluded may be relevant but were out of the scope of this thesis.

Later on, the factors that determine tourists' decision making processes are identified. Among the variables considered are the level of awareness of the environmental impacts of the activity, the knowledge of options with low environmental impacts, and the barriers to (price, quality, and personal preferences, among others) and triggers for those decisions. This study intends to explore the factors that lead to a purchasing decision at the tourists' level, as an attempt to understand which factors should be changed in order to promote tourism with less deleterious impacts on the environment.

For the present research, tourists on the Swedish island of Gotland were selected. Sweden is an interesting case due to the importance of the tourism industry for the country, both from an economic and an environmental point of view. National tourists represent two thirds of all tourists in Sweden. The Swedish tourism industry is responsible for 2.8% of the national GDP (Nutek 2007). On the other hand, it has been estimated that 11% of Sweden's national emissions come from tourism (Gossling and Hall 2008). It is necessary to draw attention to the fact that islands tend to be vulnerable environments. The availability of land, water, and food supply may multiply the negative effects that tourism can cause to this kind of destination (Vourch, 2003).

The data used in this thesis consists of 329 quantitative questionnaires with tourists, of physical observations, and of qualitative interviews with the municipality and industry representatives. Different statistical tests were performed in order to gain a better understanding of the quantitative data collected and of what it represents. First, descriptive statistics were observed with the aim of getting a general idea of the sample characteristics. Then, correlations were made between the knowledge of environmental effects of transportation, accommodation, activities, and restaurants, in order to see how changes in one level of awareness were related to changes in the level of awareness of the other factors. Then a chi-square analysis was performed in order to identify which variables are related to the choice of an environmentally preferable option and to determine their effect. Finally, the variables showing significant relation to the choice of an environmentally preferable option (identified by means of Pearson's chi-square test) were used in logistic regression to identify which variables may be good predictors of an environmentally preferable choice.

From the statistical tests it can be concluded that all of the four models obtained for environmentally preferable options in the four subsectors considered in the study leave a large portion of the observed outcomes unexplained. They predict 64-76.3% of observed data correctly and have Nagelkerke's  $R^2_N$  in the range of 0.15-0.52. This suggests that other predictors may exist which were not included in the study but which can improve the models. It was possible to identify some of the factors that prevent people from choosing an EPO; nevertheless, further research is needed in order to provide conclusive results.

The overall results of this thesis suggest that environmental aspects have low priority when tourists choose transportation, accommodation, activities, and food. Factors such as convenience, price, and quality take priority when purchasing vacation products and services. The number of "green consumers" and their willingness to go the extra mile in order to search for environmentally friendly products is unknown. However, the fact that people are starting to care more about environmental issues may be recognized as an opportunity to promote green purchases.

Municipality efforts have been successful and are in general promising. Nonetheless, more is needed in order to make Gotland a sustainable destination. It is important to promote greener alternatives, build knowledge about environmental options, create data about the options tourists have in Gotland and the impacts of these different options, and work at the community level in order to establish an action plan supported by Gotlanders. These are some initiatives that will allow the building of a stronger path towards sustainability.

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# 1 Introduction

## 1.1 Background

Tourism is an industry that is growing at a high speed. It is projected that the tourism industry will keep growing at a rate of no less than 4% annually until 2020 (World Tourism Organization 2009). Nowadays tourism is one of the world's biggest industries, accounting for 11% of the global Gross Domestic Product (GDP) and being responsible for sustaining approximately 200 million jobs. Moreover, in 4 out of 5 countries tourism is one of the top five export earnings. In 60 countries, tourism is the first source of foreign income (Rovinski 2007). According to Goldestone (2001) tourism has been the only large service sector in poor countries that has shown a consistent economic surplus through the last 10 years.

Traditionally, tourism has been seen as a source of development and as economic relief, especially for developing countries (UN and UNWTO 2008; Simpson et al 2008). Nevertheless, with the increase and expected increases in tourism activity questions about the sustainability and real benefits of the tourism industry have been raised (Simpson 2008; Bartholo et al 2008). There are side effects on recreational areas brought about by tourism activities which do not allow the industry to be called "sustainable". It has been estimated that the tourism industry accounts for between 5 and 14% of the world global warming caused by anthropogenic activities (Simpson et al 2008). In addition, if poorly managed tourism may be a cultural and ecological threat (Wood 2002).

As a result, there have been global attempts to enhance the potential benefits of the activity – source of income for local communities, knowledge of other cultures - while reducing its negative impacts - cultural and environmental losses - (World Tourism Organization 2009; UNEP 2009; Rovinski 2007). Industry has worked toward implementing sustainability practices on its activities (Simpson et al 2008). Also there are programs to build capacities in governments and local authorities in order to create an adequate scenario for sustainable tourism development (Vourch 2003). Work at the community level and small scale community projects have been conducted in order to build capacities and guide locals towards sustainable tourism (Bartholo et al 2008). In addition, there are certification schemes and eco-labels whose job is to help consumers identify environmentally friendly and socially responsible products (Rovinski 2007). Management systems as EMS and ISO 14000 have joined the efforts to make the tourism industry more sustainable.

Despite the attempts from industry, governments, and locals, there is still a long way to go towards sustainable tourism. Not only structural (industry) but also behavioral (tourists) changes are needed if we intend to make the tourism industry more sustainable (Simpson et al 2008). As stated by Simpson et al (2008) industry can offer a wide range of options to consumers, but the tourist will be the one in charge of making the final decision regarding what option to choose. The supply will change in the degree in which the demand changes. In this regard, there are studies that suggest a growing public concern on environmental issues, predicting growing numbers of eco-tourists (Wight 2001; Lew 1998). This opens the challenge of creating a match between tourists' demand and industry supply that can contribute to reducing the negative effects of the tourism industry in local cultures and environments.

## 1.2 Problem definition

Tourism is a dynamic industry, affected by global changes. Dwyer et al (2009) propose six trends that in the coming years will influence the tourism sector. Figure 1.1 shows how the megatrends will affect the sector in the near future. Interactions between demand and supply in the industry are expected to evolve. From the model proposed by Dwyer et al (2009)

changes in the demand side can influence the supply side. Variations in the consumer demands will have a response from the supply (Font et al 2008).

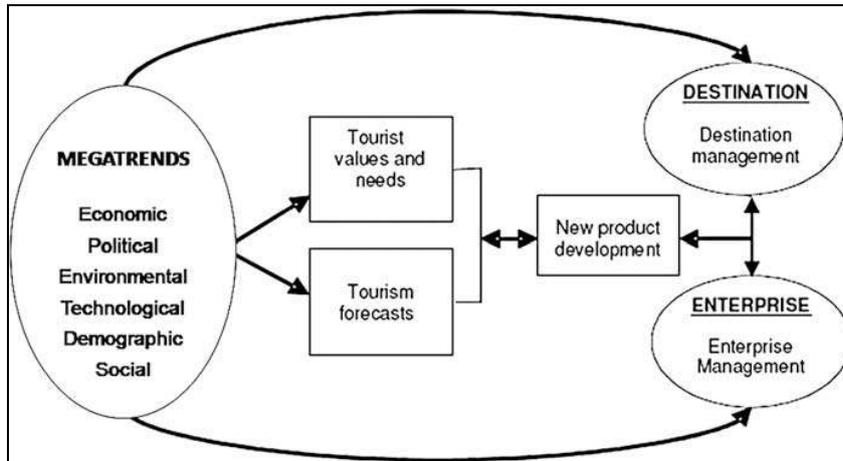


Figure 1.1 Influence of megatrends on tourism  
Source: Dwyer et al 2009

In contrast with the predicted environmental megatrends proposed by Dwyer et al (2009), some studies suggest that there is no real market for sustainable products in the tourism industry (Chafe 2005; Kasim 2004). There is a research gap concerning the factors that trigger or prevent tourists' purchase of environmental products and services.

Sustainable citizens is an under research area despite the potential it has to change people unsustainable consumption patterns (Seyfang 2006). Therefore, this research aims to get a closer look at the factors that influence tourists' purchases of options with low environmental impact.

The environmental problems that we are experiencing now are derived from our unsustainable patterns of economic growth, consumption, and behavior (Swedish EPA 2003). The author thinks that there is a need to explore more the demand side in order to search for ways to switch tourists' practices and activities towards greener alternatives. Having a better understanding of the factors that determine tourists' decision making process can help to get insights that will allow to propose measures to encourage tourists to switch their consumption patterns to more sustainable ones.

### 1.3 Objective and Research Question

The need for more environmentally friendly patterns of consumption in the tourism industry from the demand side opens the question of:

What are the factors that influence tourists' purchase of an "Environmentally Preferable Products and Services"?

Consequently, the objectives of this paper will be:

- To identify what can be an environmentally preferable option for tourists regarding transportation, accommodation, activities, and restaurants.
- To identify the factors that influence consumers' decision making process.
- To propose measures that can be taken in order to switch tourists' consumption patterns towards more environmentally preferable options.

Thus, the general objective of this paper is to obtain a better understanding of the factors that influence tourists' decision making process in order to identify possible ways in which the purchase decision can be changed towards more environmentally friendly procurements.

## **1.4 Scope of the research**

The research focuses on the demand side. References are made to how the results will affect the supply side but the study is focused primarily on factors that influence consumers' decision making process and tourists' environmental performance.

Due to the high impacts of these variables on the environment, the research will focus on the study of tourists' decisions regarding transportation (to and from the destination), accommodation, activities, and restaurants. Gossling and Hall (2008) and Becken et al (2003) argue that within the tourism industry there are three activities that are the main contributors to energy consumption and greenhouse gas emissions. Global emissions originating from tourists are estimated to be 75% due to transportation, 21% to accommodation, 3% to activities and 1% to other factors. Air transport represents approximately 40% of all the emissions generated by the tourism transportation sector (UNWTO–UNEP–WMO, 2008).

Some studies categorize restaurants and eating out as part of transport due to the transportation of food to the different destinations. Other studies categorize food in accommodation due to hotels or hostel's cafeterias, restaurants, and catering services. Besides, there are studies that categorize eating out as an activity. To avoid the problem of allocating restaurants to a specific sector, this study will analyze eating out in restaurants as a separate tourism industry sub-sector.

The impacts of the different activities on the environment and the environmentally preferable options are seen mainly from an energy consumption perspective. Social, economical, and biological perspectives are taken into consideration but due to data availability energy consumption is used as the main guideline for comparison of options.

## **1.5 Methodology**

The literature review of several publications on sustainable tourism is made in order to have an overview of the recent undertakings in the area. Later on, the definitions to be used throughout this study are identified. The agreements and differences in the diverse theories are recognized and the theories or components that might be applicable for the present study are selected. An attempt is made to go from general to specific facts in the tourism industry, while a reliable overview of the tourism sector is essential to identify points of interest for the research.

The impacts of the different options of transportation, accommodation, activities, and restaurants are identified. Following, the options are classified according to their impacts and an environmentally preferable option is selected for each one of the four previously mentioned sub-sectors. It is crucial to make clear that the characterization was made from an emissions perspective. Economic, biological, or social aspects were identified but not included on the categorization due to lack of data homogeneity and data availability. Some of these factors may be relevant but were out of the scope of this thesis.

In this thesis, an environmentally preferable option will be identified in the different tourism sub-sectors. Accordingly, there will be an attempt to identify the variables that lead to that purchase decision. Among the variables considered will be the level of awareness of environmental impacts of the activity, knowledge of options with low environmental impacts,

barriers (price, quality, personal preferences, among others), and triggers to that decision. This study intends to explore the factors that lead to a purchase decision at the tourists' level, as an attempt to understand which factors should be changed in order to promote tourism with less negative impacts on the environment.

A triangulation between possible options in the literature, the tourist's perceived available options, and the available options according to tourism industry representatives and authorities is performed in order to identify the real choices tourists have.

Further on, statistical analysis is used to test the relations between the environmentally preferable options and different demographic factors, reasons to choose a certain option, barriers for choosing an option with low environmental effects, and environmental awareness. Statistical models are developed in order to identify which variables can be predictors of tourists' green choices. Finally, based on the findings of the present study, recommendations to promote the purchase of "sustainable" tourism options are made.

### **1.5.1 Location of the study: Gotland**

For the present research tourists in the Swedish island of Gotland were selected. Sweden is an interesting case due to the importance that the tourism industry has in the country both from an economic and from an environmental point of view. National tourists represent two thirds of all tourists in Sweden. The Swedish tourism industry is responsible for 2.8% of the national GDP (NUTEK 2007). On the other hand, it has been estimated that 11% of Sweden's national emissions comes from tourism (Gossling and Hall 2008). It is necessary to draw attention to the fact that islands tend to be vulnerable environments. The availability of land, water, and food supply may multiply the negative effects that tourism can cause to this kind of destinations (Vourch, 2003).

Gotland has unique characteristics that make it an ideal place for studying the vacation decision making process. Nordic people in general are considered to have a high degree of environmental awareness (Bohdanowicz 2006). Accordingly, in Gotland tourists have a wide range of available options regarding transportation, accommodation, activities, and restaurants. They can choose means of transportation with low environmental impact, eat local food, or stay at an environmentally certified accommodation. As stated by Dolnicar and Leisch (2008) a reason why people do not perform in an environmentally responsible way at tourism destinations might be because of the lack of physical facilities that would allow this process to take place. Sweden has pushed towards higher environmental regulations and it is recognized as a leader regarding environmental performance and standards.

### **1.5.2 Data collection**

Data from 329 interviews made during summer 2008 in a sustainable leisure project conducted by The International Institute for Industrial Environmental Economics was used. In addition, interviews with different stakeholders were taken by the author in April 2009.

The questionnaires in summer 2008 were made randomly; people were approached outside supermarkets, shops, restaurants, gas stations, on the beach, etc. The main aim was to get a sample as big as possible that could include all kinds of tourists in Gotland. The questionnaires have 63 multiple choice questions. It includes semi-structured data about: demographics, vacation patterns, transportation, accommodation, daily routines, entertainment, eating, and souvenirs. People were asked the questions without being given the

possible answers, then the interviewers selected the answers according to what people replied. A copy of the questionnaire can be found in Appendix 1.

Qualitative interviews were made to the municipality and industry representatives in April 2009. The objective of these open ended questions was to gather an idea of the policies and projects carried on at municipal and industrial level regarding tourism development. In addition, these interviews helped the author to get a better idea of the situation in Gotland. Observations were made in Visby town regarding the availability of options concerning transportation, accommodation, activities, and restaurants.

329 quantitative interviews with tourists, physical observations, and qualitative interviews with the municipality and industry representatives were combined in order to get a better picture of the situation in Gotland. This helped to identify the possibilities to promote tourism options with low environmental impacts on the environment.

### 1.5.3 Data analysis

The structure of the questionnaire is shown in Figure 1.2. In its first part, the survey is composed by a set of demographic questions that help to get a deeper understanding of the sample and the general characteristics of the people that participate in the study. Then, there are a set of questions regarding the means of transport used to reach the destination, the accommodation choice, the activities selection, and the restaurant choice. Subsequently, for each one of the four factors shown in Figure 1.2 column two, there are a set of four questions (column three) that ask the respondents about their knowledge of environmental effects caused by their decision (column two), their knowledge of other options with less impact on the environment, together with the reason for their choice and the factors that prevent them from picking a more environmentally friendly option.

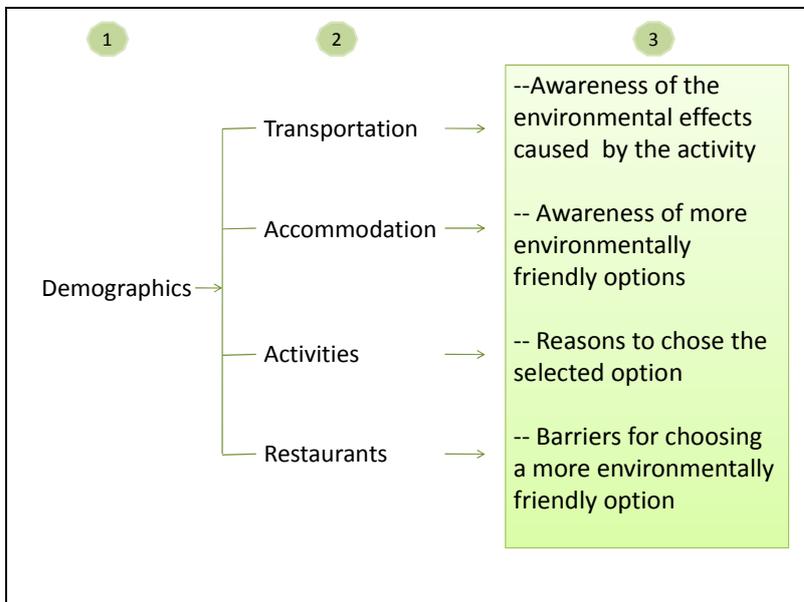


Figure 1.2 Questionnaire structure

The results of the questionnaire were processed using the computer statistical package SPSS 15. Once the data base was ready, frequencies were observed in order to get a general idea of people’s answers and choices. Then a Pearson’s Chi-square test was performed to see if there is a relation between the categorical variables. In addition, a Spearman correlation was made to

determine the proportion and the direction of the relation between the awareness regarding transportation, accommodation, activities, and restaurants. A logistic regression analysis was made in order to identify which factors can be predictors of whether or not tourists choose an environmental preferable option.

## 1.6 Limitations and assumptions of the study

According to a study from Swarbrooke and Horner (1999), consumer behavior related to tourism is in its early stage. It is complex to study consumer behavior in tourism areas because the decision depends on a wide and multifaceted web of factors (Decrop 2006).

There are few studies that focus on tourists' decision making. Moreover, according to Swarbrooke and Horner (1999) one of the main problems in this area of study is that most of the results are theoretical; there is not enough empirical research done. Therefore, the present thesis is a contribution to filling this gap.

Gotland is a seasonal destination, where tourists arrive mainly during the summer. Consequently, and due to the time of this thesis research the author used last year's questionnaires to collect information from tourists. The questionnaires were designed and performed in the framework of a tourism project directed and executed by the International Institute for Industrial Environmental Economics. The author did not participate in the design or run of the 329 questionnaires to tourists but only on the complementary interviews with stakeholders in April 2009.

In addition, the language barrier has to be considered as a limitation of the study. The questionnaires and the interviews were made in English with non-native English speakers. More than 80% of the tourists in Gotland are Swedes, the level of English varies according to the respondents and might be a communication constrain.

To some extent grey literature was used. In addition to academic sources, industry magazines and reviews were observed in order to explore the supply and demand of green products in the different tourism sub-sectors.

## 1.7 Outline

This thesis is structured as follows:

Chapter 1: Provides background information, problem statement, scope, methodology, and limitations of the study.

Chapter 2: Gives definitions about what is sustainable tourism. In addition, the impacts of the different possible choices regarding transportation, accommodations, activities, and food are identified. Impacts are categorized in order to determine what will be an environmentally preferable option in each one of the four tourism sub-sectors.

Chapter 3: Offers an introduction to the green tourist's environmental concerns. Further on, it gives a description of the decision making process in the transportation, accommodation, activities, and food tourism sub-sectors.

Chapter 4: Provides an overview of Gotland; its tourism sector and the available options tourists have while on vacations on the island.

Chapter 5: Shows the data and the descriptive statistics of it. In this chapter it is possible to see general characteristics of the sample.

Chapter 6: Presents a summary of the statistical analysis, including correlations, chi-square, and regressions.

Chapter 7: Discusses the data and some of its implications.

Chapter 8: Provides the concluding remarks of this thesis, including policy recommendations, conclusions and general recommendations.

## 2 Sustainable tourism

### 2.1 Introduction

As a starting point to search for sustainable tourism, it is important to understand the factors and characteristics encompassed by this concept. There have been numerous discussions on what can be classified as sustainable tourism and what not. Moreover, there are several definitions of sustainable tourism (Dolnicar et al 2008). The United Nations Tourism Organization (UNWTO) on its web page presents a general guideline of what should be included into the sustainable tourism concept. It is stated that sustainable tourism should conserve the environment, respect and preserve local communities, and provide socio-economic benefits to all stakeholders in a tourism destination.

The UNWTO also emphasizes the importance of safeguarding the natural and cultural attractiveness of the tourism destination for the future. Sustainable tourism is seen as a long process that requires continuous work. Besides, the UNWTO states the importance of involving all stakeholders in achieving sustainable tourism, highlighting the role of authorities in promoting it. In addition, the need for guaranteeing the satisfaction with and education on sustainability issues of tourists is emphasized.

