RESIDENTS’ INFLUENCE ON THE ADOPTION OF ENVIRONMENTAL NORMS IN TOURISM

Malgorzata Ogonowska
Dominique Torre

GREDEG WP No. 2013-17
http://www.gredeg.cnrs.fr/working-papers.html

The views expressed in the GREDEG Working Paper Series are those of the author(s) and do not necessarily reflect those of the institution. The Working Papers have not undergone formal review and approval. Such papers are included in this series to elicit feedback and to encourage debate. Copyright belongs to the author(s).
Residents’ Influence on the Adoption of Environmental Norms in Tourism

Malgorzata OGONOWSKA† Dominique TORRE∗

GREDEG Working Paper No. 2013-17

Abstract

Since the expansion of environmental awareness and protection in recent decades, market actors, tourists and stake-holders have been progressively more aware of ecological issues and conscious of existing pollution caused by mass tourism. Therefore, a new concept of sustainable tourism have appeared, including environmental and societal concerns, as well as the development of more responsible products, which meet environmentally conscious consumers’ needs. Subsequently, this paper considers the case of a tourism service provider, in a situation of monopoly, facing heterogeneous demand (differentiated by the sensibility to environmental issues) and located in a destination inhabited by a population of residents, more or less active in their resistance to tourism activities. Hence, this paper gives a theoretical framework of this 'service provider - residents - tourists’ interaction. It shows that taking into account residents’ actions leads the service provider to the reduction of his offer, and in most cases, to choose the sustainable solution.

JEL Classification: L83, Q56

Keywords: Economics of Tourism, product heterogeneity, demand heterogeneity, sustainable tourism, residents-tourists relationship, resident actions, environmental norms.

1 Introduction

Tourism includes a wide range of economic activities that have an important impact on the physical environment and the local populations of the destinations. Environmental protection and awareness became the major issues in the 1990s when the concept of sustainable development was introduced in Our Common Future by the Brundtland Commission†. Moreover, as mass tourism is a product-led industry, not concerned with the environmental issues, it has caused drastic changes in some,

†University of Nice Sophia-Antipolis - GREDEG - CNRS, 250 rue Albert Einstein, 06560 Valbonne, France. E-mail: malgorzata.ogonowska@gredeg.cnrs.fr, dominique.torre@gredeg.cnrs.fr
†World Commission on Environment and Development [1987]
mainly coastal, regions. Thus, actors have become more and more concerned with the sustainability issues, what has lead to emergence of a new segment of demand, desiring environmentally and socially responsible products. These new concerns modify tourist’s perceptions of destinations, accommodation brands, and the way they conceive travel experience. These considerations have to be taken into account by tourism service providers, while conceiving the products they offer. Therefore, a new concept of sustainable tourism has been developed and became an important issue in tourism related literature. As stated by the Associazione Italiana Turismo Responsabile (quoted by Cracolici, Cuffaro, Nijkamp [2009]), sustainable tourism may be defined as “every tourism activity that preserves for a long time the local natural, cultural and social resources, contributing to the well-being of individuals living in those tourist areas”.

Accordingly, this paper considers the case of a tourism service provider facing heterogeneous demand and located in a destination inhabited by a population of residents, more or less active in their resistance to tourism related activities. Potential tourists are differentiated by their sensibility to environmental issues. This paper gives a theoretical framework of this service provider - residents - tourists’ interaction and explains the role of local host population in the adoption of environmental and sustainable norms in tourism. In order to consider this issue, the paper is organized as follows. Section 2 presents the contributions of literature on sustainable tourism. Then, in section 3, the model is presented. First, demand and product heterogeneities’ questions are considered without taking into account any residents’ possible actions. Next, local residents’ population is introduced. At this point, the focus is made on service providers relations with this host community, on their possible negative reactions to tourism activities and on service provider’s possible actions to avoid them. Finally, in section 4 main results of the model, in partial and in global interaction settings, are presented before concluding in section 5.

2 Literature contribution

Literature related to sustainable tourism questions is quite various and interested in diverse economic features of those issues. It provides numerous definitions of sustainable tourism which show on which aspects the focus is made. In consequence it can be classified in several categories.

First, Swarbrook [1999] defines sustainable tourism as “tourism which is economically viable, but does not destroy the resources on which the future tourism will depend, notably the physical environment and the social fabric of the host community”. The author emphasizes two main points on which the truly sustainable tourism (as opposition to mass tourism) should focus. In this point of view sustainable tourism ought to assure the relationship between the local community and the tourists. According to Bohdanowicz and Zientara [2009] the arrival of tourists and the development of tourism in a given location have significant cultural and social
impacts on host communities and their quality of life. It might even cause changes in resident’s behavior. That is why, since approximately 10 years, Corporate Social Responsibility concept has been developed. It intends that businesses should justify their existence in terms of services to the community, rather than in making profits. It involves dealing fairly with employees, suppliers and customers, supporting local communities, donation to charitable causes, and promotion of environmental sustainability (Crook [2005]). On the tourism service provider’s point of view, it means developing sustainable products, more respective of the environment. This development may be impelled by demand desires (Accinelli et al. [2007], Brau [2008], Claude and Zaccour [2009], Minciu et al. [2010], Ogonowska and Torre [2013]). Indeed, tourists vary in environmental concerns and value orientations (Luzar et al. [1998], Schultz, Zelezny [1999], Laroche et al. [2001], Schultz [2001], Weaver and Lawton [2002], Fairweather et al. [2005], Lee and Moscardo [2005], Hedlund [2011], Ogonowska and Torre [2013]) which constitute different segments of demand. The proof of this heterogeneity may be found in studies on tourists’ willingness to pay for environmental protection and sustainable products (Thogersen [2000], Choi et al. [2009], Dodds et al. [2010], Hedlund [2011]). Service providers may take advantage of this segmentation by increasing the prices of products including ecological amenities in comparison to traditional (more “polluting”) ones. Moreover, price discrimination practices are also observed in natural reserves tickets pricing.

