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HOST COMMUNITIES' PREFERENCES IN A MULTIDIMENSIONAL FRAMEWORK

EVALUATION OF REPEATED CHOICE EXPERIMENTS

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Abstract

This work provides a study on resident's preferences about environment conservation and other tourism externalities in Alghero (Sardinia, Italy). The first part draws connections within the current research explaining residents and tourism relationship, consumer theory and economics choice literature. Each area of study has much to offer to another. Most of the literature on resident's analysis focuses on attitudes and perceptions without going beyond to consider host communities' preferences about policy development. Moreover, it is not able to acquire direct information in a constructive agenda. On the other hand, economic consumer theory inquiries some aspects, emphasizing how consumers' aim is to maximize utility according to a bundle of goods and services. Literature across subjects is examined, synthesised and integrated to develop a multidimensional framework to grasp how to methodologically deal with residents' welfare. By expanding the theoretical framework, the host community can be also regarded as a *composite stakeholder* that is at the same time a producer and a consumer. Hence, residents, will achieve the maximisation of their profit (as producers), but also they will maximize their utility (as consumers), by choosing the combination that maximizes positive externalities and minimize the negative externalities. The composite stakeholder's acceptance of tourism development is a key factor for the long-term success and sustainability of such an economic activity in a destination. Ultimately, residents have to bear with tourism sector' externalities producing and consuming at the same time, sharing their territory and resources with tourists. Residents' latent preferences are determined by their perception toward externalities and contribute to determine the choices that maximize their utility/profits.

The second part describes the choice experiment (i.e. a stated preferences elicitation method) employed to infer residents' preference in a multidimensional framework. Residents' welfare and preferences are evaluated calculating willingness to pay estimates for alternative scenarios regarding the use of the territory. The choice experiment has been undertaken twice: first in 2006 and then in 2010. Resident' preferences are examined for both years referring to the change in the levels of environment protection that entail different perceived impacts in occupation, congestion and taxation. A policy banning to build before 2 km from the coastal is used as a proxy variable for environment protection. Conditional logit estimation method is applied for this purpose. The results suggest that a reduction of congestion levels

and an increase in employment are strongly sought from the host community. It would renounce to an increase in environment protection if it would be compensated by previous benefits. Residents are willing to pay 1.87 euros for an employment growth in the town in 2006 and 2.85 euros in 2010. A decrease of congestion levels produced by tourists entails a welfare improvement around 1.96 euros in both years. It can be seen as the compensation required to accept the inconvenience. These findings can usefully add to the academic debate on community-based tourism and can also support policy makers in their effort towards a more sustainable model of environmental and tourism development for destinations.

Introduction: aim and objectives

According to World Travel & Tourism Council data, tourism is a system destined to growth: total contribution to GDP, including its wider economic impacts, is forecast to rise by 4.2% pa from US$5,991.9bn (9.1% of GDP) in 2011 to US$9,226.9bn (9.6%) by 2021.

Among scholars (see the literature review by Brida and Pulina, 2010) it is acknowledged as tourism activity drives economic development in several countries leading to the so-called tourism-led-growth hypothesis. In this light, tourism will have more and more impacts on daily lives of hosting communities playing a strategic role in the supply component.

Tourism externalities have been classified by the literature into three basics components: economic, environmental and socio-cultural. To foster tourism activities, able to account for residents' quality of life, social, cultural, environmental and economic requirements as well as to encourage tourists to repeat visit, is important to maintain equilibrium between costs and benefits of such components. These are the objectives defined by the World Tourism Organization in the definition of sustainable tourism.

A key strategy is to continually evaluate residents as stakeholder in order to design suitable development policies. To guide destinations toward a sustainable tourism development is important not to take into account only GDP, arrival and overnight stays but also residents 'opinion, the trade-off between alternative policies they are willing to implement. The final aim is to avoid to *"immiserize residents"*, to say it with Nowak 's words (2004).

The first part of this work draws connections within the current research explaining residents and tourism relationship, consumer theory and economics choice literature. Each area of study has much to offer to another. Most of the literature on resident's analysis focuses on attitudes and perceptions without going beyond to consider host communities' preferences about policy development. Moreover, it is not able to acquire direct information in a constructive agenda. Also economic consumer theory inquiries some aspects, emphasizing how consumers' aim is to maximize utility according to a bundle of goods and services.

Literature across subjects is examined, synthesised and integrated to develop a multidimensional framework to grasp how to methodologically deal with residents' welfare. The final scope is to pursue the right trade-offs and to find the right balance between tourism benefits and costs for host communities as well as for tourists. This is also the new direction taken by the literature.

Individual preferences analysis could be seen as a target and a reference point to recognise which is the best policy to meet host communities' needs. Mazzanti (2003) has argued that valuation and appraisal of the demand, both in qualitative and economics terms, is helpful to public decision-making and regulation policies. An *ex-ante* and an *ex-post* analysis could be run to infer about preferences and to estimate net benefits. In the first case, cost benefit analysis and ex ante cost effectiveness have more importance whereas, in the second case, ex post cost effectiveness gives an indication about the policies efficacy. Therefore, policy effectiveness and policy efficiency appear to be complementary and not alternative objectives, responding to different questions

In 2004, a regulation driven at to foster a long run sustainable planning in Sardinia was issued (Legge Regionale n.8, 25/11/2004), with the consequence to apply restrictions on the use of natural resources, forbidding any construction within two-kilometres from the coastline. This law introduced the "PPR (*Piano Paesaggistico Regionale*)", i.e. regional landscape program. The legislator's aim was to preserve landscape and seacoast environment, and at the same time to impose restrictions for the use of these resources in tourist activities. This regulation is likely to have an impact on the island economy as well as for residents' quality of life.

The banning itself has a double outcome: on the one hand, it protects landscape and the coastline; on the other hand it imposes a considerable limit to exploit the resources for tourism purpose.

A choice experiment questionnaire is a valuable tool to understand local community attitudes toward the mentioned legislation and its main effects. For this research the case study is on the city of Alghero that has been chosen to investigate the regulation effects given its considerable specialisation in tourism, which leads to assume that residents have potentially experienced both positive and negative tourism externalities.

This research aims to apply the same methodology in an early stage after a policy implementation, when not all the effects are observable, and after six years from it (that is four years after the first survey).

Residents' preferences and their willingness to pay (WTP) for environmental protection, job creation and quality of life have been first measured by employing data collected in 2006. In 2010 a second wave of data collection has been undertaken with the intent to evaluate whether or not preferences change after policy implementation and parameters related to the experience and hence social benefits are stable.

The survey questionnaire develops on the choice experiment, a choice modelling technique

belonging to stated preference method, as a tool to infer about individual preferences when goods are not directly traded in the market and when an existence value or a use value are present. According to the literature review, this research is one of the few that applies the methodology to residents' analysis of preferences. Namely, most of the empirical literature concentrates its efforts eliciting tourist's preferences. Furthermore, it is the first example of research that repeats the same choice experiment questionnaire.

A choice experiment requires the comparison between two scenarios: one that describes the actual situation and the other that describe a hypothetical alternative. The scenarios are constructed considering four attributes: environmental protection, occupation, congestion and taxation for the residents with several levels. To analyse these data it is necessary to refer to the conditional logit model (McFadden, 1973). It estimates the probability to choose the most favourite alternative. The theoretical framework lies in the Random Utility Theory, initially developed by Thurnstone (1927), which is the same theory behind the origin of choice modeling techniques.

This work is structured in the following manner. In the next section, a literature review is provided. It examines tourism externalities on residents, models and methods of analysis employed to study the topic. Further, the economic theory reference framework is evaluated. The second chapter focuses on the existing approaches to elicit preferences. Features of choice experiments are provided along with a review of empirical paper in which are applied it to analyse resident's preferences about tourism policies. The theoretical model is outlined in the third chapter, whereas the choice experiment questionnaire carried out in Alghero and the data are described in the fourth chapter. The fifth chapter presents the empirical model along with the main findings, discussion and policy implication. Concluding remarks are given in the last section.

Chapter 1

1. Tourism: externalities, perceptions, theories, utility and preferences

1.1 Tourism externalities and residents

Research of the past three decades allows one to clearly classify tourism externalities and their impacts perceived by residents. The most recent literature is concentrated to detect residents' perception and attitudes, that is residents' opinions. Although each study finds out slightly different factors a few commonalities exist: all have revealed as tourism produce either positive or negative impacts in at least three dimensions. Though this literature is relatively fragmented and scarcely structured, it provides a key classification.

In their survey on perceived impact on tourism, Mathieson and Wall (1984) detect three basic categories of benefits and costs: economic, physical and social (see also Murphy, 1983; Gunn 1988; Gursoy et al., 2000). Ap (1990) distinguished the same three categories. Scholars (Dwyer and Forsyth, 1997) acknowledged that tourism growth, unless carefully managed, could results in negative externalities, or costs, such as increased pressure on fragile environments, erosion of sites, unwelcome socio-cultural effects, road congestion or the crowding out of attractions. Tourism activity may also bring positive externalities or benefits, such as greater awareness of the environment and local culture, conservation of human man-made monuments and wildlife preservation (Norton and Roper-Lindsay, 1992). Candela et al. (2008) define them as "multiple externalities" or intersecting externalities meaning that tourism externalities can change from positive to negative depending on the level of tourism development.

According to the surveyed literature it is possible to classify tourism externalities in three broad categories with peculiar characteristics maintaining almost the classification proposed by the literature (Table 1.1). The summary is given by elements belonging to economic, environmental and socio-cultural domain that can have either a positive or negative effect.

Externalities that can have positive impacts on residents' welfare are found: improvement of the local economy and of standard of living, job creation, more and better leisure facilities,

preservation of natural environment historical buildings, development and improvement of infrastructure, cultural exchange, and so on.

Examples of negative externalities are general increase in prices, crowding and congestion of roads, public transportation and cities, generating a conflict between tourists and residents, pollution, degradation of nature and cultural resources, land use loss, increased urbanization and crime rate and so on.

TABLE 1.1 - SUMMARY OF TOURISM EXTERNALITIES ON RESIDENTS

Tourism Externalities		
	Positive	***Negative***
Economic	•Improve local economy and increase employment (Liu and Var, 1986; Milman and Pizam, 1988;Ross, 1992; Akis,1996); •Increased income levels and standard of living (Milman and Pizam,1978; Liu and Var, 1986; Akis, 1996, Tosun 2002); •Improve investments, infrastructure expenditure, public transport (Milman and Pizam, 1988; Williams and Lawson, 2001); •Improved tax revenues (Milman and Pizam, 1988; Haralambopoulos and Pizam, 1996); •Increases shopping occasions (Liu and Var, 1986)	• Increase in price and shortage of good and services (Milman and Pizam, 1988;Ross, 1992); • Increase price of Land and housing (Liu and Var, 1986; Ross, 1992);
Environmental	•Preservation of the natural environment in order to not cause decline (Liu and Var, 1986); •Improved park opportunities (Perdue et al.1990); •Conservation and protection of both natural habitat and artificial habitat (Norton and Roper-Lindsay, 1992)	•Increase air pollution, water pollution, noise pollution and litter (Andereck, 2005); •Disruption of natural habitat and large buildings which destroy views (Andereck, 2005); •Congestion and overcrowding (Liu and Var, 1986);
Socio-cultural	•Improve quality of life protection (Milman and Pizam, 1988) •Increase recreation opportunities (Liu and Var, 1986; Ross, 1992); •Preserve cultural identity of host population and increase demand for cultural events (Liu and Var, 1988); •Preservation of historic buildings and monuments (Allen et al. 1988) •Encourage cultural exchange (Liu and Var, 1986; Milman and Pizam, 1988);	•Increase crime, prostitution, gambling, alcohol and drugs (Ap, 1992; Upchurch and Teivane, 2000; Biagi and Detotto, 2010)

Tourism has thus the potential to modify social, cultural and environmental local systems. It has to be pointed out as non-economic impacts frequently tend to be seen negative as a whole, whereas economic impacts studies tend to emphasise benefits and minimize costs. This may be due to the fact that income or employment is tangible and proportionally easy to measure, while many of the economic cost such as noise, congestion, pollution are difficult to measure in a common gauge.

Many authors strongly recommended the need to continuously evaluate host community impacts and perceptions since they are the most closely affected agents by positive and negative tourism externalities (Mowforth and Munt, 2003; Sirikaya et al., 2008). A

continuous assessment is particularly important in order to foster a sustainable[1,2] development in tourism based economies, provided the number of possible externalities (Akis, 1996; Faulkner and Tideswell, 1997). Evaluations could support improvements in the economic system performance not only giving economic support but also regulating environmental and socio-cultural impacts (Harril, 2004; Hampton and Christensen, 2007). However, as suggested by researchers this requires a mutual consensus among stakeholders and a significant level of community integration and involvement during the tourism planning process (Chen, 2006) that will lead toward a sustainable tourism development, whenever a collaborative policymaking process among agents is implemented (Vernon at al., 2005).

The literature emphasises how residents' acceptance of tourism development is crucial for the long-term success and sustainability of tourism in a destination (Andriotis and Vaughan, 2003). Besides, host community should be involved in the development and planning process and their attitudes and perceptions must be continually evaluated.

Within a holistic evaluating framework, economic, environmental and socio-cultural impacts could be the path to follow in order to pursue a sustainable form of tourism that preserves the environment, enriches tourists' experience, with the objective to encourage repeat visitations, and account for residents' quality of life. This is because the relationship between tourism and the surrounding endowments is quite complicated. On the one hand, profitable tourism development requires a high standard of surroundings in terms of environmental quality, but on the other hand a number of activities may damage the natural environment and alter socio-cultural composition and uniqueness of the territory that are the main tourism attractions.

In this context, the evaluation process has to take into account three important features: irreversibility, uncertainty and uniqueness. Tourism development may prevent that initial conditions are re-established and, since the future is unknown, potential costs may occur. In addition, all features that characterise a destination exist only for that site. Candela and Figini (2010) define destinations as territorial systems that supply a bundle of good and services (i.e. tourism product) able to satisfy a range of tourist consumers. Specifically, according to the authors, destinations could not be defined as microeconomic agent or as macroeconomic aggregates. However, it is in the destination that tourism supply meets tourism demand and where a conflict between residents and tourists could arise for existing resources. It is very

[1] The World Tourism Organization defines sustainable tourism as "tourism which leads to management of all resources in such a way that economic, social and aesthetic needs can be filled while maintaining cultural integrity, essentials ecological processes, biological diversity and life support systems."

[2] Sustainability is identified by researchers (Ritchie and Crouch, 2000) as one of the most important elements for the competitiveness of a destination.

challenging to maintain equilibrium between these components; negative impacts of tourism can undermine main tourism attraction and activity underpinning the industry, if not well balanced.

Still, as noted by many authors (Allen et al. 1988, Lankford and Howard 1994, Ap and Crapton 1998,Gursoy et al., 2002) studying host communities' preferences toward tourism is fundamental for its development and sustainability. As Fridgen (1991) observed, residents' negative attitudes adversely influence tourists' willingness to visit again that place. In this light, it is central to understand how to develop a favourable support for tourism recognizing what is influencing attitudes and studying the local reaction.

Carefully measuring trade-offs between positive and negative externalities would help to evaluate if a specific policy increases (or decrease) residents and tourists' welfare.

1.2 Models of analysis

To describe tourism externalities and how residents perceive them, several models have been developed[3]: Doxey's Irridex model (1975), Butler's Tourist Area Life Cycle (1980) and Social Exchange Theory (Ap, 1992).

The first model "Irridex (irritation index) model" describes as the irritation of residents increases as the number of tourists increase. Four stages are identified: euphoria, apathy, irritation and antagonism. At each stage correspond a different level of number of visitors and a different integration phase between the two including an external ownership of local resources.

The second model is the "Tourist Area Life Cycle (TALC)" proposed by Butler (1980), that distinguishes tourism progress through the stages of exploration, involvement, development, consolidation, stagnation and then decline or in some cases rejuvenation. According to the theory, there is a correlation between residents' attitudes and these stages. Initially, residents have positive attitudes toward their guests but as their number increases, local community starts to be concerned about long-term benefits from tourism. This occurs because tourism is actually positive only for small groups or because benefits are unrealistic. At the same time a concern toward environmental and social costs starts to emerge. However, it is important to take into account that residents attitudes change because, as the development stage progresses, the objective function of the residents changes and not in relationship to the different impacts

[3] Comprehensive literature reviews of these models are referable to Harril (2004) and to Monterrubio Cordero (2008).

perceived. So, residents' attitude would endogenously change accordingly with stage of development. In addition, the described models consider host communities as a homogenous entity while each of them is different for socio-economics and demographics characteristics. The TALC model is pretty descriptive and lacks of a solid theoretical basis.

