

Systemic Analysis and Model of Sustainable Tourism

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ABSTRACT

Today, tourism is oriented towards new forms of development pertaining to an insight of “sustainable development” that aims at respecting, preserving, and sustainably highlighting the patrimonial resources (natural, cultural, and social) of a territory to the hosted tourists so as to reduce the negative impacts they may engender. Our modeling approach for the tourist sector as a complex social system, based on systemic approach may apprehend specific issues related to sustainable tourism and envisage innovative and lasting solutions on the long term. It equally shows that a sustainable tourist initiative can be part of a virtuous circle under the effect of learning and feedback loops.

JEL Classifications: Q56, L83

Keywords: tourism; sustainable development; systemic; stakeholders; learning

I. INTRODUCTION

Tourism involves crucial economic issues (created wealth, generated jobs, and collected currencies¹), but it is also considered as the source of several problems regarding sustainable development. The present tourism problematic consists in succeeding in preserving the environment as well as heritage and cultural diversity. In addition, tourism is chiefly benefiting the developed economies. For instance, Africa accounted for only 4.4% of international tourist arrivals and 2.8% of revenues in 2005 and this situation has only slightly improved in recent years². These observations should encourage States, citizens and companies to question the legitimacy of tourism because even if the preservation of heritage and cultural diversity are insured, the ecological impact remains significant. This impact is generally measured through two indicators: the greenhouse gas (GHG) emissions and environmental footprint.

The countries' public policies may define procedures to reduce the GHG and the environmental footprint, but this requires a global agreement that has to be reached between all the countries around the world to have a real effect. The conferences held in Copenhagen (2009) and Durban (2011) on Climate Change have shown the difficulties in defining a comprehensive agreement between most countries to limit greenhouse gas emissions.

This awareness of the risks associated with tourism is beginning to emerge within the companies. Nowadays, some firms incorporate into their strategy sustainable development through its three pillars: economic, social, and environmental. This integration does not fundamentally alter their purposes but it adds a number of constraints on how to make profit (respecting the future generations) and to redistribute it (between employees and shareholders).

The voluntary adoption of additional constraints, related to sustainable development and ungovernable by the regulations or standards of an industry shows that the company promotes some values. But the question that arises is to identify whether it is a real commitment of the firm or a "marketing" approach aimed at stakeholders? Indeed, the company can make use of sustainable development to appeal to consumers (e.g. fair trade) providing that they further incorporate this criterion in their decision making. This type of argument can also be targeted to current and potential employees (e.g. charter on the integration of disabled workers), shareholders (e.g. sustainable development is reflected in the search for long-term performance and then it proves that short-term results are lower than investors' expectations), public authorities (e.g. to win invitations to tenders), etc.

For instance, we can mention many innovative actions of private actors:

- "Nouvelles Frontières" acts in favour of local populations (school building) and the preservation of diving sites. It has partnered with WWF and it has a charter of good practices.
- "Costa Cruises" (American Carnival Group) is in accordance with the different standards below: ISO 14001, OHSAS, ISO 18001, ISO 9001.
- "Voyageurs du Monde" compensates for the environmental cost of airplane travels. The Carbon tax which originally started in 2007 by voluntary service became automatically included in the tickets' price in 2008 because of the customers' lack of enthusiasm. Thus, the company has collected 70,000€ which will be used in reforestation projects in Madagascar and Cambodia³.

These experiments show that on the one hand, it is possible to reconcile between tourism and sustainable development practices. On the other hand, there is a need to handle the overall problematic of sustainable development, that's to say by integrating all stakeholders (firms, citizens, customers, governments, etc...) and their interaction to have a real impact. This is especially due to the fact that some agents have a dual role, such as customers who are both citizens and tourists.

In this study, we are making use of a systemic approach to show how tourism can successfully integrate principles of sustainable development in an industry which is said to be relatively remote. The systemic analysis is more advantageous in providing the theoretical framework which enables us to examine the tourism industry as a complex social system and therefore, to understand the specific issues related to sustainable development. In fact, the tourism industry is akin to a complex structure because it is composed of multiple components (companies, tourism offices, local authorities, etc.) that are involved in all sorts of mutual interactions and in connection with their environment. Despite the difficulties of individual identification, these elements can, however, be depicted on a more global level, that is the sector. The use of the systemic analysis allows this transition from the local to the global and how to better understand the process of organization and interaction of these elements in a complex system. It explains why and how the elements whose composition is so varied manage to keep a high degree of organization at a global level. The practical objective is to help stakeholders in the tourism industry to better coordinate their activities and devise innovative solutions to meet the challenges of their industry in terms of sustainable development.