In this paper, green or sustainable tourism will be seen from the demand perspective. Consequently, the analysis will be focused on the tourist behavior and consumption patterns. A sustainable or “green” tourist will be seen as the one who, if possible, chooses alternatives that are less harmful to the environment.

### 2.2 Tourism products impacts

It is necessary to identify the impacts that tourism-related activities have on the environment in order to understand their implications. There are impacts from a social, economic and environmental perspective. Impacts might be multiplied by the amount of tourists reaching a certain destination. On the other hand, research and investigation have led to less polluting technologies that have allowed reducing the impact per tourist over a certain activity (Kelly and Allan, 2006). Nevertheless, increase in demand has aggravated the overall effect that tourism activities generate in the environment and local communities.

In addition, it is important to consider not only the tourist’s activities themselves but the infrastructure needed in order to perform these activities. Natural areas are replaced by the infrastructure required to support tourism, roads and resorts replace natural areas in touristic places (Davenport and Switalski 2006).

The impacts and threats that specific tourism activities have on the environment have been studied mainly from an emissions perspective (Gossling and Hall 2008). There are few studies that analyze activity wise the biological impacts caused by tourism activities as well as their footprint on the environment (Peeters and Schouten 2006; Davenport and Davenport 2006) or social impacts.

The environmental outcomes that tourism activities produce are mainly from transport, followed by accommodation and leisure activities (Gossling and Hall 2008; Peeters and Schouten 2006; Davenport and Switalski 2006). Table 2.1 presents the emissions caused by the tourism industry in Sweden during 2000/2001.

Table 2.1 Tourism emissions in Sweden

	TRANSPORT					Accom.	Activities	Total
	Air	Car	Coach	Rail	Ferry			
Swedes	0.599	2.543	0.067	0.028	0.102	0.361	0.66	4.258
International tourists	1.377	0.096	0.096	0.001	0.222	0.108	0.19	1.775
Total	1.976	2.639	2.639	0.029	0.324	0.469	0.85	6.033

Source: Gossling and Hall 2008

### 2.3 Transportation effects

Transport in the tourism sector is considered to be the movement of people to and from a destination (Gossling and Hall 2008). With improvements of technology these movements have become faster, economically accessible, and easier. To reach a destination people have several options depending of the distance to the destination, the location or type of destination, and the available infrastructure.

Transportation can occur by air, land or water. The main means of transportation are planes, cars, trains, buses and ferries. Planes have been characterized by their high contribution to global warming and by their large amount of emissions. Buses and trains, as means of public transport are considered to have a rather low environmental impact per passenger due to their high capacity and energy efficiency. Cars on the other hand are considered to increase road congestion and air pollutants. Cruisers and ferries have been related with damage of coral reefs and sea grass bed (Davenport and Switalski, 2006). In addition they cause disturbances in the marine environment and generate the risk of oil spill. Table 2.2 presents a summary of the emissions of the different transportation modes.

Table 2.2 Annual passenger transport and emissions for Swedes, 2000

	Air	Car	Coach	Rail	Ferry	High-speed Ferry
Passenger transport pkm		2592	304	380	40	16
Total emissions tourism (Mt)	1.976	2.543	0.067	0.028	0.047	0.055

Source: Gossling and Hall, 2008

With the boost of transportation systems environmental damage has also risen. Transport is known as an activity with high environmental impact. As stated previously transport is the cause of the majority of emission within a vacation holiday (Gossling and Hall 2008). All transportation modes that do not rely on renewable sources of energy emit green house gases and consequently damage the environment (Davenport and Davenport 2006). In addition, transportation produces noise and visual disturbance.

Within the transportation sector it is necessary to consider also the infrastructure. Building highways, gas stations, terminals, or airports takes up land that could have been used for other purposes (Kelly and Allan 2006; Davenport and Switalski 2006). Building the infrastructure to support transport can create habitat loss and habitat fragmentation (Davenport and Switalski 2006).

According to Ecological Footprint (EF) calculations (Peeters and Schouten 2006) walking and cycling are the modes of transportation with the smallest EF, followed by ferries, coaches, cars, rails, and planes.

Within transportation systems it is necessary to consider that the fact that a person pays for his emissions or the use of clean sources of energy can alter the impact that this activity has on the environment. Also, the level of occupancy can influence the emission or effects per person that a transportation means produces. In this study, a rather general hierarchy based on emissions will be used to categorize the various impacts that the different transportation means have in order to establish what the most preferable and the less preferable choice will be for tourists. The ranking is presented in Figure 2.1.

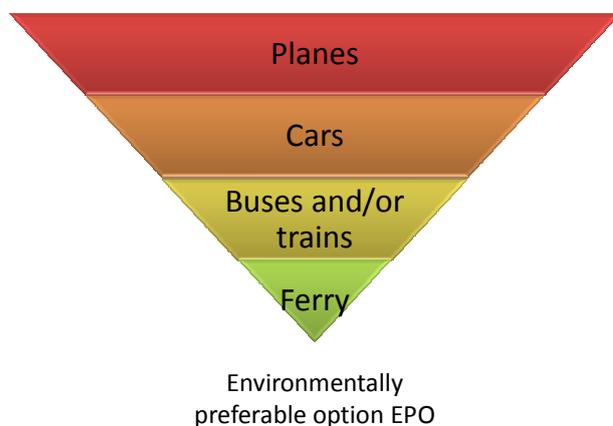


Figure 2.1 Transportation modes hierarchy

## 2.4 Accommodation

The complexity of the accommodation sector, due to the number of factors involved complicates the creation of a standard that will allow categorizing the different accommodation options. Moreover, case specific characteristics of the hotels and accommodation types (what light bulbs they use, food they purchase, energy efficiency measures, employees' origin, working conditions, etc) make it difficult to create a standard that will encompass all the different available accommodation options.

Regarding the effects that accommodation can cause on the environment, the energy use for lighting, heating, cooling, and cleaning will be considered. In addition to the previously mentioned, it would be ideal to take into account air emissions, solid waste and waste water generated by these facilities (Chan et al, 2008).

There is no numerical data that will allow estimating the total environmental impacts of the accommodation sector (Chan et al, 2008). Nevertheless there have been attempts to estimate in general terms the emission from this sector.

Table 2.3 presents Gossling and Hall's (2008) general estimation of emissions per guest night according to the type of accommodation.

Table 2.3 Energy use for accommodation in Sweden, 2005

Accommodation	Emissions per night CO <sub>2</sub>	guest (Kg CO <sub>2</sub> )	Emissions domestic (Mt CO <sub>2</sub> )	Emissions international (Mt CO <sub>2</sub> )	Total emissions (Mt CO <sub>2</sub> )
Hotel	14.4		0.252	0.078	0.33
Camping	5.5		0.071	0.019	0.09
Holiday village	10		0.025	0.007	0.032
Youth hostel	6		0.011	0.003	0.014
Boat (privat leisure)	2		0.002	0.001	0.003
Total	37.9		0.361	0.108	0.469

Source: Gossling and Hall 2008

The social impacts of accommodations include the employment conditions and the numbers of locals participating in the sector (Font et al 2008). Good working conditions and job opportunities for locals are factors that reduce the overall impacts of accommodation activities. The different impacts that accommodation has will depend also on the control exercised over suppliers in the sector, guarantying that the products they provide (blankets, food, energy, etc) were produced in an environmentally friendly way (Font et al 2008).

Research suggests that luxury hotels have a bigger environmental footprint than cheaper hotels (Peeters and Schouten 2006; Gossling and Hall 2008). This can be due to the amount of energy and resources needed in order to provide fancy facilities and high quality service to the guests. For instance, laundry is one of the most energy intensive activities in the accommodation sector (Ali et al 2008), the fact that in private accommodation or hostels guests are required to bring their own bed linen, towels, and shower stuff can reduce the energy consumption per guest.

Other studies (Font et al 2008; Ali et al 2008) show that traditionally big chains have been the ones implementing sustainability and environmental programs, focusing on environmental labels or reducing energy and waste disposal costs. While the small chains argue that they do not have enough resources or power to have environmentally friendly suppliers (Font et al 2008) or to purchase energy saving technologies (Ali et al 2008). From the social perspective it is important to consider who the owner of the hotel is and where the revenues go. Usually the accommodation revenues of big hotel chains go outside the destination.

From an energy consumption perspective, in Figure 2.2 a general hierarchy is proposed ordering the accommodation options from the least preferred to the most preferred according to the impacts they have on the environment.

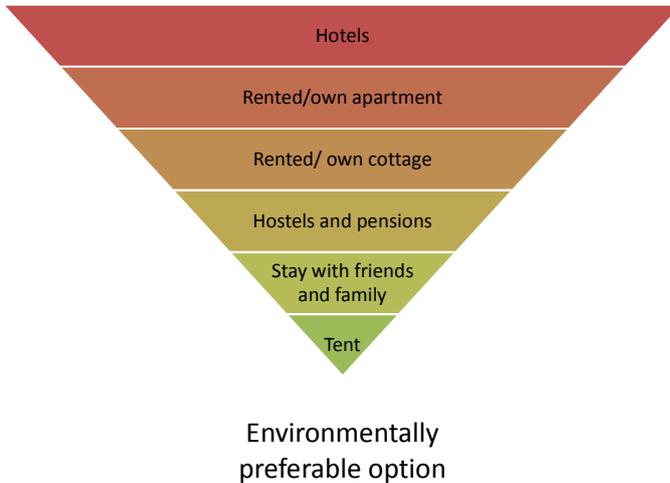


Figure 2.2 Accommodation options hierarchy

## 2.5 Activities

The different activities that tourists do during holidays have an impact on the environment. Within the impacts are the energy use and infrastructure that they require. As well as the noise and visual disturbances they can cause in the environment.

Among the activities walking can be considered as the least harmful, assuming that people behave in an environmentally responsible way, with no littering. The problem with walking comes when it is done in extremely environmentally sensitive areas or when the caring capacity of the ecosystem is overdue (Davenport and Switalski 2006). Cycling has a similar effect as walking, assuming again that bike riders do not litter or do not go outside of their paths. Horse riding in natural environments causes significantly more soil compaction and erosion than hikers or bikers (Davenport and Switalski 2006).

Swimming, kite-surfing, sun tanning are generally low impact activities. Nevertheless the infrastructure required to allow these activities to happen can severely influence the “non-harmful” nature of these activities (Davenport and Switalski 2006). Diving and visiting neighboring islands disrupt the aquatic environment and due to the use of boats contribute to the impacts of this transport activity.

Jet skiing has been identified with water contamination, wildlife harassment, and conflict with non-motorized vacationers. Jet skis are not efficient devices and release 30% of their unburned fuels into the water and the air. This can cause negative effects on the aquatic environment. In addition, there is a risk of contamination in the food chain due to accumulation of the substances released into the water in the seafood that leave in fishing areas. Another effect is disturbances of wildlife and vacationers due to noise production (Davenport and Switalski 2006). The problems are exacerbated in reproduction and nesting periods. Jet skiing and motorboats also generate waves; once these waves reach land they create erosion.

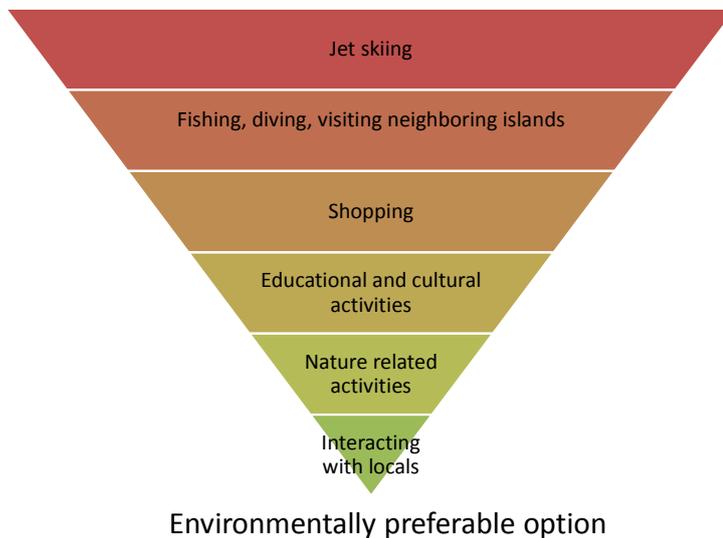
Jet skiing and kayaks bring the possible damage of introducing invasive species on their surface. Also, disturbances in aquatic environments due to noise and physical damage can occur. In addition, the use of fuels has to be added (Davenport and Swirtalski 2006). Kite surfing causes disturbances to birds. They disturb areas near the shore where birds feed. If regulations are ignored, or if not well planned and managed fishing may endanger species.

Peeters and Schouten (2006) in their ecological footprint study categorize walking and cycling as low EF activities, followed by boat trips, visiting museums, visiting casinos and bars, visiting zoos, regional excursions, cinemas, theatres and concerts, restaurants, disco dancing and fun shopping. Within shopping activities, the environmental burden of producing “non-essential” goods that people buy is added as a negative environmental externality (Peeters and Schouten 2006).

Activities like visiting museums, getting to know nature, or interacting with locals are good from a social perspective because people are getting broader knowledge that will help them to learn from others and also show other different perspectives. If people get a better understanding of the importance of nature or other culture, they might feel more inclined to respect or preserve it.

Another factor that has to be considered is the generation of income for the local communities. Tourism can generate local revenues if the activities are managed at the local level or generate local employment. The social wealth that tourism can bring can balance the negative environmental effects that tourism activities have at the destination.

From an energy consumption perspective, a characterization has been created ordering the leisure activities from the most preferable ones from an environmental point of view to the less preferable ones. These are shown in Figure 2.3.



*Figure 2.3 Leisure activities hierarchy*

## 2.6 Restaurants

In line with the Green Restaurants 4.0 Standard (Green restaurants association 2009) there are several aspects that need to be considered when evaluating the environmental impacts of a restaurant. The points that will ideally be taken into account are:

- Water efficiency: relates to water use efficiencies of the different equipments or machinery use for food processing, waste water generation, and water treatment facilities.
- Sustainable furniture: relates of the characteristics of the furniture in the restaurant, for instance Forest Stewardship council FSC certification for wooden stuff.
- Waste reduction: this refers to waste disposal, considering initiatives as composting food leftovers, using remaining food grease as biodiesel, etc.
- Sustainable foods: stands for purchasing eco certified food, buying local and seasonal products, etc.
- Energy use: relates to energy efficiency of the different machineries and equipments and also to energy source (e.g. buying renewable energy).
- Use of recycled and bio based disposables: it is related to green procurement, for instance the purchase of trash liners made from recycled plastic.
- Pollution reduction: this includes measures that go from using paintings with zero organic volatile compounds, use of rain water, to being located near public transport, making the deliveries in bike or by cars that use alternative fuels, among others.

Restaurant's environmental impacts are of two types: facilities impacts and food impacts. Regarding facilities impacts, Elan (2007) suggests considering energy use and green house gas emissions. These aspects are related to the machinery used in the cooking process (fridges, ovens, dish washers, etc) and the amount of resources (energy, water) that each machinery uses. In addition, Elan states the importance of considering secondary materials when evaluating the impacts of a restaurant as disposable food package.

When considering impacts of restaurants on the environment, it is important to take into account what kind of food they sell because it will determine the food specific impacts that the restaurant has on the environment. Food production requires energy, fertilizers, and water (Khan and Hanjra 2009). In addition, Bougherara et al (2009) mention the importance of evaluating the use of pesticides, animal welfare, and trade considerations.

Leahy (2008) proposes considering the food source as an impact of restaurants besides water and energy use, and waste production and disposal. Concerning food source, Leahy considers the emissions caused by the food mile of the different products. Khan and Hanjra (2009) add to the transportation emissions of the food mile the energy use in processes like cooling the food, or any other agro-industrial process needed in order to preserve the food before it arrives at its end user. In this context, locally produced food will have the smallest food mile while the further the production the bigger the impacts.

A restaurants classification based on the type of food they sell and food mile will allow a general and rather simplistic categorization of restaurants because there is no need to evaluate the specific conditions (energy saving equipment, water use, waste disposal, etc) of each one of them. The proposed general hierarchy for restaurants is presented in Figure 2.4.

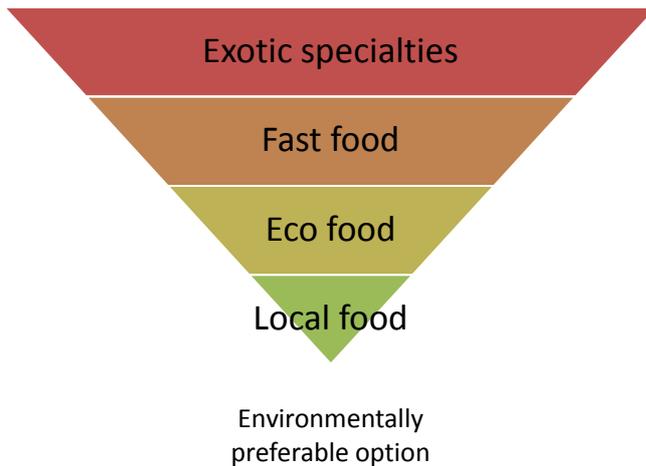


Figure 2.4 Type of food hierarchy

## 2.7 Environmentally preferable Options

An environmentally preferable option (EPO) will be the one that causes fewer impacts on the environment. The ranking provided earlier in this chapter oversimplifies the categorization of the impacts of the different tourism products. Moreover, it considers only energy use, disregarding socioeconomic or biological aspects.

In addition, even if everybody would be willing to choose the EPO probably the system as it is now, would not be able to provide the opportunity for everybody to choose the most environmentally preferable option. As such, and with the aim of giving more flexibility to the concept of EPO in this study the different tourism products were divided evenly in EPO and no EPO. As a result, the upper half of the pyramids is considered as non-environmentally preferable options, and the lower half of the pyramids is treated as environmentally preferable options.

As a result, EPO's in the transportation sector will include bus, trains, and ferries. The EPO for accommodation will be staying with friends and family, staying in a trailer or boat, and staying in a tent. The EPO's in activities will comprise educational activities, nature related activities, and interacting with locals. Finally, the EPO in food choice will comprise of eco and local food.

### 3 Tourists decision making process

#### 3.1 The green tourist

It is important to identify who is going to choose EPO's, who the green tourist is. Nowadays, there is a growing concern about environmental issues and a tendency in consumer attitudes to search for more environmentally friendly products (Wight 2001; Lew 1998). There is a detailed characterization of the green tourist by Swarbrooke and Horner (1999). In their book the authors point out all the issues in which ideal "green" tourists will be interested. Figure 3.1 is a summary of the green tourists' possible main concerns.



Figure 3.1 Concerns of green tourists  
Source: Swarbrooke and Horner (1999)

In Figure 3.1, *transport* is evaluated by the green tourists due to the pollution that it causes and the energy that it uses. Also, the impacts of the infrastructure necessary for the functioning of the transportation system are considered.

In the case of the *activities*, the effects on the environment caused by doing the activity itself, and of building the facilities to perform the activity are considered by the green tourist. Regarding the *facilities*, the scale, location, shape, and materials used during the construction period are observed.

In the *operational practices* the environmental performance of the units providing the tourist service are evaluated, for instance, among other factors waste management, energy efficiency, type of products, recycling system, water use are considered. In *pollution*, effects on soil, water, noise, air, visibility and natural resources in general are taken into account.

In *resources*, the way the water, food and land are being used and preserved is of high consideration. The *conservation* of landscapes, wildlife, local culture and view is enforced by the green tourist. Finally, the *wildlife* concern is focused on, namely the use of animals in tourist activities (hunting, zoos, and safaris).

Those are the general subjects in which green tourists may be interested. However, tourists are different among each other and each green tourist will have different priorities and points of interest. As a result, green tourists will attribute more importance, due to specific personal circumstances, to the different green tourist concerns.

As stated in the scope of this study the focus of the research will be Transport, Accommodation, Activities, and Restaurants. It is relevant to note that these factors encompass the majority of emissions of tourists' activities and at the same time are responsible for the majority of the revenues generated by tourism.

Given the general picture of the tourism activity, some authors have defined the search for a "green tourist" as "wishful" (Swarbrooke and Horner 1999). The actual existence of a sustainable tourist has been questioned (Peattie, 2001; Dolnicar et al., 2008). Nevertheless, the author considers that due to the high impacts that tourism activities have and due to the potential benefits that the activity can bring to the economy and culture, it will be important to see if the growing general concern about environmental issues is reflected in the vacation decisions that tourists make for their holidays.