The third model is proposed by Ap (1992) who first suggested to adopt social exchange theory to analyse residents response to tourism. The relationship between residents and guests is considered as a trade-off between costs and benefits for each party, which will achieve an outcome. Individual's attitudes toward this activity, and the level of support for its expansion, is influenced by community evaluation of resulting outcomes depending on the final whole balance between costs and benefits.

Residents tend to view tourism positively if they believe are gaining a benefit from it and negatively if the opposite holds. Tourism has economic and noneconomic impacts and, as Andereck et al. (2005) argued, benefits may belong to both spheres. However, application of social exchange theory in understanding residents' attitudes seems oriented to investigate merely on the economic side (Andereck et al. 2005; Jurowski et al. 1997; McGehee and Andereck 2004; Perdue et al. 1990; Sirakaya, Teye, and Sonmez 2002).

To complete this literature review on residents' attitudes from a theoretical perspective analysis is also helpful to refer to macroeconomic growth models recently developed although scarcely applied. This strand of research takes into account the interaction and consequences between tourism development and host territory. It has to be pointed out that although tourism development has been considered in many ways, it seems that little attention has been given to growth models. A strand of the literature has been recently developed with the aim of analysing the dynamic evolution of tourism-based economies (Nowak et al., 2004, Lozano et al., 2004; Ray-Maquiera et al. 2005, Candela and Cellini, 2006; Cerina, 2007; Cerina, 2008; Lozano et al. 2008).

As an example, Lozano et al. (2004) built a two-sector dynamic general equilibrium model where land is reallocated from low productivity activities (such as agriculture and forestry) to tourism. A fixed amount of land is given but before the full employment is reached, other costs, such as congestion of public goods and loss of cultural, natural and environmental resources, occur. These externalities are able to discourage tourism attractiveness and decrease tourists' willingness to pay for the destination, reducing return to investments in the tourism sector and at the same time, affecting residents' welfare. They show that the optimal solution is to stop tourism expansion before the maximum capacity is reached and that

environmental degradation represents an "externality problem" that affect both current and future generations.

Nowak et al. (2004) present a model aimed to detect interdependence between tourism sector, agriculture and manufacturing starting from the assumption that tourism has adverse effects on the environment such as pollution, congestion and despoliation. According to the authors, these effects should be considered to calculate tourism net benefit. On the whole, a competition for resources between agriculture and tourism is highlighted, which also has an ambiguous role on the manufacturing sector development. The model suggests that output, deriving from manufacturing and welfare may decrease as tourism increases because the non-traded tourism sector is more labour intensive then the agriculture traded sector. From this model stems an important result that implies that tourism boom may *immiserize residents* when efficiency loss due to increasing return to scale in manufacturing (negative effect) prevail over an increase in relative price of non-traded goods (positive effect).

Applying the concept of sustainability to tourism, Lozano et al. (2008) develop an environmental growth model for a tourism-based economy. The findings confirm the TALC evolutionary hypothesis according to which the environmental deterioration and public goods congestion are responsible for tourism destination stagnation. In the model, evolution also depends on the private supply of tourism services that govern the length of the growth period. According to the authors, a criticism can be moved to previous work about the TALC hypothesis: the methodology has not a formal base; it is rather descriptive and detached from the economic growth literature. The authors underline how "environmental growth models" significantly consider the role of the environment as a constraint to the economic development focusing on the intertemporal effects of resource allocation and considering market failures associated with the use of natural and environmental resources.

1.5 Methods of analysis

Aside from theoretical models not always empirically applied, the quantitative methodology is very simplistic: studies are essentially based on a single Likert-type scale and, as pointed out by Andriotis (2009), statistical techniques are applied without a priori theory. Survey questions may be posed in numerous manners, benefits and costs are not univocally defined and each respondent may understand them differently.

A well-established empirical framework is the Structural Equation Model (SEM) that allows one to draw causal relations between measured items. Lindberg et al. (1997) use it to understand values and expectancy toward tourism of eight coastal communities in Oregon. Gursoy et al. (2002) employed SEM to five counties, in Virginia, to find that host community support is affected by level of concern, ecocentric values, utilization of resource base, perceived costs and benefits of the tourism development.

In a self-administered survey questionnaire in Australia, Gursoy et al. (2009) apply the same methodology but with a two-step approach to examine residents' attitudes toward tourism development. Vargas-Sánchez et al. (2009) apply SEM to investigate residents' reactions to tourism within a first stage of development in Spain (province of Huelva) while Gursoy et al. (2009) analyse residents data of Sunshine Coast (Australia). Very recently, Vargas- Sánchez et al. (2011) improve SEM theoretical approach including new variables such as "behaviour of tourist" and "level of tourism developments perceived by resident" and concluded that perceptions of negative impacts compensate positive impacts.

Other statistical techniques, as factor analysis and cluster analysis (Williams and Lawson, 2001), have been extensively used to examine this topic. Haley, Snaith and Miller (2005) apply a factor analysis to examine residents' attitudes in Bath (UK). Andereck et al. (2005) carry out a survey with 38 items in Arizona and apply a factor analysis to analyse resulting data using the social exchange theory.

Several researchers have investigated potential links between the impacts and attitudes toward tourism by comparing residents across levels of participation in recreation (Keogh 1990; Perdue et al. 1990), attachment to the community, length of residence (Um and Crompton, 1987), knowledge about the tourism activity (Davis et al., 1988), proximity to its business zone or contact with tourists (Belisle and Hoy, 1980; Sheldon and Var, 1984), socio-demographic characteristics (Brougham and Butler 1981; Ritchie 1988), political and demographic position in society (Mansfeld 1992; Thomason et al., 1979), type and form of tourism (Murphy 1983; Ritchie 1988), and economic benefits derived from this activity (Ap 1992; Liu and Var 1986; Pizam 1978; Prentice 1993).

Most of the studies examining residents' perceptions have been descriptive, generally lacking of supportive theory and aimed to detect how tourism produces perceived impacts. It is worthwhile to consider social exchange theory as a background to residents' response analysis to tourism. It is important to take into consideration tourism life cycle as proposed by Butler (1980) and residents irritation scale, as Doxey (1975) suggested. However these are not

sufficient to clarify to what extent costs and benefits perceived by residents can be valued, how a new policy would be valued and how to monitor their choices. Nor simple survey, cluster analysis, factor analysis nor SEM supports an answer to the previous questions. None of the described empirical frameworks gives a clear indication of how to place a value and to derive residents' utility associated with tourism.

As stated, tourism impacts are diverse and partially reflect sector characteristics. Therefore, the impact evaluation is difficult. In addition, tourism as an amalgam of different activities is not an easy phenomenon to assess, as it is not straightforward to distinguish between single activity impacts. Both local population and tourists themselves could both organize tourism activities and if it is the case, it is difficult to separate the effects. These difficulties are reflected on the great part of impact studies in the literature. According to Pearce (1989) other factors are responsible for incompleteness of impact studies: resources lack, evaluation methods inadequacy, absence of a multidisciplinary approach. Yet all these gaps still need to be filled.

1.6 Toward residents' utility

In economics terms, tourism has direct, indirect and induced effects (WTTC, World Travel and Tourism Council) that combined yield a contribution either to GDP and employment. According to a WTTC classification, tourism has direct effects on services (i.e. accommodation, transportation, entertainment, attractions), industries (i.e. hotels and catering, retail, transportation and business services), spending source (i.e. residents' and businesses' spending in travel and tourism). Indirect contribution affects public and private investments as well as impact of purchases from suppliers. The induced effect, that is changes in economic activity resulting from household spending of income earned directly or indirectly as a result of tourism spending, has an impact on food and beverages, recreation, clothing and housing. Above all, environmental and socio-cultural impacts, other than economics are detected as well.

The tourism sector embraces a wide range of goods and services. Therefore, the output is not the simply combination of production factors. The consumer/tourist is essential across the tourism process to take place, but at the same time it is also influenced by political, social, economic and physical situation of the destination. Furthermore, the setting has a different impact on purchasing a standard good or tourism good. In the first case, consumers consider

the good as homogeneous and pay the same price in all cases and at all times. In the case of a tourism good, weather, conditions for instance, affects consumer and producer simultaneously. Besides, in the case of standard goods travel cost is constant, while tourism services and markets are influenced by travel costs. All these aspects, according to many authors (Noval, 1975; Kammas, 1991; Kim, 1996) make tourism market's analysis different from the conventional economic theory. In this sense, tourism is seen as a composite good. Candela and Figini (2010) recently enforced this aspect defining tourism product as a complex good, bundle of several goods and services. The authors observe as the usual object of study is, for the microeconomics, the single good or service and for the macroeconomics, the aggregate production. However in general, the bundle is considered as an instrument while becomes an object of study when Lancaster's theory (1966) is applied. As highlighted by Aguilò et al. (2003), this theory seems to naturally suit to tourism.

As a matter of facts, the neoclassical consumer theory considers the good *per se,* the direct "producer" of utility and the objective of consumer choice, but it does not take into account all intrinsic characteristics of the good that are likely to actually determine the preferences. The so-called "*new approach to consumer theory*", developed by Lancaster (1966), proposes goods characteristics as source of utility. At the same way, several elements contribute to determine consumer's choice of tourism in terms of a destination. Each destination incorporates a bundle of characteristics that determine the utility of each consumer.

According to the neoclassical consumer theory, individuals are rational and this rationality affects their choices among goods to consume. These goods produce utility by themselves, regardless their intrinsic characteristics or properties. As Johnson (1958) underlines, "*all properties that make a diamond quite different from bread have been omitted from this theoretical approach..".* However, this approach does not allow for the incorporation of new information about goods and for consumers reactions due to a change in quality or for the introduction of a new commodity into the market. As an alternative, Lancaster (1966) allows to consider these elements. According to this theory, goods are divisible and the utility derived from them can be divided separately or in combination. Consumers' objective is to maximize utility that is a function of the good's characteristics, rather then, as occurs in the neoclassical approach, a function of the good *per se.* In addition, Lancaster assumes that the good will possesses several characteristics, which could be shared by more than one good and that combination of goods may present different features from those in combinations. Those characteristics are the same for all consumers and an objective configuration exists of how consumers look at the goods.

Hence, a good, or a collection of goods, is a consumption service with a linear relationship between the service's level and consumed goods. It is expressed by the relation $x = Ay$, where x is a vector of observable values of characteristics z, A is a matrix that transforms goods y into objective characteristics, called consumption technology, which is the same for all consumers. Each individual has as utility function of the value of commodity characteristics z: $u = U(x_1, x_2, \dots, x_z)$.

As already mentioned, Lancaster model has been developed referring to divisible goods. Considering indivisible goods, Rosen (1974) formulated a similar approach. He assumes available alternatives for a set of characteristics, still objective for all consumers, and does not need Lancaster's transformation from goods to characteristics. With the new assumption, it is possible to state the consumer's goal, utility maximization, in terms of prices and quantities of characteristics. The consumer problem is as follow:

$$Max\ U(x_1, x_2, \dots, x_z) \quad subject\ to \quad p(x_1, x_2, \dots, x_z) + d = M \tag{1.1}$$

He or she has to maximize the utility given by characteristics $(x_1, x_2, \dots, x_z)$, produced by a group of goods, under an income constraint M, considering the price of the purchased good $p(x_1, x_2, \dots, x_z)$ and d, all other goods.

On the one hand other scholars (Papatheodorou, 2001) have empirically analysed tourism in light of Lancaster's model suggesting as an empirical approach, that is a hedonic price analysis. That is, the price of a product is regressed on a set of characteristics. On the other hand, Lancaster and Rosen' microeconomic contributions are the point of departure of the Random Utility Model (RUM) originally proposed by Thurstone (1927) and implemented, with particular attention to dichotomous choice and contingent valuation empirical analysis, by Luce (1953) and McFadden (1974). Consumers choice is modelled according to a random utility model with a given utility function, subsequently it is possible to determine the choice probability. The individuals' aim is to maximize their utility and it is possible to look at it in terms of attributes specified in a functional form, which is usually linear and additive. According to this approach, a set of individual behavioural rules and an indirect utility function exists with a random component that influences population choice behaviour. The indirect utility function, usually denoted by $v(p, w)$, represents the consumer's preferences and the maximal utility attained when the goods price level is p and their income is w.

Let's then consider consumer i*'s* utility given by the choice he makes among different alternatives, J. The equation below represents that indirect utility of the representative individual:

$$\boldsymbol{U_{ij} = V_{ij} + \varepsilon_{ij}} \quad (1.2)$$

V_{ij} characterize the aspects specific to the individual and the choices. It is typically composed by attributes of the choice and varies across them and across the individual. It is equal to $\sum_{k=1}^{K} \beta_{jk}\, s_{jki}$ where β represent the utility parameters independent of i but not of attribute level and s , consumers attribute vector. V_{ij} is assumed homogeneous across the population relatively to the attributes contained in it. The utility is decomposed in two parts: a systematic component, V_{ij}, also called representative utility that can be observed, and a random component, ε_{ij}, that is the part of utility deriving from unobserved features and not from individuals that chose to maximize their utility in a random way. Indeed, the complexity of economic decisions is a reflection of the unobserved attributes of individuals, like tastes, that can vary over a population.

A central concept behind the above theories and the analytical tool to obtain estimates is the paradigm of choice. According to Keynes the paradigm assumes that people will make judgments logically and consistent with their preference and aims. Their choices will have the highest subjective expected utility among the available alternatives. If the choice is above non-marketable goods or services, and a positive contribution to human wellbeing occurs**,** they have an economic value. In other words, individuals' preferences satisfaction implies that the good or service has an impact on human wellbeing.

A similar perspective could be applied to destination's heterogeneity as Rugg (1973), Morley (1992) and Papatheodorou (2001) accomplished. Analysing from the tourism demand side, Papatheodorou (2001) suggest that Lancaster's framework has a potentiality to produce a holistic answer for the tourism choice question. According to this approach each destination characteristic affects tourists' choice and simultaneously host communities that place an intrinsic value on them. The two communities necessarily share the same territory and resources and are strictly interconnected. Inevitably, residents' choices will affect tourism activity but also play a fundamental role in its development. However, many good and services determining tourists' choice and resident's endowment are not traded in the market and for this reason called non-market goods.

1.7 Near to a multidimensional framework

The reviewed literature has been fundamental to isolate tourism positive and negative externalities on residents allowing thinking in a *multidimensional framework* composed by elements belonging to economic, environmental and socio-cultural aspects.

Ultimately, externalities characterise the bundle of choices residents are called to value when dealing with tourism policies. From a theoretical perspective it has been assessed how conflicting preferences between tourists and host communities may arise. It is even more compulsory to take into account residents' objective function in order to follow a sustainable development path.

The relationship between residents and tourism can be analysed by an economic perspective. Specifically, the behaviour of this agent is a matter of trade-offs between positive and negative externalities deriving from economic activities. Bailey and Richardson (2010) define an "ecological economics framework" to analyse economic decision making in tourism. They include constraint factors such as physical, environmental and socio-cultural carrying capacities in classical firm' optimization problem, that is:

$$Max\ \Pi = P.f(l,k) - wl - rk \qquad s.t. \qquad Y = f(l,k,\mu,\xi,\upsilon) \tag{1.3}$$

where P is the price, Y the output, l the labour, k the capital, w the wage rate, r the price of capital, μ the physical carrying capacities, ξ the environmental carrying capacities and υ the socio-cultural carrying capacities.

By expanding this theoretical framework, the host community can be also regarded as a *composite stakeholder* that is at the same time a producer and a consumer. Hence, residents, will achieve the maximisation of their profit (as producers), but also they will maximize their utility (as consumers), by choosing the combination that maximizes positive externalities and minimize the negative externalities. The composite stakeholder's acceptance of tourism development is a key factor for the long-term success and sustainability of such an economic activity in a destination. Ultimately, residents have to bear with tourism sector' externalities producing and consuming at the same time, sharing their territory and resources with tourists. Residents' latent preferences are determined by their perception toward externalities and contribute to determine the choices that maximize their utility/profits.

While a strand of tourism literature has focused its attention on analysing resident's perceptions and attitudes toward tourism socio-cultural impacts (Monterrubio Cordero, 2008),

another thread has dedicated its efforts to residents' perceptions and/or attitudes towards tourism development and to community integration during the planning process (Del Chiappa, 2011). However, a link between attitudes, perceptions and residents' choice exists and could be used to assess host communities' needs according with their utility function. A sketch has been given by Ben-Akiva et al. (2002) who propose a description of the decision-making task in a lifelong sequence based on a behavioural approach (see Appendix A, Figure A1). The scholars underline that the choice is a function of perceptions, information and attitudes, since memory influences all the process and the importance of heterogeneity across decision makers. The economic choice process appears integrated into the cognitive process where RUM is capable to describe most of the economic choices addressing policy issues in a framework closely connected with the economic theory of consumer behaviour (McFadden, 2001).