Furthermore, according to UNTWO [1997] sustainable tourism development “meets the needs of present tourists and host regions while protecting and enhancing opportunity for the future. It is envisaged as leading to management of all resources in such a way, that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems.” In spite of this statement, as ones of principal stakeholders, local authorities and administrations should develop appropriate policies focusing on environmental protection and enhancing market actors to implement ecologically responsible measures and amenities (Caserta and Russo [2002], Rivera [2002], Weaver [2005], Accinelli et al. [2007], Accinelli et al. [2008], Brau [2008], Claude and Zaccour [2009], Minciu et al. [2010], Shen and Zheng [2010]). In order to smooth the progress of the environmental policies implementation, there is a need to educate market actors (hotel management, tourism agents, tour operators, administration), as well as, the whole population with the purpose to adapt people’s perceptions into this new long term vision (Henry and Jackson [1995], Nita and Agheorghiesei [2010], Jamal, Taillon, Dredge [2011]), as emphasized by Bramwell and Lane [1993]: “sustainable tourism is an economic development model conceived to improve the quality of life for the local community, and to facilitate for the visitor a high-quality experience of the environment, which both the host community as the visitors depends on”.

\footnote{Indeed local visitors (verified in the 3rd world countries) pay lower fees than the other tourists (for more extensive analysis on this issue see Becker [2009], Walpole et al. [2001]).}
3 The Model

This paper analyses the evolution of an accommodation service provider’s offer in a situation of monopoly, which faces heterogeneous demand of \( n \) potential tourists and adapts the range of products to consumer preferences and to reactions of local residents to the pollution generated by tourism. Consumer preferences are particularly influenced by progressive awareness of environmental risks generated by tourism. Therefore, two subpopulation of potential tourists have to be distinguished as well as respectively two types of products, which service provider choses to offer. Before considering the complete framework, including the interaction with local host population, model basics are explained in the first subsection.\(^3\)

3.1 Model basics: analysis without residents

The model considers two different tourists’ subpopulations. First segment consists of potential clients, who are interested in acquiring traditional/standard tourism products and are not concerned with environmental issues, labeled “traditional tourists”. They all have the same propensity to pay related to the level of parameter \( \alpha (\alpha > 0) \) in their utility function which measures in monetary terms the satisfaction they draw from the consumption of traditional tourism products. If \( p_T \) figures the price of this product, the net utility of potential tourists of this subpopulation is given by equation (1)

\[
u_T^T = \alpha - p_T + \beta, \tag{1}\]

where \( \beta (\beta > 0) \) is an index of quality of the product.

Traditional tourists choose to purchase the standard product if \( u_T^T \geq 0 \) and to reserve in the opposite case.

Second subpopulation of \( m \) \((0 < m < n)\) potential tourists, labeled “environmentally conscious tourists”, is sensible to sustainability issues and perceives traditional products as generating pollution and desire sustainable tourism products. The utility that each member of this subpopulation associates to the consumption of traditional products is given by (2):

\[
u_T^S = \alpha' - p_T + \beta \tag{2}\]

with \( \alpha' < \alpha \), since environmentally conscious population considers traditional product as polluting and then draws from its consumption lower utility than traditional

\(^3\)This paper is an extension of the model by Ogonowska and Torre [2013] on the emergence of environmental norms. Using theoretical monopoly and duopoly frameworks, the authors explain how environmental quality standards may become general norms in tourism industry, depending on sustainable product’s quality level and demand heterogeneity.
population. Environmentally conscious tourists choose to purchase the standard product if \( u_T^S \geq 0 \) and to reserve in the opposite case.

The service provider, which produces without costs in a situation of monopoly, determines the price maximizing its profit, by extracting the maximum of the consumer surplus, according the structure of the population it is facing. Since the demand is heterogeneous, the service provider cannot apply a first degree price discrimination. It has therefore to choose between charging the price \( p_T^1 = \alpha + \beta \) or the price \( p_T^2 = \alpha' + \beta \). In the first case, only \((n - m)\) tourists buy the product and the profit is \( \pi_{T1} = (n - m)(\alpha + \beta) \). In the second case, the whole population of \( n \) tourists purchases the product at a lower price and the profit is then \( \pi_{T2} = n(\alpha' + \beta) \).