### **3.2 Factors involved in the tourists' decisions**

Decrop (2006) also describes the decision making process as a mix of factors like perceptions, attitudes, lifestyle, emotions, etc, as components of a complex tourists' decision making process. Tourists' decision making process is characterized by the interaction of factors dependent and independent/external of tourists. It can be said that a vacation is a combination of travel choices (Becken et al 2003). The focus of this paper will be tourists' decisions regarding transport, accommodation, activities, and restaurants.

The decision making process in tourism is a complex procedure due to the number of factors involved in it (Decrop 2006). When studying the tourists' decision making process a number of studies refers to Swarbrooke and Horner (1999), according to who there are two factors that determine the purchase-decision process: the *motivators* and the *determinants*. *Motivators* in this context are:

- Personality. The way a person is will determine their preferences and their choices.
- Lifestyle. The lifestyle will be a sign of the context in which the decision was taken.
- Past experience. The good and bad experiences of previous holidays will influence the decision that will be taken for future holidays.
- Past life. People may choose destinations due to their reminiscence of places they visited in the past.
- Perceptions. How people see or feel about a place will influence their decision.
- Image. How the trip will affect the way other people see them.

On the other hand, *determinants* of tourists' choices are:

- The destination and activities. Perception of the destinations (related to the destination itself, the promotion of the destination, and to factors linked to it such as delinquency rate, political situation, social situation, etc) and, different choice of activities according to the destination.
- Dates and length of the trip. Available leisure time and, availability of different tourism products.
- Mode of travel and accommodation. The available means of transport, different hotel offers, budget for transport and accommodation, and convenience.

- The holiday party or group. The decision of where to go will be determined by the preferences, specific situations, and characters of the group members.
- Cost. The amount of money available for the trip and, the different cost offers from the different tourism operators.

The changes that are brought about in a destination by the diverse tourism components will influence different decision making factors such as “perceptions”, “images”, “mode of travel and accommodation” “destination and activities”, among others. Tourists’ behavior and choices while on vacation will have effects on the destination itself. Tourists’ contribution to preserving or destroying a destination will have implications for future tourism activities in the area.

### 3.3 The decision making process

Jeng and Fesenmaier (2002) point out three characteristics of the vacation decision making process, namely multi-dimensionality, sequentiality, and contingency. Multi-dimensionality means that the process involves many different factors; sequentiality denotes the cascading characteristic of the process, for instance people have to first choose a destination and then pick a mean to reach it; contingency, once a decision is taken it will limit subsequent decisions, for example picking a certain destination will automatically bind the activity options to the ones available in the chosen destination.

Jeng and Fesenmaier (2002) also divide vacation decisions as core, secondary and tertiary. Being the core decisions taken prior the departure and not being subject to change. In this context core decisions can be destination, dates of the travel, general budget, and accommodation. The secondary decisions include decisions that are more or less planned prior to the travel but can change, for instance activities and attractions to visit. Finally, tertiary decisions are the ones that are taken while on vacation, as buying food or souvenirs, etc.

There are facilitating and constraining factors that will shape decisions (Woodside et al 2006; Hyde and Laesser 2009). Inhibitors are factors that can cause tourists to react differently from what their normal attitudes dictate (Decrop 2006). For instance, budget can be an inhibitor or constraint for staying in a five-star hotel, while low price might be a facilitator for eating fast food. Inhibitors and facilitators interact and result in the tourists’ final choice. This process of balancing facilitating and constraining factors may be mechanical, and therefore unconscious and unnoticed by tourists (Woodside et al 2006).

Regarding the decision making process and the choices people make, it is necessary to realize that people tend to choose an alternative that is “good enough” rather than choosing the best alternative. The information the tourists can gather is usually incomplete and the lack of time or will to do a deeper search cause an aim for satisfaction instead of an aim for maximization of the vacation experience (Decrop 2006).

While making decisions the simple the information provided the easiest for consumer to evaluate and choose and option. If too much technical data is provided consumers will lost themselves on it and will end up ignoring the criteria all together. Consumers tend to search for simple, easy to understand, reliable information. The simple and easy to understand the information provided, the easier for consumers to incorporate it to their decision making process (MacDonald 2009).

Tourists’ brochures, media, and internet can help tourists plan their trips beforehand. Being able to access information and insights into the different option that the chosen destination

has can help tourists to decide in advance what kind of activities/accommodation/restaurants or transport means they want to experience while on holiday. The plans might change on site (Woodside and King 2001). Nevertheless, having access to the available options will help tourists to make a more informed decision.

### **3.3.1 Green choices**

According to McDonald et al (2009) green or ethical consumption can be defined as “a process by which individuals make sense of themselves and their relationships with others, and act within the constraints of the institutions and the norms of society of which they are part”. Sustainable citizens will feel a responsibility towards the earth and consequently evaluate the impacts of their activities and try to reduce them (Seyfang 2006).

Regarding factors that influence choosing the option with less impact on the environment, Garling et al (2003) affirms that awareness of the consequences can be a factor influencing green behavior. In addition, De Groot and Steg (2007) state that environmental awareness is an important determinant in performance related to environmental issues. In their studies, De Groot and Steg (2007) and Garling et al (2003) relate the awareness with the value orientation of citizens.

Green consumers' purchases are a representation of their needs and core values. As such, “sustainable consumers” will fight against the one aspect with which they do not identify themselves. If a person is vegetarian, being his concern animals' welfare, probably he will avoid meat consumption and the purchase of animal related products -leather seat covers, leather shoes, etc- (McDonald et al 2009). When procurements are based on values consistency is expected among purchases in different sectors.

Green consumers are willing to buy the most environmentally friendly product possible within their needs, availability, and budget (McDonals 2009). In this context, green characteristics are ideal but might be compromised by factors as price and availability. Manaktola and Jauhari (2007) state that green concerns are seldom the main determinants of a purchase choice but are seen as attributes that add value to the product or service.

“Green consumers” sometimes compromise their sustainable criteria due to factors as price or comfort. In addition, consumers do not always use the same criteria while evaluating products. Seyfang (2006) states that green purchasing decisions are not consistent between different sectors, green consumers may prioritize environmental criteria (energy or water use) for some purchases, while using ethical criteria (labor used), or community criteria (benefits to the local community) in other occasions.

Moreover, McDonald et al (2009) suggests that some consumers may not be interested in specific product characteristics but in the images associated with a certain product or service. In this case the decisions are not based in environmental values and the purchases within sectors will not show a consistent pattern. Consumers want to be environmentally friendly but do not want to quit to their lifestyle; consumers may not be ready to compromise convenience, price, or product performance (Manaktola and Jauhari 2007) in favor of environmentally friendly purchases.

Based on the literature review the author distinguishes two types of green consumers, the ones that make informed decisions and buy environmentally friendly products due to sustainability issues, and green consumers that do it as a fashion thing for image reasons.

### 3.3.2 Transportation

One important decision people have to take while planning their vacations is about the transportation means they are going to use in order to reach their destination. Several factors will influence this decision. For instance, Nicolau (2009) identifies time and distance as factors that influence the means of transportation chosen. People will choose between different transportation modes depending on how long it will take to reach the destination (Woodside et al 2004), the amount of time they have for holidays, and perhaps the things to see there. Tourists can choose to reach a destination by train instead of plane due to the road views or to an activity on the way they want to pass by. Nevertheless, the influence of time, views, and distance in the choice of a transportation means will depend on the specific characteristics of the trip and on the traveler's preferences.

Choosing a transportation mode can also depend on the different prices of the different transportation means. A family might not afford to pay for all its members' plane tickets and therefore they might choose to sacrifice time and go by train or car (Hyde and Laesser 2009). In addition to the price, income, the presence of children, and specific characteristics of the destination (available public transportation) among other factors can influence the mode of transportation (Nicolau 2009). The decision of the means of transportation chosen will result from the interaction of different factors.

Green consumers do think about environmental issues. Nevertheless, while choosing a transportation mode during vacations their green conscious may be compromised to other factors like convenience, price, time availability, length of the trip, etc (McDonald et al 2009). Green criteria are in consumers' mind but in reality time and price will be the determinants of the transportation mode.

Transportation is a tourism product in which people sometimes do not have choices (e.g. long haul trips). For instance, if someone wants to go from Sweden to Thailand the only available option is to fly, regardless of their environmental beliefs. The environmentally friendly option in this case would be not to go to Thailand. Results from McDonald et al (2009) study suggest that people are more likely to compromise their environmental beliefs while choosing a transportation mode.

A summary of the variables that influence the choice of transportation mode can be found in Figure 3.2.



Figure 3.2 Factors that influence transportation choice

### 3.3.3 Accommodation

The accommodation choice comes after choosing a destination. Perhaps if a family goes to a sun and sea destination they might want a cottage near the sea, while if they go to Las Vegas they might want a five-star hotel with a casino. Accommodation is a sequential decision that depends on the availability of options in the chosen destination (Woodside and King 2001).

Proximity to main attractions, or advertisement, have been recognized as factors that can push people to choose a certain accommodation option (Woodside and King 2001). The fact that a hostel is in the city center or that it appears in popular travel magazines can encourage people to use it. For people unfamiliar with the destination, internet and travel guides can be the only way to find accommodation prior to their holidays.

In addition, income has been identified as a trigger of the accommodation choice (Nicolau 2009). Besides, facilities (swimming pool, gym, etc) have also been recognized as factors that influence accommodation decision (Woodside et al 2004). Kasim (2004), in his study of tourists in Malaysia, presents a gloomy view in which when taking a decision regarding accommodation tourists prioritize price, service quality, and facilities, disregarding factors as social responsibility or environmental issues.

From a consumer's perspective, hotels have core attributes that refer to the functional value of the hotel plus nonessential attributes that deliver additional nonessential values, being environmental performance part of this second group (Manaktola and Jauhari 2007). Watkins (1994) suggests that people want more environmentally friendly hotels; nevertheless, they are not willing to pay the extra costs that certification schemes of measures to implement green schemes will involve.

Common factors that customers usually search for while choosing a green accommodation are measures related to energy efficiency, waste reduction, appropriate usage of air conditioning and heating systems, towels and bed linen change rate, use of recyclable paper, etc. Manaktola and Jauhari (2007) study reflects that 22% of hotels users in India search specifically for environmental information and performance, 55% pay attention to environmental initiatives, and 23% do not bother at all about searching for that kind of information.

Green consumers expect to have available and visible information regarding the efforts that are being carried on. Customers want to see employees with knowledge of environmental issues, participation on certification schemes, recycling and waste management schemes in all areas, have the re-use option for bed linen to multiple night guests, environmentally friendly products (chemicals free shampoo, krav breakfast, etc), partnerships with environmentally friendly service providers (buy green electricity), energy and water efficient equipment, among other green attributes (Manaktola and Jauhari 2007). Figure 3.3 presents a summary of the factors that influence accommodation choice.



Figure 3.3 Factors that influence accommodation choice

### 3.3.4 Activities

While choosing a destination people might be implicitly choosing an activity, or at least limiting their activity options (Hyde and Laesser 2009). If somebody chose the jungle as a holiday location then probably some of the activities will involve hiking or other nature related activities. Woodside et al (2006) states that people sometimes travel in order to perform their favorite hobbies. People act according to their preferences or according to what they are used to doing.

While planning their vacations, tourists consider doing the activities they see in tourists' brochures or advertisement (Woodside et al 2004). Plans might change on the spot. People have a general idea of what they want to do before going on vacation but the final decision on what activities to perform or choosing among different service providers happen on site. If activities are close and accessible, tourists might be willing to try them although unplanned (Woodside and King 2001).

Income has been also recognized as a factor influencing tourists' choices (Nicolau 2009). To perform different activities has different prices and therefore peoples' budget will be a constrain while choosing holiday activities. The price of the different activities can act as a barrier or facilitator to perform them (Hyde and Laesser 2009).

Age has been identified as a determinant of tourists' activities (Nicolau 2009). At different ages people have different preferences of what they want or do not want to do. People interests change with age. While for a teenager partying and spending time with friends might be a priority, for a grown-up cultural activities might be a better activity option. Besides, the party crew will influence the activities selection (Woodside et al 2006). If a couple travels with kids their activity choice will probably differ of their activity choice when they travel alone.

There are activities, like shopping, that can happen without previous planning. People see thinks that they like and decide to buy them, even though before the trip they were not even aware of their existence (Woodside and King 2001). In addition, tourists sometimes consider doing some activities only after they see them, despite the fact that they did not consider them previously (Woodside et al 2004). Going in an excursion to the nearest national park might happen only after the tourists see that the hotel is providing that service and they talk with some satisfied clients.

Figure 3.4 Presents a summary of the different variables that influence activity choice.



Figure 3.4 Factors that determine activity choice

### **3.3.5 Restaurants**

Law et al (2008) group the factors that determine restaurant choice as food and beverages, service, price, environment, and attractions. Inside of the food and beverages category are the variety, quality, portions and presentation of the food. In service are the speed, the attitude, the opening hours, and the diversity. In the environment are the atmosphere, the comfort, the cleanliness/hygiene, location, and decoration. In the attraction are the image, it being considered as a new experience, word of mouth, and advertisement.

Thorn and Barrier (2005) state that people eat things they are familiar with, people want new things but at the same time people do not want things that are too different from what they are use to eat. Thorn and Barrier article also identifies freshness and flavor as things people search for. People relate quality ingredients with good food, they want to eat things that look, smell, and taste good.

Law et al (2008) states that the main attributes for tourists while eating out are portion size, quality, presentation, taste, price and variety of choices. Being worth of mouth also a factor that incentives tourists to eat in a certain restaurant. Soriano (2002) states that restaurant clients search for good price, high quality, variety of food, clean environments with adequate facilities, good service and good location.

Hume (2008) identifies money and distance as determinants of food choice. Young families tend to eat food like pizza (starchy, big, cheap) due to its low price and because everybody likes it. Thorn and Barrier (2005) identifies age as a determinant of food choice. The older the people are, usually the more likely they are to consume healthy food.

A combination and interaction of the various characteristics stated by different authors will end up determining the decisions that consumers will take regarding food choice. Consumers will match the restaurants offers with their personal needs and preferences in order to choose the food that better fits their particular situation.

Regarding consumption of food with low environmental impacts, Thorn and Barrier (2005) state that the demand for organic products is increasing, a couple of year ago nobody was asking for organic products while now there are a couple of clients that do. The authors recognize that certainly the number of clients demanding organic products in restaurants is still very small but it is expected to increase in the coming years. Glazer (2008) suggests that despite the fact that the majority of consumers do not seem to be searching for green restaurants they are more likely to consume green food options when they are on the menu.

The most frequently stated reasons for consuming organic food are food safety, animal welfare, environment, and taste (Seyfang 2006). People consider that organic food is safer (more nutritious, tastier and better to eat compared to regular food), environmentally better (agrochemicals, package, food mile, etc), and more socially desirable (support local communities).

Environmental consumers take into account different variables when they consider green purchases. In food they will consider factors such as fair trade or organic food, as well as local products and for instance small scale, locally owned restaurants. In the food sector, green consumers are ready for compromises: they are likely to pay a premium product price, be committed to a brand, or in some cases even sacrifice convenience or performance in order to act accordingly to their principles (McDonald et al 2009).



Figure 3.5 Factors that influence food choice

Figure 3.5 shows a summary of the variables that can influence food choice. It is important to notice that there is an increasing demand for environmental issues. It is expected that in the future factors as organic or fair trade certifications will influence the food choice.

## 4 Destination Gotland

### 4.1 Introduction

Gotland is an island located in the middle of the Baltic Sea (see Figure 4.1), has a surface of 3140 square kilometers, and a coastline of 180 kilometers. Gotland has a population of approximately 57300 inhabitants, about 39% of whom live in Visby (the capital). Gotland is separated from the Swedish mainland by 90 kilometers.

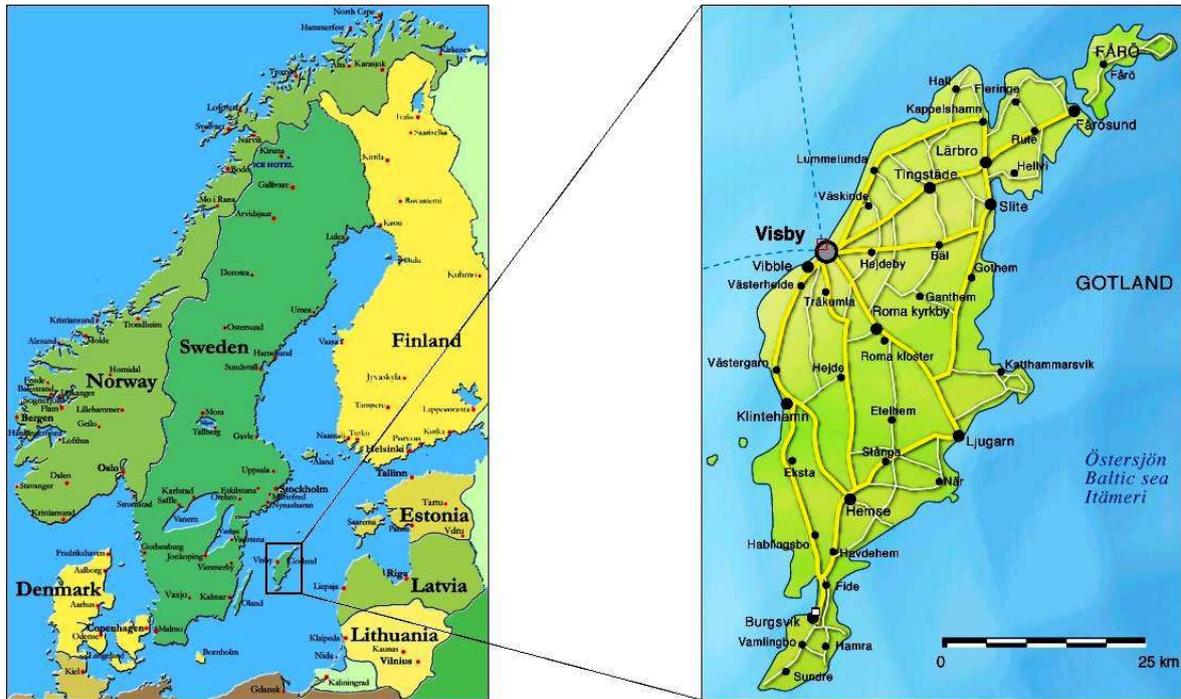


Figure 4.1 Gotland: geographic location

Source: Adapted from [http://www.scantours.com/maps/scandinavia\\_map.jpg](http://www.scantours.com/maps/scandinavia_map.jpg)

Gotland was part of the Hanseatic League, and as a consequence it was a center for trade during 12th and 13th centuries. Visby, the main town in Gotland was designated in 1995 as part of Unesco's World Heritage list. The award was given due to the history of the town. Visby preserves a magnificent stone architecture represented by nearly 200 well preserved constructions. The wall surrounding Visby city center is approximately 3.5 km in length and 11 meters high. Its construction started at the end of the 12th century (Gotland in Figures 2009).

Despite its wealthy past and historical importance, nowadays Gotland is one of the poorest counties in Sweden. Tourism provides employment for 7% of the island's population and is considered a priority area of development. Tourism is dominated by small family owned enterprisers (Twining-Ward and Braum 1998). In the island, the industry used to be represented by the cement factory. Nevertheless, now it has been overtaken by agriculture and tourism, industries that are gaining more and more space. In addition, there are plans to promote the growth of small local industries (e.g. souvenir production).

Gotland in 1996 set an ambitious plan to become sustainable within one generation, by the year 2025 (Andersson 2009, personal interview). The municipality works together with the industry and in general supports any plan or initiative towards sustainability. The municipality

seeks to be a model at the national and international level. The island is a pioneer in environmental issues and has been an example for other destinations. Government representatives from Japan and other countries come to get familiar with the sustainability plans that the local government of Gotland is implementing.

Indeed the municipality has developed several plans in order to incentive a more rational use of the resources. They had run projects like: projecting movies in the ferries explaining tourists about municipality sustainability plans and encouraging them to support the efforts, running magazines to explain locals about new municipality plans to improve environmental conditions, among others. Regarding this efforts there are successful and unsuccessful stories. The movies were taken out of the ferries because people “got bored” with them. Regarding the newspapers informing the population about the need of waste sorting and the programs to implement a waste sorting system in the island the unsorted waste has been reduced by 30% in the last 10 years (Grahn 2009, personal interview).