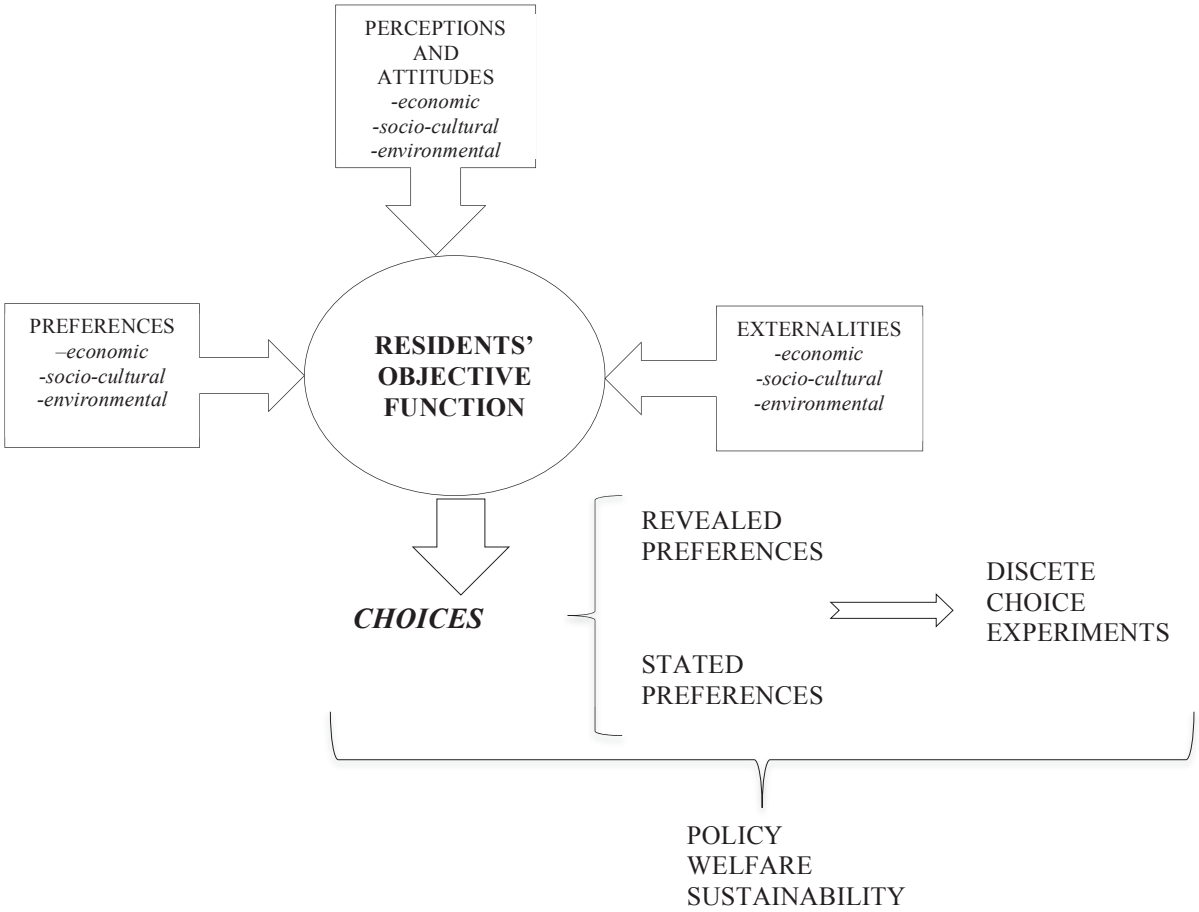

FIGURE 1.1: RESIDENTS' DECISION MAKING PROCESS IN A MULTIDIMENSIONAL FRAMEWORK

Figure 1.1 exemplifies and applies this outlook to residents' analysis in order to elicit preferences and policy directions in *a multidimensional framework*. Perceptions and attitudes, preferences and externalities are found to influence residents' objective functions. Choices, in turn, are made according to that objective (i.e. resident's utility function) and could be real in the market structure (revealed preferences) or hypothetical ones (stated choice, i.e. choice experiments). These elements may be exploited to design policies in order to maximize residents' utility, profits and welfare, achieve sustainability and sector growth.

These results may be attained applying non-market evaluation techniques (revealed preferences and stated preferences), mainly used in economics when markets are absent. These approaches lead to the optimum choice between different alternatives able to give the maximum utility or welfare in the presence of scarce resources. As an example, if an increase in the environmental quality occurs, there will be an economic improvement since it raises social welfare. Understanding how residents' utility function is affected by tourism growth and development is a valuable tool to monitor host communities' needs, perceptions and quality of life and to account for a sustainable tourism development and to improve social welfare.

This approach can potentially overcome some limitations to host community participation in tourism policy such a lack of co-ordination between stakeholders, defined by Tosun (2000) operational limits, but also cultural boundaries such as limited capacity of uneducated people, apathy and low level of awareness within the local community. Moreover recurring to a multidimensional framework, existing difficulties to assess and handle the numerous side effects associated with tourism, particularly non economic one (as no market for them exists) may be come through. To improve residents' welfare it is therefore important to implement appropriate policies to deal with externalities whereas the multidimensional framework could be an efficient manner to achieve an optimum equilibrium between the two communities.

Chapter 2

2. Obtaining estimates in a multidimensional framework

2.1 Preferences: Stated and Revealed

Different data collection methods have been developed to elicit consumers' preferences, measuring utility benefits or to attach monetary value to a preference (willingness to pay or willingness to accept).

A particular problem arises when markets are imperfect or even absent as for a composite commodity such as tourism that involves different aspects, including an environmental impact. Since environmental goods and services are not traded in the market system, there is no clear economic value to assign to them. The literature provides different approaches to obtain economic values mainly referable as *Revealed Preference* (RP) and *Stated Preference* or *Stated Choice Method* (SP) (Hanley et al. 2001, Carson and Louviere, 2011)

RP embraces studies in which a monetary value is revealed through a complementary market: in this group is possible to distinguish between *Market alternatives, Hedonic Price* and *Travel Cost Methods* where data are collected from real markets.

SP analysis entails to "ask" people what they would hypothetically be willing to pay or willing to accept for a given good or bundle of commodity characteristics. A further distinction within SP could be made between *contingent valuation*[4](CV) and *choice modeling* (Hanley et al. 2001). CV surveys involve straighter questions to respondents about their willingness to pay (i.e. *What are you willing to pay?*, *Are you willing to pay £X?*). When changes are multidimensional, CV is not well suited while choice modeling partially overcomes this problem (Hanley, 2001). Especially for this reason, it is becoming widely used, mainly in environmental economics (Mogas *et al*., 2006). With this methodology a variety of procedures are used to infer willingness to pay from sets of rankings or ratings of alternative options presented to respondents. The main difference between SP and RP lies in the way consumers reveal their preferences. In the former case respondents refer to a

[4] The first one that proposed contingent valuation surveys to value no market goods in theory was S.V. Ciriacy-Wantrup (1947). The first one to apply it in practice was Davis (1963) estimating hunters and tourists value on a wilderness area.

hypothetical market, while, in the latter, choices are made in a real market. In the RP there only exists alternatives which are proposed and prospective correlations between attributes can be captured, whereas SP can avoid this statistical issue and can present more attributes and levels in the choice set among to choose[5].

RP methods assume that choices are made by rational, well-informed individuals, as well as SP methods which in addition presume that they will say the truth. Since they are merely hypothetical, SP surveys can be used to investigate the introduction of a new market proposal without additional costs, unlike RP surveys. Market and personal constraints (Louviere *et al*., 2000) are incorporated in RP data and often, especially the latter, cannot be captured. In SP data, market constraints could instead be simulated to obtain some specific information. This is obviously not feasible with personal constraints.

Therefore, with RP it is possible to obtain valid and highly reliable estimates because they refer to real choices, although the data are quite rigid. It also produces a single estimate for a group of people. However, models estimated with SP data produce a range of estimate and are more robust since they are richer in attributes trade-offs.

RP also performs well in short time forecasts but are inappropriate if used for long time or other dimensions predictions; on the contrary, SP data that does not predict well in current time period but have good results for longer periods and different dimensions.

SP methods are widely used and very useful in assessing environmental goods and in general for other commodities that are not traded in the market system. Whenever markets are imperfect or absents, as it occurs for environmental goods, they are classified as hypothetical markets. Therefore, deficiencies deriving from it are exploited through the analysis of individual choices that can provide information about preferences. As underlined by Swait and Adamowicz (1999) this occurs either for choices made in actual markets (revealed preferences) or in hypothetical ones (stated preferences). SP often is the only technique available whenever there is a lack of detailed data and a need to evaluate new policies or interventions. Very frequently it is used in combination with RP studies, as reported by the literature (Swait *et al.,*1994; Adamowicz *et al.,*1994; Adamowicz *et al.*,1998; Ben-Akiva *et al.*,1990). The main idea is to improve the choice model so that authenticity of choice depends on information about observed choices while new alternatives are studied using hypothetical choices.

[5] It is what Louviere et al. (2000) call *Technological Relationships.* The name probably refers to the Lancastarian relation $\mathbf{x} = \mathbf{A}\mathbf{y}$, where $\mathbf{x}$ is a vector of observable values of characteristics $\mathbf{z}$, $\mathbf{A}$ the consumption technology matrix that transforms goods $\mathbf{y}$ in objective characteristics.

2.2 Choice modeling or discrete choice experiments

Carson and Louviere with the aim to make a clear point in the literature, in 2011 define precisely the terms connected with SP surveys. The authors refer to those designs involving multiple choices in a hypothetical market as *Discrete Choice Experiments* (DCE) whereas Hanley et al. (2001) identify as *Choice Modeling*. In what follows the first nomenclature is pursued.

The origin of the DCE lies in the Random Utility Theory, initially developed by Thurnstone (1927) and subsequently by McFadden (1974). During the 70s and the 80s, DCE has been applied to marketing research and to the analysis of transportation (Hensher and Johnson, 1981; Louviere and Hensher, 1982; Louviere, 1991). The first contributions in economics are found in environmental and rural economics (Blamey *et al.*, 1999; 1998; Morrison *et al.*, 1999; 1998; Adamowicz *et al*., 1998; Hanley *et al.*, 2001, 1998; Adamowicz *et al.*, 1994), with the aim of measuring, through "willingness to pay", the economic value of composite natural goods and the implicit trade-off between their attributes. For this reason choice modeling is called "compensatory" (Permain *et al.*, 1991).

DCE comprises *discrete choice responses* that can be asked as *single binary choice* and as *single multidimensional choices* (Carson and Louviere, 2011). Different DCE approaches exists in the literature and in each of them respondents are asked to do something different: to rank, to score or to choose among the alternative presented to them, depending on the specific variant used. Hanley (2001) classifies four options that could be used in applying a DCE that are called differently in Carson and Louviere paper (2011) but basically are the same:

1. Choice Experiments;
2. Contingent Ranking;
3. Contingent Rating;
4. Paired Comparison.

The difference between them lies in the complexity of the design that will reflect the quality of information produced. Consequently, they differ in the way of generating a WTP estimate consistent with other welfare measures (Hanley, 2001). A common welfare measure is the *Hicksian* that yields a compensating surplus and a compensating variation respectively for a change in quantity and a change in prices whenever a status quo is defined (Carson and Louviere, 2011). This is why choice experiments (CE) have been indicated as consistent with the measures of welfare, while, reliability, for the others three techniques, is uncertain (Hanley, 2001).

Two or more alternative scenarios, one of which the *status quo*, are presented in a CE survey to the respondents that has to choose the one that he prefer, that is, produce him greater utility. The alternatives differ between them for the attributes that they take into account. An alternative is a combination of some features: each of them takes a single value that is typically called level. One of the attributes is usually a price term that allows estimating the WTP. They are constructed keeping an invariant option in each choice set that is called also *status quo* and should represent the situation like it is in that moment. The inclusion of an invariant option in the choice set allows the researcher to accomplish welfare measures consistent with demand theory. In fact, as Hanley (2001) pointed out, if the status quo or current situation option is not included, respondents are actually being forced to choose between alternatives that could not be something that produce the desired level of utility.
Table 2.1 describes an example of choice experiment used in the present study that will be analysed in the next section. Respondents are asked to choose the most preferred scenario that differs in the levels of the alternatives.

TABLE 2.1 - ILLUSTRATIVE EXAMPLE OF A CHOICE EXPERIMENT CHOICE SET

	SCENARIO A *Current Situation Effects*	**SCENARIO B** *Alternative hypothesis effects*
EFFECTS ON THE QUALITY OF THE ENVIRONMENT: *New buildings distance from the sea (meters)*	**2000 meters**	**500 meters**
EFFECTS ON THE ECONOMY: *Number of new employees in your town tourist sector*	**40 new employees**	**20 new employees**
EFFECTS ON LIFE QUALITY: *Increase of the usual time spent on daily activities (in minutes) due to the crowding of built up areas*	**+15 minutes**	**+15 minutes**
COST FOR RESIDENTS: *Annual increase on a real estate taxes (in euros)*	**€ 0**	**€ 30**
Do you prefer scenario A or scenario B?		

CE has been initially introduced in marketing and transport literature by Louviere and Hensher (1982) and Louviere and Woodworth (1983). Afterwards, it has been applied in different field specifically with the aim to estimate the value of recreational and environmental goods (Boxall et al., 1996; Adamowicz et al., 1998a; Hanley et al., 1998a; are only few examples). CE is of particular interest since has the advantage to deal with circumstances with multidimensional changes also identifying the value of individual alternative of a good.

The core is then attributes and levels: as seen, choice sets are two alternatives defined in terms of good attributes that differ in the levels. During the interview the respondent has to choose the favourite alternative; the number of choices he makes determine the number of observations. In this way, as observed by Bennet (1999), is possible to determine tradeoffs between attributes. As example of trade-off between attributes, let's think about protection and use of environmental resources, where exists problems about a sustainable use of them. Analysing preferences is possible to capture which is the importance of use value (increase in value) and no-use value (protection and preservation) and to give a monetary assessment to implicit prices and welfare measures.

Different attributes produce different choices and hence different probability to choose an alternative. It is important because to have reliable estimates is necessary to obtain a great number of choices. In theory, for a perfect identification of the model, is required the presentation of all possible combinations of attributes and levels[6] to the respondents that however is not feasible because of the impossibility to manage them at the same time. To simplify it, a fractional factorial is used in order to give a selection of all possible attributes and levels. To achieve the best results and to isolate the single attributes, the orthogonal property, hence a zero correlation between them, has to be respected.

Very often the choice sets are computed through an "orthogonal main effect design" (Louviere, 1993), where the principal effects of the possible alternatives are selected. Afterward is assumed that all the interactions between attributes are not significant.

The aim is to minimize the number of alternative to show to the respondents and at the same time to maintain the orthogonal condition. So, "All effects can be estimated independently because of the survey construction procedure". According to Louviere (2000) is possible to estimate even 80 parameters without any problems in terms of degree of freedom: even few choices produce a sufficient number of observations.

By repeating such choices, and varying attribute levels, the researcher can determine which attributes significantly influence the choices and hence the marginal contribution that each single characteristics add to individuals' utility (Morrison et al. 1998), how the attributes are ranked, the marginal WTP for an increase or decrease in any significant attribute and also the implied WTP for a policy which changes more than one attribute at the same time.

In Contingent Ranking the respondent has to rank a series of alternatives with a number of attributes, proposed at different levels across options. A status quo is usually included, as

[6] The set of all possible combination of attributes and levels is defined full factorial.

well. In table 2.2 is provided a modification of the above CE, in order to illustrate the contingent ranking format.

TABLE 2.2 - ILLUSTRATIVE EXAMPLE OF A CONTINGENT RANKING CHOICE SET

	SCENARIO A	**SCENARIO B**	**SCENARIO C**
EFFECTS ON THE QUALITY OF THE ENVIRONMENT: *New buildings distance from the sea (meters)*	**2000 meters**	**500 meters**	**150 metres**
EFFECTS ON THE ECONOMY: *Number of new employees in your town tourist sector*	**40 new employees**	**20 new employees**	**60 new employees**
EFFECTS ON LIFE QUALITY: *Increase of the usual time spent on daily activities (in minutes) due to the crowding of built up areas*	**+15 minutes**	**+15 minutes**	**+15 minutes**
COST FOR RESIDENTS: *Annual increase on a real estate taxes (in euros)*	**€ 0**	**€ 30**	**€ 30**
Ranking	☐	☐	☐

In Contingent Rating a number of scenarios are showed to the respondents and they have to rate them individually on a semantic or numeric scale. Table 2.3 provided an example.