The service provider can then adapt to the relative shares of the two subpopulations and offer a sustainable product, generating few or no environmental damages, or the traditional service. The sustainable product involves specific and costly investments. For example, the hotel should be heated with renewable energy, gather rain water, engage in an environment protection policies, etc. All these improvements incur additional costs \( c \). If this quality is appreciated at the level \( \gamma \) by all tourists, the utility of tourists’ population not interested in environmental issues is given by (3) and the utility of environmentally conscious tourists is expressed by (4):

\[
\begin{align*}
    u_T^G &= \alpha - p_G^1 + \gamma \\
    u_T^S &= \alpha'' - p_G^2 + \gamma,
\end{align*}
\]

where \( \alpha'', \, (\alpha'' > \alpha > \alpha') \) expresses the preference of environmentally conscious tourists for sustainable products.

Two situations have to be distinguished, according to the potential tourists population the service provider faces. On the one hand, if it serves only the subpopulation of tourists sensible to sustainability issues, the price that it charges for the sustainable product is the reservation price of this subpopulation \( p_G^2 = \alpha'' + \gamma \). In this case the profit equals \( \pi_{G2}^* = m(\alpha'' + \gamma) - c \).

On the other hand, if the service provider serves all the potential tourists population, it then charges the reservation price of traditional tourists \( p_G^1 = \alpha + \gamma \) and the profit becomes \( \pi_{G1}^* = n(\alpha + \gamma) - c \).

After having defined the pattern of each type of product’ adoption, the next section will consider the extension of this benchmark model by including the possible interactions with local population of residents.

\[\text{It is reasonable to suppose that luxury standards of sustainable and traditional products are equivalent. } \gamma \text{ is then close to } \beta.\]
3.2 Residents’ perceptions of tourism and environmental issues - analysis of residents’ utility

In the previous section, distinctions between the two tourists populations and the two types of products have been specified. At this stage, a new population of $k$ homogeneous residents is introduced. As it was already emphasized by the literature, tourism related activities have an important impact on local host populations. These effects can be considered objectively, in terms of monetary transfers from the tourism service provider or from the tourists themselves to the residents, and from the residents (including local authorities) to service providers and tourists. It can also be captured from a more subjective point of view, given that tourism, tourists and service providers are more or less positively considered by residents and local authorities. Environmental issues play an important role in the objective as well as in the subjective components of residents’ perceptions, and consequently, of the overall impact of tourism on the host population. These influences can be captured in the utility function of a representative resident. Accordingly, the utility of a given resident is given by (5):

$$v = t^{1/2} - d$$  \hspace{1cm} (5)

with $t = (w + z)$ and $d = (o + s)$.

The positive component $t$ captures the individual monetary transfers associated to economic interactions between tourism activities and residents. These transfers are the sum of two components per capita:

- $w$ figures the wages, taxes and other local directs or indirect payments of the tourism service provider to a given resident,
- $z$ figures the direct expenses of tourists benefiting the residents, net from the investments that local authorities undertake to attract or enable tourism activity.

Considering $w$, two cases may be distinguished. First, if there is no difference in the skills and qualifications of local and other (non-local) workers, the service provider employs automatically local workers. Second, if local workers are less qualified / productive than required, it is more costly to employ them. In this second case, $w$ is a service provider’s control variable.

The term $z$ is directly linked to the number of tourists. Thus, again, two different specifications should be considered. First, all tourists are supposed to have the same level of expenses. In the second case, it is considered that environmentally conscious tourists allocate a larger amount of expenses to local products. Under this setting, $z$ depends on the proportion of environmentally conscious tourists.

Residents’ utility increases at a decreasing rate with revenue. This assumption corresponds to a decreasing marginal utility of income, usually supposed in microeconomic standards. This hypothesis explains the nature of the exponent of $t$. 

6
The negative component $d$ corresponds to the monetary individual estimation of negative impacts of tourism related activities. As it is usually supposed for pollution, the negative impact of $d$ on utility increases more rapidly than the positive impact of the income $t$. The term $d$ includes two types of influences.

- The term $o$ figures individual perception of objective inconveniences generated by tourists and tourism activity (pollutions, transport and public utilities’ congestion, accelerated deterioration of public equipments, etc.),

- The term $s$ refers to more subjective impacts, such as inadequacy to local development projects, perturbations of social climate, negative impacts on cultural integrity and other effects perceived as negative on customs, habits and ways of life.

The term $o$ can be controlled by the service provider, when it chooses to reduce or extend its offer. It is reasonable to suppose that the respect of environmental norms decreases objective inconveniences perceived by residents. The term $s$ is mainly a result of tourism activity as a whole. Still, supposing that $s$ depends only on the number and the type of tourists, all things being equal, the higher the proportion of environmentally conscious tourists is, the smaller $s$ would be.

In spite of their utility function components, local residents can undertake actions in order to encourage or deter tourism. These actions can range from laws, rules and protections that regulate or limit tourism activity, to spontaneous actions as protests and more or less symbolic, or even aggressive, actions against tourism service providers and/or tourists. The intensity of these actions $a$ depends on positive and negative components of individual residents’ utility. The simplest form of $a$ is given by (6):

$$a(v) = -\min \left[0, \eta \left(t^{1/2} - d\right)\right]$$

with $t = (w + z)$, $d = (o + s)$ and $\eta > 0$. This expression captures the negative relation between the residents’ utility and their actions’ intensity.

### 3.3 Tourism Service Provider’s decisions

The service provider decides of the amount of wages $kw$ paid to local workers and the costs’ level that it can bear to protect its activity against residents’ actions.