## 4.2 Tourism Context

Gotland is highly dependent on tourism. Tourism is a source of employment and income for the local community. Therefore, there are plans at the municipal and at the industry level in order to promote this activity. Variations in the number of tourists in the last sixteen years can be seen in Figure 4.2 and Figure 4.3. Despite the importance of the tourism industry to the island it is necessary to take into consideration that Gotland is an Island and as such a fragile area. The ability to process waste, generate electricity, grow food, etc has several land and resource limitations.

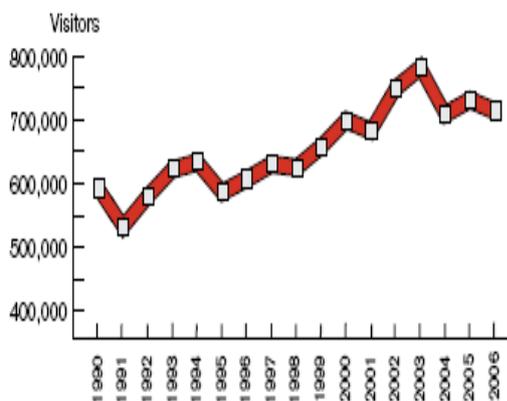


Figure 4.2 Number of travelers to Gotland (including Gotlanders)

Source: Gotland in figures

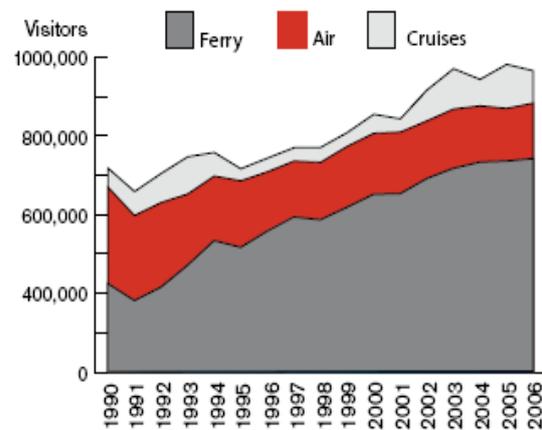


Figure 4.3 Trips to Gotland

Source: Gotland in figures

Each year Gotland receives approximately 800,000 tourists. The fact that tourists come seasonally represents challenges for the environment in general and for the waste management systems specifically. There is a need to work on sustainability issues at the tourists' level in order to accomplish the economic development that tourism can bring but at the same time preserving the resources of the island for the present and future generations.

According to the tourism association representative people think about Gotland as a natural destination because it's pristine sea and well preserved environment. Nevertheless, this fact might do not necessarily relate to people's behavior and demands while there are in the island. The tourism association view is that sometimes people consider being in Gotland as an

environmentally friendly behavior as itself and forget to ask about environmentally friendly products and activities (Jansson 2009, personal interview).

Tourism in Gotland is a seasonal activity concentrated in the summer months, around 70% of the tourists come to the island in summer. Efforts have been made in order to attract tourist or company groups (conferences) during the rest of the year but there is still a lot of work to do. The tourism sector in Gotland generated in 2006 1189 full time positions. The distribution of those employment opportunities are summarized in Table 4.1.

Table 4.1 Job opportunities per sector

Sector	Number of annual positions 2006
Accommodation	411
Food Production	67
Restaurant	276
Transportation	170
Shopping	127
Activities	132

Source: Gotland Tourism Association (2009)

The Gotland tourism association differentiates between two groups of tourists: young people that search for fun, parties, and adventures and family groups that want calm, relaxed vacations near nature (Jansson 2009, personal interview). The transportation means that they chose, the type of food that they eat, their accommodation choice, as well as their activity choice will influence the impacts that tourists will have on Gotland. Therefore it is important to understand what options they had during their vacations in the island.

### 4.3 Transport Sector

Gotland is an island and therefore it is necessary to take either the ferry or the plane to reach this destination. Year round there are planes to Visby from Stockholm (Bromma), Stockholm (Skavsta), and Anelholm. Additionally, during summer Swedish routes from Sundsvall, Goteborg, and Växjö are open, together with a route from Finland (Helsinki-Visby), and a route from Norway (Oslo-Visby).

There are ferries to Visby from Oskarshamn in South Sweden, and from Nynäshamn (close to Stockholm). The frequency of the ferries increases during summer months. Efforts have been made in order to achieve better environmental performance in this mode of transportation. For instance, Destination Gotland, the ferry company that operates the routes between Gotland and the mainland, tries to minimize its environmental impacts. Destination Gotland operates with a certified environmental management system and also has a new float fleet that uses state of the art technology which results in fewer emissions on the environment compared to regular ships (Gotland tourism association 2009).

In addition to ferries and planes, public and private transportation systems support travel to Gotland. It is possible to reach the airports or the marine ports in buses, trains, taxis, or private cars. Regarding train systems, Swedish railways have high targets for emissions reduction and use almost entirely renewable energy. Besides, the railways company has launched programs to guarantee high environmental performance within its activities and programs to educate the public on environmental issues (Simpson et al 2008).

It is estimated that around 30% (450 000) people take their cars in the ferry to Gotland. For each person that goes by plane to Gotland five go by ferry (Jansson 2009, personal interview)

#### **4.4 Accommodation Sector**

Gotland offers a wide range of accommodation. Different locations, facilities, and prices can be found according to the tourists needs. Hotels, villas, apartments, guest houses, cottages, youth hostels, and camp sites can be found in the island. Within the same type of accommodation there is a wide range of different services and facilities according to the provider.

In the accommodation sector efforts have been made towards a more sustainable use of resources. The Best Western-Strand Hotel, part of the international hotel chain Best Western, is the only hotel in Gotland with an environmental certification. Nevertheless, there are other efforts toward sustainability. For instance, Gotlandsresor hotels do waste sorting and have wind power supplied electricity (Gotlandresor 2009). There are other types of accommodation that also claim efforts toward a better use of resources.

It is important to keep in mind Sweden's right of public access. The municipality promotes rules among campers. A code of conduct has been created and promoted in order to encourage people to preserve the natural areas in which they are staying. The code of conduct implies regulations regarding mainly waste disposal and fire controls (Andersson 2009, personal interview).

Scandinavian people are characterized for having one of the highest rates of access to second houses. 23.7% of all Swedish's second houses are located within 500 meters from the sea. Moreover, 15.9% of summer houses are located in an island. Oland and Gotland have large numbers of second houses, a lot of whom are used as vacation houses (Marjavaara 2007). Tourists in Gotland may go to their own houses while on vacations.

When asked about accommodation facilities in Gotland, Jansson (2009, personal interview), stated that there are roughly 20 hotels, 18 pensions, 3000 cottages for rent, 500 apartments for rent, 200 trailers, 50 boats, and 1000 camping spaces. It is estimated that during a year Gotland receives 1 million guest nights in commercial places, 1 million from people that have their own summer houses in the island, and 1 million people that stay with family and friends.

#### **4.5 Activity sector**

Especially during summer months there are plenty of different activities that can be done in Gotland. Within the activities that the tourism association promotes are fishing, cycling, visiting caves and museums, going to Kneippbyn waterland, practicing golf, riding horses, running races, kids theaters, going to the Viking festival, among a wide range of other activities. Since one of the aims of authorities and industry in Gotland is to promote tourism, they try to sell the idea that there are plenty of activities for tourists in Gotland, regardless of their preferences. The supply of activities is abundant and increases in high season months.

There is also a natural reserve in the north of the island, as well as several activities: walking, riding bikes, bathing and sun tanning, etc, that the tourists can do by themselves.

Jansson (2009, personal interview) states that Gotland has approximately 30 museums and a lot of historical sites to visit. Also there are at least 100 beaches, 1 kayak service provider and 2 surfing service providers. 50 000 people visit the caves in Lummelunds. There are from 10 to 100 bike rentals and between 100 and 1000 shops. In Gotland, there are 3 to 5 tour providers, and from 3 to 5 Viking related activities. In addition, there are approximately 6 activities with green certification.

#### **4.6 Food sector: Restaurants**

Gotland has many restaurants with a wide variety of cuisines. Tourists can chose to eat local specialties, fast food, exotic food, etc. Tourists have a lot of options regarding quality, price, and type of food.

In an interview with the municipality representatives, they stated that several restaurants buy mostly organic products (available in the different supermarkets throughout Gotland) but have not applied for the certification due to the high costs that this process involve. The industry sector states that there is no demand for krav certified restaurants on the island.

Jansson (2009, personal interview) affirms that in Gotland there are be between 10 and 50 fast food restaurants. Also, between 10 and 20 restaurants that sell exotic specialties (e g Mexican food, Thai food, Indian food). Between 20 to 100 restaurants that sell local specialties, and no restaurant with green certification or that uses 100% krav food.

## 5 Findings

### 5.1 Characterization of the sample: demographics

Questionnaires were given to 329 people during July and August 2008. Local tourists represented 83% of the sample -5.2% came from Norrland, 59.3% from Svealand including stockholmsområdet, 18.5% from Götaland including Goteborgsområdet- 4% came from Denmark, Norway, and Finland, 0.3% came from the Baltic countries, 5.8% came from Germany and Poland, and 7% came from other countries. A graphic representation of the origin of the sample is presented in Figure 5.1.

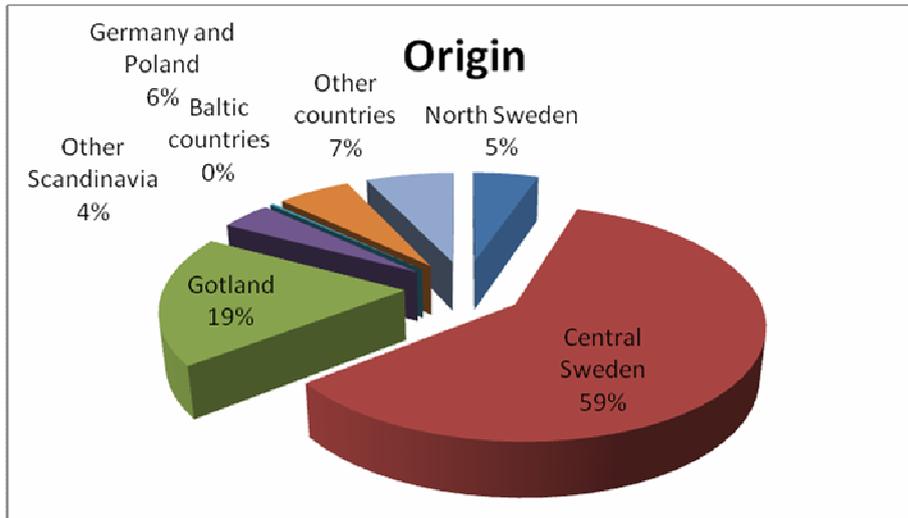


Figure 5.1 Origin of the sample

The majority of the people 35.2% were mixed groups of young adults up to 25 years old, followed by families with children 21%, couples without children 19.4%, mixed groups of adults of more than 25 years old 15.2%, people that travel alone 7.7%, and groups of families traveling together 1.6%. 19 people did not answer this question.

Regarding education 61.2% of the sample had a University degree, followed by 35.6% that had secondary education, 1.9% had a level of education of folkhögskola, 0.6% attended Hogskolan and 0.6% had other level of education. 17 people did not answer this question.

Concerning the level of income it is important to notice that 32.8% of the sample did not answer this question. Regarding the people that did answer the question 48.9% have an annual pre-tax income between two hundred thousand and four hundred thousand Swedish kroner. 33.5% of the sample had a pre-tax income of less than two hundred thousand kroner a year, and 17.6% earn more than four hundred thousand Swedish kroner a year.

People were also asked about their age. 43.6% were between twenty one and thirty years, 29.4% were between thirty one and forty nine years, 13.8% of the sample is confirmed by people of twenty years or younger, and 13.2% is people older than fifty years. 0.9% of the sample did not answer this question. Regarding gender, 65.5% of the sample is composed of females while the remaining 34.5% are males.

## 5.2 Descriptive statistics

### 5.2.1 Transport

Within the transportation sector people were asked about their knowledge of environmental effects that come from transport. A summary of people’s knowledge of environmental effects from transportation is presented in Figure 5.2. Only 7 people did not answer this question.

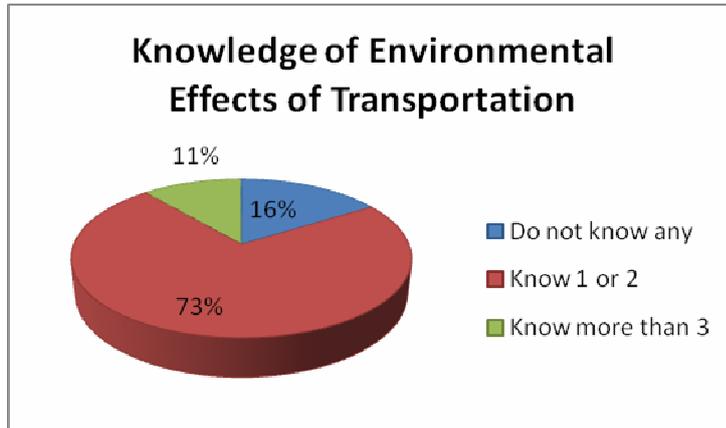


Figure 5.2 Knowledge of transportation impacts

Regarding the knowledge of transportation means that have less impact on the environment, 20.5% of the respondents were not aware that such an option exist and 68.1% were aware of 1 option with fewer impacts on the environment. Finally, 11.4% of the sample was aware of two or more options with less impact on the environment. People were also asked if they compensate for their emissions. Only 1.9% said they did, 60.9% did not, while 37.2% did not know. Twelve people did not answer these questions.

The different means of transportation that people selected to come to Gotland are presented in Figure 5.3. It can be seen that most of the people chose ferry, followed by bus, car, train, plane, boat, other means of transportation, and sharing car with friends. Two people did not answer these questions.

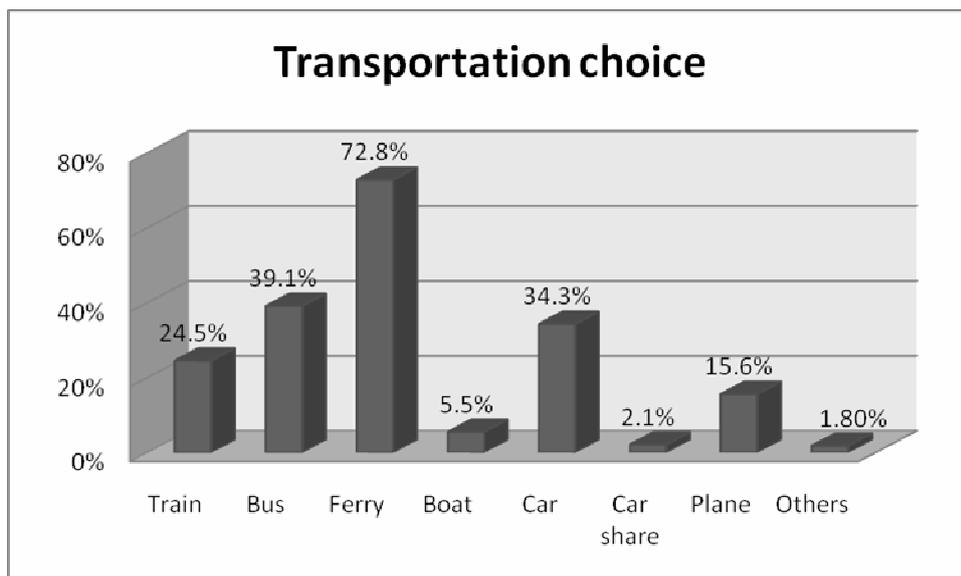


Figure 5.3 Transportation modes used to go to Gotland

Respondents were asked about the factors behind their transportation choice. The results are summarized in Table 5.1. The safeness for children and environmental reason were the least popular answers with two and three people choosing them respectively. In the other hand, the most frequently stated reason to chose within the different transportation options was convenience, followed by price, other reasons, comfort, being it the only option from their hometown, the flexibility to move around, enjoying the scenery and the choice being a group/family decision. Twelve people did not answer these questions.

Table 5.1 Did these factors influence your transportation choice?

Answers		Reasons: Transportation							
		Convenience	Price	Comfort	Flexibility to move around	Enjoy scenery	Only option from my town	Groups/family decision	Others
Yes	No. people	225	96	33	23	9	28	9	35
	%	71	30.3	10.4	7.3	2.8	8.8	2.8	11
No	No. people	92	221	284	294	308	289	308	282
	%	29	69.7	89.6	92.7	97.2	91.2	97.2	89

People were questioned about the factors that prevent them from choosing the trains or an environmentally friendly transportation option. The results are summarized in Table 5.2. The most frequently stated reason for not choosing a transportation mean with low impacts on the environment was the lack of comfort, followed by the price, the low speed, other reasons, lack of space and lack of knowledge that such an option exist, children safeness, and considering the low impact transportation means as being boring. As many as 129 people did not answer these questions.

Table 5.2 Did these Barriers prevent you from choosing and environmentally friendly mean of transportation?

Answers		Barriers: Environmentally friendly transport							
		Price	Low speed	Lack of space	Lack of comfort	Not safe for kids	It is boring	Lack of knowledge	Others
Yes	No. people	64	25	10	107	3	1	10	18
	%	32	12.5	5	53.5	1.5	0.5	5	9
No	No. people	136	175	190	93	197	199	190	182
	%	68	87.5	95	46.5	98.5	99.5	95	91

## 5.2.2 Accommodation

In this section of the questionnaire information regarding the accommodation choice was collected. People were asked about their knowledge of environmental effects that come from accommodation. Results are presented in Figure 5.4. Eleven people did not answer this question.

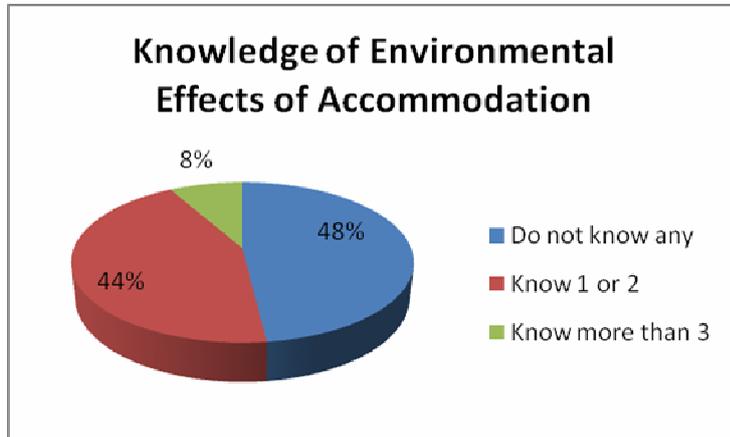


Figure 5.4 Knowledge of accommodation impacts

Then respondents were asked about their knowledge of accommodation options that are not or less harmful to the environment. The majority (60.4%) were not aware that such alternatives even exist, 35.2% were aware of 1 option, and 4.4% were aware of at least 2 options. Eight respondents did not answer this question.

People were asked about their accommodation choice. The findings are summarized in Figure 5.5. Most of the people stayed with family and friends, followed by the ones staying in an apartment, a cottage, a tent, a hotel, a hostel, other accommodation option, a boat, a pension, and a trailer. One person did not answer these questions.

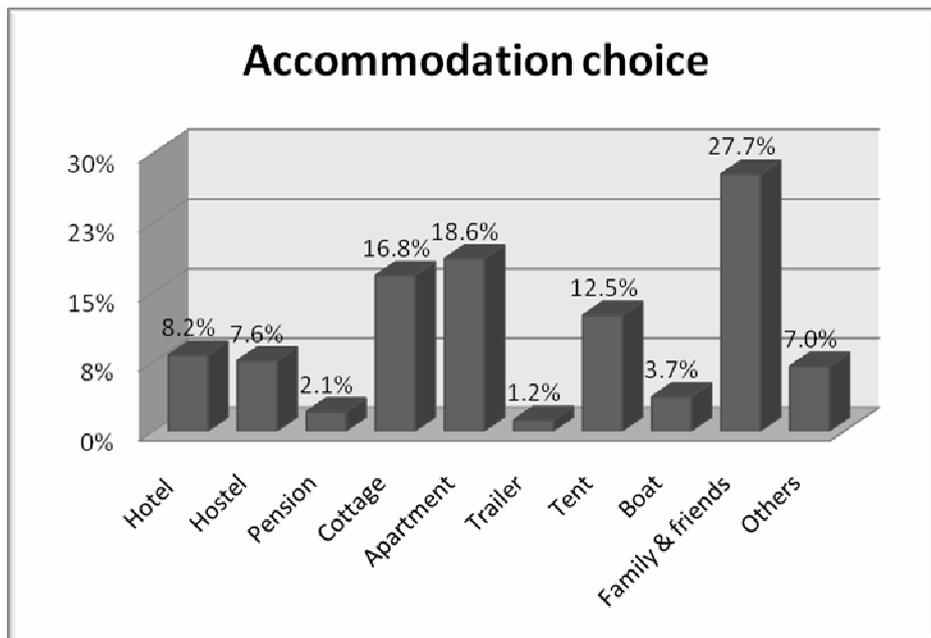


Figure 5.5 Tourists' accommodation choice in Gotland

People were asked about the reasons behind their choice of accommodation. A summary of the answers is presented in Table 5.3. It is important to notice that nobody mentioned air conditioning as a reason to choose their accommodation. Consequently, care of the facility to save water and energy, together with knowing the actual reasons were mentioned only once. The most frequent answer to this questions is “because it is the only option that I saw”, followed by price, comfort, other reasons, the fact that it is close to Visby or other main attractions, friends’ advice, children safeness, the quality of the accommodation, the good view and the cleanliness. Eight people did not answer these questions.