TABLE 2.3 - ILLUSTRATIVE EXAMPLE OF A CONTINGENT RATING CHOICE SET

	SCENARIO A
EFFECTS ON THE QUALITY OF THE ENVIRONMENT: *New buildings distance from the sea (meters)*	**2000 meters**
EFFECTS ON THE ECONOMY: *Number of new employees in your town tourist sector*	**40 new employees**
EFFECTS ON LIFE QUALITY: *Increase of the usual time spent on daily activities (in minutes) due to the crowding of built up areas*	**+15 minutes**
COST FOR RESIDENTS: *Annual increase on a real estate taxes (in euros)*	**€ 0**
1 2 3 4 5 6 7 8 9 10	
Very low preference	***Very High preference***

Finally, in paired comparisons, respondents choose their preferred scenario out of a set of two choices and indicate, in a numeric scale, the strength of their preference, as illustrated in Table 2.4.

TABLE 2.4 - ILLUSTRATIVE EXAMPLE OF A PAIRED COMPARISON CHOICE SET

	SCENARIO A	SCENARIO B
EFFECTS ON THE QUALITY OF THE ENVIRONMENT: *New buildings distance from the sea (meters)*	**2000 meters**	**500 meters**
EFFECTS ON THE ECONOMY: *Number of new employees in your town tourist sector*	**40 new employees**	**20 new employees**
EFFECTS ON LIFE QUALITY: *Increase of the usual time spent on daily activities (in minutes) due to the crowding of built up areas*	**+15 minutes**	**+15 minutes**
COST FOR RESIDENTS: *Annual increase on a real estate taxes (in euros)*	**€ 0**	**€ 30**
1 2 3 4 5 6 7 8 9 10 ***Strongly prefer A***		***Strongly prefer B***

A common feature of these techniques is the stages that one has to follow to construct them: selection of attributes of the good to be valued, assignment of levels that should be feasible and realistic, use of statistical design theory to combine the levels of attributes into a number of alternative scenarios with a subsequent construction of the choice sets and the estimation procedure.

In determining the number of choice sets to show to the respondents is necessary to consider that increasing the number of choices, the selection process of the preferred option could be less consistent with the preferences but more influenced by "tiredness". However this approach has the potential to identify a value for each feature of a good or better, a composite good.

2.3 Contingent valuation versus choice experiments

Contingent Valuation (CV) is one of the most used technique among the Stated Preference family it has been employed for more than thirty years in environmental economics to obtain *existence value,* that is, the value put on something never use directly (for example the Gran Canyon).

As already mentioned, in CV, respondents are directly asked for their willingness to pay in a hypothetical situation with a specific question. In this context it is important to underline all risks and benefits that may arise with the introduction of a new policy in order to obtain reliable answers.

To elicit WTP, different formats are available but the most commonly used are: open-ended, bidding game, payment card and dichotomous choice or referendum.

Open-ended questions ask what is the maximum WTP in tax for a described change. In a bidding game respondents have to say yes or no to the question: "would you pay £ x in taxes for the change described" for each bid here made. The amount £x will increase or decrease until the individual will say no (Hanley et al., 2001).

The third format, Payment cards, uses visual aids: a large number of monetary amounts are shown to the respondents and they have to indicate which one is the maximum that they are willing to pay. With dichotomous choice, the respondent says yes or no to a sum and is then asked to say yes or no to higher/lower bids in order to map out the demand curve. Using the referendum method respondents say yes or no to a single WTP amount or bid.

CV methods have been extensively used to generate estimates in the environmental field, however their application has been subject to criticism concerning the ability to produce reliable and accurate estimates of the WTP (Diamond and Hausman, 1994).

According to Kahneman and Knetsch (1992), in CV surveys there is the tendency of the responses to be highly similar across surveys. This is the drawback that the authors call *embedding effect*.

Another issue that arises with CV survey is the *yea-saying problem* (Adamowicz, 1998): in this case respondents tend to say yes to amounts above their true maximum WTP (Ready *et al.*, 1996). Furthermore, individuals tend to give answers that make themselves look good (Paulhus, 1991). This category of bias is particularly accentuated in surveys with an environmental component because of a social desirability bias which creates the tendency of

the respondents to present themselves in a sympathetic position towards social norms. A strategic bias occurs when respondents give answers that are not their true preferences in an attempt to influence the provision of public goods or policy (Blamey *et al*, 1999).

Others types of bias associated with CV but also with CE exist (Louviere *et al*., 2000). For instance hypothetical bias which may also arise in any method that involves purely hypothetical choices or part whole that occurs when it come out that the sum of the valuations placed by an individual on a part of a good is larger than the valuation placed on the good as a whole. Furthermore information bias may arise whenever respondents are forced to value attributes with which they have little or no experience. In such cases, the quality and quantity of information presented to respondents may affect their answers

Non-response bias is a concern when sampling respondents, since individuals who do not respond are likely to have, on average, different values than individuals who do respond.

However, CE may overcome some problems that arise with CV, like the embedding effect and the yea-saying bias because of the several possibilities that individuals have to express a positive opinion during the questionnaire (Adamowicz, 1998).

Different attempts have been done in order to compare CV and CE and to appraise the consistency, efficiency and accuracy of their outcomes (Swait and Adamowicz, 2001; Boxall *et al*., 1996; Hanley *et al*., 1998; Mogas *et al*., 2006; these are only few examples), but no final answer has been given to judge one method better than the other one.

If the aim is to value characteristics, CE performs better. If CV is used with this purpose the questionnaire can become unmanageable and too demanding for respondents. Also RP techniques are able to value different characteristics but statistical problems may arise if characteristics are correlated. CE does not include options in which characteristics are correlated by construction so as to avoid that problem.

Besides, CE responds with better performances than CV in measuring the marginal value of changes in a range of characteristics of an environmental plan that has been defined by Adamowicz (1994) like "*a very fruitful variant of SP methods to value non-market goods"*. Moreover, probably given to its flexibility, it is more informative then a CV survey.

However, it is not perfect and the researcher has to take into account the problem that it is difficult for an individual to manage simultaneously a lot of information and therefore a large choice set. Consequently, the risk is an irrational choice (Tversky and Shaffir, 1992). Another issue that arises is the correlation between responses when there are repeated answers for each respondent.

A main assumption in CE is that the value as a whole of the scenario is given by the sum of the parts; however some additional attributes that the respondent considers important may not be included in the design. Willis and Garrod (1995) underline that the disaggregation of a goods value into the value of its characteristics could provide estimates with an external validity.

In conclusion, a main difference between CV and CE is that if one needs values for individual characteristics, then CE is preferable. It is important that attributes change gradually along scenarios: if they improve or get worse at the same time there will be no useful information revealed about preferences.

2.4 Choice experiments and residents: the state of the art

The literature provides some examples of choice experiments applied to analyse residents' trade-offs toward tourism. However, as far as the author knowledge is concerned, the number is quite limited and it will follow an attempt to offer a comprehensive overview.

Chronologically, the first example is due to Lindberg, Dallaert, Rassing, in 1999. Previously (1997) Lindberg with Johnston, applied CV to measure social impacts in a way that favour an "integrated analysis of tourism's diverse impacts". Lindberg et al. (1999) present a CE approach as a more general method for residents' trade-offs evaluation and with the precise aim to identify which choices residents are willing to make with respect to tourism's impact. The design is constituted by 4 attributes and 4 possible level each. It submits variation in number of jobs, tax reduction, increase in the amount of rubbish and in the number of cars. Results show that residents are willing to accept negative impact of tourism provided that they also receive positive impacts, represented by an increase in new jobs.

Table 2.5 lists all published research studies, as far as the author knowledge is concerned, using CE as a methodology to detect residents' evaluation and "relationship" with tourists and tourism. Along with references, are briefly described research scopes, designs and applied analytical methods.

TABLE 2.5 - CHOICE EXPERIMENTS STUDIES IN RESIDENTS' CHOICE ANALYSIS

Reference	***Scope/Aim***	***Design***	***Analytical Method***
Lindberg, Dallaert and Rassing (1999) *ATR*	Detect trade-offs residents are willing to make with respect to tourism's impact of a specific project/policy in the Danish island of Bornholm	Choice Experiment 4 attributes with 4 level each 16 scenarios 391 respondents	Discrete choice analysis logit model
Lindberg, Andersson and Dallaert, (2001) *ATR*	Compare welfare change between residents and tourist of an hypothetical ski resort development in Sweden	Choice Experiment 2 attributes with 4 levels each 16 scenarios 274 residents respondents 384 visitor respondents	Discrete choice analysis logit model
Hearne and Santos (2005) EDS	Analysis of educated residents and foreign tourists preferences toward ecotourism in Guatemala	Choice Experiment 7 attributes with 1 to 3 levels 9 scenarios 192 residents respondents 192 foreign tourists respondents	Discrete choice analysis Multinomial logit
Naidoo and Adamowicz (2005) EDE	Determine how preferences toward protected areas are formed by tourists and foreign residents in Uganda	Choice Experiment 7 attributes with 2 to 4 levels 16 scenarios 690 tourists 142 foreign residents	Multinomial Logit Model Random Parameters Logit Model
Hearne and Tuscherer (2007) working paper	Analysis of residents and tourists preferences toward ecotourism in Standing Rock Sioux Indian Reservation	Choice Experiment 6 attributes with 3 to 4 levels 54 residents 88 tourists	Multinomial Logit Model
Atzeni and Concu (2007)	Measure residents trade-off between tourism externalities in Alghero, Italy	Choice Experiment 4 attributes with 5 levels each; 25 scenarios split in 2 groups;	Conditional Logit
Bimonte and Fratelli (2007)	Understand if Follonica (Italy) tourism characteristics is well-suited with residents prederences	Choice Experiment 6 attributes with 2 to 4 levels each; 32 scenarios: respondents split in 4 groups, consider 8 choice sets; 240 residents;	Not clear
Riganti (2008) Int.J. STM	Propose to value in economic terms cultural tourism externalities in the city of Syracuse, Italy.	Choice Experiment 6 attributes with 6 levels 10 scenarios Desired sample of 250 tourists and 250 local residents	Discrete choice analysis Analysis to be implemented
Waterman (2009)	Measure of tourists and residents preferences toward the different impact of tourism expansion in Barbados, Caribbean.	Choice Experiment 3 attributes with 3 levels each 212 residents and 163 tourists 5 scenarios	Discrete choice analysis Conditional logit model
Figini, Castellani and Vici (2009)	Study how residents internalise direct and indirect effects of tourism in the city of Rimini, Italy	Choice Experiment 6 attributes with 2 to 4 levels each; 32 scenarios: respondents split in 4 groups, consider 8 choice sets; 606 residents;	Discrete choice analysis Conditional Logit Model with interactions
Oh, Draper and Dixon (2010)	Compare resident and tourist preferences for public beach access in South Carolina	Choice Experiment 5 attributes with 3 to 4 levels each; 6 paired choice set each; 423 tourists and 572 residents; Mail survey;	Discrete choice analysis Conditional Logit with interactions
Asgary, Rezvani and Mehregan (2011)	Resident's preferences toward second home development in Tehran, Iran	Choice Experiment 150 rural residents 5 Attributes with 5 levels Face to face interviews	Binary Logit Regression

In some cases, CE is adopted to investigate about development of new structure as in Lindberg et al. 2001, that uses it to infer about an hypothetical ski resort development in Sweden and compare welfare change between residents and tourist and across residents. In other cases it has been used to investigate how preferences for particular protected areas are formed (Naidoo and Adamowicz, 2005). In their analysis, the authors evaluated tourists' demand for elevated biodiversity levels, relative to other protected areas attributes. Sometimes, CE is employed as a balance for residents and tourists recreational needs. For instance, Hearne and Santos (2005) apply it to analyse preferences toward alternative scenarios of ecotourism of foreign tourists and educated local residents. Recently, CE has been implemented also to investigate about tourists and residents preferences about public beach access and "relates amenities" other resources (Oh et al., 2010). In the considered examples, outcomes are analysed and described by random utility approach, theoretical foundation of CE. Particular attention in the latter years has been paid to overcame heterogeneity and preference heterogeneity in the sample turning to slightly econometric complex models as Random Parameters Logit Model (Noidoo and Adamowicz, 2005) or Conditional Logit Model with interactions (Figini et al., 2009; Oh et al., 2010).

Concluding, CE is an accurate tool to measure trade-offs, useful to develop new policies desirability. Besides, it does not require large sample size as underlined by Brau (2007) considering that for an econometric analysis the recommended sample size is at least of 200-250 observations since each interviewed repeats the choice more than once and implicitly increases sample sizes. Furthermore, introducing a price attribute it is possible to monetize trade-off and externalities on residents. A monetary measure has different advantage:

- Easy measure of the preference intensity
- Straightforward understanding for policy makers that can support their arguments with numbers
- Mean of comparison with other projects

On the other hand, applications require considerable expertise and knowledge of the study objects to be productive could be costly and complex to implement in terms of money and resources. In order to understand local concerns and research needs, a fundamental starting point is a comparison with involved actors, through meetings with experts, focus groups. To gain better knowledge of the term of the problem is advisable and it is ideally to develop a preliminary questionnaire. While designing CE, attention should be paid to the attributes

definition that must vary independently one from the other, have a level balance between scenarios and have a minimal overlap between levels (Louviere et al. 2000).

Chapter 3

3. The theoretical Model

3.1 Random Utility Model

This study develops on the model created by McFadden (1974), known as multinomial logit model or conditional logit model, for the determination of the probability of a particular alternative to be chosen as the most favourite.

The origin of the choice experiment is based on Random Utility Theory (RUT), originally proposed by Thurstone (1927) and implemented, with particular attention to dichotomous choice and contingent valuation empirical analysis, by Luce (1953) and McFadden (1974). The latter, in particular, did not change the basic idea[7]: consumers' choice is modelled according to a random utility model with a given utility function; subsequently it is possible to determine the choice probability. According to this approach, there exists a set of individual behavioural rules and an indirect utility function with a random component that influences population choice behaviour.

The indirect utility function, usually denoted by $v(p, w)$, represents the consumer's preferences and the maximal utility attained when the goods price level is p and their income is w. It depends on the utility representation chosen and it is a very useful analytical tool. In particular, using this approach, it is possible to understand what consumers think about their preferences in terms of what they consume rather than in terms of price.

The random component (see below) indicates the presence of unobserved elements on the choice selection that could be derived by the sample population distribution. To introduce a general model for individual choice behaviour, it is necessary the presence of a choice set with a set of alternatives and observed attributes of decision makers. Besides, a rule to combine them and a model of individual choice and behaviour is required. Once it has been determined, it is possible to define the probability to select an alternative x, considering the

[7] While Thurnstone starts using a normal distribution that produces a binary probit model, McFadden assume a Gumbel distribution (Type I extreme value distribution), that leads, with the hypothesis of logistic distribution of the random terms difference (Maddala, 1983) to a Conditional logit Model.

individual socioeconomic characteristics and the set of available alternatives (Hanley et al. 2001). It is important to underline that, during the choice process, consumers follow an individual behaviour rule drawn from a set of individual behavioural rules.

Hence, in this framework the individuals' aim is to maximize his utility and it is possible to look at it in terms of attributes specified in a functional form, which is usually linear and additive.

Let's then consider consumer *i's* utility given by the choice he makes among different alternatives, J. The equation below represents that indirect utility of the representative individual:

$$\boldsymbol{U_{ij} = V_{ij} + \varepsilon_{ij}} \quad (3.1)$$

V_{ij} characterize the aspects specific to the individual and the choices. It is typically composed by attributes of the choice and varies across them and across the individual. It is equal to $\sum_{k=1}^{K} \beta_{jk}\, s_{jki}$ where β represent the utility parameters independent of i but not of attribute level and s , consumers attribute vector. V_{ij} is assumed homogeneous across the population relatively to the attributes contained in it.

The utility is thus decomposed in two parts: a systematic component, V_{ij}, also called representative utility that can be observed, and a random component, ε_{ij}, that is the part of utility deriving from unobserved features and not from individuals that chose to maximize their utility in a random way. Indeed, the complexity of economic decisions is a reflection of the unobserved attributes of individuals, like tastes, that can vary over a population.