As tourism activities require payment of wages, the specific costs, which are considered here, cover only the extra costs involved by the employment of locals. These extra costs could be partly explained by the inadequacy of competences or smaller productivity of local workers, that could require more employees than usual, and partly by the excess of wages paid to local workers i.e. over the market level. If the normal wage cost is estimated to $k\bar{w}$, the extra costs are then $k(w - \bar{w})$, with $w \geq \bar{w}$. To simplify the cost expression, it is supposed that $\bar{w} = 0$. The “extra-wage” $w$ then corresponds to a control variable of the service provider.
Residents’ actions, defined by equation (6), generate other costs for the service provider. These new expenses correspond to the relocation or the modification of access to resort/hotel, buildings’ and clients’ protection against possible aggressive actions of residents, etc. These protection costs \(c_p(a)\) can be considered as linearly increasing with the intensity of actions \(a\), i.e., such as \(c_p(a) = \mu a\) with \(\mu > 0\). Other costs are also borne by the service provider, such as costs involved to resolve conflicts, to make the activity more in harmony with local development projects, more respectful of local culture, usages and habits, which improve the residents’ perception of tourism. The reduction of the level of negative subjective incidence of tourism activity on residents’ utility \(s\) to the level \(\bar{s}\) involves a cost \(c_i\), which increases at an increasing rate. This integration cost \(c_i\) can be considered as a control variable. It is relatively simple to reduce the level of \(s\) by undertaking few actions, but it is extremely difficult, or even impossible, to vanish all the negative subjective effects on residents’ utility. Therefore, it is relevant to make this cost take a quadratic form \(c_i(s - \bar{s}) = \lambda(s - \bar{s})^2\) where \(\lambda\) is a positive constant.

Then, the profit of the service provider can be expressed as (7):

\[
\pi = R - \delta c - k(w - \bar{w}) - \mu a - \lambda(s - \bar{s})^2, \quad \text{with } w \geq \bar{w} \text{ and } \bar{s} \leq s
\]

where \(R\) figures the service provider’s receipts, with \(\delta = 0\) when only the traditional product is offered and \(\delta = 1\) in other cases.

4 Study of Model Equilibrium

After having defined, in previous section, model’s assumptions, the following section will consider equilibrium resulting from service provider - residents interactions. Therefore, the first subsection will discuss the equilibrium in a limited framework, focusing on those interactions, without tackling tourists’ neither product differentiation. This setting will give an interesting approximation of results and will constitute a benchmark for the analysis of complex global interactions of service provider, residents and tourists’ equilibrium, which will be presented in the second subsection.

4.1 Equilibrium of the Tourism Service Provider - Residents’ game in a partial equilibrium setting

In this subsection a simplified version of the model is considered, in which the service provider’s choices concerning services it is providing are independent of its interactions with residents. In this case, \(R\) and \(c\) are given for the service provider. Analogically, \(o\) and \(\bar{s}\) are given for the residents, since the type of service provided and the distribution of tourists do not depend on the interactions between the residents and the service provider.
The equilibrium of the model is then the triplet \( \{a^*, w^*, s^*\} \), such that \( a^* \) is the level of residents’ actions when wages are \( w^* \) and the perception of tourism activities is at level \( s^* \), while wages \( w^* \) and costs necessary to obtain \( s^* \) maximize the service provider’s profit when the level of residents actions is given by \( a^* \).

If the service provider and the residents play simultaneously, the model provides only a very deceiving Nash equilibrium. One can easily verify that \( \{a^* = \alpha(z - o - \bar{s}), w^* = 0, s^* = \bar{s}\} \) is indeed always the only Nash equilibrium, whatever the values of the parameters are. In this case, \( w^* = 0 \) and \( s^* = \bar{s} \) are indeed the best answer of the service provider, whatever the level of action of the residents is. To break this deadlock, the service provider has to initiate the game by announcing wages \( w^* \) and the cost \( c_i \), which improves the residents’ perception of tourism, by decreasing \( s \) to the level \( \bar{s} \), after having integrated the adequate answer of residents to these announces. The game is then played sequentially with service provider being a leader: it is backwardly solved and the Stackelberg equilibrium is the adequate equilibrium concept.

The study of this equilibrium then provides the following result:

**Proposition 1.** For all values of parameters, there exists a unique Stackelberg equilibrium triplet \( \{a^*, w^*, s^*\} \).

If the possible corner solutions are neglected, the comparative static analysis of this equilibrium exhibits the following properties:

(i) \( w^* = \left(\frac{\nu \eta}{2k}\right)^2 - z \)

(ii) \( \lambda(s - \bar{s})^2 = \frac{\nu^3 \mu^3}{2\lambda} \)

Proof: see appendix 1.