Table 5.3 Where these the reason for your accommodation choice?

Answers		Reason: Accommodation									
		Price	Comfort	Clean	Quality	Close to Visby	Good view	Safe children	Only option I saw	Friends advice	Others
Yes	No. people	115	98	3	6	19	3	11	141	12	53
	%	35.8	30.5	0.9	1.9	5.9	0.9	3.4	43.9	3.7	16.5
No	No. people	206	223	318	315	302	318	310	180	309	268
	%	64.2	69.5	96.7	98.1	94.1	99.1	96.6	56.1	96.3	83.5

Respondents were questioned about the factors that prevent them from staying in a more environmentally friendly type of accommodation. The answers are summarized in Table 5.4. Price was the factor repeated the most as a reason for staying in an accommodation with less impact on the environment, followed by other reasons, comfort and not considering other options, time, friends’ advice, children’s safeness, service quality, and no reason. As many as 64 people did not answer these questions.

Table 5.4 Where these the barriers to choose an environmentally friendly type of accommodation?

Answers		Barriers: Accommodation								
		Price	Time	Friends advice	Quality of service	Comfort	Children’s well being	Others	Not consider other options	Don’t know
Yes	No. people	94	31	8	2	39	3	84	39	2
	%	35.5	11.7	3	0.8	14.7	1.1	31.7	14.7	0.8
No	No. people	171	234	257	263	226	262	181	226	263
	%	64.5	88.3	97	99.2	85.3	98.9	68.3	85.3	99.2

### 5.2.3 Activities

When people were asked about their knowledge of environmental effects that come from different tourists' activities, 62.3% of them did not know of any, 34% knew one or two impacts, and 3.7% knew more than 3 environmental effects of activities. Eight people did not answer this question. The results are presented in Figure 5.6.

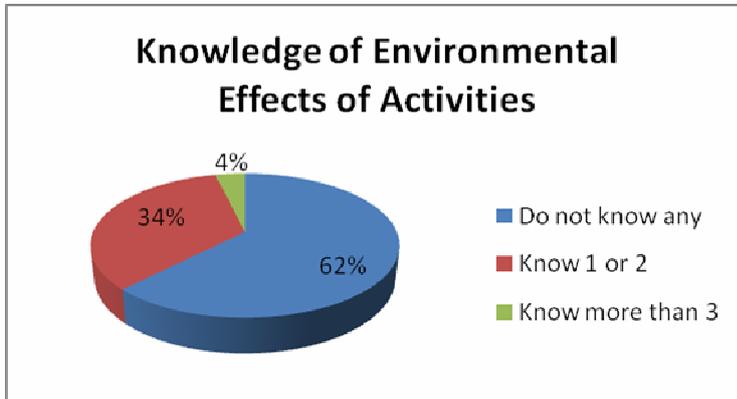


Figure 5.6 Knowledge of Activities' environmental impacts

People were also asked about their knowledge of other activities with less environmental impacts. The vast majority, 74.1% of the sample had no idea that such activities exists while 23.1% were aware of one activity with less impact, and 2.8% were aware of the existence of two or more activities with less impact on the environment. Eight people did not answer this question.

The different activities that people did while on vacations in Gotland are summarized in Figure 5.7. The activity selected the most by people was bathing and staying on the beach, followed by visiting museums, other activities, biking, shopping, hiking/bird watching/visiting caves, and diving and doing boat related activities.

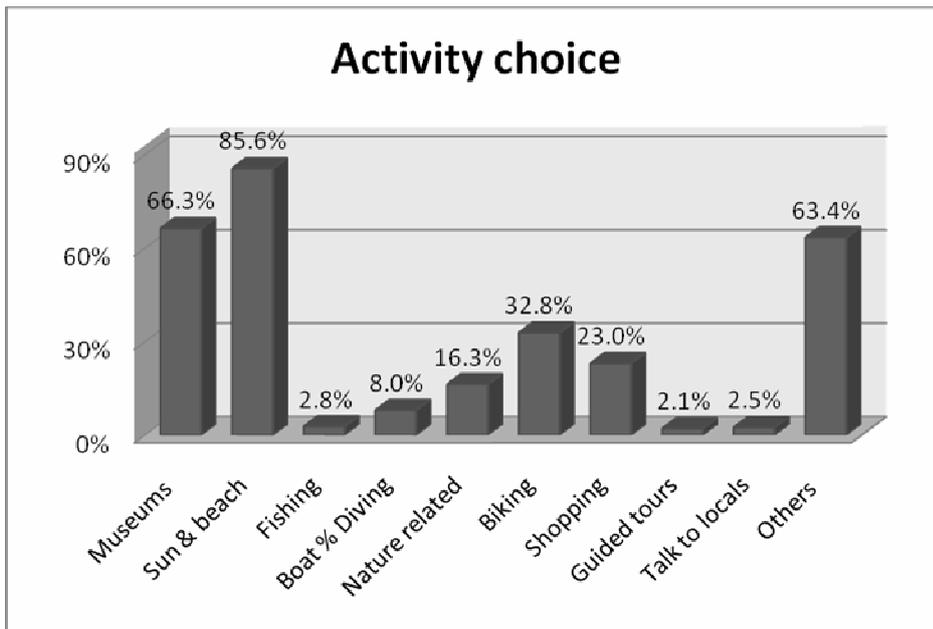


Figure 5.7 People's activities choice in Gotland

In addition to the activities represented in Figure 5.7, people also mentioned that they did kayaking, windsurfing or kite surfing, horse riding, guided tours, live like a viking, talk to locals and learn more about the place; in all of the cases the amount of people that did these activities was less than 5%(9) of the sample. From the people that were interviewed nobody did jet skiing or activities included in a holiday package. Three people did not answer these questions.

People were asked about the reasons that moved them to choose their holiday activities. The answers are summarized in Table 5.5. The most frequently stated reason was it being relaxing, followed by it being their hobby, other reasons, desire to try new things, personal inclination towards nature related activities, curiosity, time convenience and location, and it being their passion and because it was free in the holiday package. Nobody in the sample said that price was their reason for choosing holiday activities. Some 31 people did not answer these questions.

Table 5.5 Where these the reasons to choose holiday activities?

Answers		Reason holiday activities								
		Hobby	Relaxing	Others	Passion	Desire to Try new things	Time convenience and location	Curiosity	Inclination to nature related activities	Free in the package
Yes	No. people	126	195	44	2	13	3	4	8	2
	%	42.3	65.4	14.8	0.7	4.4	0.9	1.3	2.7	0.7
No	No. people	172	103	254	296	285	295	294	290	296
	%	57.7	34.6	85.2	99.3	95.6	89.7	98.7	97.3	99.3

People were asked about the factors that prevent them from doing environmentally friendly activities. The answers are summarized in Table 5.6. Respondents stated the fact that they are not comfortable as the main barrier for not doing activities with less impact on the environment, followed by disliking these activities, price, distance, other reasons, children's safeness, them not being relaxing, and them being too noisy. As many as 197 people did not answer these questions.

Table 5.6 Where these barriers for choosing environmentally friendly activities?

Answers		Factors that prevent you from doing environmentally friendly activities							
		Price	Dislike the activities	Not relaxing	Too noisy	Not comfortable	Safe for children	Distance	Other
Yes	No. people	13	56	2	1	64	2	4	3
	%	9.8	42.4	1.5	0.8	48.5	1.5	3	2.3
No	No. people	119	76	130	131	68	130	128	129
	%	90.2	57.6	98.5	99.2	51.5	98.5	97	97.7

### 5.2.4 Restaurants

When people were asked about their knowledge of environmental effects that come from restaurants 49.5% of the sample could not mention any environmental impact, while 43.9% could mention one or two effects, and 6.5% could mention three or more effects that come from restaurants. Eight people did not answer this question. The results are summarized in Figure 5.8

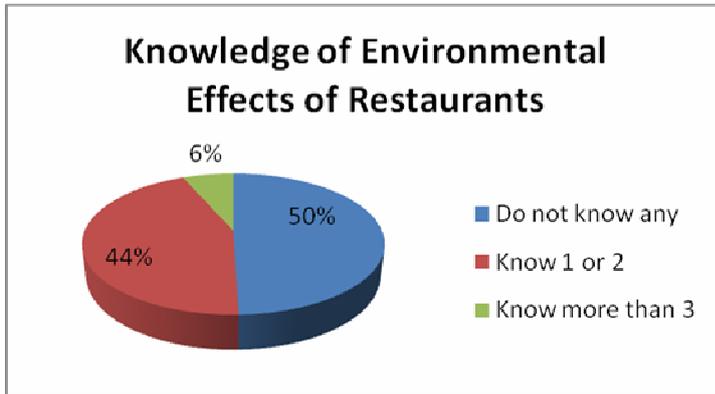


Figure 5.8 Knowledge of restaurants environmental impacts

When people were questioned about their knowledge of restaurants that have fewer impacts on the environment 21.7% of the sample said that they were not aware that such options exist. Many more respondents (68.6%) were aware of one restaurant with less impact on the environment, and 9.6% knew more than one restaurant option with low impacts on the environment. Seven people did not answer that this question.

People were asked about what kind of food they ate during their stay in Gotland. The results are summarized in Figure 5.9. It is important to notice that the food option that was chosen the most is local food, followed by fast food, exotic specialties, other type of food, and finally eco food. Some 62 people did not answer these questions.

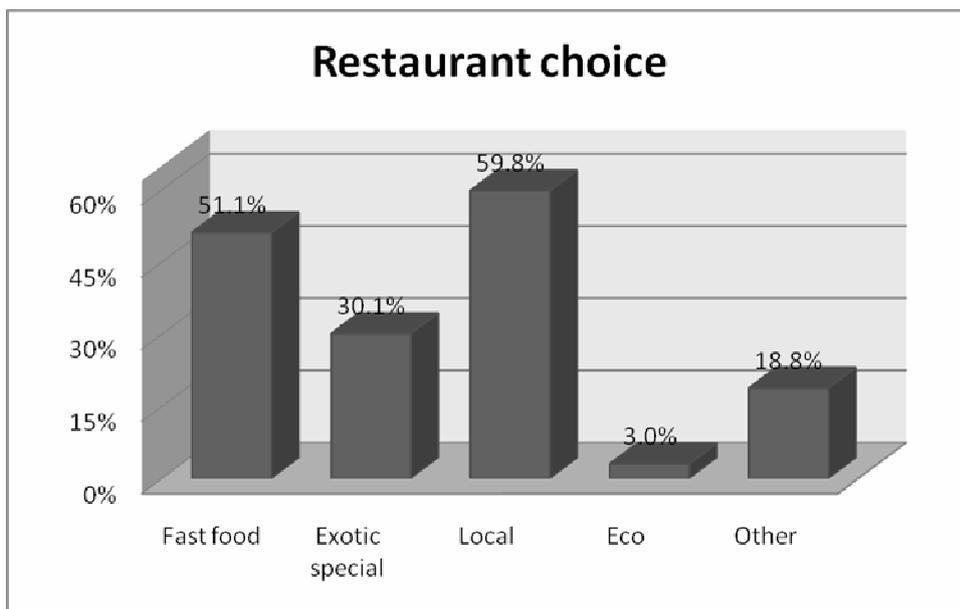


Figure 5.9 People's food choice in Gotland

People were asked about reasons for their food choices. The answers are summarized in Table 5.7. It is important to notice that nobody mentioned the following factors as a reason for their food choice: it being a friend's recommendation, the restaurant selling vegetarian food, or the restaurant selling organic products. The most repeated answer to the question was "because of the quality", followed by "because of the price", personal preferences for that type of food, comfort, short distance, nice atmosphere, service, and "because it is good for children". As many as 79 people did not answer this question.

Table 5.7 Where these the reasons for your food choices?

Answers		Reason of your food choice							
		Price	Quality	Short distance	Personal preferences	Comfort	Nice atmosphere	Service	Good for children
Yes	No. people	114	146	2	77	17	1	1	1
	%	45.6	58.4	0.8	30.8	6.8	0.4	0.4	0.4
No	No. people	136	104	248	173	233	249	249	249
	%	54.4	41.6	99.2	69.2	93.2	99.6	99.6	99.6

Further on people were asked which factors prevent them from picking a restaurant option with low impacts on the environment. Their answers are summarized in Table 5.8. It can be seen that the most regular answer to the question was "because it is expensive", followed by disliking that kind of food, distance, lack of knowledge of a restaurant with low impacts on the environment, lack of time to search for other options, poor quality of food, and other reasons. More than half of respondents (194) did not answer these questions.

Table 5.8 Do you consider these as barriers for choosing an environmentally friendly meal?

Answers		Reasons for not eating a meal with low environmental impacts						
		Expensiveness	Distance	Dislike the food	Lack of time	Poor quality	Lack of knowledge	Others
Yes	No. people	102	7	16	6	1	15	2
	%	75	5.2	11.9	4.4	0.7	4.6	1.5
No	No. people	33	128	119	129	134	120	133
	%	24.4	94.8	88.1	95.6	99.3	36.5	98.5

## 6 Statistical Analysis: summary

### 6.1 Introduction

Different statistical tests were performed in order to get a better understanding of the collected data and what it represents. First, correlations were made between the knowledge of environmental effects of transportation, accommodation, activities, and restaurants in order to see how changes in one level of awareness were related to changes in the level of awareness of the other factors. Then a chi-square analysis was performed in order to identify which variables are related to the choice of an environmental preferable option and their effect was determined. Finally, the variables showing significant relation to the choice of an environmentally preferable option identified by means of Pearson's chi-square test were used in logistic regression to identify which variables may be good predictors of an environmentally preferable choice. This chapter will present a summary of the results of the different statistical tests. More detailed information can be found in Appendix 2.

### 6.2 Awareness consistency

A Spearman's correlation coefficient was calculated to test the existence of a relation between knowledge of environmental effects among the different factors (transportation, accommodation, activities, and restaurants). Generally, correlations coefficients show whether changes in one variable result into changes in the second variable (Field, 2005). In the present study, the variable knowledge of environmental effects has 3 categories: 1 represents knowledge of 0 environmental effects; 2 stands for knowledge of 1 or 2 environmental effects; and 3 goes for knowledge of 3 or more environmental effects. The test results are presented in Table 6.1.

*Table 6.1 Knowledge of environmental effects correlation coefficients*

	KEE from Restaurants	KEE from Accommodation	KEE from Transportation	KEE from Activities
KEE from Restaurants	1	0.344	0.371	0.447
KEE from Accommodation	0.344	1	0.393	0.367
KEE from Transportation	0.371	0.393	1	0.381
KEE from Activities	0.447	0.367	0.381	1

*All correlations significant at a level of 0.01.*

The correlation coefficient is a number between -1 and +1; where a coefficient of 1 represents a perfect positive relation, indicating that if one variable changes the second variable will change in the same proportion. For instance, if the knowledge of environmental effects (KEE) from accommodation increases, the KEE from activities is expected to increase as well. According to Field (2005) correlation coefficients that rank between 0.344 and 0.447, indicate that the relation between the variables is between medium and large.

There is a significant positive correlation between KEE of the impacts of the different tourism activities in the four different sub-sectors. This implies that knowledge of environmental effects of one activity is linked or related to knowledge of the environmental effects of the other activities, thus if the knowledge of environmental effects of one activity increases it is likely that the knowledge of the environmental effects of the other activities will increase as well.

### 6.3 Environmentally preferable options and related variables

Pearson's chi-square tests if there is a significant relation between two categorical variables. In this case indicating that socio-demographic factors, barriers, triggers, awareness of impacts and available options will have a significant effect on whether a person would choose and environmentally preferable option (EPO). Chi-square tests were calculated between each of the environmentally preferable options and socio-demographic variables, awareness of impacts, awareness of other alternatives, motivators and barriers. Table 6.1 to Table 6.5 contain those variables which have significant relation with the different EPO's.

In addition to chi-square, the odds ratio was calculated in order to measure the effects size of one variable over the other one. It shows how much more likely is an outcome of one variable to occur under different values of the second variable. The less than 1 signifies a decrease in odds of an outcome occurring as the predictor increases.

Table 6.1 Variables related to the EPO in transport and their effect size

	Variable	Odds ratio
Barriers (B)	Low speed	-9
	Comfort	-5.2
Motivators (M)	Good price	2.03
	Flexibility to move around	-3.8
	Only option from hometown	13.29
KEE	Aware of 0	-2.7
	Aware of 1 or 2	1.5
	Aware of 3 or more	1.58

EPO in transport was found to be related to 6 variables (notice that KEE is one variable including three categories, which had to be split into 3 in order to obtain an effect size) which include 2 barriers and 3 motivators. The highest effect size is produced by the motivator "Only option from hometown". In case the answer is "yes" an EPO choice is 13 times more likely to occur than if the answer is "no". The highest opposite effect is attributed to the barrier "Low speed" according to which the EPO choice is 9 times less likely to take place when it is true.

Positive factors are the motivators price, only option from hometown, and awareness of 1 or more environmental effects that come from transportation. While the factors that affect negatively the choice of an EPO are the barriers speed, comfort, the motivators flexibility to move around, and the lack of knowledge of environmental effects that come from transportation.

As shown in Table 6.2 EPO in accommodation was found to be related to 7 variables (origin and age both include more than two categories, and had to be split in order to obtain corresponding effect sizes) among which 3 are motivators and 2 are barriers. The variables origin (Svealand and abroad), age (30 years or younger and more than 50 years), the motivator "only option I considered", and the barrier "other" are related with people taking an EPO. Meanwhile, the origins Norrland and Götaland, the age (31-49 years), the motivators "comfort" and being "close to Visby" with the barrier "time" decrease the possibilities of an EPO to be taken. The highest effect size is produced by the origin variable. People coming from abroad are 3.3 times more likely to pick an environmentally preferable option in

accommodation compared to people coming from Sweden. The highest opposite effect is attributed to the barrier “time”. In case the time serves as a barrier for an EPO, it is 4.5 times less likely to take place compared to a situation when time is not a barrier.

Table 6.2 Variables related to the EPO in accommodation and their effect size

	Variable	Odds ratio
Origin	Sweden (Norrland)	-2.5
	Sweden (Svealand)	1.26
	Sweden (Göteborg)	-2.8
	Abroad	3.26
Age	20 years or younger	2.09
	21-30 years	1.42
	31-49 years	-2.3
	More than 50 years	1.08
Motivators (M)	Comfort	-3.3
	Close to Visby	-4
	Only option I considered	2.69
Barriers (B)	Time	-4.5
	Other	1.73

EPO in activities was found to be related to 5 variables (again income, age, and knowledge of environmental effects where disaggregated to determine effect sizes). Being an income higher than 200 000 Kr/year, age more than 31 years old, and knowledge of 1 or more environmental effect factors that lead to an EPO choice. As oppose origin, an income of less than 200 000 Kr a year, being younger than 30 years, lack of KEE, and the barrier “dislike the activity” are factors that prevent people from taking an EPO in activities. It is important to notice that the barrier “dislike that activities” produces the highest negative effect size on choice of EPO in activities. The EPO is 2.6 times less likely to occur in case a tourist dislikes the activity. The highest opposite effect size is shown by the variable age. People who are more than 50 years old are 2.3 times more likely to choose an EPO in activities than those who are younger.