However, the assumption that has been made in this kind of models is that individual will choose the alternative that yields him the highest utility; therefore, individual i will choose alternative j only if choosing it will have a greater utility then choosing any other alternative:

$$U_{ij} > U_{im} \quad all\ j \neq m \ \in A \quad (3.2)$$

Given equation 1 is the same to write:

$$\left(V_{ij} + \varepsilon_{ij}\right) > (V_{im} + \varepsilon_{im}) \quad (3.3)$$

Moreover, putting the observed and the unobserved together, it becomes:

$$\left(V_{ij} - V_{im}\right) > (\varepsilon_{ij} - \varepsilon_{im}) \quad (3.4)$$

that however cannot be determined exactly because of the unobserved component. It is necessary to calculate the probability[8] that $(V_{ij}-V_{im})$ is greater than $(\varepsilon_{ij}-\varepsilon_{im})$. It is given by:

$$P(x_{ij}|s_{i,},A)=P_{ij}=P\{[V(s,x_j)-V(s,x_m)]>[\varepsilon\,(s,x_m)-\varepsilon(s,x_j)]\}\ for\ all\ j\neq m. \qquad (3.5)$$

Hence, the probability that an individual of a sample, randomly selected, with characteristics s and choice set A, will choose x_j is equal the probability that the difference between the systematic utility levels of alternatives j and m is greater than the difference between the random utility of alternatives j and m for all alternatives in the choice set. Equation 3.5 characterizes the Random Utility Model. To determine that probability, it is fundamental to know the distribution of the random component and to make some assumptions. One of the main axioms is the Independence from Irrelevant Alternatives (IIA), introduced by Luce (1959), that states: "*the ratio of the probabilities of choosing one alternative over another (given that both alternatives have a non-zero probability of choice) is unaffected by the presence or absence of any additional alternatives in the choice set"*. This property implies that the random utilities are independent across alternatives and identically distributed. As an implication, the alternatives should be sufficiently different from one another. In addition, McFadden (1974) emphasizes the positivity and the Irrelevance of alternative set effect assumptions: according to the latter without replication on each individual it is not possible to identify the alternative choice set effect. According to the positivity assumption, given the consumers' socio-economic characteristics and the alternatives in the choice set, the probability that an alternative has to be chosen is greater than zero. It is then assumed that the function used to determine selection probabilities has an additive separable form:

$$V(s,x,z)=V(s,x)-V(s,z). \qquad (3.6)$$

To convert the unobserved random component associated with each alternative in terms of probability is frequently used a statistical distribution, called in different names: Gumbel, Weibull, double-exponential and extreme value type 1 (EV1) distribution. It is defined, in terms of the random component, by:

$$P(\varepsilon_j\leq\varepsilon)=exp(-exp-\varepsilon)=e^{-e^{-\varepsilon}}. \qquad (3.7)$$

[8] The structure is based on probability due to the stochastic component.

Its mean is equal to $\frac{\eta+\gamma}{\mu}$ and variance $\sigma^2 = \frac{\pi^2}{6\mu^2}$. The parameter η is the mode of the distribution, μ is a positive scale parameter, $\pi = 3.14159$ and $\gamma = 0.577$, the Euler's constant.

Considering the Gumbel distribution, it is possible to express the random utility model (equation 5), hence the probability to choose the alternative j, in the following form assuming that $U_j \neq U_m$:

$$P_{ij} = P\left(\varepsilon_m < \left(\varepsilon_j + V_j - V_m\right)\right), \tag{3.8}$$

Assuming that ε_j is independently distributed, is possible to express the probability to choose the alternative j as the product of $j-1$ terms, for some given value of ε_m (for example b), with the help of the Gumbel distribution in the following way:

$$P_{ij} = P\left(\varepsilon_m < \left(\varepsilon_j + V_j - V_m\right)\right) = \prod_{j=1}^{J} exp\left[-exp - (b + V_m - V_j)\right]. \tag{3.9}$$

That is possible to simplify to the probability density function:

$$exp\,(-b)exp\left[-\sum_{j=1}^{J} exp - (b + V_m - V_j)\right]. \tag{3.10}$$

Integrating the above expression over all values of ε, is possible to obtain the probability of choosing the alternative m:

$$P_m = \int_{b=-\infty}^{b=\infty} exp\,(-b)exp\left[-\sum_{j=1}^{J} exp - (b + V_m - V_j)\right]db. \tag{3.11}$$

Equation 3.11 yields, after some arrangement, the probability of choosing a particular alternative *m* expressed as:

$$P_{im} = \frac{exp(V_{im})}{\sum_{j=1}^{J} exp(V_{ij})} \tag{3.12}$$

Expression 3.12 corresponds to the econometric specification, known as Multinomial Model, commonly used to analyses Random Utility Models. This class of models has different variants according to whether or not regressors vary across alternatives. It is generally assumed that the probability relating the utility functions to consumer choice probabilities can be described with the help of a conditional logit model (CL) or a multinomial logit model (MNL). Specifically, a CL model is used when there are alternative specific regressors that have different value for different alternatives. If x_{ij} stand for the value of the regressors, respectively for individual i and alternative j, $x_i = [x'_{i1}\, x'_{i2}\, ...\, x^1_{im}]'$, and β represents the parameters that are constant across alternatives, is possible to specify the model as:

$$p_{ij} = \frac{exp^{x'_{ij}\beta}}{\sum_{k=1}^{m} exp^{x'_{ik}\beta}} \qquad j = 1, \ldots\ldots, m \tag{3.13}$$

On the contrary, a MNL model is used when regressors do not vary across alternatives and it specifies:

$$p_{ij} = \frac{exp^{x'_{i}\beta_j}}{\sum_{k=1}^{m} exp^{x'_{i}\beta_k}} \qquad j = 1, \ldots\ldots, m \tag{3.14}$$

Both models are an extension of the binary logit model and give probabilities that lie between 0 and 1 and sum up to one. They enable us to relate the choice made by an individual in a real or hypothetical context to some characteristics that vary across his choice set.

Their estimation take place with the help of the Maximum Likelihood Estimator (MLE), which is the most used estimator for this kind of models. In this study the Conditional Logit estimator is used in the empirical analysis and in appendix is reported MLE for the alternative specific regressors model.

Chapter 4

4. The case *study*

4.1 Alghero

Alghero is a town of approximately 44,000 inhabitants situated in the North-West coast of Sardinia (Italy), one of the bigger islands in the Mediterranean Sea.

It makes an interesting case study because of its environmental, infrastructural and cultural peculiarities and its touristic development. Alghero is urbanized, near the sea borderline, however the surroundings areas have different levels of development, with some zones fairly undeveloped (see Figure 4.1).

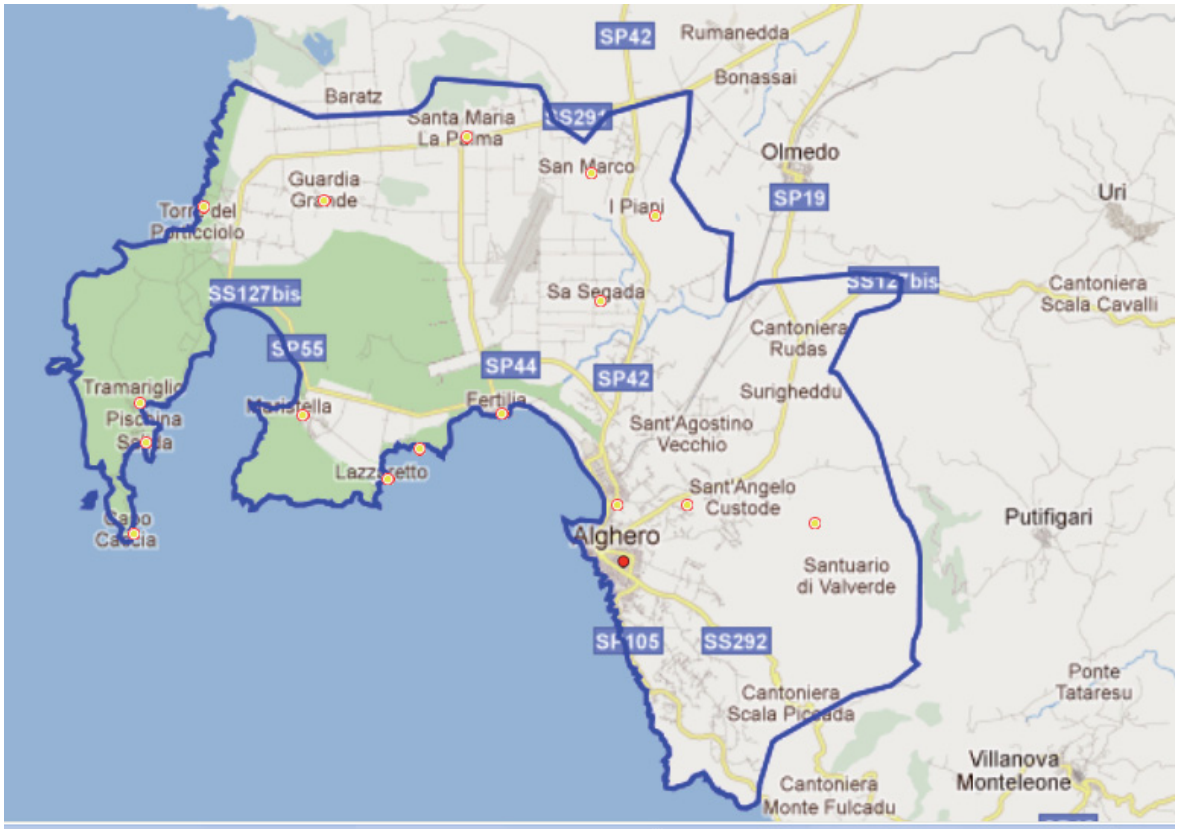

FIGURE 4.1 - MAP OF ALGHERO. ELABORATION ON GOOGLE MAPS, JULY 2011.
The blue line delineate Alghero's territory.

Its touristic development started in the '50s, becoming the first town in the island to have such an experience. Initially born as "*élite tourism*", already during the '60s it becomes a mass

tourism destination with constantly increasing arrivals (Solinas, 1997). These flows are favoured by the near airport, far away 12 km from the urban centre. In addition, since June 2000, it has become a low-cost Mediterranean destination, thanks to low-cost flights companies (including Ryanair) introduction in its airport. It is considered as one of the main factors explaining the expansion of tourism demand in the last decade (Pulina and Cortés-Jiménez, 2010).

Though the number of visitors increases every year, citizen's incomes results mainly from the public, construction, manufacturing, and agricultural sectors of the economy.

As reported also by Pulina and Biagi (2010) a regulation driven to foster a long run sustainable planning in Sardinia was reached in 2004 (Legge Regionale n.8, 25/11/2004), when the regional government applied restrictions on the use of natural resources, forbidding any construction within two-kilometres from the coastline. By means of this law a program about the regional landscape (PPR, Piano Paesaggistico Regionale) has been instituted. The law was implemented to preserve landscape and seacoast environment, and at the same time to impose restrictions for the use of these resources in tourist activities

Currently, local institutions, business and citizens still discuss on the effects the above law may have on economic growth.

The banning to build within two kilometres before the borderline has a double effect: from one side protects landscape and the coastline; from the other side, there is a considerable limit to exploit the resources for touristic purpose. For that reason, the law is quite controversial: it assumes that environment protection is necessary among other things to preserve tourist opportunities; on the other hand, opponents to the law claim that these measures are too restrictive and it implies a strict limit for economic development.

A more recent law (Legge Regionale n. 4, 23/10/2009) has partially invalidated the previous law, allowing new constructions beyond 300 meters from the coastline.

The aim of the choice experiment carried out is to explore Alghero residents' preferences on different hypotheses about tourist development. Scenarios presented contain different hypotheses on the degree of environmental protection and touristic development. Individuals assign an economic value based up on their preferences and implicitly express their willingness to pay during the choice of the alternative. Therefore, it is possible to evaluate hypothetical touristic development policies, and at the same time to have resident direct feedback about the PPR.

The DCE survey in Alghero should help to understand local community attitudes toward the mentioned legislation and its main effects. Alghero has been chose as a case study to

investigate the regulation effects because it has a considerable experience in tourism and therefore its residents have potentially experienced the positive and the negative effects of this activity.

Alghero residents' preferences and their willingness to pay (WTP) for environmental protection, job creation and quality of life will be first measured for the year 2006, just two years afterward the law implementation. With the intent to value if this parameters are stable with the experience and social benefits deriving from it have changed, in 2010 a second wave of the survey has been undertaken.

The next section presents the choice experiment questionnaire (see appendix A3) that has been carried out in Alghero (Sardinia, Italy).

4.2 The questionnaire structure

A first survey was carried out in Alghero (Sardinia, Italy) from the 10th to the 20th June 2006 via face-to-face interview. The second wave was undertaken between October and November 2010 employing the same questionnaire structure. The aim is to collect information about the residents' attitudes towards environmental protection and other aspects influenced by tourism. The choice experiment questionnaire was designed to obtain specific, although hypothetical data about residents perceptions towards environment and other spheres influenced by this economic activity. Residents' preferences and their willingness to pay (WTP) for environmental protection, job creation and quality of life are first elicited for the 2006. The 2010 wave aloud one to evaluate whether or not preferences change after policy implementation and parameters related to the experience and hence social benefits are stable. The final purpose is to understand how to compensate changes in the environmental protection, nature conservancy and in residents' quality of life alongside the economic opportunities of tourist development.

The questionnaire (the same for 2006 and for 2010) is composed of three parts submitted (Appendix A1) to the interviewee and two reserved to the interviewer. With the intent to introduce the respondents to the argument, the first part asks about general opinions regarding tourism and the environment (attitudinal questions); the second section presents the choice experiment and in the last one socio-economic information were asked. In order to assess the reliability of answers, the last section of the questionnaire contains also some questions to the

interviewer, about his opinion on respondents' level of comprehension and their degree of interest.

As previously mentioned, the questionnaire was intended for people resident in Alghero; the sample was selected based upon a quota sampling procedure, grounded on the distribution of Alghero population as resulting from census returns in 2001 for the 2006 sample. Considered the large span of time since the last census (2001), the 2010 stratified sample was constructed up on DemoIstat statistical data. The quotas were based on age and gender and covered cases characterized by heterogeneous demographics features. Afterwards it was the interviewers task to randomly select people to include in the sample according to the given instructions. As opposed to random sampling, quota sampling requires that representative respondents are chosen out of a subset of individuals within a population. This procedure may lead to a bias because not everyone gets a chance to be selected, however it overcomes the potential bias derived from a random sample procedure.

A minimum number of 380 participants were set as a target in 2006. These calculations were based on 5% margin of error, at a confidence level of 95%. The response distribution rate was 90%. Ultimately, 501 questionnaires were completed for 2006. In 2010, due to budget restrictions the required sample size has been modified according to a 6.5% error and a 95% confidence interval: the target was 226 completed interviews. Eventually, 268 questionnaires were successfully undertaken.

The choice experiment questionnaire implies the comparison between two scenarios: one that describes the actual situation and another one that describes a hypothetical situation. In our exercise as well, the CE is structured as follow. The scenarios are created using an orthogonal design method, the Hyper Greco-Latin (HGL) matrix, which is able to create choice sets equal from the point of view of the attributes in a way that each attribute can be evaluated independently from all the others. In fact, constructing the choice sets using an HGL design allows for the identification of the effects of every single attribute on the utility. At the same time, this orthogonal design method helps to avoid parameter of an attribute depending on the level of another attribute. In this way the orthogonal condition is respected. HGL produced 25 combinations of attributes. Submitting all the cards to a single respondent may expose to the risk of unreliable answers, thus, to overcome this problem, the sample has been divided in 2 subsamples: one even, with 12 pair of cards, and one odd with 13 pair of cards. Each card reports an invariant option (scenario A), *status quo* that is the same in all 25 cards, and the products of the HGL, called alternative or scenario B. The invariant option describes a

scenario that represent the future effects of the actual situation hence the future expected effects of the *PPR* (Regional Landscape Program) application, as in the legislator mind, and other collateral effects, no directly attributable to it. Those effects are described by four attributes:

1. Distance of new buildings from the sea, expressed in meters;
2. Variation in the number of employees in the tourist sector in Alghero;
3. Increase of the usual time spent on daily activities, expressed in minutes, due to the crowding of urban and suburban areas;
4. Annual increase in real estate taxes, expressed in euros.

The first attribute is capturing the effects on the natural environment indicating the rank of protection of the coastline. The identified levels are the followings:

a. 150 meters: that is the limit to build new hotels or others receptive buildings imposed by the previous legislation;
b. 500 meters: this is the limit that the earlier law required to build new houses within the coastline;
c. 1 kilometre: this level is fundamental to understand if the individual place his utility function in a halfway point between the previous and the current legislation; it is more restrictive in respect to the past but less compared to the present;
d. 2 kilometres: is the ban imposed by the *PPR* (Regional Landscape Program) and it is the invariant option;
e. 3 kilometres: to capture individuals with a preference more restrictive then the real one.