The expression \( w^* = \left(\frac{\nu \eta}{2k}\right)^2 - z \) indicates that the wages \( w^* \) paid to the residents increase sharply, when compared to \( \eta \), the sensibility of residents’ actions to their utility. Similarly, the costs \( \lambda(s - \bar{s})^2 \) borne by the service provider to control the level of residents’ actions increase strongly with the sensibility \( \mu \) of these costs to those actions. In contrast, wages \( w^* \) decrease only linearly with the tourists’ local expenses. In other words, it is costly for the service provider to gain local residents’ approval for activities he is managing. If the activities managed by the service provider are disapproved by local communities, they might undertake different actions, more or less aggressive, in order to discourage tourism and once the location is in disgrace, it is very difficult to change tourists’ opinion and attract them. Usually tourism related activities are perceived by host communities as polluting, disturbing and creating many inconveniences, even if those activities create a great number of jobs. In order to get residents’ approval, give some kind of compensation to the local community, tourism service providers cooperate with local businesses, local craftsmen, but also they make important efforts for the overall communities (contribute to cleaning and environment protection projects, country planning, offer locals some discounts to access the services provided in hotel/resort, such as SPA access, etc.).
The partial equilibrium setting is the first interesting approximation, but it is not sufficient to understand the interactions between the service provider and the residents. Three important parameters of the partial equilibrium setting, namely the tourists’ expenses expressed by \( z \), and the negative impacts of tourism activities \( o \) and \( s \) depend on the type of product offered and on characteristics of tourists’ population. The following subsection will analyze their determinants and their complex impact on the equilibrium.

4.2 The equilibrium of the service provider - residents - tourists game in a global interactions setting

Have the proportion and other characteristics of environmentally conscious tourists an influence on interactions with the residents? Do these interactions between the service provider and residents generate spillovers in the nature of provided services? These issues will be tackled in the present section.

At this point, to simplify the analysis, are considered only the cases where, without any interactions with the residents, the service provider would have chosen to provide all the \( n \) tourists with the traditional service at the reservation price \( p_t = p_{T2} = \alpha' + \beta \) or the sustainable product at the reservation price \( p_g = p_{G1} = \alpha + \gamma \). The reservation price \( p_t = p_{T2} \) corresponds to the maximum price paid by environmentally conscious tourists for the traditional (polluting) product, i.e. the one that provides them with less utility than the sustainable product. The reservation price of traditional tourists, not interested in environmental issues, for the same product is higher, but as the service provider serves all the tourists’ population, it has to adapt the price to the reservation price of the subpopulation which has the lower valuation of the product. Analogically, the reservation price \( p_g = p_{G1} \) corresponds to the maximum price that traditional tourists accept to pay for the sustainable tourism product, as it is not the product that they prefer. The reservation price of environmentally conscious tourists for this product is higher, as it is environmentally respectful. As the service provider is willing to serve the whole population with the product, it has to adapt its price to reservation price of the subpopulation which has the lower valuation of the service. When the relations with residents are neglected, the choice of the service provider is then determined by comparison between the profit \( \pi_t = n(\alpha' + \beta) \) associated to the traditional offer and the profit \( \pi_g = n(\alpha + \gamma) - c \) associated to the sustainable product. The sustainable product is then offered if \( \gamma \geq (\alpha' + \beta - \alpha) + \frac{c}{n} \) and the traditional product is provided in the opposite case. A rapid analysis of this inequality shows, that the sustainable product prevails when its quality is sufficiently high, its additional cost is relatively moderate, and when environmentally conscious tourists depreciate sufficiently the traditional product. Moreover, as the service provider never chooses to serve only a fraction of tourists, two other inequalities are satisfied to exclude the cases where only traditional or environmentally conscious tourists are served, namely (8) and (9):
\[(n - m)(\alpha + \beta) < n(\alpha' + \beta) \quad (8)\]

\[m(\alpha'' + \gamma) < n(\alpha + \gamma) \quad (9)\]

The left-side of equation (8) figures the service provider’s profits when it distributes the traditional product to the subpopulation of traditional tourists only. In this case, as only tourists with higher valuation of the product purchase it, the price is higher than in case when the product is distributed to the whole population. The right-side of equation (8) figures the profits, when the whole population is provided with the traditional product. Although in this case the price is lower, as it corresponds to the reservation price of environmentally conscious tourists, the number of tourists purchasing the product is higher, as it corresponds to the whole population. As, at this point the analysis is limited to the service provider serving the whole tourists’ population, the inequality (8) has to be satisfied.

Analogically, the left-side of equation (9) corresponds to the service provider serving sustainable product to the subpopulation of environmentally conscious tourists only. In this case the product’s price is higher, because it is distributed only to the subpopulation, which prefers the sustainable product to the traditional one and thus, has higher willingness to pay for this service than the rest of the population. The profits of the service provider serving the whole population is figured by the right-side of the equation (9). In this case, the price is lower, because it corresponds to the reservation price, which traditional tourists are willing to pay for the sustainable tourism product, but the service provider serves the whole tourists’ population. Still the analysis here is limited to the case, when the service provider serves the whole population, so the inequality (9) has to be satisfied.

Now, in order to examine the complete setting, a distinction of specific subpopulations is made. Thus, \(m_1\) figures the optimal number of environmentally conscious tourists and \(m_2\) - the optimal number of traditional tourists. The integration of residents provides more precise definitions of parameters \(z\), \(o\) and \(s\), which have been considered as given in the partial equilibrium setting. Until now, the tourists’ expenses have been supposed to be only a function of their number, without considering the two subpopulations separately.