First, we suggest displaying the sources of capital for sustainable development and therefore difficulties to succeed in reconciling the tourist activity and sustainable development objectives. Nevertheless, the first part will be also used to show the social, environmental and even strategic interest in acting for a sustainable tourism. Second, we present the principles of the systemic approach and show how it is possible to promote the adequacy of sustainable development to the structure of the tourist system on the one hand, and the sustainable development to the function of the tourist system on the other hand. Our analyses will permit us to synthetically explain how the principles of sustainable development can be integrated in the complex system of the tourism industry.

II. SUSTAINABLE TOURISM?

Intuitively, it is easy to be skeptical about the power of the industry of tourism to encompass the overall principles of sustainable development (Hunter, 1997; Tao and Wall, 2009; Castellani and Sala, 2010). Tourism integrates some strategic and marketing considerations which marginalize reflections on environment protection and further neglect social and environmental preoccupation over the long term. Nonetheless, the position of sustainable development in the tourism industry is likely to be reinforced thanks to the political and media interests and an increasing awareness of the tourists themselves.

A. The Pillars of Sustainable Development

Sustainable development is a recent expression resulting from the interest with which the present generations are thinking about the next generations. Time is omnipresent. According to Bruntland report (the name Gro Harlem Bruntland, a Norwegian president of the 1987 committee which elaborated the “Our future for all” report. It is a development that aims at meeting the present needs without compromising the ability of the future generations to meet their own needs. As far as territorial development is concerned, it implies a consideration of long term effects of recycling abandoned spaces and renovating the debased areas.

In general, the concept of sustainable development is the establishment of a non temporary equilibrium between natural resources and human beings' use of them. There are three levels of concern: economic, environmental and social. Sustainable development includes a group of capitals (air, water, welfare, culture, nature, money, etc.) which are all equally important.

The objective of sustainable development is to successfully reconcile between economic growth, respect of the environment and social progress.

Economically, sustainable development pursues progress, a successful globalization that promotes cooperation between firms, institutions and public authorities. An efficient economy abandons the use of unsustainable production methods. The principle of polluter/payer is a case in point.

In so far as the environment is concerned, the objective is to preserve the natural environment by reducing greenhouse gas emissions, pollution of air and water through recycling, and making every effort to avoid the extinction of plant and animal species, deforestation, desertification and the weakening of natural resources. For instance, Marriott International has signed an agreement of approximately \$2 million with the Brazilian Amazonas in order to protect and preserve 1.4 acres of rainforest that may probably disappear in Amazon.

At the social level, sustainable development has an objective which is to succeed in feeding and providing water and labor for the coming generations especially that the population of the Earth will grow to ten billion people in 2050. Sustainable development aims at reducing inequalities between the North and the South. It is also founded on principles like union and equity for the present and the future generations in order to bring about a large-scale improvement in the welfare of each person in terms of health, education, and well-being. Moreover, sustainable development has a goal of preserving local traditions and authenticity while promoting the development of populations.

B. Tourism Versus Sustainable Development

If within few decades, the average standard of living of an individual largely increases, social inequalities and environmental imbalances will equally become reinforced.

The economic development has contributed to the disruption of the ecosystem and the destruction of a valuable asset for future generations. Tourism, as such generates a consumption of power (in transport, accommodation and entertainment) and a consumption of “geographical territories” sources of pollution (waste, wastewater, noise and physical pollution). Tourism is not basically economical on natural resources.

Traveling, which is an essential activity for tourism is a major source of greenhouse gas emissions (kerosene, gasoline, fuel oil). The environmental consequences of a given tourist activity depend on its objectives. The preserved national parks rely essentially on respecting fauna and flora, an equilibrium between the park's economic activity, the visitors' enjoyment, and the respect of landscape and wildlife. But amusement parks seek primarily how to provide entertainment and excitement for tourists at a cost of power and natural resources that exceeds the ecological limits. Las Vegas is often referred to for its staggering consumption of water and electrical energy. While 1.6 billion people are deprived from drinkable water, 1000 liters of water per person, per day are consumed at Las Vegas (three quarters of the cost of water being due to gardens and golf courses)⁴. In terms of electricity, while an American already consumes 10kWh annually, a resident at Las Vegas consumes twice that amount⁵. These places of entertainment are created by investors who are merely motivated by their high profitability (Tao and Wall, 2009) before being aware of sustainable development.