Table 6.3 Variables related to the EPO in activities and their effect size

	Variable	Odds ratio
Origin	Sweden	-2
Income	Less than 200 000Kr/year	-2
	200 000 - 400 000 kr/year	1.89
	Over 400 000Kr/year	1.01
Age	20 years or younger	-2.4
	21-30 years	-1.8
	31-49 years	2.25
	More than 50 years	2.34
KEE	Aware of 0	-2
	Aware of 1 or 2	2.01
	Aware of 3 or more	1.47
Barriers (B)	Dislike that activities	-2.6

Finally, EPO in restaurants was found to be associated to 5 variables which include 2 motivators and 1 barrier. Having a salary of more than 400 000 Kr a year, being older than 31 years old, and having quality as a motivator, can contribute to the choice of an EPO. On the other hand having an income of less than 400 000Kr a year, being younger than 30 years old, and considering price as a barrier or as a motivator will decrease the possibilities to take an EPO in restaurants. Here price acts both as a barrier and as a motivator. Both of them show negative effect on the EPO choice in restaurants. However in the case of being a motivator the effect size of price is higher than when it acts as a barrier: the EPO is 11 times less likely to take place when price is a reason for restaurant choice compared to when it is not, while the EPO is 2.5 times less likely to take place when price is a barrier for restaurant choice compared to when it is not. The highest positive effect size is produced by the motivator “Quality”. In case the answer is “yes” an EPO choice is almost 5 times more likely to occur than when the answer is not.

Table 6.4 Variables related to the EPO in restaurants and their effect size

	Variable	Odds ratio
Income	Less than 200 000Kr/year	-2
	200 000 - 400 000 kr/year	-1.1
	Over 400 000Kr/year	3.01
Age	20 years or younger	-2.3
	21-30 years	-1.9
	31-49 years	1.36
	More than 50 years	3.54
Motivators (M)	Price	-11.1
	Quality	4.89
Barriers (B)	Price	-2.4

The variables which were found to have a significant relation to the EPOs in all of the 4 subsectors will be used further on to check whether they can serve as predictors for each of the EPOs.

## 6.4 Predictors of environmentally preferable options

Logistic regression is used to predict whether or not a person is likely to choose an environmentally preferable option regarding transportation, accommodation, activities, and restaurants. Through logistic regression a relation can be established between a categorical dichotomy (e.g. did or did not a person take an environmentally preferable option) and a set of categorical or continuous predictors (gender, education, income, etc).

Additionally to the parameter estimates SPSS provides a number of outputs which are useful in assessing the model in general. Further information about these outputs can be found in Annex 2.

For the general assessment of a model SPSS provides the percentage of the cases which can be predicted correctly by the model using the observed data. Obviously, the higher the percentage the better the model fits the data. Additionally, Nagelkerke’s  $R^2_N$  provides an estimate of how much of the variation in the outcome variable can be explained by the model. It varies between 0 (the model is useless at predicting the outcome variable) and 1 (predictors can predict the outcome variable perfectly).

### 6.4.1 Modeling results

Four logistic regression models were obtained by means of SPSS, each corresponding to one of the 4 tourism subsectors selected for the study and predicting probability of choice of an environmentally preferable option in the subsector. All of the variables which were proven to have a significant relation with an environmentally preferable option (see Subsection 6.3) were initially used as predictor variables for that option. However, whenever there was an indication of a predictor having no influence on the outcome, the predictor was removed and SPSS was rerun to obtain a new model. This was repeated until a model was obtained which contains only those predictors which are making significant contribution to the prediction of an outcome.

The logistic regression model for the occurrence of EPO in the transportation subsector is summarized in Table 6.5. According to it as many as 7 predictors make a significant contribution to the outcome of the EPO variable. The motivator “Only option from hometown” has the highest positive effect on the odds of a person taking an EPO in transportation (the odds of occurrence of the EPO is 16.6 times higher in case the transportation means is the only option from hometown), while the barrier “Low speed” causes the highest negative effect on the odds of a person taking an EPO (the odds of occurrence of the EPO is 11.5 times lower in case the low speed is perceived as a barrier).

Table 6.5 Variables in EPO Transportation regression

Predictor	Significance	Exp(B)
Price (M)	.001	2.565
Only option from hometown (M)	.000	16.601
Low speed (B)	.002	-11.5
Comfort (B)	.000	-7.8
Aware of 0 impacts (KEE)	.004	-3.3
Age: 31-49 years	.016	-2.1
Origin: Sweden	.047	1.562

As much as 75.3% of the sample can be correctly predicted by the model. Figure 1.1 illustrates this graphically. Each letter on the graph shows the observed value of the outcome, while its position along the horizontal line illustrates probability predicted by the model. The model would have predicted all of the values correctly if all of the cases in which EPO was not taken (denoted by “n”) had been placed between 0 and 0.5, while all of the cases in which EPO was taken (denoted by “y”) had been placed between 0.5 and 1. Ideally, the predicted outcomes should also cluster at both ends of the graph. However, in our case the model does not fit the observed data perfectly. The value of Nagelkerke’s  $R^2_N$  is 0.42, which means that only about 42% of the observed data can actually be explained by the model. All of the above suggest that predictor(s) of the EPO exist other than those that were considered in the analysis.

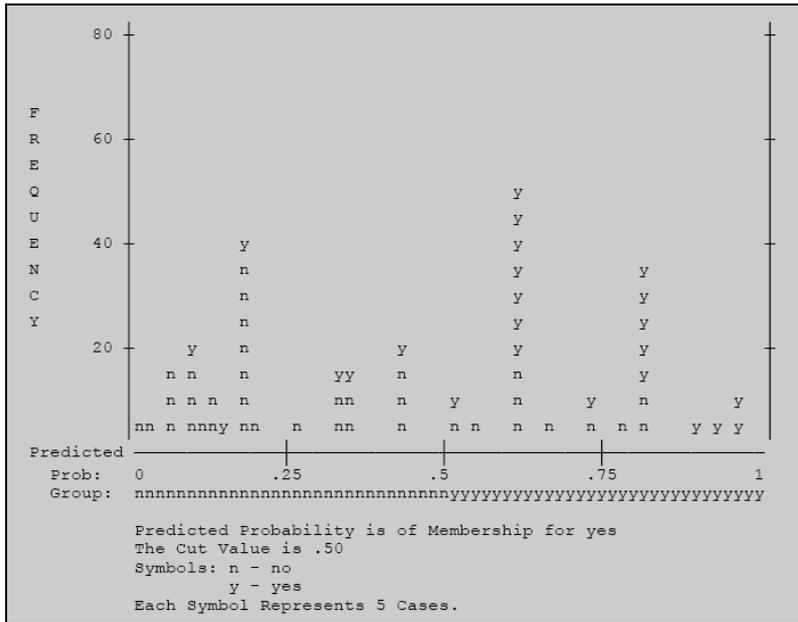


Figure 6.1 EPO in Transportation: observed groups and predicted probabilities

The logistic regression model obtained for EPO in the accommodation subsector is summarized in Table 6.6. According to it as many as 7 predictors together with a constant make a significant contribution to the outcome of the EPO variable. All of the predictors produced negative effects on the odds of a person taking an EPO. The highest negative effect is calculated to come from the predictors denoting origin (e. g. the odds of occurrence of the EPO is 8.3 times lower in case a person comes from Norland compared to anywhere else). The model predicts 74.6% of the sample correctly and the Nagelkerke’s  $R_N^2$  is 0.261. The graphical representation of the observed groups and predicted probabilities can be found in Appendix 2.

Table 6.6 Variables in EPO Accommodation regression

Predictor	Significance	Exp(B)
Origin: Norland	.004	-8.3
Origin: Svealand	.024	-2.9
Origin: Götaland	.000	-7
Time (B)	.026	-2.8
Comfort (M)	.002	-2.6
Close to Visby (M)	.050	-3.2
Age: 31-49 years	.031	-2
Constant	.000	9.553

Another logistic regression model was built to predict occurrence of EPO in the activities subsector (see Table 6.7). As many as 5 predictors make significant contributions to the outcome of the EPO variable. Knowledge of environmental effects has the highest positive effect on the odds of a person taking an EPO in activities: the odds of occurrence of the EPO is a bit more than 3.1 times higher in case a person is aware of 1 or 2 effects compared to a person with any other knowledge. The age of a person causes the highest negative effect on the odds of a person taking an EPO: the odds of occurrence of the EPO is 3.6 times lower if a person is 20 years old or younger compared a person of any other age. The model is able to

predict 64.0% of the sample correctly and the Nagelkerke's  $R_N^2$  is 0.148. The graphical representation of the observed groups and predicted probabilities can be found in Appendix 2.

Table 6.7 Variables in EPO Activities regression

Predictor	Significance	Exp(B)
Age: 20 years or younger	.001	-3.6
Age: 21-30 years	.000	-2.6
Dislike the activities (B)	.017	-2.2
Aware of 0 impacts (KEE)	.038	1.536
Aware of 1-2 impacts (KEE)	.000	3.135

Finally, the logistic regression model for the occurrence of EPO in the restaurant subsector is presented in Table 6.8. Only 2 predictors make significant contributions to the outcome of the EPO variable. Both age and price have a negative effect on the odds of a person taking an EPO in restaurants. The highest negative effect among the 2 is attributed to the motivator “Price” (the odds of occurrence of the EPO is 9 times lower for those people who take price as a reason for their restaurant choice). The model predicts 76.3% of the observed outcomes correctly and the Nagelkerke's  $R_N^2$  is 0.521. These are the best characteristics among all of the four models. The graphical representation of the observed groups and predicted probabilities can be found in Appendix 2.

Table 6.8 Variables in EPO Restaurants regression

Predictor	Significance	Exp(B)
Price (M)	.000	-9
Age: 21-30 years	.002	-2.5

All of the four models obtained for EPO choices in the four subsectors considered in the study leave a large portion of the observed outcomes unexplained. They accurately predict 64-76.3% of the sample data correctly and have Nagelkerke's  $R_N^2$  in the range of 0.15-0.52. These suggest that other predictors may exist which were not included in the study but which can improve the models. Among the possible candidates is education, income, and travel party. Although, these were indeed a part of the present study, limitations like low category score violated the necessary condition for Person's chi square, while the large number of missing values made them not appropriate for logistic regression due to possible bias. The latter, however, was sometimes possible to overcome. In the case of barriers to EPOs, when people chose the EPO they were not required to give an answer about the barriers to choose that EPO. The resulting missing cases were assumed to be no barriers to EPO.

## **7 Discussion**

The majority of this study sample (83%) is composed of Swedish people; this agrees with the data provided by the tourism industry representative that says that more than 80% of the tourists in Gotland are national tourists. This fact may open opportunities to develop local sustainable tourism.

The main visitors of Gotland are adults younger than 25 years old, follow by families, couples without children, and mixed groups of adults of more than 25 years old. When considering sustainable action plans it will be important to target the programs keeping in mind the age and possible interests of the target groups.

Regarding income, an important percentage did not answer this question. Income is considered a sensitive question and people's failure to provide this data is somehow expected. If this study sample represents reality, it can be expected the majority of Gotland tourists to be located in the middle income range of between 200000 and 400000 Swedish kroner.

It is necessary to adapt the theory to the specific conditions of Gotland. To make a decision regarding vacation choices (transport, accommodation, activities, and restaurants) tourists consider factors such as time, convenience, cost and match them to the available options (Becken et al 2003). Accordingly, it is important to consider the information provided in chapter 4 to understand the context in which tourists made their vacation decisions.

### **7.1 Transportation**

Knowledge of environmental effects that come from transportation is unsurprisingly high, national and international efforts have been directed towards creating awareness about environmental impacts of transportation. Despite the studies, media advertisement, and political and industrial efforts to reduce emissions, it seems that the message does not reach consumers. The majority of the people do know about what are the options with less impact on the environment but few people use means of transportation with low impacts. An important percentage of tourists do not use public transportation to go to Gotland and prefer to bring their own cars.

The fact that almost 1 out of 3 people bring their car to Gotland may be related with the fact that public transportation system in Gotland is not the desirable one. Andersson (2009, personal interview) states that transportation inside the island is not enough if tourists want to move around. Tourists need to plan carefully their trips because the buses between towns are not frequent. Without a car tourists will most probably have to spend their holidays in one fixed location.

It is important to mention the fact that a noteworthy portion of the sample (37.2%) is not familiar with the concept of "compensating for emissions". People do not know what does it mean or about the possibility of compensating for emissions. Perhaps, if the knowledge increases the amount of people that compensate their emissions may increase.

Most of the people choose ferry to go to Gotland. Nevertheless, this can be a result of the fact that they only have two options to reach the island: ferry or plane, and not because of an environmental concern. That is why it is important to consider supplementary transportation means (use of car versus use of public transportation).

From the data it can be seen that convenience and price are the main reasons to choose a certain transportation option. Environmental reasons are among the least popular reasons

when deciding which transportation means to use. In addition, the main barriers to choose an option with low environmental impacts are comfort and price.

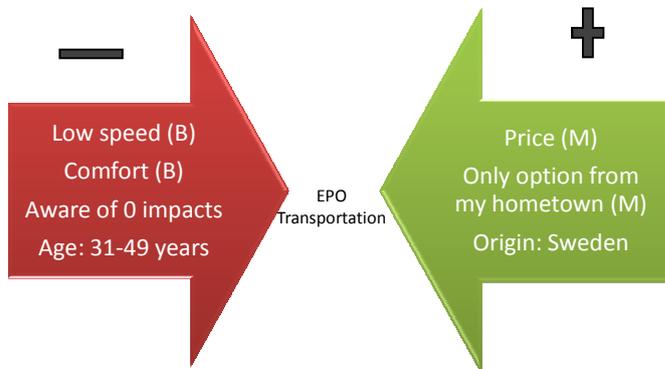


Figure 7.1 Regression summary for transportation EPO

Figure 7.1 shows a summary of some of the factors that lead to an EPO choice in transportation. From the sample data it can be seen that the barriers low speed and lack of comfort, together with lack of awareness about the environmental impacts of transportation can lead to a no choice of an environmentally preferable option. In addition the fact that people are in the age range of 31-49 years old also weight against an EPO in transportation. On the other hand factors like motive price, only option from my home town and origin Sweden can lead to an EPO in transportation.

## 7.2 Accommodation

The questionnaire output shows that almost half of the respondents do not know the environmental effects of accommodation, while a similar number was able to mention one impact of this activity. Awareness about the effects that an activity has on the environment has been identified as a factor that can promote a more environmentally friendly attitude. In this context, and with the aim of targeting the 48% of the people that are not aware of any environmental effect of accommodation, it may be important to generate activities that will create awareness among the people.

In addition, from the sample responses it can be concluded that respondents do not really know which accommodation types have impacts on the environment or the magnitude of those. Categorizing impacts of accommodation is a complex process because the multiple factors involved (resources use, waste management, social aspects, etc) are case specific.

Regarding the reasons for choosing an accommodation the most frequent answer is “it was the only option that I saw”, followed by price and comfort. It is important to notice that only one person out of the 329 based their accommodation choice on water and energy performance of the facility. In this case it becomes evident the need to create awareness among people regarding the impacts that accommodation has on the environment. One of the reasons why people do not search for environmentally friendly accommodation types might be the lack of awareness or knowledge.

“Price” and “other reasons” are the variables that prevent people from choosing an environmentally friendly accommodation. But being environmentally friendly does not necessarily mean a higher price, for instance from an emissions perspective the environmentally friendly option is staying in a tent. In reality, it would not be possible or sustainable for all the tourists in Gotland to stay in a tent, but the fact that people still mention the price as the main reason for not staying in an environmentally friendly facility supports the statement that people just consider environmental products more expensive without real knowledge or reason. It will be good to give tourists the instruments to make an informed decision.

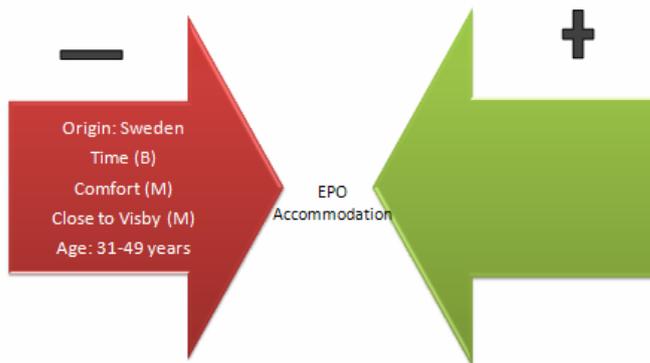


Figure 7.2 Regression summary for accommodation EPO

A summary of the regression made in the statistical analysis to identify the factors that determine the choice of an Environmentally Preferable Option in accommodation is presented in Figure 7.2. The factors identified (Origin, Time, Comfort, Being close to Visby, and Age) lead to a decrease in the chances of people taking the EPO. It is important to notice that none of the variables in this study influence or promote taking an Environmentally Preferable Option in accommodation (from a statistical point of view).

### 7.3 Activities

In this subsector the knowledge of environmental effects is again very limited. More than half of the sample was not able to mention any environmental impact from activities. This may reflect the need to create awareness among people that what they do has an impact on the environment.

People do not know the effects of their activities and consequently do not know that other activities may have less impact. Creating awareness in people, as well as promoting activities with low impact, may help to change people’s activity choice.

The fact that people consider Gotland as a nature destination and that indeed low impact nature related activities (walking, biking, sun, and bathing) are popular, is an opportunity to promote these low impact leisure.

Among the reasons to choose a certain activity, the main ones are “because it is relaxing” and “because it is my hobby”. People go on vacations to have a break from normal life and enjoy doing what they like. It is important to mention that price was not a factor here. As such, people can be sold environmentally friendly activities as long as they contribute to their vacation experience.

A number of people identified the following barriers for not choosing an environmentally friendly option: being “not comfortable” or disliking this kind of activities. In the cases in which the reason is because people “do not like the activities” there is little opportunity for change.

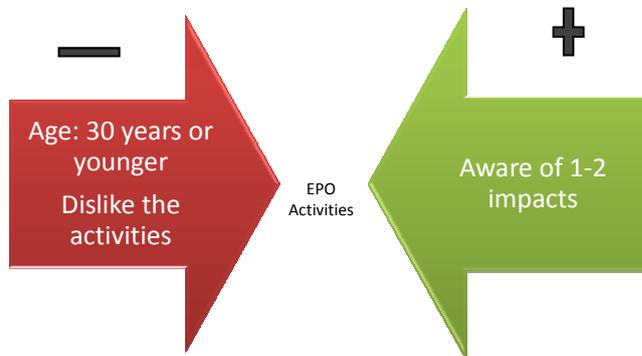


Figure 7.3 Regression summary for activities EPO

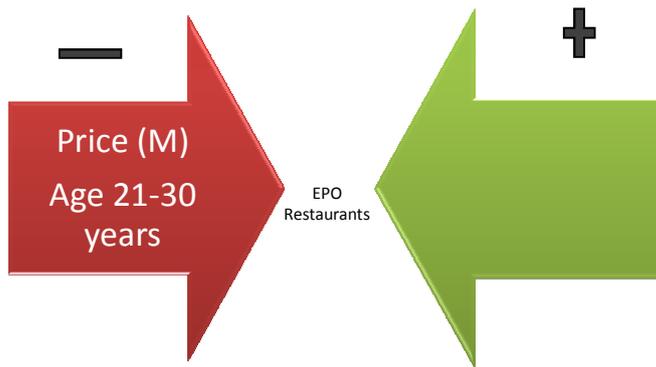
From the activities EPO regression summary presented in Figure 7.3 it can be seen that the variables that influence negatively the choice of an EPO in activities are age and disliking the activities while the factor that influence positively a choice of an EPO in activities is awareness of impacts. Thus, the more aware people are about the impacts of their activities the more likely for them to choose an environmentally preferable option in activities.

## 7.4 Restaurants

Almost fifty percent of the sample was not able to mention any environmental effect that comes from restaurants while a similar number could mention one or two impacts, few people were able to mention three or more effects. The lack of knowledge about environmental impacts of the different food choices is clear. People have heard about environmental issues but their real knowledge about the topic is rather limited. The majority of the sample does have an idea of which options have less impact on the environment, even though this is not their main concern while choosing a restaurant. Very few people eat “eco food”, but this might be a reflex of the fact that there is no restaurant in Gotland with an environmental certification.

Among the reasons for a restaurant choice are quality, price, and personal preferences. Factors such as “because they sell organic products” or “because they sell vegetarian food” are ignored. The reason for people not to specifically search for a restaurant that serves vegetarian food might be that it is possible to find this food in a regular restaurant. As stated before the reason for people not searching for organic food may be because this option is not available in Gotland. Nevertheless, the possibility of this market segment to exist should be explored.