Nowadays many ecological sustainable alternatives are more expensive than the less sustainable products. The differentiation between the two subpopulations (environmentally conscious and traditional one) takes place at this level. As it was already emphasized by the literature, environmentally conscious tourists tend to accept more economic sacrifices to protect environment and to purchase more sustainable tourism alternatives than tourists who are not environmentally concerned (for further information on this issue see Luzar et al. [1998], Thogersen [2000], Laroch et al. [2001], Weaver and Lawton [2002], Fairwether et al. [2005], Lee and Moscardo [2005], Choi et al. [2009], Dodds et al. [2010], Hedlund [2011]). According to
Fairweather et al. [2005], who distinguishes two types of value orientations, tourists with biocentric value orientation\(^5\) have a more positive attitude towards environment and are more attentive to ecological labels than those with anthropocentric value orientation\(^6\). Moreover, Schultz and Zelezny [1999] and Schultz [2001] show that universalism\(^7\) and benevolence\(^8\) value orientations have a positive relationship with pro-environmental attitudes and behavior and thus, tourists that present those value types are more environmentally conscious and have more pro-environmental buying intentions. Finally, Hedlund [2011] shows that stated universalism value orientation has a positive effect on tourists’ environmental concerns, which has a positive effect on their willingness to accept economic sacrifices to protect environment and to buy ecologically sustainable alternatives.

Accordingly, the tourists’ expenses which benefit the residents, \(z\), are considered as a function of total tourists’ number \((m_1 + m_2)\), but also of their environmental responsibility. Thus, \(z\) is defined as (10):

\[
z = \zeta (m_1 + m_2) + \zeta' m_1an{(10)}
\]

where \(\zeta\) and \(\zeta'\) are two positive constants.

The objective negative impact of tourism activities is still essentially a function of tourists’ total number \(n\) and is given by (11):

\[
o = \omega (m_1 + m_2), \tag{11}
\]

where \(\omega\) is a positive constant.

Last, \(s\), developed in (12), increases only with the number of traditional tourists, as the respect of culture, identity and local customs is a part of sustainability consciousness.

\[
s = \sigma m_2 \tag{12}
\]

At this point, it is supposed that possible service providers’ choices limit to offer the traditional or the sustainable product to the \(m_1\) environmentally responsible tourists, to the \(m_2\) traditional tourists or to the whole tourists’ population.\(^9\) Then, the expression (7) can be expressed as (13):

---

\(^5\)which extends the status of moral object from human beings to all living things in nature.  
\(^6\)regarding humans as the central element of the universe.  
\(^7\)which includes altruism towards humankind and comprises such values as equity, social justice, and peace on earth.  
\(^8\)that encompasses altruism towards in-groups and includes values such as being helpful, forgiving, and being responsible.  
\(^9\)A more complete setting should consider for the service provider the possibility to ration one or the other population. In some cases, the service provider could find advantageous to provide all environmentally responsible tourists and only some given proportion of traditional tourists with the product. In such case, as inside each category all tourists are considered as the same, it is necessary to introduce a first level discrimination to accept all the tourists from one category and only a part of the other one. Under current settings, such discrimination is not possible.
\[ \pi = \max[\pi_{t1}, \pi_{t2}, \pi_{g1}, \pi_{g2}] \]  

with,

\[ \pi_{t1} = \max_{(w \geq 0, s \geq \bar{s})} (n - m)(\alpha + \beta) - kw - \mu a(m_1 = 0, m_2 = n - m) - \lambda (\sigma(n - m) - s)^2 \]  

\[ \pi_{t2} = \max_{(w \geq 0, s \geq \bar{s})} n(\alpha' + \beta) - kw - \mu a(m_1 = m, m_2 = n - m) - \lambda (\sigma(n - m) - s)^2 \]  

\[ \pi_{g1} = \max_{w \geq 0, m} m(\alpha'' + \gamma) - kw - c - \mu a(m_1 = m, m_2 = 0) \]  

\[ \pi_{g2} = \max_{(w \geq 0, s \geq \bar{s})} n(\alpha + \gamma) - kw - c - \mu a(m_1 = m, m_2 = n - m) - \lambda (\sigma(n - m) - s)^2 \]  

and (18):

\[ a = -\min \left[ 0, \eta \left( (w + \zeta(m_1 + m_2) + \zeta'm_1)^{1/2} - \omega(m_1 + m_2) - s \right) \right] \]  

At this point, the analysis of interactions with the residents makes emerge following results:

**Proposition 2.** When, without considering interactions with residents, the best choice for the service provider is to offer the sustainable product to the whole tourists’ population, this choice can be confirmed when the interactions with residents are integrated. In some cases, the service provider can also choose to limit the number of tourists, either by providing sustainable products to the environmentally conscious subpopulation only, or by providing traditional products to traditional tourists only, offering each product at the reservation price of a respective subpopulation.

Proof: see appendix 2.

**Proposition 3.** When, without considering interactions with residents, the best choice for the service provider is to offer the traditional product to both categories of tourists, this choice can be confirmed or not when the interactions with residents are integrated. If it is not confirmed, the service provider can offer the sustainable product to both categories of tourists or decrease the number of tourists provided.

Proof: see appendix 3.

These two results show that, all things being equal, the integration of interactions with residents can have a double impact. First, to limit the number of tourists; second, to accelerate or to slow down the adoption of environmental norms. Accelerating forces are likely to dominate statistically, given that residents have a better
perception of products and tourists’ population respectful of local culture and environment. In some cases, when the objective negative impacts of tourism dominate the others, it could however be more profitable for the monopolist to provide only the traditional tourists with the traditional product.