In order to capture the policy effect on the economy a second attribute is introduced. It has been measured with the variation of the number of employees in the tourist sector each year. The hypothesis to formulate the levels has been that the variation of the employees in Alghero is equal to 1/10 of the all region variation, as Alghero represent around 10% of Sardinian tourism sector (Istat, 2011). The levels used are:

a. 0 new employees each year: this hypothesis describe the situation that is outlined by the law's opponents; since the tourism sector development is strictly correlated with new investments and the PPR does not allow to build near the coastline, according to them, the law implies a loss of competitiveness due to less investments;
b. 20 new employees each year: this level reflects an increment at regional level of 1% each year;

c. 40 new employees each year (invariant option): employment rises, at a regional level, about 2% each year, 1/10 only in Alghero. This hypothesis correspond to a stable situation where there is not a worsening with respect to the conditions before the PPR;
d. 60 new employees each year: this is the correspondence to an increment of the 2% of the regional employment level;
e. 80 new employees each year: implies a 4% increase in the all region.

An other PPR aim was to uniformly allocate tourists in the urban villages near the coastline. To describe it are used 2 attributes are used. The first one is the increase of the usual time spent on daily activities and hence, represents the congestion level. The PPR will increase the congestion problems in the touristic areas: 15 minutes more than before. The identified levels are:

a. 5 minutes: if there is an increase that is similar with the one at the time of the survey;
b. 10 minutes;
c. 15 minutes: invariant option;
d. 30 minutes.

The last attribute is expressed in monetary terms and represents the annual contribution to sustain the policy in terms a local taxation increase on real estates (*ICI*, *Imposta Catastale sugli Immobili*).

It helps to understand the individual willingness to pay and 5 levels are defined:

4. 0 euros each year (invariant option);
4. 10 euros each year;
4. 20 euros each year;
4. 30 euros each year;
4. 40 euros each year.

Considering the entire law and the uncertainty around it, it has been forecasted that the effects will manifest in a period of five years. In the table below is represented an example of the cards (another example has been given in section 3.2).

TABLE 3.1- EXAMPLE OF ONE CHOICE SET OF THE CHOICE EXPERIMENT CARRIED OUT IN ALGHERO

	SCENARIO A *Current Situation Effects*	**SCENARIO B** *Alternative hypothesis effects*
EFFECTS ON THE QUALITY OF THE ENVIRONMENT: *New buildings distance from the sea (meters)*	**2000 meters**	**150 meters**
EFFECTS ON THE ECONOMY: *Number of new employees in your town tourist sector*	**40 new Employees**	**0 new Employees**
EFFECTS ON LIFE QUALITY: *Increase of the usual time spent on daily activities (in minutes) due to the crowding of built up areas*	**+15 minutes**	**+5 minutes**
COST FOR RESIDENTS: *Annual increase on a real estate taxes (in euros)*	**€ 0**	**€ 0**
Do you prefer scenario A or scenario B?		

4.3 Samples' characteristics

As anticipated above, the questionnaire begins with the attitude questions with the scope to introduce respondents to the argument and help them to have a reflection on the topic.
What emerges in general is a positive attitude toward tourism and environment protection (figure 4.1 and 4.2). In 2006, 86% of the sample believes that the regional government should invest more on environment protection. The 70% has a positive opinion about tourism and its effects on residents' everyday life. These percentages turned to be 95% and 66%, respectively in 2010. However, almost half of the sample in both years (46% in 2006 and 48% in 2010) believes that natural resources are negatively affected by tourism. The latter figures are perhaps related with the common perception that an environmental good level is needed in order to develop a high-quality level of tourism. According to 2006 respondents', tourism has a positive effect also on occupation, culture and services: 88% agree with a positive effect on employment, 70% on culture and 57% on services. In 2010, these data undergoes a little change: 79% agree with a positive effect on employment, 75% on culture and 46% on services. It appears that residents are acquiring a different awareness of tourism development in Alghero.

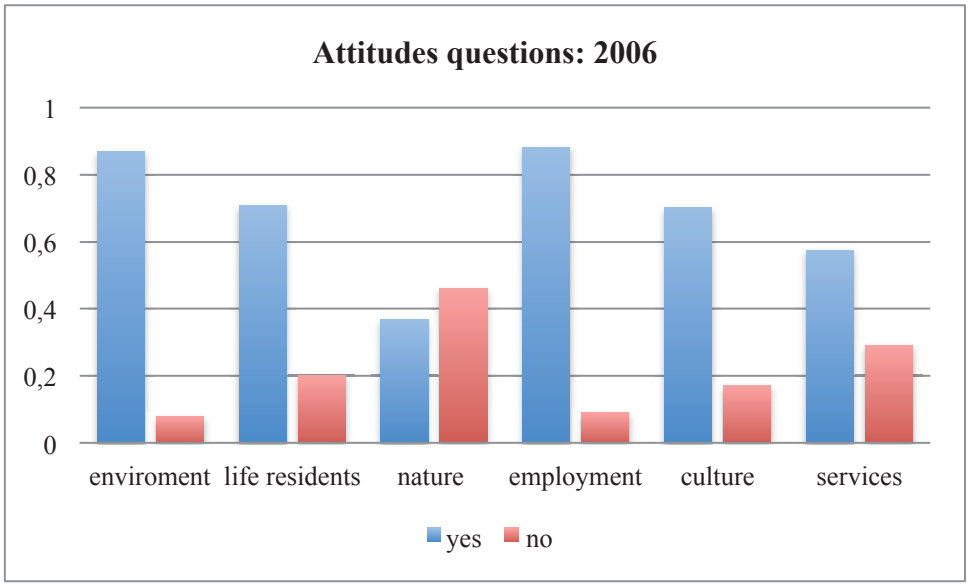

FIGURE 4.2 - PROPORTION OF ANSWERING YES OR NO TO ATTITUDE QUESTIONS FOR 2006

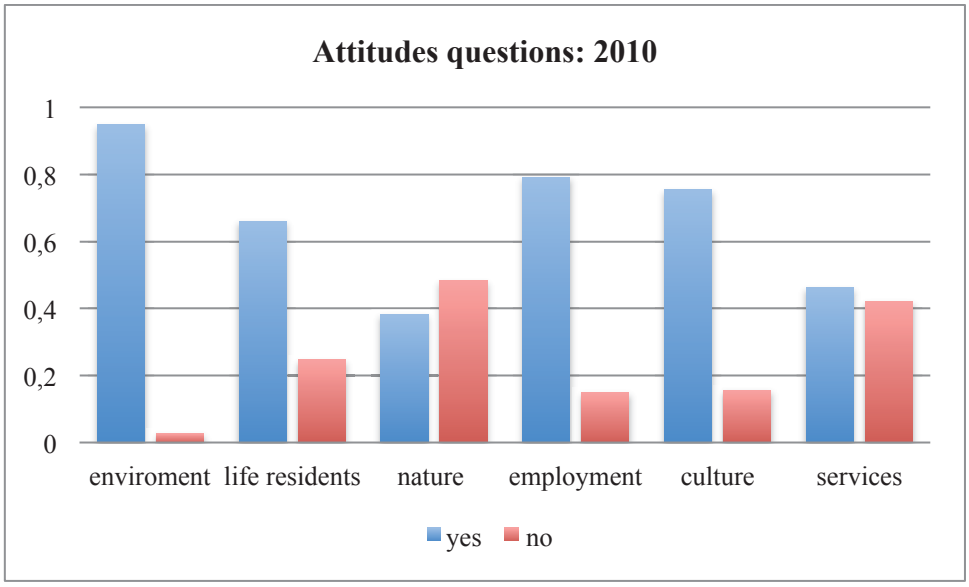

FIGURE 4.3 - PROPORTION OF ANSWERING YES OR NO TO ATTITUDE QUESTIONS FOR 2010

As mentioned, the survey was planned with respect to two characteristics of the population: age and gender. The proportion between gender has been successfully respected for both years: in 2006, 48% of respondents are male and 52% female as well as for 2010. Age classes' distribution (Table 4.3) follows the planned sample design and if in 2006 the respondents' average was 46 years old, in 2010 it was 47. Other than these characteristics further information has been collected in order to understand if socio-economic position of the respondents may have influenced the answers in the choice experiment. The same

questions have been asked in both years: born place, domicile, occupation, education, mean of transport, annual income and income from tourism. Overall, samples' characteristics distribution is quite similar between 2006 and 2010 allowing for a fair data comparison.

Reported percentages of qualitative responses (Table 4.3) show as the most common educational qualification attained for the samples is a upper school (42% and 44%) which corresponds to the class that mostly have a personal income between € 0 and € 7500,00 per year. A significant part of interview was carried out during office hours and along the streets. This is reflected on the respondent's occupation 21%of which (2006) and 18% (2010) are retired and 13% in both waves are students. From the data analysis it appears that the choice between *status quo* and alternative does not vary dramatically by these characteristics. The income of the great part of the sample does not depend upon tourism activity (72% and 69%), and it has not been observed any difference among the choice of the scenario between those whose income is somehow related with tourism and the others.

TABLE 4.2- SOCIO-DEMOGRAFIC CHARACTERISTICS OF THE SAMPLES

Characteristics	***2006***	***2010***	***Characteristics***	***2006***	***2010***
Age Classes			***Occupation***		
16-40	41%	41%	*Retired*	21%	18%
41-65	40%	38%	*Student*	13%	13%
>65	19%	21%	*Other*	12%	11%
Born place			*Office Worker*	11%	6%
Alghero	58%	58%	*Housewife*	8%	7%
Sardinia	31%	32%	*Dealer*	8%	5%
Italy	10%	7%	*Worker*	6%	7%
Abroad	2%	2%	*Unemployed*	5%	3%
Domicile			*Freelancer*	5%	4%
City center	38%	34%	*Teacher*	4%	1%
Touristic area	34%	14%	*Artisan*	3%	2%
Out of town	18%	12%	*Entrepreneur*	3%	3%
Periphery	10%	39%			
Education			***Mean of transport***		
Primary school	16%	13%	*By car*	38%	55%
Junior high school	29%	27%	*On foot*	36%	28%
Upper school	42%	44%	*Motorbike*	12%	5%
Graduate	12%	16%	*Public transport*	7%	4%
Postgraduate	1%	0%	*By bike*	6%	7%
Income in €			***Income from tourism***		
0-7500	41%	23%	*No*	72%	69%
7500-15000	46%	28%	*Yes*	28%	31%
15000-30000	6%	34%			
>30000	7%	16%			

Chapter 5

5. Empirical Analysis

5.1 Econometric and economic outline

In the empirical literature about tourism estimation of implicit prices have been carried out using the conditional logit model as in Figini *et al.* (2007) but also with the help of the multinomial logit (ML) model, as in Lindberg *et al.* (1999). However, the standard approach used in the literature to estimate CE data is the conditional logit (CL) model. The ML implies that the choice probability of an alternative is expressed as an attribute function of that alternative and the other alternatives in the choice set, including the effect of individual characteristics, as in equation 15:

$$\boldsymbol{p_{ij}} = \frac{exp^{x_i'\beta_j}}{\sum_{k=1}^{m} exp^{x_i'\beta_k}} \qquad \boldsymbol{j = 1, \ldots\ldots, m} \tag{5.1}$$

In this specification the coefficients indicate the relative influence of the various attributes on the probability that an alternative is selected.

Employing a CL as Figini *et al.* (2007), one obtains an estimate of the probability that an individual i choose alternative j out of m alternatives according to equation 16:

$$\boldsymbol{p_{ij}} = \frac{exp^{x_{ij}'\beta}}{\sum_{k=1}^{m} exp^{x_{ik}'\beta}} \qquad \boldsymbol{j = 1, \ldots\ldots, m} \tag{5.2}$$

Using this class of models to estimate the random utility specification, the coefficients β are able to evaluate the rate at which respondents are willing to trade off one attribute with one other (Mazzanti, 2003; Figini *et al.* 2007).

However, when individuals are making a series of binomial choices between a new alternative and a current situation, CL model is more appropriate. On the contrary, the ML model is more suitable when individuals have many options for a single choice

A difference between the two papers lies in the type of codification of alternative attribute variables: in Lindberg the attributes are all quantitative whereas in Figini only the price variable is quantitative; the others attributes are qualitative and therefore the levels are expressed as dummy variables. On the contrary, in the present study the attributes are only

quantitative variables that in the dataset take the same values presented in the questionnaire. However, either model can deal with both quantitative and qualitative explanatory variables. If the variables are quantitative then the ratio of the coefficients represents the marginal trade-off. If the variables are qualitative then the ratio of the coefficients represents the "value of levels change" – ratio of discrete changes.

Is important to notice that the data organization appears like a panel dataset. Each respondent has to provide up to twelve different choices across the choice sets according to the assigned subsample (even, 12 pair of cards; odd, 13 pair of cards).

A problem that often occurs in panel data is the heterogeneity bias that is, the explanatory variables are correlated with some unobserved heterogeneity across individual producing biased estimates. The data of the present work are collected according to a stratified sample randomly selected conditional on the age and gender. For this reason is unlikely to discover a correlation with some omitted variable.

The estimators used analysing data derived from choice experiments is the conditional logit model.

As introduced by equation 12, the probability of individual i to choose alternative j can be expressed with the conditional logit model. The estimation methodology that can be used is the maximum likelihood that is based on the population set which generate the sample more often. Let's consider m alternatives and m binary variables for each observation y that takes value 1 if alternative j is chosen and value 0 if not. The likelihood function for a sample of N individuals and the choice that they actually make can be written as:

$$L = \prod_{n=1}^{N} \prod_{j=1}^{J} P_{ji}^{y_{ji}} \tag{5.3}$$

For computational reasons is easier to maximize the logarithm of the likelihood function, that is:

$$L^* = \sum_{n=1}^{N} \sum_{j=1}^{J} y_{ji} \ln p_{ij} \tag{5.4}$$

p_{ij} is a function of the utility parameters β, that are unknown, and of the regressors. L^*can be maximized with respect to the β and the first order condition for a general multinomial model is:

$$\frac{\partial L^*}{\partial \beta} = \sum_{n=1}^{N} \sum_{j=1}^{J} \frac{y_{ji}}{p_{ij}} \frac{\partial p_{ij}}{\partial \beta} = 0 \tag{5.5}$$

For the CL model (equation 15) the first order condition simplify to:

$$\sum_{n=1}^{N} \sum_{j=1}^{J} y_{ij} \, (x_{ij} - \bar{x}_i) = 0 \tag{5.6}$$

Because $\frac{\partial p_{ij}}{\partial \beta} = p_{ij}(x_{ij} - \bar{x}_i)$ and $\bar{x}_i = \sum_{j=1}^{J} p_{ij}\, x_{ij}$, that is a probability weighted average of the regressors. Differentiating and doing some other algebraic manipulation, the β estimator for the utility parameters of the model will be:

$$\hat{\beta}_{CL} \xrightarrow{a} N\left[\beta, \left(\sum_{n=1}^{N}\sum_{j=1}^{J} p_{ij}\left(x_{ij} - \bar{x}_i\right)\left(x_{ij} - \bar{x}_i\right)'\right)^{-1}\right] \quad (5.7)$$

Thus, $\hat{\beta}_{CL}$ indicate some characteristics that are more likely to have generated the observed choice structure.

Summing up, if an individual i contend with m choices, U_{ij} represent the level of indirect utility associated with the *j*th choice, determined by a set of attributes and a random component that capture unobserved variation in taste and errors in the perception and optimization by consumers. An observed variable that denote the choice, let's call it Y_i, will take value 1 when the alternative that maximize the utility is chosen and 0 otherwise.

Normally, when such models are estimated the inclusion of an alternative specific constant occurs (Louviere *et al.*, 2000). It cannot be specified for all the alternatives that yield a utility V_j because in this case would be perfectly correlated, making it impossible to obtain parameter estimates. Hence, there can be no more than $j - 1$ alternative-specific constants in the model.

Additionally, using a conditional logit models is not possible to include individual characteristics because they are the same for all alternatives and have a constant within-group effect on the unconditional probabilities. The likelihood of the data depends on the conditional probabilities but individual characteristics do not contribute to determine them, therefore, they are not estimated.

However, it is possible to include interaction variables in the utility function, either in the form of interactions between two attribute variables, or interactions with additional variables as individual-specific variables.

Through this specification it is possible to explain some of the heterogeneity in individual's preferences. Interaction terms included in the model, multiplied with the attribute variables, are able to create differences in utility across alternatives. The individual-specific variables affect the difference in benefits through their interaction with the attributes of the alternatives[9] (Train, 2003).