The main reason for people not to choose a restaurant option with low environmental effects is because of the price. People perceive environmentally friendly food as expensive and might not be willing to pay a premium price for it.



*Figure 7.4 Regression summary for restaurants EPO*

The results for the restaurants EPO regression are summarized in Figure 7.4. It can be observed that the factors that influence positively the choice of an EPO in restaurants were not identified in this study. Variables as price and young age (between 21 and 30 years) were identifies as factors that prevent people from taking a restaurants EPO.

## 8 Concluding remarks

### 8.1 Policy implications

The fact that the majority of tourists are Swedish might mean that instead of going to sun and sea destinations abroad (for instance Thailand) people can be attracted to a local destination that can bring them an equal rewarding summer holiday experience. Now that emissions and global warming are core factors in environmental policy, doing internal tourism can be an opportunity for Sweden to reduce its international aircraft emissions. In addition, a destination with the characteristics of Gotland may be an opportunity for countries like Germany, the Baltic States, or Scandinavian Countries to visit sea and beach without having to travel far.

Tourists' lack of knowledge about environmental issues is evident. Efforts like the magazines informing house owners in Gotland about waste collection or municipality environmental plans (Jansson 2009, personal interview) should proceed.

Pursue of sustainability involves a joint work between demand and supply. Efforts should be made to encourage people to choose environmentally friendly options; in parallel there should be industry programs that guaranty the availability of green options in the market.

The author thinks it will be interesting to have some sort of top 10 on environmental performance. The municipality distributes a magazine to house owners in which it may be a good idea to include the 10 business with better environmental performance. It may contribute with the municipality aim of pursuing sustainability. In addition, the environmental efforts of the 10 business that would appear in the magazine might be an inspiration for the others to follow the leaders.

Despite the argument that states that tourists in general do not demand environmentally friendly products and services, research suggests that the concern about environmental issues is growing and will keep growing in the future. As such, creating a simple and reliable scheme for tourists to see the environmental performance of different business can provide them with a tool to be informed and to choose activities with less impact on the environment. In addition, the fact that data is disclosed to the public may inspire the industry to aim for a higher environmental performance, creating a sort of top runner scheme.

In addition, such a scheme may allow people to compare between options with similar prices and facilities but with different environmental performance. If being environmentally friendly does not cost more or the price difference is not significant, people might be likely to choose an option with a more desirable environmental outcome. Allowing tourists a better overview of the general picture of available options might trigger an environmentally friendly choice.

One of the common stated reasons for not choosing an EPO is the lack of comfort. It would be impossible to change the amount of hours it takes to reach Gotland by train. Nevertheless, it may be worth to try small not expensive changes that can increase tourists comfort. For instance, creating packages that move people to the hiking places or providing assistance to bikers may be a way to promote these activities. Further research should be undertaken to investigate the factors that make the environmentally friendly options "not comfortable" in order to see if there are opportunities to improve this situation.

There is a general perception that environmentally friendly options have higher prices. Nevertheless, this is not applicable in all the cases, as such traveling by plane might cost more than traveling by ferry and public transportation. If there are sales or ways to get good prices

they should be advertised. A good example of this is the ferry system (EPO from an emissions perspective); that in its web page states that if bought in advance is cheaper.

Decrop (2006) explains that in the decision making process there is a desire for incrementalism, new things are tried if people consider them better than the status quo. "Decision making implies a permanent incremental search". Therefore, creating green alternatives can be the value added tourists search for.

## 8.2 Conclusions

*"There is no "perfect" or "wrong" tourist. All tourists have characteristics that move them closer or further from the concept of a responsible tourist" (Standford, 2008)*

There is a general perception that environmentally friendly options have higher prices. Nevertheless, this is not necessarily true for all the cases. Some options with less impact on the environment are affordable; as such they have the opportunity to become more popular in the future.

The number of "green consumers" and their will to go the extra mile in order to search for environmentally friendly products is unknown. Nevertheless the fact that people are starting to care more about environmental issues may be recognized as an opportunity to promote green purchases.

There are variables that might have been important to measure in order to predict the choice of an environmentally preferable option but were out of the scope of this research. The statistical models were able to predict from 15 to 52% of the EPO's choice, therefore, more variables should be tested and added to the models.

From the statistical models it can be seen that most of the predictors of an EPO choice are fixed variables as origin, age, train speed, "only option from my hometown" and as such will be difficult to modify. However, in the case of activities "knowledge of environmental effects" was a significant variable when choosing an EPO; therefore it might be important to explore the possibility of promoting activities to increase awareness regarding the impacts of the different activities as an attempt to promote activities EPO choice.

Data availability was not the ideal one. Mistakes in filling the questionnaires together with no answers constrain the results of the statistical analysis. As such, it was not possible to obtain conclusive results, in deep studies should be made in order to get stronger information that will allow proposing further action plans.

In some sectors (restaurants, accommodation) the factors that lead to the choice of an environmentally preferable option could not be identified. It will be important to study and include other possible variables that can give more insights into what are the factors that lead to the choice of an EPO.

In addition, in some cases statistical analyses lead to results that apparently do not correspond with reality. For instance, knowledge of 0 environmental effects was statistically related to the choice of an EPO in activities. Cases like this should be further investigated in order to see which other variables might be affecting the result making it not applicable.

Despite the fact that it is highly unlikely that all tourists will become green it is important to give people the opportunity to reduce their impact on the environment. Gotland has the opportunity to stand as an example and not only be seen by tourists as a green destination but becoming one, giving tourists and locals the opportunity to improve their environmental performance. In Gotland the availability of green options is still very limited.

It is important to see environmental issues as a way to add value to the overall tourism experience. Green products and services might be an opportunity for attracting more tourists to Gotland rather than to increase sales for a specific tourism subsector.

### **8.3 Recommendations for future research**

Due to lack of data availability the hierarchies of impacts are general and rather simplistic; it will be interesting for further studies to include more aspects in the characterization (social, economical and biological).

The statistical analysis did not lead to conclusive results, more variables need to be included and studied in order to improve the accuracy of the statistical analysis. Perhaps more qualitative data and some in deep interviews with key actors might provide better insights of the Gotland situation and allow ruling out some alternatives in advance.

It will be good to create joint plans with the community in order to seek for the best alternatives in order to switch tourists and locals behavior towards more environmentally sustainable options. It is important to raise awareness regarding environmental issues and sustainability.

Create better data bases and registry about the available alternatives for tourists. The only way to know which available options tourists have and what needs to be improved is to have a precise idea of what is there. In the case of Gotland the data range is too wide (ex. In Gotland there are between 100 and 1000 shops).

In addition, it is important to evaluate and determine the impacts of the different tourism activities in the island environment. Once the impacts are known the options that are less harmful to the environment can be promoted and emphasized.

Sweden's environmental performance is prominent; it will be interesting to explore the programs that have proven to be successful in mainland Sweden to see which ones can be replicated in Gotland.

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## **Abbreviations**

DMP	Decision making process
EF	Ecological Footprint
EMS	Environmental management system
EPO	Environmentally Preferable Option
GDP	Gross domestic product
UN	United Nations
UNWTO	United Nations World Tourism Organization
KEE	Knowledge of Environmental Effects



# Appendix 1

## Questionnaire

1. Where are you coming from?

1. Norrland
2. Svealand including Stockholmsområdet
3. Götaland including Göteborgsområdet
4. Denmark, Norway or Finland
5. Estonia, Latvia, Lithuania (the Baltic Countries)
6. Other: .....

2. How many times you have been to Gotland in the last 3 years?

1. First time
2. 1-2 times
3. 3-5 times
4. 6 or more times

3. How long will you stay on Gotland?

1. Day visit
2. 2 – 5 nights
3. 1 week
4. 2 weeks
5. More than 2 weeks

4. Is this your most important / longest holiday this year?

1. Yes
2. No

5. Why did you choose Gotland for your holiday? .....

6. Where did you go for your main vacation in the last 3 years? .....

7. What kind of holidays you took in the past 3 years?

1. One long holiday in the summer (at the beach? Visit cities & museums? Hiking, walking?)
2. One long holiday in the winter (ski? Travel to warm countries e.g. Asia, Latin America? )
3. A few mini-holidays a year within Europe
4. A few mini-breaks in Sweden /Scandinavia
5. Visiting family and friends
6. Other: .....

8. Who are you traveling with?

1. Alone
2. With my family: ..... adults; ..... Children; Age:..... (if infants under 5 yrs.)
3. As a group of families
4. Mixed Group of young adults up to 25 years
5. Mixed group of adults (26 or over)
6. Couples without children

**IDENTIFY TOURIST ACTION/CHOICES**

### TRANSPORT TO/FROM GOTLAND

9. **How** did you travel to Gotland?

- |          |                              |                 |
|----------|------------------------------|-----------------|
| 1. Train | 4. Own boat                  | 7. Plane        |
| 2. Bus   | 5. Car/hire car              | 8. Other: ..... |
| 3. Boat  | 6. Shared a car with friends |                 |

10. **Why** did you choose this option?

- |                                   |  |
|-----------------------------------|--|
| 1. Convenient for the time I have | 6. It is safe for children                 |
| 2. Good price for me              | 7. It is less harmful to the environment   |
| 3. Comfortable                    | 8. It was the only option from my hometown |
| 4. Flexibility to move around     | 9. Other: .....                            |
| 5. I like to enjoy the scenery    |  |

11. **How often** in the past 3 years did you use this transport when going on holidays?

1. Every year                      2. Less .....

12. (If they have not taken the train): The train company has some offers to come to Gotland by train, did you consider this?    1. Yes                      2. No

**What prevented you** from taking the train?

- |                                    |                          |
|------------------------------------|--------------------------|
| 1. Expensive                       | 5. Not safe for children |
| 2. Slow                            | 6. I find it boring      |
| 3. Not enough space for my luggage | 7. Did not know about it |
| 4. Not comfortable for my needs    | 8. Other: .....          |

### LOCAL TRANSPORT ON GOTLAND

13. **How** do you go around the island?

1. *By local bus*    2. *Taxis*    3. *Car rental*    4. *Biking*    5. *I'm more or less stationary*

14. **Why** do you use this mode of transport?.....

15. Did you always use this transport during your holidays in the **last 3 years**?

1. *Yes, every year*    2. *No, less: .....*

16. *(if not chosen previously)*: Did you consider using local transport on Gotland?

Yes, but, .....

#### **ACCOMMODATION**

17. **What** type of accommodation are you using on Gotland?

- |                                |                                    |
|--------------------------------|------------------------------------|
| 1. <i>Hotel</i>                | 6. <i>Rented/own trailer</i>       |
| 2. <i>Hostel</i>               | 7. <i>Rented/own tent</i>          |
| 3. <i>Pension</i>              | 8. <i>Rented/own boat</i>          |
| 4. <i>Rented/own cottage</i>   | 9. <i>Stay with friends/family</i> |
| 5. <i>Rented/own apartment</i> | 10. <i>Other: .....</i>            |

18. **Why** did you choose this option?

- |                                   |   |
|-----------------------------------|---|
| 1. <i>Good price</i>              | 6. <i>Close to Visby (the hot spot)/other attractions/beach</i> |
| 2. <i>Comfortable</i>             | 7. <i>Has a good view</i>                                       |
| 3. <i>Clean</i>                   | 8. <i>Safe for children</i>                                     |
| 4. <i>Good quality of service</i> | 9. <i>It takes care to reduce water and energy consumption</i>  |
| 5. <i>Has air conditioning</i>    | 10. <i>It was the only option I saw</i>                         |

11. Was recommended by friends

12. Other: .....

19. **How often** did you use this type of accommodation during holidays in the last 3-5 years?

1. Every year

2. Less .....

20. **Did you consider other types** of accommodation? What prevented you from choosing those?

1. Expensive

5. Not comfortable

2. I did not have the time to look for other options

6. Not safe for children

3. I prefer to take what my friend recommended

7. Others .....

4. Poor quality of service

#### DAILY ROUTINES

21. If you don't mind, I would like to ask you some questions about your personal routines during your holiday on **Gotland**. Please **feel free to decline answering** if the questions make you uncomfortable in any way.

What do you do more frequently and what do you do less frequently during your stay here in Gotland as compared to a weekend day at home? How much more (or less)?

1. Swim in the pool? .....

3. Watch TV? .....

2. Use air conditioning? .....

4. Take a shower? .....

#### ENTERTAINMENT ACTIVITIES

22. What are your **favorite 3 entertainment activities** on Gotland (you did frequently):

1. Visiting museums & historical sites across the island

7. Windsurfing/kite-surfing

2. Bathing & staying on the beach

8. Hiking/bird-watching/visiting caves

3. Fishing activities

9. Biking

4. Diving and boat activities/Visiting neighboring islands

10. Horseback riding

5. Kayak paddling

11. Shopping

6. Jet skiing

12. Guided tours

13. *Activities included in a holiday package*

14. *Living like a Viking*

15. *Talk to locals and get to know more about the island*

16. *Other .....*

23. Did you do the same activities during summer holidays in the last 3 years?

1. *Yes*            2. *Not always: .....*

24. **Why** did you do these more than other?

1. *My hobby*

2. *My passion*

3. *I want to try new things*

4. *These were affordable to me this year, maybe next year ....*

5. *It relaxes me*

6. *Were close to where I stayed (convenient for time, did not need a car/bus to get there)*

7. *I like to do activities out in the nature*

8. *I was curious*

9. *it was for free in the package I bought*

10. *Other: .....*

25. Did you consider other types of activities, such as hiking, biking, visiting museums? Why/why not?

1. *Expensive*

2. *I don't like these type of activities*

3. *Not relaxing*

4. *Too noisy*

5. *Not comfortable for my needs*

6. *Not safe for children*

7. *Too far awa*

## **EATING OUT**

26. **How many times** do/did you eat out **during one week** in Gotland?

1. *Every evening*

2. *3 times*

3. *1 time*

4. *Don't need, my dinner is included in the package*

5. *I cook my own food*

27. When you went out, **where** did you go?

1. Fast food / pizza
2. Restaurant with exotic specialties e.g. Mexican, Thai food
3. Restaurant with local specialties e.g. Gotland lamb
4. Restaurant with ekologiska products e.g. KRAV products
5. Other: .....

28. **Why?**

1. Affordable / good price
2. Good quality
3. Was close to where I live
4. I like this type of food
5. Comfortable for my needs
6. Nice atmosphere
7. Good service
8. They serve organic products
9. Good for children
10. They serve vegetarian food
11. Recommended by a friend

29. Is this the type of place where you would take dinner during holidays last 3 years?

1. Yes
2. No

30. Did you consider **other options in Gotland**, for example restaurants specializing in local foods, *local pastry shops that use organic ingredients* or *winery with organic products*?

1. Yes
2. No
3. I don't know

31. Why not?

1. Expensive
2. Was far away
3. Don't like the food
4. Did not have time to look for other options
5. Poor quality of food
6. Did not know of any such a restaurant

## DAILY FOOD PRODUCTS

32. **How often** do you buy food products from the supermarket during one week on Gotland?

1. Every day (7 days)
2. Every second day
3. Occasionally
4. Never, my meals are included in the holiday package

33. **What products** do you buy frequently during one week in Gotland? (*read options*)

1. Local products e.g. lamb, eggs, vegetables
2. Fresh vegetables from wherever
3. KRAV products
4. Exotic food e.g. Mexican
5. Pre-cooked food (microwave food)

34. Is this what you usually buy during holidays last 3 years?

1. Yes
2. No
3. I don't know

35. Is this **different** than what you buy at home?

1. Yes, how much more/less?.....And why? .....
2. No, the same
3. Don't Know (e.g. "We eat out instead")

36. In your opinion, do you consume MORE or LESS **meat** than at home?

1. The same
2. More
3. Less
- Why? .....

## GIFTS/LOCAL PRODUCTS/SOUVENIRS

37. Can you mention 3 such products from Gotland? .....

Did you buy any?

1. Yes, what? .....
2. No, why not? .....

38. During the last 3 years, how often did you buy souvenirs during summer holiday? Can you indicate a few?  
.....

39. Did you buy from/hear about any of the local producers (*Huskrokken in Ronehamn - local yarn shop using environmentally friendly dyes and Hoas Hanverk in Visby (family owned handicraft business using organic techniques and materials)*)?

1. Yes, bought from:.....

2. If they heard but not bought, why not? .....

3. No

4. Don't know

## DEGREE AND SIGNIFICANCE OF ENVIRONMENTAL AWARENESS

### TRANSPORT TO/FROM AND ON GOTLAND

40. Do you know of any environmental effects that come from transportation by planes, cars or trains? Can you name the effects?

1. None            2. 1 or 2 (or unspecific answer)            3. 3 or more

41. You chose ..... when coming to Gotland. Do you know of other transport options that have less impact on the environment?

1. I'm not aware such options exist            2. Aware of 1            3. Aware of 2

42. You use ..... on Gotland. Do you know of other transport options that have less impact on the environment?

1. I'm not aware such options exist            2. Aware of 1            3. Aware of 2

43. What prevented you from choosing one of these options?

1. *Price*            2. *Time*            3. *Comfort*            4. *Safety*            5. *Good for children*            6. *Service quality*

44. Did you compensate for the emissions caused by your trip to and from Gotland?

1. Yes, how?.....            2. No            3. Don't Know how

### ACCOMODATION

45. Do you know of any environmental effects that come from people using accommodation (public or private) Can you name a few of these effects?

1. None            2. 1 or 2 (or unspecific answer)            3. 3 or more

46. You chose ..... when coming to Gotland. Do you know of other accommodations that have less impact on the environment?





58. You chose ..... as souvenirs from Gotland. Do you know of other souvenirs that bring a better benefit to local communities?

1. I'm not aware such options exist                      2. Aware of 1                      3. Aware of 2

59. What prevented you from choosing one of these options?

1. Price    4. Safe    7. Other: .....
2. Time    5. Good for children
3. Comfort    6. Service quality

### BACKGROUND

If you don't mind, we would like some **background** information about you?

60. What is your education?

1. Högstadium    3. Folkhögskola    5. Other
2. Gymnasium    4. Högskola/Universitet

61. What is your pre-tax income?

1. Less than 200 000 kr/year                      2. 200 000 – 500 000 kr/year                      3. Over 500 000 kr/year

62. What is your age?

1. 20 yrs or younger
2. 21-30 yrs
3. 31-49 yrs
4. 50 yrs or more

Gender\_\_

## Appendix 2

### Statistical Analysis

Different statistical tests were performed in order to get a better understanding of the collected data and what it represents. First, correlations were made between the knowledge of environmental effects of transportation, accommodation, activities, and restaurants in order to see how changes in one level of awareness were related to changes in the level of awareness of the other factors. Then a chi-square analysis was performed in order to identify which variables are related to the choice of an environmental preferable option and their effect was determined. Finally, the variables showing significant relation to the choice of an environmentally preferable option identified by means of Pearson's chi-square test were used in logistic regression to identify which variables may be good predictors of an environmentally preferable choice.

### Awareness consistency

A Spearman's correlation coefficient was calculated to test the existence of a relation between knowledge of environmental effects among the different factors (transportation, accommodation, activities, and restaurants). Generally, correlations coefficients show whether changes in one variable result into changes in the second variable. Spearman's correlation coefficient is used for non-parametrical data, when the variables to be tested are categories with an order of importance (Field, 2005). In this case knowledge of environmental effects is an ordinal variable, the more knowledge of environmental effects the better. In the present study, the variable knowledge of environmental effects has 3 categories: 1 represents knowledge of 0 environmental effects; 2 stands for knowledge of 1 or 2 environmental effects; and 3 goes for knowledge of 3 or more environmental effects. The test results are presented in Table A.

There is a significant positive correlation between KEE of the impacts of tourism activities in the four different sub-sectors. This implies that knowledge of environmental effects of one activity is linked of related of knowledge of the environmental effects of the other activities.

*Table A. Knowledge of environmental effects correlation coefficients*

	KEE from Restaurants	KEE from Accommodation	KEE from Transportation	KEE from Activities
KEE from Restaurants	1	0.344	0.371	0.447
KEE from Accommodation	0.344	1	0.393	0.367
KEE from Transportation	0.371	0.393	1	0.381
KEE from Activities	0.447	0.367	0.381	1

*All correlations significant at a level of 0.01.*

The correlation coefficient is a number between -1 and +1; where a coefficient of 1 represents a perfect positive relation, indicating that if one variable changes the second variable will change in the same proportion. A coefficient of -1 represents a perfect negative relation, indicating that if one variable increases the second variable will decrease in exactly the same proportion. A coefficient of 0 is an indicator of no relation between the variables. When interpreting the data literature commonly characterizes values of  $\pm 0.1$  as a small effect,

$\pm 0.3$  as a medium effects, and values of  $\pm 0.5$  as a large effect (Field 2005). In Table 6.1 it can be seen that the correlation coefficients of Knowledge of environmental effects between different tourism sub-sectors variables rank between 0.344 and 0.447, indicating that the relation between the variables is between medium and large.