In order to illustrate these dynamics the case of Corsica may be quoted (for more information on the issue see Giannoni [2009]). Corsican residents may be considered as very active and strongly concerned with environmental issues. They perceive mass tourism as pollution and thus, they undertake actions against it. This activism has protected Corsican coasts from excessive urbanization and facilitated protection of natural environment, by urging local authorities to undertake measures in that way. This scheme has been observed also in Southern European countries (Greece, Spain and Portugal) during 1970-1990 (Kousis [2000]). Moreover, Giannoni’s model [2009] shows that sustainable mass tourism is not possible, while considering characteristics of a truly sustainable tourism. Hence, the impact of residents tends to reduce the number of tourists visiting the area and contributes to select the tourists more concerned by the environmental and local-social issues.

5 Concluding remarks

The paper considers the case of a tourism accommodation service provider, in a situation of monopoly, facing heterogeneous demand and located in a destination inhabited by a population of more or less (re)active residents. Thus, two segments of demand are distinguished: tourists concerned with environmental issues, who desire sustainable tourism products, while others are more interested in different products’ characteristics, such as luxury standards and best prices. Each subpopulation has a preference for one of the two types of products, the traditional or the sustainable one. This preference implies a difference in both demand segments’ willingness-to-pay for each type of product. The service provider cannot differentiate its offer, because of important investments that have to be made in order to develop sustainable tourism products and those improvements cannot be undone instantly. Therefore, it decides which of the two types of products it is going to distribute to the whole tourists’ population. In order to make its decision, it takes into account the number of tourists composing each subpopulation, the profits it would make while offering the one or the other service, and the local residents’ reaction to pollution generated by tourism. As associated activities interfere with ecosystem and create diverse impacts on host community, they may lead sometimes to collective local resistance, which is modeled in the paper as the intensity of resident’s actions/reactions. The latter may be decreased by service provider’s monetary and non-monetary efforts in favor of the host population and/or environmental protection. After having defined the level of service provider’s profits in each possible setting, while taking into account residents’ actions, two main results appear. First of all, the integration of interactions with residents leads to a reduction of service providers’ offer, which then distributes a

---

10Kousis [2000]
limited number of products in order to serve only a part of tourists’ population, to limit the intensity of resident actions. In most cases, the presence of active residents makes the service provider choose to offer the sustainable product. Finally, second result is that taking into account the host population’s actions, may in some specific cases lead the service provider, not only to reduce his offer, but also to choose the non-sustainable solution.
References


**Appendix 1: Proof of Proposition 1**

Excluding the cases where $a^*$ vanishes, in the profit equation (7) the value of $a$ is replaced by its expression given by (6) as a function of $w$ and $s$. Given the quasi-concavity of the resulting function in $w$ and $s$, the first-order conditions may be expressed, then obtained to obtain the unconstrained values of $w^*$ and $s^*$ as

$$w^* = \left(\frac{\mu w}{\lambda}\right)^2 - z \quad \text{and} \quad s^* = s - \frac{\mu s}{2k}.$$  

The constrained values of $w^*$ and $s^*$ are then bounded respectively from above by $\bar{w}$ and from below by 0. If the analysis is limited to the interior solutions, $a^* = (o + s) - \frac{\mu w}{2k} \left(\frac{1}{k} + \frac{1}{\lambda}\right)$ is obtained. From the interior value of $w^*$ one may easily verify, that wages paid by the tourism service provider increase as the square value of $\mu$ and $\eta$ and decrease linearly with all increase of $z$. Then, the cost of integration for the monopolist is expressed as $\lambda(s - \bar{s})^2$ at the equilibrium (interior solution). Finally, $\lambda(s - \bar{s})^2 = \frac{\eta^2 \mu^2}{2k}$ is obtained, which ends up the proof.
Appendix 2: Proof of Proposition 2

Without considering residents, the profit of tourism service provider is given by $\pi_{G1} = n(\alpha + \gamma) - c$. Residents introduce the term $a$ in the profit function. Equation (17) corresponds to the profit associated to the same choice of the service provider after considering residents reactions. Given the restrictions on $w$ and $s$, these two variables differ respectively from 0 and $\bar{s}$ only if $a < 0$. Then, two cases can be distinguished:

(i) The residents’ utility is positive when $w = 0$ and $s = \bar{s}$ with $n$ tourists. Given $a$ and especially its components $z$ and $\bar{s}$, this case is more likely to appear when $m_1$ is large compared to $m_2$. In this case, $w^* = 0$ and $s^* = \bar{s}$, then $\pi_{g2} = \pi_{G1}$. As, in this case, no other profit can be bigger than $\pi_{G1}$ when the residents are introduced, the optimal solution is still for the service provider to provide $n$ tourists - the whole population mixing the two categories - with the high quality sustainable tourism product.

(ii) If the residents’ utility is negative when $w = 0$ and $s = \bar{s}$ with $n$ tourists: in this case, when the solution associated to profit (17) is considered, it is optimal for the service provider to increase $w$ over 0 and/or to decrease $s$ under $\bar{s}$. If even after these actions $\pi_{g2} < \pi_{G1}$, consider then the profit associated to (16) corresponding to the decision to offer the sustainable product only to the environmentally responsible tourists and compare it to (17).