The empirical specification has a linear and additive form:

[9] Such a specification is also known as fixed effect logistic regression.

$$V_{ij} =$$
$$\beta_0(ASC) + \beta_1(metres) + \beta_2(job) + \beta_3(time) + \beta_4(tax) +$$
$$\beta_j(socio - economics\ interactions\ ) \quad (5.8)$$

β_0 is a dummy variable for the ASC, β_{1-4} are the vectors of the coefficients describing the policy, β_j is the vector of interaction terms coefficients.

The ASC captures the average impact on the utility caused by all factors not included in the model. This has the same purpose as a constant level in a regression model that captures the average effect of all non-included factors. When the alternative specific constant is included in the model, the average of the utility unobserved share, ε_{ij}, is zero. Therefore, it can be appropriate to include a constant in V_{ij} for each alternative.

The payment vehicle is *tax*: the contribution that residents are asked to make for changes in the policy from the *status quo*. Its presence aloud to estimate Hicksian welfare changes and stated preferences for compensating variation are captured in an implicit system.

The estimated coefficients give an indication of the trade-offs between attributes made by respondents and the monetary term *tax* aloud to express trade-offs as a measure of marginal value of attributes.

Therefore is possible to compute the rate of substitution of the attributes, as the ratio between the β coefficients of two attributes (Mazzanti, 2003 willingness to pay, WTP and willingness to accept, WTA):

$$WTP = -\frac{\beta_k}{\beta_s} \quad (5.9)$$

If dealing with continuous variables, these ratios are marginal effects and when attribute *s* is expressed in monetary terms, WTP is the amount of money that individuals are willing to pay to have more of the other attribute k. An important assumption behind these estimates is that the marginal utility of income is constant over the range of implicit income changes involved.

Apart from attributes and age, the other variables were elaborated as dummies and therefore, one of the dummy variables belonging to a set was left out of the model to be used as reference category and to avoid multicollinearity. The socioeconomic variables were selected doing LR tests; the dummy variables were dropped when part of a set was not significant. Is the case of the education levels the results are not significantly different from zero and therefore the choices are not influenced by this result.

5.2 The basic analysis

The basic analysis of DCE data for both years, 2006 and 2010 is presented in first columns of respectively Table 5.1 and 5.2. A conditional logit specification, as discussed above, has been employed in each case and includes three attributes, distance of new buildings from the seaside (metres), new employment in the area (jobs) and congestion (time) plus a price attribute (tax) and the alternative specific constant (ASC) for the status quo option. The role of the latter variable is to capture all utility determinants arising from the choice of an option by the individuals but that are not captured by the attributes.

The attributes coefficients are, for both years, statistically significant below 1% level and have the expected sign consistently with the theory: metres and jobs have a positive sign implying a positive utility for the respondents; achieving a better protection of the environment and new employment occasion brings respondents additional utility, *ceteris paribus*.

The price attribute, tax, and the congestion attribute, time, have an expected negative sign and are statistically significant at 1% level, again for both years. As one could expect, an increase in the monetary term and an increase in the waiting time associated with a specific scenario, negatively affect utility deriving from the choice of that scenario.

The ASC is for both years statistically significant below 1% level and have a positive sign: respondents get some disutility when choosing an alternative scenario. It is a sort of cost that an individual has to bear when choosing a different option from the status quo.

Turning to the goodness of the fit, the pseudo R^2, is the same for the 2006 model and for the 2010 model.

Moreover the correct predictions have been computed as another measure of the goodness of the fit. The number of times the model correctly predicts the status quo option: the 73% of the cases in the 2006, whilst the alternative the 45%. The 2010 model correctly predicted the 75% of the status quo choices and 41% of the alternative ones.

5.3 Hybrid Conditional Logit

In order to estimate a more accurate model and to account for respondent's socio-economic characteristics (Rolfe et al., 2000; McConnel and Tseng, 2000), two different conditional logit models including interaction terms have been estimated. This specification helps to account for heterogeneity that may affect the data.

To obtain an empirical specification able to explain the choice in a consistent manner for both 2006 and 2010, a special effort is needed. In order to perform a stepwise regression to decide which variables give the best fit in both waves, the two dataset were merged. Firstly, a regression including all explanatory variables was run.

A stepwise analysis was therefore conducted omitting those variables not statistically significant and, subsequently excluding those for which the null hypothesis of the Likelihood Ratio tests[10] on the coefficients was accepted.

Information about gender, education, age, occupation, place of birth, income and income from tourism and mean of transport used was introduced along with the preliminary questions embedding attitudinal issues about the topic. Except age, that is continuous, the other variables are coded as dummy variables. The attitudinal variables (the six preliminary questions in the questionnaire) were interacted with the ASC, whilst socio-economics features with attribute levels. Initially, all interactions have been included excluding the one with less observation to avoid multicollinearity.

Following the standard approach (Mazzanti, 2003) a preliminary model including age and income classes, interacted with the tax, has been estimated for both years. Income and age combination was statistically insignificant in each case and a better specification has been obtained replacing income classes with a dummy variable that take value 1 if the respondent' revenues depends on tourist activities (*Model 1_2006 and Model 1_2010,* Table 5.1 and 5.2).

For both *Model 1_2006 and Model 1_2010* all attributes are statistically significant at least at 5% level and the sign of the coefficients in line with the theoretical intuition that consider an inverse relationship between more taxes, less time available and utility. In 2006 the coefficient of the interaction income from tourism and tax is positive and statistically significant at 1% level: in this year those gaining an income related with tourism were willing to contribute with their money. This is not confirmed by 2010 data. According to the theoretical relationship between age and WTP, at younger ages correspond a minor WTP that occurs both in 2006 and 2010. In 2010 even older people are less WTP, perhaps due to the incoming economic crisis.

The goodness of fit (pseudo R^2 and correct predictions) of these preliminary first models is not dissimilar from the basic conditional logit.

[10] The test statistics is asymptotically distributed as chi-squared and is expressed as –2(LL1 –LL2), where LL are the log-likelihood statistics for the two models. Degrees of freedom are equal to the difference in the estimated parameters (Foster and Mourato, 2001; 2000). The null hypothesis states that the two models are not statistically different at a given significance level.

Model 2_2006 and *Model 2_2010* account for the main interaction effects estimated according to the stepwise procedure.

Introducing attitude variables (the six preliminary questions) interacted with the ASC and socio-economic characteristics interacted with metres, job, time and tax. All attributes coefficients are once more significant for both years. The only difference is the negative sign for metres in 2010 in contrast with previous results. In this case it denotes a preference for a less distance of new building from the seaside.

If one considers *model 2_2006'* attitudinal and socio-economic coefficients will notice that except for four interactions variables (feet*metres, car*time, age16-40*tax and age 41-65*tax) they are all statistically significant.

Taking into consideration significant coefficients for both years (*Model 2_2006* and *Model 2_2010*) a preference for more metres from the seaside is captured for those born in Alghero and in Sardinia, those who use the car to move in the city and women. Low educated people choose fewer metres. Who declare how he/she moves within the urban area is less sensible to the lack of employment while people aged between 16 and 40 are not.

As far as the measures of goodness of fit are concerned an improvement occur for both *Model 2_2006* and *Model 2_2010.* It can be interpreted as a better description of the choices made by respondents: compared to the basic model and to model 1 for both years, the second hybrid models have a better parametric fit and they show also an improvement in the log-likelihood values. The correct predictions are higher then the other models for the status quo as well as for the alternative.

TABLE 4.1 – CONDITIONAL LOGIT ESTIMATIONS, WAVE 2006

	Basic model_2006	*Hybrid Models*	
Variables		***Model 1_2006***	***Model 2_2006***
METRES	0,0000**(0,0000)	0,0001**(0,0000)	0,000*(0,0001)
JOB	0,0329***(0,0012)	0,0330***(0,0012)	0,041***(0,0027)
TIME	-0,0346***(0,0036)	-0,0354***(0,0036)	-0,043***(0,0076)
TAX	-0,0175***(0,0021)	-0,0260***(0,0034)	-0,019***(0,0036)
ENVIROMENT_pos			0,301***(0,1105)
ENVIROMENT_neg			0,341**(0,1377)
RESIDENTS' LIFE_pos			-0,137(0,0841)
RESIDENTS' LIFE_neg			-0,379***(0,1151)
NATURE_pos			-0,161**(0,0718)
NATURE_pos			-0,157**(0,0898)
ALGHERO*METRES			0,000***(0,0001)
SARDINIA*METRES			0,000**(0,0001)
CAR*METRES			0,000***(0,0001)
FEET*METRES			-0,0001(0,0001)
PRIMARYSCH*METRES			-0,0003***(0,0001)
HIGHSCH*METRES			-0,0002*(0,0001)
DIPLOMA*METRES			-0,0002*(0,0001)
GENDER*METRES			0,0003***(0,0001)
INCOMETOURISM* METRES			-0,0001**(0,0001)
0-7.500 €*METRES			0,0004***(0,0001)
7.500-10.000 € *METRES			0,0003***(0,0001)
10.000-15.000€ *METRES			0,0005***(0,0001)
15.000-30.000 € *METRES			0,0000(0,0001)
CAR*JOB			-0,012***(0,0031)
FEET*JOB			-0,013***(0,0032)
AGE1640*JOB			0,008***(0,0017)
CAR*TIME			-0,002(0,0095)
FEET*TIME			0,021**(0,0096)
INCOMETOURISM* TAX		0,014***(0,0028)	0,007**(0,0033)
AGE16-40*TAX		0,010***(0,0036)	-0,002(0,0047)
AGE41-65*TAX		0,001(0,0036)	0,000(0,0038)
ASC	0,443***(0,0527)	0,440***(0,0528)	0,154*(0,0805)
Log Likelihood	-3397,11	-3373,65	-3240,46
Pseudo R^2	0.14	0.15	0.18
Correct predictions	SQ=73% Alt=45%	SQ=73% Alt=45%	SQ=74% Alt=48%

*Notes: *** , ** and * indicate statistically significance at the 1%, 5% and 10% level, respectively; Standard Errors in parenthesis.*

TABLE 5.2 – CONDITIONAL LOGIT ESTIMATIONS, WAVE 2010

Variables	***Basic model_2010***	***Hybrid Models***	
		Model 1_2010	***Model 2_2010***
METRES	0,0002***(3,8600)	0,0002***(0,0000)	-0,0009**(0,0004)
JOB	0,0336***(0,0016)	0,0337***(0,0016)	0,0582***(0,0033)
TIME	-0,0231***(0,0047)	-0,0232***(0,0047)	-0,0412***(0,0090)
TAX	-0,0118***(0,0029)	-0,0181***(0,0045)	-0,0274***(0,0054)
ENVIROMENT_pos			-0,0516(0,2872)
ENVIROMENT_neg			-0,4841(0,3160)
RESIDENTS' LIFE_pos			-0,0900(0,1216)
RESIDENTS' LIFE_neg			-0,0307(0,1738)
NATURE_pos			-0,0670(0,1116)
NATURE_pos			-0,0888(0,1502)
ALGHERO*METRES			0,0014***(0,0001)
SARDINIA*METRES			0,0013***(0,0001)
CAR*METRES			0,0006***(0,0001)
FEET*METRES			0,0006***(0,0001)
PRIMARYSCH*METRES			-0,0005***(0,0002)
HIGHSCH*METRES			-0,0002(0,0001)
DIPLOMA*METRES			0,0000(0,0001)
GENDER*METRES			0,0003***(0,0001)
INCOMETOURISM* METRES			0,0001(0,0001)
0-7.500 €*METRES			0,0001(0,0003)
7.500-10.000 € *METRES			-0,0001(0,0003)
10.000-15.000€ *METRES			-0,0001(0,0003)
15.000-30.000 € *METRES			-0,0003(0,0004)
CAR*JOB			-0,0451***(0,0043)
FEET*JOB			-0,0447***(0,0054)
AGE1640*JOB			0,0064*(0,0037)
CAR*TIME			0,0171(0,0128)
FEET*TIME			0,0176(0,0156)
INCOMETOURISM* TAX		-0,0035(0,0038)	-0,0015(0,0046)
AGE16-40*TAX		0,0080*(0,0047)	0,0090(0,0057)
AGE41-65*TAX		0,0102**(0,0046)	0,0097*(0,0053)
ASC	0,6436***(0,0744)	0,6430***(0,0744)	0,6717***(0,1065)
Log Likelihood	-1882,85	-1880,04	-1443,02
Pseudo R^2	0.14	0.14	0.33
Correct predictions	SQ=75% Alt=41%	SQ=75% Alt=42%	SQ=82% Alt=57%

*Notes: *** , ** and * indicate statistically significance at the 1%, 5% and 10% level, respectively; Standard Errors in parenthesis.*

As remarked by Mazzanti (2003), a limit of this kind of specification is the lack of a preliminary selection of heterogeneity factors. In addition, a basic and restrictive assumption of the conditional logit model is the independence of irrelevant alternatives (IIA) property which states that the ratio of the choice probabilities is independent of the presence or absence of any other alternative in a choice set. Therefore, the relative probability to select a choice set is unaltered by the introduction or exclusion of other alternatives in the choice set.
This property is the direct consequence of the IID (Independently and identically distributed) assumption of utility random components stemming from the independence of the error terms of the options in the choice set.
A test for the existence of IIA hypothesis has been proposed by Hausman and McFadden (1984). It works by comparing the chi-squared statistics of models with all the alternatives and models with the exclusion of one or more alternatives. Other tests have been proposed by the literature, however Hausman-McFadden test is the most consistent (Mazzanti, 2003). If a violation of the IIA hypothesis occurs it is important to estimate an alternative to the conditional logit model such as the random parameter logit (RPL) or mixed logit where the IIA assumption is relaxed by allowing a normal distribution for the parameters in the CL model. To test for the IIA hypothesis the hessian matrix should be positive defined. Unfortunately, collected data do not satisfy this condition and it is not possible to test for it.

5.4 Implicit prices

WTP or implicit prices are computed according to expression 5.9 and following the LIMDEP's WALD procedure that implements the delta computational method. Therefore, estimates to have a benefit or to avoid a cost deriving from a change in the policy are provided for all the attributes specified in the estimated models.
From the signs it is possible to understand if the individuals are willing to pay (positive sign) or willing to accept (negative sign) for a change of one unit of an attribute level different from the *status quo*.
The estimates produce monetary terms expressed in euros for each change in the individual utility and since both attributes used in the calculation are found to be statistically significant, meaningful WTP measure can be established (i.e. all implicit prices estimates are statistically significant). The Wald statistic is statistically significant in each model case.
For example, residents are willing to pay € 0,0038 in 2006 and € 0,0198 in 2010 per year for

every metre of distance of new buildings from the seaside (attribute *METRES* for basic models).

Keeping considering the basic model as baseline, implicit prices for jobs (attribute *JOB*) are € 1,87 in 2006 and € 2,85 in 2010 for each new job in the tourism sector in Alghero.

A decrease of congestion levels (attribute *TIME*) produced by the presence of tourists entails a welfare improvement for residents equal to € 1.97 in 2006 and € 1.95 in 2010 which can be seen as the compensation required to tolerate the inconvenience

As explanatory variables are introduced in the model, a little variation occurs in the implicit prices.

TABLE 5.3 – IMPLICIT PRICES ESTIMATIONS, WAVE 2006

Willingness to pay	***Basic model_2006***	***Hybrid Models***	
		Model 1_2006	***Model 2_2006***
Metres/tax	0,0038*** (0,0017)	0,0027*** (0,0012)	0,0129* (0,0076)
Job/tax	1,8757*** (0,2275)	1,2689*** (0,1688)	2,1151*** (0,4096)
Time/tax	-1,9729*** (0,3015)	-1,3644*** (0,2195)	-2,2474*** (0,5740)
Wald Statistic	68.68	56.95	28.83
Prob. from Chi-squared[3]	0 .00000	0.000	0.000

*Notes: ***, ** and * indicate statistically significance at the 1%, 5% and 10% level, respectively; Standard Errors in parenthesis.*

TABLE 5.4– IMPLICIT PRICES ESTIMATIONS, WAVE 2010

Willingness to pay	***Basic model_2010***	***Hybrid Models***	
		Model 1_2010	***Model 2_2010***
Metres/tax	0,0198** (0,0061)	0,0130*** (0,0039)	-0,0324** (0,0147)
Job/tax	2,8509*** (0,7097)	1,8619*** (0,4642)	2,1252*** (0,4194)
Time/tax	-1,9546*** (0,6094)	-1,2834*** (0,4025)	-1,5031*** (0,4236)
Wald Statistic	16.28	16.16	25.85
Prob. from Chi-squared[3]	0 .000	0.001	0.000

*Notes: ***, ** and * indicate statistically significance at the 1%, 5% and 10% level, respectively; Standard Errors in parenthesis.*

5.5 Limitations

Although this approach has a strong conceptual ground, there are several problems at the empirical level that imply limitations, which will need to be accounted for in interpreting

the results. Resulting correlations between outcomes of interest and these determined or influenced by (i.e., endogenous) contextual variables may in fact be the result of unmeasured characteristics of the individuals themselves. Therefore an endemic issue in survey data is endogeneity that affect quantification of policy and other factors assessed in the model. Since it occurs whenever an explanatory variable or driver is correlated with unobserved information (i.e. error term of the model), the sources could be identified in data unavailability on relevant variables, measurement error, simultaneity / co-causation. To avoid it a way could be to follow a procedure from "general to particular" in order to specify a model, when we do not start from a proper theoretical model (Hendry & Richard, 1983, Hendry, Pagan & Sargan, 1984).