In addition, the fact that all correlation coefficients are positive indicates that the relation is positive. For instance, if the knowledge of environmental effects (KEE) from accommodation increases, the KEE from activities is expected to increase as well.

The significance level is a measure of the confidence about the level of strength of the experiment. Usually in social sciences any significance level below 0.05 is considered an indicator that the statistical test is meaningful (Field 2009). All the correlation coefficients in Table 6.1 have a level of significance of 0.01, showing that the correlations are significant (there is less than 0.01 probability that the correlation coefficient occurred by chance in the sample).

## Environmentally preferable options and related variables

Pearson's chi-square tests if there is a significant relation between two categorical variables, in other words tests whether or not two categorical variables are independent. If the significance value is smaller than 0.05 then one rejects the hypothesis that the variables are independent and accepts the hypothesis that they are somehow related (Field 2005). In this case indicating that socio-demographic factors, barriers, triggers, awareness of impacts and available options will have a significant effect on whether a person would choose and environmentally preferable option (EPO).

The chi-square analysis is based on comparing the frequencies in the data set with the expected frequencies for that data set. In order for the chi-square test to be accurate expected frequencies should be greater than 5. Besides, people should be in only one category; they either choose to do cycling during their holidays or not (Field 2005).

In addition to chi-square the odds ratio was calculated in order to measure the effects size of one variable over the other one. It shows how much more likely is an outcome of one variable to occur under different values of the second variable.

Chi-square tests were calculated between each of the environmentally preferable option (EPO) and socio-demographic variables, awareness of impacts, awareness of other alternatives, motivators and barriers. Table B to table E contain those variable which have significant relation with one of the options. The effect sizes of the variables are also given.

EPO in transport was found to be related to 6 variables (notice that KEE is one variable including three categories, which had to be split into 3 in order to obtain an effect size) which include 2 barriers and 3 motivators. The highest effect size is produced by the motivator "Only option from hometown". In case the answer is "yes" an EPO choice is 13 times more likely to occur than if the answer is "no". The highest opposite effect is attributed to the barrier "Low speed" according to which the EPO choice is 9 times less likely to take place when it is true.

Table B. Variables related to the EPO in transport and their effect size

	Variable	Chi-square	Significance	Odds ratio
Barriers (B)	Low speed	11.976	0.001	0.11
	Comfort	36.483	0.000	0.19
Motivators (M)	Good price	2.03	0.000	2.03
	Flexibility to move around	6.655	0.010	0.26
	Only option from hometown	26.804	0.000	13.29
KEE	Aware of 0	9.802	0.007	0.36
	Aware of 1 or 2			1.5
	Aware of 3 or more			1.58

EPO in accommodation was found to be related to 7 variables (origin and age both include more than two categories, and had to be split in order to obtain corresponding effect sizes) among which 3 are motivators and 2 are barriers. The highest effect size is produced by the origin variable. People coming from abroad are 3.3 times more likely to pick an environmentally preferable option in accommodation compared to people coming from Sweden. The highest opposite effect is attributed to the barrier “time”. In case the time serves as a barrier for an environmentally preferable option it is 4.5 times less likely to take place compared to a situation when time is not a barrier.

Table C. Variables related to the EPO in accommodation and their effect size

	Variable	Chi-square	Significance	Odds ratio
Origin	Sweden (Norrland)	24.502	0.000	0.40
	Sweden (Svealand)			1.26
	Sweden (Götaland)			0.35
	Abroad			3.26
Age	20 years or younger	13.859	0.003	2.09
	21-30 years			1.42
	31-49 years			0.43
	More than 50 years			1.08
Motivators (M)	Comfort	23.66	0.000	0.3
	Close to Visby	7.763	0.005	0.25
	Only option I considered	17.886	0.000	2.69
Barriers (B)	Time	14.418	0.000	0.22
	Other	3.865	0.049	1.73

EPO in activities was found to be related to 5 variables (again income, age, and knowledge of environmental effects where disaggregated in order to determine effect sizes). It is important to notice that the barrier “dislike that activities” produces the highest negative effect size on choice of EPO in activities. The EPO is 2.6 times less likely to occur in case a tourist dislikes the activity. The highest opposite effect size is shown by the variable age. People who are more than 50 years old are 2.3 times more likely to choose an EPO in activities than those who are younger.

Table D. Variables related to the EPO in activities and their effect size

	Variable	Chi-square	Significance	Odds ratio
Origin	Sweden	5.145	0.023	0.50
Income	Less than 200 000Kr/year	7.031	0.030	0.48
	200 000 - 400 000 kr/year			1.89
	Over 400 000Kr/year			1.01
Age	20 years or younger	23.595	0.030	0.41
	21-30 years			0.53
	31-49 years			2.25
	More than 50 years			2.34
KEE	Aware of 0	9.656	0.008	0.48
	Aware of 1 or 2			2.01
	Aware of 3 or more			1.47
Barriers (B)	Dislike that activities	10.112	0.001	0.38

Finally, EPO in restaurants was found to be associated to 5 variables which include 2 motivators and 1 barrier. Here price acts both as a barrier and as a motivator. Both of them show negative effect on the EPO choice in restaurants. However in the case of being a motivator the effect size of price is higher than when it acts as a barrier: the EPO is 11 times less likely to take place when price is a reason for restaurant choice compared to when it is not, while the EPO is 2.5 times less likely to take place when price is a barrier for restaurant choice compared to when it is not. The highest positive effect size is produced by the motivator “Quality”. In case the answer is “yes” an EPO choice is almost 5 times more likely to occur than when the answer is not.

Table E. Variables related to the EPO in restaurants and their effect size

	Variable	Chi-square	Significance	Odds ratio
Income	Less than 200 000Kr/year	9.623	0.011	0.50
	200 000 - 400 000 kr/year			0.85
	Over 400 000Kr/year			3.01
Age	20 years or younger	17.354	0.001	0.42
	21-30 years			0.52
	31-49 years			1.36
	More than 50 years			3.54
Motivators (M)	Price	39.532	0.000	0.09
	Quality	20.103	0.000	4.89
Barriers (B)	Price	6.883	0.009	0.41

The variables which were found to have a significant relation to the EPOs in all of the 4 subsectors will be used further on to check whether they can serve as predictors for each of the EPOs.

## Predictors of environmentally preferable options

### General remarks on logistic regression

Logistic regression is used to predict whether or not a person is likely to choose an environmentally preferable option regarding transportation, accommodations, activities, and restaurants. Through logistic regression a relation can be established between a categorical dichotomy (e.g. did or did not a person take an environmentally preferable option) and a set of categorical or continuous predictors (gender, education, income etc.). In its general form, a model obtained by means of logistic regression is given by the equation:

$$P(Y) = \frac{1}{1 + e^{-(B_0 + B_1 X_1 + B_2 X_2 + \dots + B_n X_n)}}$$

in which  $P(Y)$  denotes probability of an event  $Y$  occurring (e.g. a person taking an environmentally preferable option),  $X_1, X_2 \dots X_n$  signify predictor variables,  $B_1, B_2 \dots B_n$  are equation coefficients or weights given to corresponding predictors, and  $B_0$  is a constant. The resulting value of the equation varies between 0 (event will not occur) and 1 (event will occur). A value close to 1 (0) show how likely (unlikely) an event is to take place (Field 2005).

In order to obtain a model predicting a probability of an event to occur, one has to find out the values of the coefficients ( $B_1, B_2 \dots B_n$ ) and the constant ( $B_0$ ). This can be achieved with the aid of SPSS. It will estimate the parameters ( $B_0, B_1, B_2 \dots B_n$ ) by fitting models which are based on available predictors to the observed data (Field 2005). The model resulting in an outcome closest to the observed values, when the values of the predictor variable are placed in the equation, will be chosen.

Additionally to the parameter estimates SPSS provides a number of outputs which are useful in assessing the model in general. One of them is Wald statistics. It shows whether a parameter estimate is significantly different from zero. Based on it, SPSS automatically computes the level of significance, the probability of a regression coefficient to be zero. Usually the probability should be not higher than 0.05, otherwise the parameter is considered to be zero and the corresponding predictor is thought not to make a significant contribution to the prediction of the outcome.

Another output which is helpful for interpretation of the logistic regression results is  $Exp(B)$ . It indicates how the odds (ratio of probability of an event occurring to probably of that event not occurring) will change as a result of a unit change in a predictor. A value greater than 1 indicates an increase in odds of an outcome occurring as the predictor increases, while a value less than 1 signifies a decrease in odds of an outcome occurring as the predictor increases. The value of  $Exp(B)$  is basically the ration of the two odds, before and after a unit change in a predictor.

For the general assessment of a model SPSS provides the percentage of the cases which can be predicted correctly by the model using the observed data. Obviously, the higher the percentage the better the model fits the data. Additionally, Nagelkerke's  $R_N^2$  provides an estimate of how much of the variation in the outcome variable can be explained by the model. It varies between 0 (the model is useless at predicting the outcome variable) and 1 (predictors can predict the outcome variable perfectly).

## Modeling results

Four logistic regression models were obtained by means of SPSS, each corresponding to one of the 4 tourism subsectors selected for the study and predicting probability of choice of an environmentally preferable option in the subsector. All of the variables which were proven to have a significant relation with an environmentally preferable option (see Subsection 6.3) were initially used as predictor variables for that option. However, whenever there was an indication of a predictor having no influence on the outcome, the predictor was removed and SPSS was rerun to obtain a new model. This was repeated until a model was obtained which contains only those predictors which are making significant contribution to the prediction of an outcome.

The logistic regression model for the occurrence of EPO in the transportation subsector is summarized in table F. According to it as many as 7 predictors make a significant contribution to the outcome of the EPO variable. The motivator “Only option from hometown” has the highest positive effect on the odds of a person taking an EPO in transportation (the odds of occurrence of the EPO is 16.6 times higher in case the transportation means is the only option from hometown), while the barrier “Low speed” causes the highest negative effect on the odds of a person taking an EPO (the odds of occurrence of the EPO is 11.5 times lower in case the low speed is perceived as a barrier).

Table F. Variables in EPO Transportation regression

Predictor	B	Wald	Significance	Exp(B)
Price (M)	.942	11.181	.001	2.565
Only option from hometown (M)	2.809	17.460	.000	16.601
Low speed (B)	-2.440	9.761	.002	.087
Comfort (B)	-2.028	37.743	.000	.132
Aware of 0 impacts (KEE)	-1.202	8.315	.004	.301
Age: 31-49 years	-.752	5.761	.016	.471
Origin: Sweden	.446	3.928	.047	1.562

As much as 75.3% of the observed data can be correctly predicted by the model. Figure A illustrates this graphically. Each letter on the graph shows the observed value of the outcome, while its position along the horizontal line illustrates probability predicted by the model. The model would have predicted all of the values correctly if all of the cases in which EPO was not taken (denoted by “n”) had been placed between 0 and 0.5, while all of the cases in which EPO was taken (denoted by “y”) had been placed between 0.5 and 1. Ideally, the predicted outcomes should also cluster at the both ends of the graph. However, in our case the model does not fit the observed data perfectly. The value of Nagelkerke’s  $R^2$  is 0.42, which means that only about 42% of the observed data can actually be explained by the model. All of the above suggest that predictor(s) of the EPO exist other than those that were considered in the analysis.

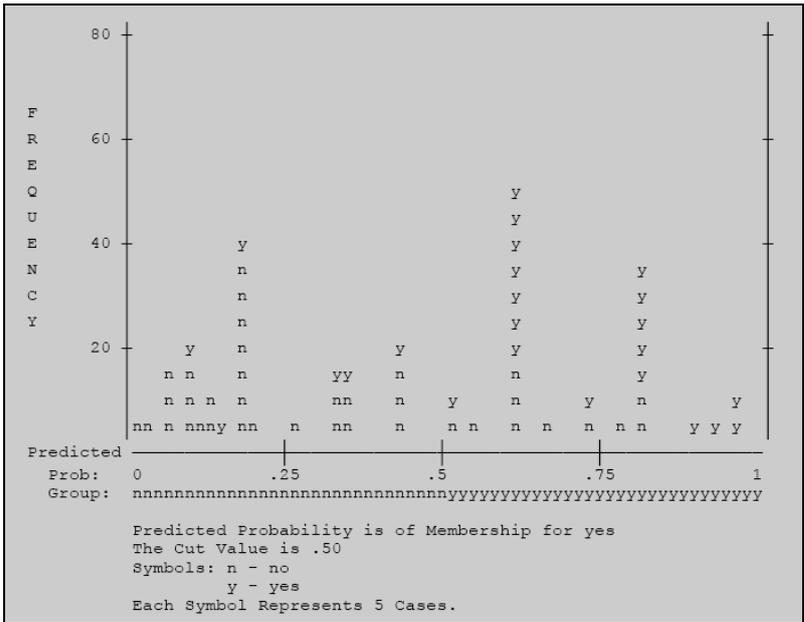


Figure A. EPO in Transportation: observed groups and predicted probabilities

The logistic regression model obtained for EPO in the accommodation subsector is summarized in table G. According to it as many as 7 predictors together with a non-zero constant make a significant contribution to the outcome of the EPO variable. All of the predictors produced negative effects on the odds of a person taking an EPO. The highest negative effect is calculated to come from the predictors denoting origin (e. g. the odds of occurrence of the EPO is almost 8.3 times lower in case a person comes from Norland compared to anywhere else). The model predicts 74.6% of the observed outcomes correctly and the Nagelkerke's  $R^2_N$  is 0.261. The graphical representation of the observed groups and predicted probabilities can be found in figure B.

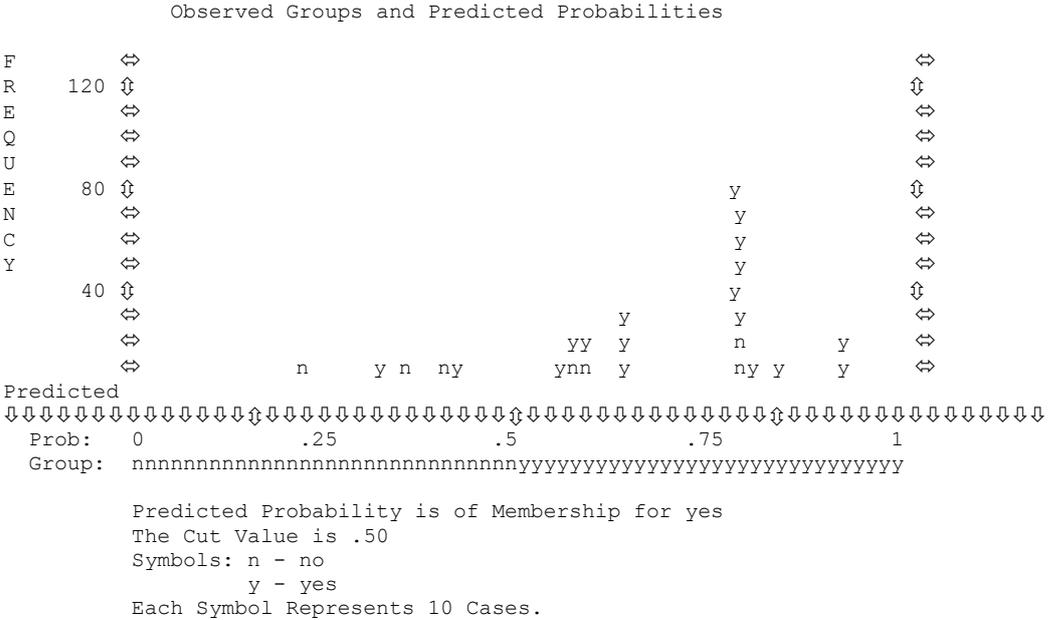


Figure B. EPO in Accommodation: observed groups and predicted probabilities

Table G. Variables in EPO Accommodation regression

Predictor	B	Wald	Significance	Exp(B)
Origin: Norland	-2.110	8.191	.004	.121
Origin: Svealand	-1.058	5.108	.024	.347
Origin: Götaland	-1.944	13.402	.000	.143
Time (B)	-1.028	4.980	.026	.358
Comfort (M)	-.959	9.215	.002	.383
Close to Visby (M)	-1.162	3.844	.050	.313
Age: 31-49 years	-.690	4.655	.031	.502
Constant	2.257	24.014	.000	9.553

Another logistic regression model was built to predict occurrence of EPO in the activities subsector (see Table H). As many as 5 predictors make significant contributions to the outcome of the EPO variable. Knowledge of environmental effects has the highest positive effect on the odds of a person taking an EPO in activities: the odds of occurrence of the EPO is a bit more than 3.1 times higher in case a person is aware of 1 or 2 effects compared to a person with any other knowledge. The age of a person causes the highest negative effect on the odds of a person taking an EPO: the odds of occurrence of the EPO is 3.6 times lower if a person is 20 years old or younger compared a person of any other age. The model is able to predict 64.0% of all observed outcomes correctly and the Nagelkerke's  $R^2$  is 0.148. The graphical representation of the observed groups and predicted probabilities is shown in figure C.

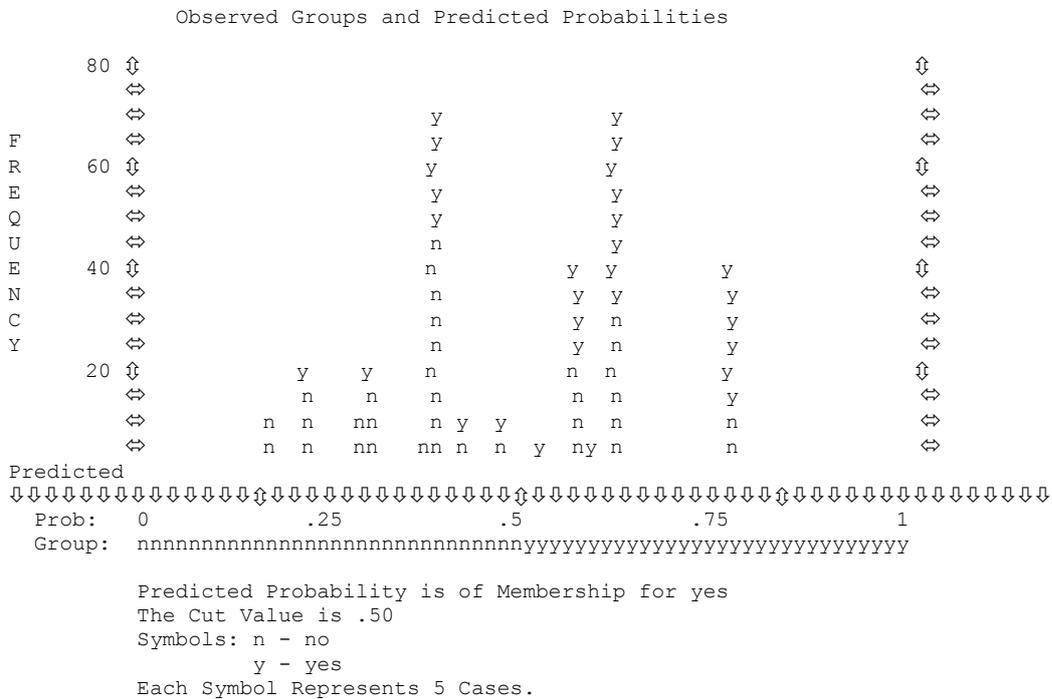


Figure C. EPO in Activities: observed groups and predicted probabilities



All of the four models obtained for EPO choices in the four subsectors considered in the study leave a large portion of the observed outcomes unexplained. They predict 64-76.3% of observed data correctly and have Nagelkerke's  $R_N^2$  in the range of 0.15-0.52. These suggest that other predictors may exist which were not included in the study but which can improve the models. Among the possible candidates is education, income, and travel party. Although, these were indeed a part of the present study, the limitations like low category score violated the necessary condition for Person's chi square, while the large number of missing values made them not appropriate for logistic regression due to possible bias. The latter, however, was sometimes possible to overcome. In the case of barriers to EPOs, when people chose the EPO they were not required to give an answer about the barriers to choose that EPO. The resulting missing cases were assumed to be no barriers to EPO.