The "pollution" level depends not only on the aims of the tourism activity, but it also depends on the objective chosen by tourists. While seaside sites seek above all to make tourists enjoy natural and wild landscapes without "over consumption" of the resort (Tartary Natural Reserve beach in Martinique, the beaches of protected sites in the archipelago of Guadeloupe: Marie-Galante). Other seaside resorts have been established as an object of consumption the Balearics, the Canary Islands and the Isle of Djerba.

Several hosting societies consider tourism as an assault. For example, in the low season, Ré Isle lists a population of about 18,000 inhabitants, while in high season this population may be ten times higher. This tourist activity has long term social and economic effects. Thus, over the past two decades, real estate prices have reached such a peak that even average-income residents have been subject to the solidarity tax on wealth (ISF)⁵ because of the soaring value of their heritage. Most of them decided to sell their property and leave the island.

C. Sustainable Tourism Solutions

Despite the difficulties to reconcile between tourism and sustainable development, sustainable tourism is a major issue in politics and is allocated much concern. Sustainable development as an issue in the tourism industry has become of an international significance since the 1992 Rio Conference, where approximately 200 countries adopted the 21 Agenda. This program of actions involves specifically the industry of tourism and travels. The hosting country has to guarantee a harmonious economic development, a contribution to the local population's well-being, and a sustainable preservation of the diversity of local fauna and flora. Local communities invest in environmental tourist solutions. Thus, tramways, electric or hybrid public transport and bike paths are developing in many cities.

Furthermore, sustainable development is being more and more markedly required by tourists. Recently, there has been a strong demand for sustainable and environmental tourism. The ecological discourse and actions make part of consumer expectations. Germanic and Northern European countries are considered as the most sensitive to the environmental cause (for example, Germany, Switzerland, Austria, Denmark, and Sweden) (Guillon, 2004). Citizens of these countries are considered the

most willing people to change their practices in tourism in order to improve the environment situation. However, in English-speaking countries where they stress the environmental requirement, it is not really obvious, but it is in progress. In France, stays in farm inns, lodgings, caravan, bicycle, or walk up are increasing every year. It is the same for ethical and socially responsible tourism. Traveling to a developing country to build a school or water well is becoming an increasingly common tourist activity. The reconciliation between travel and social action enables tourists to make stronger links with the local populations. This participatory and national approach highlights sustainable tourism and can be applied as the foundation of a sustainable tourism project that may satisfy all expectations.

Given the difficult task of reconciling between tourism and sustainable development as well as political and national ambitions to change the styles and types of production and consumption, we shall find a very useful form of governance and organization that fosters the incorporation of sustainable development in tourism. Systemic analysis is likely an appropriate solution for the complex world of tourism.

II. SYSTEMIC ANALYSIS AND MODEL OF SUSTAINABLE TOURISM

The systemic analysis is endowed by structural and functional aspects that perceive of the tourism industry as a complex set of internal and external interactions in order to accomplish predefined objectives. In order to make this tourist organization work in tune with a sustainable development policy, systemic analysis requires reconciliation between sustainable development concerns and structural and functional aspects of the tourist system.

A. The General System

The complex system is the product of a conjunction between two paradigms: the paradigm cybernetics (contingency) and the structural paradigm (integration of the internal functioning of the system).

According to Rosnay (1975), “a system is a set of elements in dynamic interaction, organized according to a goal”. In addition, Morin (1986) considers that “a system works and undergoes transformations within an environment related to its objectives”. This definition of systems is devised by a formalization of the canonical form of Le Moigne’s (1990) general system.

A system is structured into four parts (de Rosnay, 1975):

- Countable and more or less homogeneous items (that’s to say, assembled in groups, families or populations). For a seaside resort, these include the inhabitants of the city, the staff of companies working nearby the seaside, local authorities, institutions (such as coastal observatory), organizations, etc.

- A limit, which defines the boundary between all elements and the environment (Pollalis and Dimitriou, 2008). This limit is somewhat blurred, moving and more or less permeable regarding tourism as a social system (Ko, 2005). Indeed, when we find an interesting tourist site, the frontier is not easily defined. In the case of the seaside, we wonder whether it is a city, a region, in France (because the system includes the national observatory of coasts), or Europe (since parliament and the European Council determine the management strategy for the coastal regions of Europe⁷)?