The econometric approach lies on a very restrictive assumption that is the independence of irrelevant alternatives (IIA, i.e. errors components of the different alternatives are not correlated), long criticised by researchers (Colombo, 2005; Chang and Lusk, 2011). The drawback of MNL model is to consider homogeneity of individual tastes and preferences that, in turn, vary according to individual socio-economic characteristics (i.e. age, education, income). An econometric model able to handle with this unobserved heterogeneity and relax the IIA assumption is the Mixed Logit (Appendix A2) that can also approximate any random utility model, as shown by McFadden and Train (2000). A further step of this analysis could be the application of a mixed logit model for both years.

5.6 Discussion and policy implications

Tourism has positive and negative externalities and it is very difficult to understand which kind of strategy to pursue in order to keep the right balance between them. It is important to take into account the point of view of those who have to bear the impacts, the composite stakeholder, i.e. the host communities. Choice experiments are a valuable tool to determine trade-offs residents are willing to make in a multidimensional framework. It has been applied using a policy banning to build before 2 km from the coastline as a proxy variable for environmental protection in the city of Alghero. In particular, under the assumption that the distance of new buildings from the coastline stand for environment protection, preferences towards different examples of touristic development have been estimated. Changes on residents quality of life, environmental protection and employment situation have been considered.

Results show that the signs of the coefficients deriving from both estimations are coherent with the economic intuition, therefore the main findings can be summarized as follow.

An improvement in the environment protection has a positive effect on residents, however it is not strongly desiderated nor in 2006 nor in 2010. Considering the implicit prices (or WTP, computed through expression 5.9) in 2010 (0,0198 €, basic model) compared to 2006's (0,0038 €, basic model), it makes clear that residents willingness to contribute to environmental protection increases during the years. It could be seen as an increased awareness of its important derived from the current debate. In addition, the findings have evidenced that residents do not wish to return to the previous legislation, (i.e. less environment protection) but at the same time, there will be no great benefit for them from a further restriction in the "building ban".

Reduction of congestion levels and increase in employment are much more desirable from the host community. These findings have a confirmation in the willingness to pay estimations computed for the attribute levels of the choice experiments: residents are willing to compensate for a decrease in the congestion levels during the summer period that correspond to the tourism season. The compensation require was equal to 1.97 € in 2006. It was quite similar in 2010: 1.95€ showing the consistency of the sample and the model, at the meantime quantifying residents inconvenience.

To experience an increase in the number of job available within Alghero's tourism sector, resident's willingness to pay increases from 1.87 € in 2006 to 2.85 € in 2010. In 2010

residents are prepared to pay one euro more with respect to 2006 for every job created. These results reveal how the primary concern of the community is the employment status situation that has clearly worsened during the last years. As a matter of facts, the unemployment rate for the entire province was 10.3% in 2006 and 16.4 in 2010 (Istat, 2011).

These empirical findings have clear implications for the policy makers: in the first place the aim should be an improvement of the local community employment situation and, in the second place, to pay more attention to the congestion levels during the tourism season. Alghero' tourism is concentrated during the summer time and one possibility to avoid overcrowding could be to promote more tourism during other seasons. Environmental protection awareness is growing within the population. Although, it has been regarded as important, Alghero residents put it last in their preferences. This could be due to the presence of unexploited resources in its territory but also to the need to solve the unemployment issue. On the whole, the welfare gain generated by the reform has increased during the considered time span.

These findings are however, subject to caution. It is not possible to extend the above results to all the island population. The reasons are in the differences of the territorial conformation and in the various levels of tourism development achieved. Besides, is not possible to compare the results with those of similar studies, as those of Lindberg (1997) or Figini (2007). Indeed, the alternatives and the attribute levels presented in Alghero choice experiment are quite different and, moreover, quite different in the reference population sample. The empirical outcomes can be used as a guide in planning the future of this destination. Furthermore, the findings remind destination managers and policy makers the importance in involving the local community before tourism actions are taken and the need to truly understand and monitor over time how resident perceive the impacts of tourism development. The measurement of residents' perception should be used as one of several indicators to monitor and assess the tourism sustainability of a destination (Choi and Sirakaya, 2005) as well as trade-offs they are willing to make.

Conclusions

In this research the factors behind residents' preferences toward tourism were investigated. The main emphasis was the replication of the choice experiment survey for two waves in two different years. The theoretical literature on residents and tourism relationship, consumer theory and economic choice are the starting point to define the multidimensional framework of analysis. As far as the author's knowledge is concerned, this is the first research study that replicates a choice experiment analysis on the same population target and that the literature review is the first one that draws a connection between tourism, consumer theory and economic choice.

Despite tourism sector has been experiencing a remarkable growth in recent years, there are a very few papers that consider its externalities to the host communities trying to quantify them. In particular, research aimed at analysing and quantifying trade-offs along with perceptions and attitude of residents toward tourism development policies, is still somehow missing. The empirical aim of this study was to investigate local community attitudes toward a regional landscape program. Especially, the law known as PPR (i.e. Piano Paesaggistico Regionale) produces other than an environmental protection and conservation consequence, an effect on host-community quality of life and job creation.

The objective of this study was to investigate residents' perception toward the policy and consequently on tourism development within the city of Alghero, a key tourism attraction in Sardinia. To this purpose, two waves of the choice experiment survey were undertaken in two different years: 2006 and 2010. The intent was to value the stability of the parameters and social benefits.

The empirical findings of this work concern the monetary measure implicitly attributed by residents to intangible goods. It has been evidenced that residents do not wish to return to the previous legislation, (i.e. less environment protection) but at the same time, there will be no great benefit for them from a further restriction in the "building ban". An improvement in the environment protection has a positive effect on the community and the willingness to contribute to it increases during the time span 2006-2010. Great awareness has been elicited

for the unemployment problem. Resident willingness to pay for the local employment would increase of about one euro in 2010 compared to 2006. In turn, a reduction of congestion level would raise resident's welfare gain.

These findings can usefully add to the academic debate on community-based tourism and can also support policy makers in their effort towards a more sustainable model of environmental and tourism development for destinations.

The present study does highlight several possible future research paths. The study may be repeated in other tourism destinations in order to verify if its findings can be generalized and/or if they change according to the extrinsic factors of the tourism destination chosen as research site (i.e. the degree or stage of tourism development, the level of economic activity in the host area, the seasonality of tourism, etc). Besides, future research may investigate the role that other intrinsic variables (community involvement, community attachment, etc) can exert in discriminating residents' preferences toward environment and tourism development.

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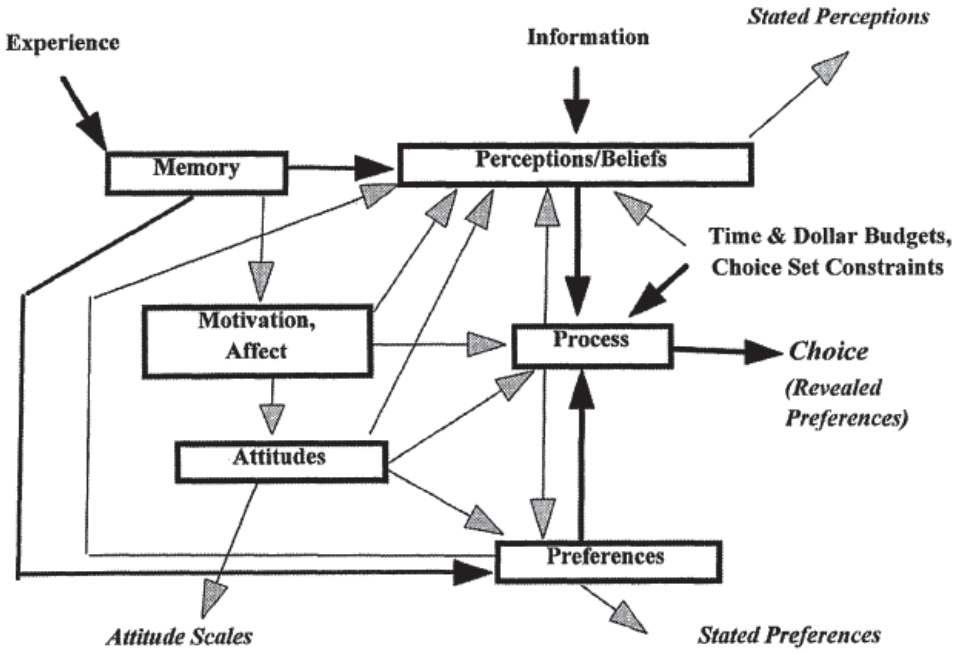
Appendix A

FIGURE A1 - ECONOMIC CHOICES, THE CHOICE PROCESS. MCFADDEN (2001)



Appendix A1: Questionnaire

Section 0 *(for the interviewer)*		
0.	Interviewer code	
1.	Questionnarie code (progressive number)	
2.	Date (dd/mm/yyyy)	
3.	Time	
4.	Interview time length (minutes)	
5.	Place of the interview	

There is an increasing concern about the negative effects that uncontrolled tourist development could have on natural, archeological and cultural local resources. They might also have a negative impact on economy if, as most people believe, tourists are likely to be more and more interested in visiting places which still maintain their original natural characteristics. Different choices in tourism planning generate different effects on the territory and economy of Sardinia. Consequently the local public governement needs to know and consider the tourists'opinions in order to plan correct tourism development strategies. Any choice indeed has its own costs and benefits which need to be carefully estimated. The aim of this questionnaire is to know your opininion about the advantages and disadvantages related to the tourism specialization and in particular to understand those aspects of tourism development that you consider to have positive and/or negative effects.

Section 1. Opening questions

1. Do you believe the Sardinian regional governement needs to increase its investments in the enviroment protection?

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

2. Do you believe tourism has positive effects on the everyday life of local residents?

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

3 Do you believe tourism has positive effects on natural resources?

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

4 Do you believe tourism has positive effects on local employment?

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

5. Do you believe tourism has positive effects on the cultural life of local residents?

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

6. Do you believe tourism has positive effects on local facilities and public services?

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

Section 2. Tourists' assessments

For the interviewer: at this point you need to take the scenario cards and explain the scenarios. There are two sets of cards: one is for you and it includes the explanations regarding the experiment and the scenarios. The other set contains the cards you need to show to the interviewee, without any explanation. Remember to show even cards to half of the interviewed people,and uneven cards to the other half.

Cross the box corresponding to the answer given by the interviewee.

No marks on the cards.

UNEVEN CARDS	SCENARIO A	SCENARIO B
1		
3		
5		
7		
9		
11		
13		
15		
17		
19		
21		
23		
25		

EVEN CARDS	SCENARIO A	SCENARIO B
2		
4		
6		
8		
10		
12		
14		
16		
18		
20		
22		
24		

Section 3. socioeconomics data about the resident

1. Place of born

1.Alghero 3. Italy 2. Sardinia 4. Abroad

2. Nationality

1. Italian 2. EU 3.Extra EU

3. Place of domicile

1. Centre 3. Near the sea 3.Outskirt 4.Out of the town

4. If where you live is out of the town, is it near the sea??

Yes. No.

5. Year of born_____

6. Gender

1. M 2. F

7. Family composition

1. Single
2. Couple
3. Couple with children
4. Other…….

8. Qualifications: (highest level)

1 No qualifications
2 Primary school qualification
3 General Certificate of Secondary Education (GCSE)
4 A-Levels
5. Undergraduate degree
6. Postgraduate degree (Master, Phd etc)
7 Not declared

9. Occupation

1. Entrepreneur
2. Freelance
3. Craftsman
4. Manager
5. Retailer
6. Clerical worker
7. Teacher
8. Labourer
9. Farmer
10. Housewife
11. Student
12. Retired
13. Unemployed
14. Other_____
15. Not declared

10. Occupational field

Please specify

_____

11. Which mean of transportation do you use in Alghero?

(one choice only)

1. Car
2. By foot
3. Public transportation
4. Bike
5. Motorbike
6. Other……

12. The house where you live is?

1. Yours
2. In rent
3. Other……

13. Could you please specify your annual income class? (in euros)

1. From 0 to 7.500 euros
2. From 7.500 to 15.000 euros
3. From 15.000 to 30.000 euro
4. Above 30.000 euros
5. Not declared

For the interviewer: (not to be asked to the tourist)

28. What is your judgement about the level of interest shown by theresident?

1. Very interested
2. Interested
3. Enough interested
4. Not very interested
5. Not interested at all

29. What is your judgement about the tourist understanding of the questions asked?

1. Good/Very good
2. Discrete
3. Sufficient
4. Not sufficient
5. Very poor

Interviewer's comments

Appendix A.2: Random utility theory an mixed models

The origin of the choice experiment is based on Random Utility Theory (RUT) which models consumer choices according to a random utility model with a given utility function. Therefore it exist a set of individual behavioural rules and an indirect utility function with a random component that influences population choice behaviour.
Let's consider consumer *j's* utility given by the choice he makes among different alternatives. The equation below represents that indirect utility of the representative individual:

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad (1)$$

V_{ij} characterizes aspects specific to the individual and the choices and is equal to βx_{ij}. While x_{ij} are observed explanatory variables, β and ε_{ij} are not.
The utility is decomposed in two parts: a systematic component also called representative utility that can be observed, and a random component that is the part of utility deriving from unobserved features and not from individuals that chose to maximize utility in a random way. Indeed, the complexity of economic decisions is a reflection of the unobserved attributes of individuals, like taste, experiences attitudes and perceptions that may vary over a population.
To analyse discrete choice data considering RUT it has been widely employed the multinomial logit model (MNL) that however lies on a very restrictive assumption that is the independence of irrelevant alternatives (IIA, i.e errors components of the different alternatives are not correlated), long criticised by researchers (Colombo et al., 2005; Chang and Lusk, 2011). The drawback of MNL model is to consider homogeneity of individual tastes and preferences that, in turn, vary according to individual socio-economic characteristics (i.e. age, education, income). An econometric model able to handle with this unobserved heterogeneity and relax the IIA assumption, is the Mixed Logit that can also approximate any random utility model, as shown by McFadden and Train (2000).

Two different specifications of MXL exist: the random parameter logit (RPL) and the error component logit (ECL) that differ as with the first one, every variable coefficient varies and are correlated, while with the latter only errors vary and are correlated (Brownstone and Train, 1999; Revelt and Train, 2000).

Considering the RPL approach, an individual *i* will choose the alternative that will generate him the greatest utility and, considering that each person's β is not known, the likelihood (unconditional choice probability) is equivalent to:

$$P_{ij} = \int L_{ij}(\beta_i) f(\beta) d\beta \quad (2)$$

where $L_{ij}(\beta_i) = \frac{\exp(\beta'_i x_{ij})}{\Sigma \exp(\beta'_i x_{ij})}$ and correspond to the logit probability conditional on β and $f(\beta)$ to the density function of β. It can take several specifications (normal, lognormal, uniform, triangular…) with, usually, estimated parameters *b* and *W*. This approach allows for preference heterogeneity in the sample and assumes that the weighting coefficients vary in the population according to a distribution (i.e. normal, lognormal….) capturing, in this way, unobservable heterogeneity.

The ECL considers the unobserved components as a single separate error component. In this framework the stochastic component of the utility function is decomposed to allow for correlation across alternatives:

$$U_{ij} = V_{ij} + \eta_{ij} + \varepsilon_{ij} \quad (3)$$

Both η_{ij} and ε_{ij} are random terms with zero mean but differ in their distribution: the former's depending on the underlying observed parameters or data while ε_{ij} is IID (independent and identically distributed) over alternatives and individuals not depending on the underlying parameters (Hensher and Greene, 2003). According to Hensher and Greene (2003) these models are called mixed logit as a mixture of logits and *f* gives the choice probability.