The term $m(\alpha'' + \gamma)$ is smaller by definition than $n(\alpha + \gamma)$ but as $o$ is the same in the two expressions, if the effect of the decrease of $s$ to 0 in (16) compensates more the effect of the decrease of $z$ in $a$, the difference in the terms $\mu a$ can counterbalance the difference between the terms $m(\alpha'' + \gamma)$ and $n(\alpha + \gamma)$ given the choice of the optimal level of $w$ in (16), then making more advantageous for the service provider to decrease the number of tourists and to decrease also extra expenses associated to interactions with residents.

As an example, consider the case where $\sigma$ and $\lambda$ are very large, i.e. where residents are highly sensible to traditional tourists’ attitude and where the service provider incurs large costs to improve communication with residents. One will easily verify, that the profit (15) associated with the traditional products’ offer to the whole tourists’ population is never larger than the profit (17) in this case.

Consider then the case where initially, $\pi_{G1} = n(\alpha + \gamma) - c$ is only slightly larger than $m_2(\alpha + \beta)$ and $m_1$ close to $m_2$. The additional cost of sustainable product is, then, quite large and the two populations of tourists are rather equivalent. Suppose also, that $\omega$ is large, while $\sigma$, $\zeta$ and $\zeta'$ are negligible: the objective bad effects of tourism become the main problem, when interactions with residents are integrated.

In this case, $\pi_{t1} > \pi_{g2} > \pi_{g1}$, i.e. the best choice for the service provider can be to restrict the number of tourists to the subpopulation of traditional ones and to offer the traditional product.

Appendix 3: Proof of Proposition 3

In this case, there are also many possibilities. Suppose for instance that $m_1$ and $m_2$ are close while $c$ is large. Suppose also that residents actions’ level is low, with finally $a = 0$. In this case, the initial choice is maintained.
Given that in (17), an increase of \( m \) has the consequence to decrease \( w \) and \( s \), the decrease of the costs for the service provider can make more than compensate the loss of profit from \( n(\alpha' + \beta) \) to \( n(\alpha + \gamma) \). In this case, the best solution for the service provider could be to offer only the sustainable product if the cost \( c \) is small. Suppose now, that there is a high level of negative interactions between tourists and residents, i.e. that \( \omega \) and \( \sigma \) are big, with reasonably high values of \( k \) and \( \lambda \). Then, given the level of \( a \), the optimal value of (15) supposes payment of rather high over-wage \( w \) and imposes a costly effort for the service provider to decrease \( s \) at a lower level \( \bar{s} \). It can then be interesting to reduce the number of tourists. If \( c \) is very big, it could be interesting to limit the offer of the traditional product to the traditional tourists only which decreases \( o \) and limits the service provider’s effort to increase \( w \) or decrease \( s \). If \( c \) is not so big, the best choice for the service provider can be to supply the sustainable product to the environmentally responsible tourists: the result is then to drop \( s \) and to save the effort cost of decreasing it.
2013-01  Raphaël Chiappini  
Persistence vs. Mobility in Industrial and Technological Specialisations: Evidence from 11 Euro Area Countries

2013-02  Kevin D. Hoover  
Was Harrod Right?

2013-03  Kevin D. Hoover  
Man and Machine in Macroeconomics

2013-04  Isabelle Corbett-Etchevers & Aura Parmentier-Cajaiba  
Toying with Regulation: ‘Strategizing Tools’ as Organizational Bricolage

2013-05  Aura Parmentier-Cajaiba  
Research Diary Mapping: Enhancing Reflectivity in Process Research

2013-06  Richard Arena  
Sraffa’s and Wittgenstein’s Crossed Influences: Forms of Life and Snapshots

2013-07  Christophe Charlier & Sarah Guillou  
Distortion Effects of Export Quota Policy: An Analysis of the China - Raw Materials Dispute

2013-08  Cristiano Antonelli & Alessandra Colombelli  
Knowledge Cumulability and Complementarity in the Knowledge Generation Function

2013-09  Marco Grazzi, Nadia Jacoby & Tania Treibich  
Dynamics of Investment and Firm Performance: Comparative Evidence from Manufacturing Industries

2013-10  Anna Calamia, Laurent Deville & Fabrice Riva  
Dynamics of Investment and Firm Performance: Comparative Evidence from Manufacturing Industries

2013-11  Lauren Larrouy  
Bacharach’s ‘Variable Frame Theory’: A Legacy from Schelling’s Issue in the Refinement Program?

2013-12  Amel Attour  
Adoption et modèles de diffusion régionale de l’innovation dans les gouvernements locaux: le cas du développement de l’e-Gouvernement en Lorraine

2013-13  Anaïs Carlin, Sébastien Verel & Philippe Collard  
Modeling Luxury Consumption: An Inter-Income Classes Study of Demand Dynamics and Social Behaviors

2013-14  Marie-José Avenier & Catherine Thomas  
Designing a Qualitative Research Project Consistent with its Explicit or Implicit Epistemological Framework

2013-15  Amel Attour & Maëlle Della Peruta  
Le rôle des connaissances architecturales dans l’élaboration de la plateforme technologique d’un écosystème en émergence: le cas des plateformes NFC

2013-16  Evelyne Rouby & Catherine Thomas  
Organizational Attention Elasticity: An Exploratory Case of Cement Production

2013-17  Małgorzata Ogonowska & Dominique Torre  
Residents’ Influence on the Adoption of Environmental Norms in Tourism