- Networks relationship between system components. The more there are interrelationships, the better the organization and the complexity. These relationships rest mostly on physical communication networks that provide exchanges of materials, electricity or information through roads, canals, electric conductors, phone wires, fiber optic etc.,

- Tanks used to stock power, materials or information (reservoirs of the atmosphere or capital reserve of knowledge, media memory, library, gas tank, etc.)

At the operational level, a system is characterized by four elements:

- Material flows, energy or information, which use networks of relationships. Material and power flows can increase or lower the level of tank level. While information flows act as a decision basis, they affect other types of flows to adjust tank levels,

- Decision centers, which shape the network of relationships, that's to say, they coordinate and manage the stocks.

- Delays resulting from different rates of flow movement, storage capacity in reservoirs, or friction between the elements of the system. They are a fundamental feature of the behavior of complex systems through amplifying or preventing the appearance of some phenomena.

- Feedback loops provide information on the coming impacts after the flow enters. Thus, the decision centers can have quick information about the general state of the system and anticipate its evolution.

From a structural and functional point of view, this definition shows that the tourism industry, tourist resorts, and tourist firms belong to open complex systems (with intense material and information exchanges with their environment) (Ko, 2005). It is very useful to understand how tourism can successfully incorporate sustainable development principles. It highlights especially the possible reconciliation between sustainable development and the structure of the tourism system as well as between sustainable development and the function of the tourist system.

B. Tourism Structure for a Sustainable Development Model

The adequacy between sustainable development and the structure of the tourist system is questioned because of the need to determine the extent to which sustainable development can be incorporated in the following tourism constituents: its frontier, its uncountable and interrelated elements and its reservoir (energy, material and information).

Considering a tourist site as a complex social system confirms that the development of a given tourist site does not result from a simple market process. In fact, the evolution of a tourist site is the product of agreements between several actors, a subtle interplay of individual and group stakeholders' issues. For instance ski resort competitiveness depends on the interaction of different actors in the tourist system: the valley firms, local authorities and the inhabitants of the valley (who diverge among themselves between those who benefit from the ski resort as they practice skiing, work in the ski resort or otherwise benefit from the built infrastructures and those who are disturbed by the additional traffic caused by the resort). These actors look for personal interests, which are often paradoxical like maximizing profit for companies and utility

for the inhabitants and the decrease in unemployment rates for local authorities. In addition, tourism has variable impacts depending on the actors. Indeed, the tax increase for investment in the ski resort and its development will probably be perceived of differently by an employee working in the ski resort and a company that tries to flourish thanks to its tourist activities, and a retired resident.

Reflections on sustainable development should be internal and in cooperating with the whole group of actors too. They can be represented by the tourist agencies, hosting providers, carriers, restaurateurs, and even residents, customers, consumer organizations, legislative and political bodies, certification groups, local communities and companies.

For instance, before the transition to 2000, Accor hotels developed an ecological approach relying on employer bodies and national and international public institutions (Guillon, 2004). The Accor project has been backed by the International Organization for Hotels and restaurants (700,000 hotels and restaurants in 150 countries), the United Nations Environmental Program, and the International Hotel Environment Initiative (including hotels and national professional associations). In addition, Accor has strived to closely meet the requirements of international legal authorities, while guaranteeing a legitimate approach by creating an Eco label that is applicable to the hotel business.

Beyond the identification of the components within the system that can contribute to sustainable development for tourism, particularly the system's actors (whether physical or legal element), understanding the functioning and evolution of a system depends mainly on the kind of relation between actors.

C. Sustainable Development and Tourist System Function

Questioning the very adequacy of the principles of sustainable development and the function of the tourism system is to find the extent to which sustainable development can be integrated in the functioning of the following elements in the tourist system: inventory flows from the reservoir (of energy, materials, or information), decision centers that manage the flows and stocks, the temporary organization of flows and decisions, and feedback loops.

1. The relationship between the actors of the tourist system

We will explore the relationships between the main actors of the tourist system: the organization resulting from the tourist activity, service providers, potential customers, government agencies and organizations of tourism improvement, local governments and the State. The clarification of these relationships helps in understanding how and why actors whose composition is so varied manage to keep highly organized at a global level.

2. The organization conditions the tourist activity

Within a sustainable approach to tourism, it is of crucial importance to mobilize all actors and, thus, all the resources and skills of tourism. The first actor is the organization which is responsible for tourism. Controlling skills and resources is fundamental. Internally, sustainable development has to be cross-integrated. It affects

all business functions insofar as it concerns the various offerings of the company, from their production to their consumption. In 1994, the Environmental Manager function was founded within Accor and in 1995, the Environment Department was created and it worked with 50 international correspond (Guillon, 2004).

3. Service providers

The relationships between service providers are crucial because they determine the set of services offered to customers. A tourist site can be evaluated in terms of its attractiveness and this is through the level of cooperation between different providers. Indeed, beyond the competition between firms, this competitiveness is determined by the tourist site on which firms are settled and the service package offered to meet customer expectations. In a ski resort, customers do not only seek easy access, but also the housing quality and the ski area, catering and entertainment services, facilities for children (for example, ski school) and sports (like ice rink and swimming pool).

Service providers in tourism are of widely varying types and sizes. Tour operators, transportation companies (air, sea, land) as well as hotel, restaurants and entertainment chains are global (Thomas Cook, Air France, Accor, Disneyland). However, most providers are SMEs especially in local transport, accommodation, catering and entertainment of tourists. Therefore, while their size does not necessarily require a high degree of cooperation with other providers, major groups have realized the importance of cooperation even with the smallest providers. Large companies can offer a global service (i.e. accommodation, catering, entertainment, sports, etc.), but they need other providers to enhance their promotion, meet specific needs and provide troubleshooting.

4. Relationships with present and potential customers

Whether small or large, tourist companies seek to maintain close relations with customers basically for strategic reasons. The literature, actually, shows that customer orientation positively influences the firm's profitability (Bitner, 1990; Goodale et al., 1997). Customer orientation of service is primarily aimed at customer satisfaction while maintaining the firm's profitability. This satisfaction is based mainly on the perceived service quality and any possible deviation from the expected quality. The degree of customers' satisfaction is not easily evaluated because, on the one hand, it depends on the intrinsic quality of individual and comprehensive services⁸. On the other hand, it relies on the social bond that results from the contacts with service providers. In fact relations between tourists and service providers guide the representations of tourism and mutual practices, especially in terms of loyalty. In such a way, to create added value for travelers, new types of firms are emerging and they act as search engines to orient tourists to find flights according to their environmental impact (cf. carbon-friendly flights). Furthermore, establishing social links can create a special attachment to a given service provider or a tourist site and keep customers more effectively than any generous loyalty program (Bodur and Grohmann, 2005).

5. Public organizations for tourism promotion

In a tourist site, these entities organize the vertical regulation system (the sector) seeking to promote the site. This requires some coordination between actors and especially between service providers and local authorities on the one hand; on the other hand, between service providers themselves. For example, many tourist offices offer on their websites many types of accommodation for the same site as a supermarket shelf.

6. Local communities

Local communities have two targets with which they communicate on the basis of their territorial jurisdiction: citizens and companies. As citizens elect representatives of these communities, the elected representatives should rather focus on the needs of citizens; however, the fulfillment of these objectives depends on the economic development of regions. Therefore, they are more committed in their relation to local firms. Communities do provide the inhabitants with grants in order to make possible their access to cultural facilities, entertainment and sports as well as to finance and help tourist firms in their local development program. They also provide a local regulation within their area of jurisdiction.

7. The state

Given its missions, the state has two types of relationship. First in a relationship with local communities where it intervenes to support local economic programs, particularly in financing a project which enhances the attractiveness of a given site (providing attractions, monuments restoration, assistance to establish businesses etc), or building infrastructure. Second, the state is related to all elements of the system as it implements the policy of regional planning and environment protection. Most importantly, it regulates the system by law enforcement and the development of proposals for legislation, and then voted by the Parliament and the Senate.

8. Learning sustainable development and its feedback loops

Both learning and feedback loops are crucial elements of complex system that we are explaining for the tourist system.

9. Learning

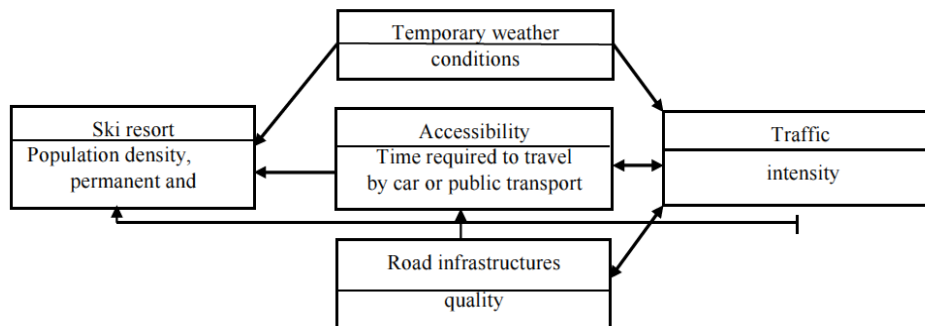
Sustainable development is such complex a system that it requires learning and therefore knowledge transfer. Tourist companies can rely on their previous mistakes in conveying the best steps to undertake in sustainable development. They can also abide by the instructions of decision-makers. For instance, Accor reports that it is not only implementing the recommendations of the Global Code of Ethics to Tourism that is applied by the World Tourism Organization, but it is also contributing to the development of the Ethics Charter of Tourism in France (Guillon, 2004). Sharing knowledge is a fundamental practice in the systemic organization of sustainable tourism. Participants' training in the process of sustainable development is essential. It must include the characteristics of each business, industry, corporate culture and local tradition.

Learning disseminates information. Marketing communication is of a crucial importance and it tries to be legitimate in the eyes of tourists. Sustainable development-oriented communication and activities make it possible to strengthen the links between the tourist firm and the customer who expects environmental action and to improve its image with its customers and its employees. In order to ensure their authentic character, communication experts must check that the media and media communications are persuasive and not counter-productive. Media persuasion is very important because it encourages tourists to optimize their use of transport and energy costs, to waive certain destinations or offers, despite the attractive prices and services, to be socially committed, to consider the environment. In this respect, since 1998, the European Charter for Sustainable Tourism has aimed especially at educating tourists to environmental protection.

10. Feedback loops analysis

Tourism can be considered in its systemic dimension to examine the feedback effects. We can consider the case of a sub-system related to a road to a ski resort to show the feedback inherent in any complex system. We observe that in order to develop a ski resort, road infrastructure should be improved. The easier the access, the heavier the traffic and the population. Nonetheless, improving the access and road infrastructure

Figure 1
Examples of retroactive effects over a ski resort population density



together with a nice weather can lead to travelers' resentment to approach the ski resort given the crowded roads leading to the ski resort (passers-by affluence decreases once there are signs of heavy traffic) and prematurely wearing out the road infrastructure, and hence, the importance of systematically and nonlinearly examining tourism activity.

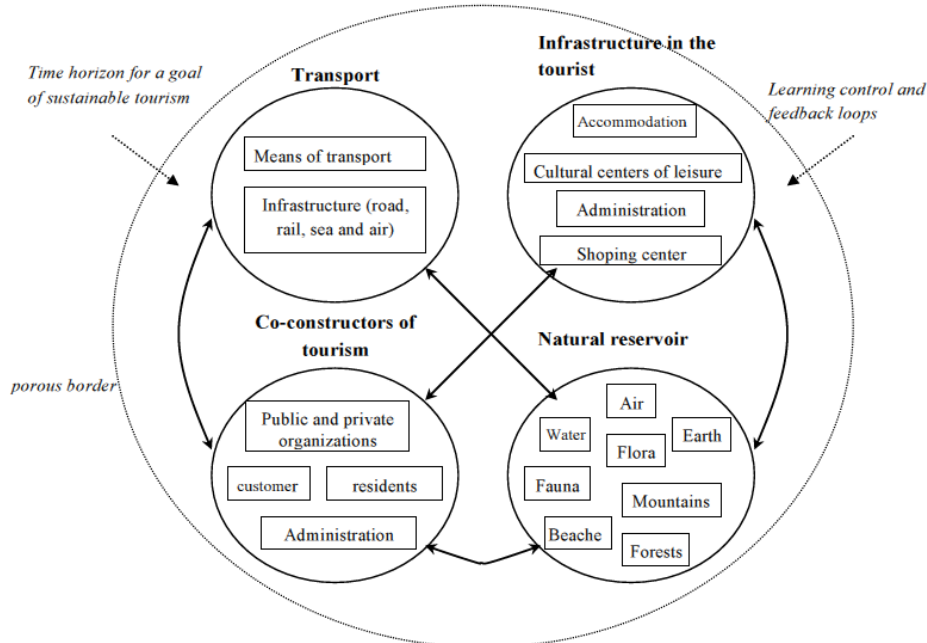
Feedback loops can also control and evaluate the impact of tourist practices and sustainable activities on the economic, social and environmental development. Measures have to be done on the short, median and long term. These measures often require the involvement of partners (suppliers, customers, local actors, etc.). The indicators required to monitor the effectiveness of measures used in sustainable

development include the level of CO₂ emissions and environmental footprint. Although the calculation methods are sometimes criticized, their evolution results in a tendency on the impacts of tourism. Given the results of audit on activities, some preventive or regulatory measures have to be taken.

Finally, sustainable tourism is made up of interconnected subsystems likely to act together so as to preserve the present and the future generations: the transport subsystem (a source of pollution and noise pollution, so a deterioration of the social and environmental capital), the infrastructure subsystem that is catering for the tourist activity (also a means of damaging the social and the ecological capital), the subsystem uniting the actors of the tourist activity (including members of the social and economic capital), and the natural subsystem that involves the reservoir (environmental capital which is subject to the strains of the other subsystems) (Figure 2).

The systemic presentation of sustainable tourism initiatives shows that individual participation in social and ecological tourism, results from registering quickly in a complex but synergetic system. For instance, the Organization 1901 Tourism for Development (TFD) was created by an Egyptian ship owner, Mustapha El Gendy who was eager to develop ethics in tourism practices. When a trip is stamped TFD, this means that the hosting hotel allocates a dollar a night for the purpose of backing a local development project held near the tourist site. However, such an individual initiative cannot develop without taking into account the various actors of sustainable development. Thanks to TFD partnership with Fnac Travels, the former succeeded in publishing a catalogue of services that suits its commitment. Being connected to such Non Governmental Organizations (NGOs) as Care and Enda Tiers Monde, TFD has

Figure 2
Systemic presentation of sustainable tourism



benefited many under-developed populations. In addition, TFD network of travelers (Voyageurs du Monde or World Travelers, Sand Roads, Fnac Travels, etc.) has widely increased the number of recipients who benefited from its label.

III. CONCLUSION

Economic issues of tourism imply that all actors have to limit their expansion, including countries, tourist companies, current or potential customers, tourism employees, etc.). Applying sustainable development in tourism requires a reevaluation of tourism by all stakeholders who should identify “another sort of tourism”, namely slower and milder (Castellani and Sala, 2010).

We have pointed that systemic analysis resulted in a better understanding of tourism complex social systems and thinking about long-term innovative and sustainable solutions pertaining to sustainable development. It also shows that a sustainable tourism initiative can be part of a virtuous circle, as a result to learning and feedback loops. For instance such a travel agency as La Route de Sens (founded in 1997) permits tourists to go on travels that are beneficial to sustainable development (25% of the travel price is devoted to hosting populations) and depending on the tourists' wishes, to contribute actively to helpful programs for local populations during their stay, like contributing to local development projects, technical, economic and logistical support, to participate after their travel in different events held by the organization, and to be benevolent to communicate in schools and other institutions on travelers' responsible behavior. Reconciling between sustainable development and tourism is, therefore, possible providing that economic actors strive to take into account the complexity of the system to which tourism belongs.

ENDNOTES

1. In 2009, tourism accounted for 6.4% of GDP in France, more than 900,000 salaried jobs and balance in foreign trade estimated at €7.8 billion (source: <http://www.senat.fr/rap/r10-684/r10-6846.html>).
2. http://www.rfi.fr/actufr/articles/073/article_41389.asp
3. http://www.tourmag.com/Taxe-CO2-les-clients-de-Voyageurs-du-Monde-n-ont-plus-le-choix_a25535.html
4. http://www.consoglobe.com/ac-environnement-biodiversite_1990_vegas-royaume-gabegie-fait.html
5. http://green.thefuntimesguide.com/2007/04/las_vegas_energy_use.php
6. ISF : solidarity tax on wealth in France
7. http://europa.eu/legislation_summaries/environment/sustainable_development/g24_229_fr.htm
8. The failure of an actor of a service providing group of a travel has often an impact on the perceived quality of individual services even if they are not linked to each other. For instance, delaying a flight or luggage loss may have a negative effect on the overall satisfaction of a traveler as well as that related to his stay in a hotel while the latter has no responsibility for the transport quality.

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