Sustainable Hotel Industry from the Perspective of the Social Environmental Management

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ABSTRACT

Sustainable projects development cannot be considered just from the perspective of passive design, sustainable construction, and energetic efficiency of the building during its life cycle. Other dimensions of systemic sustainability must be involved as a part of the real-estate management model, in order to increase its importance and establish equity and efficiency based on relationships with the economic and cultural context where each project is located. This point of view starts off by recognizing that construction is not just a contaminating, noisy and negative transformer of the physical medium activity, but it is also a promoter of positive cultural and social transformation of the community located around the project.

A social-environmental management model is presented based on this condition, which allows a hotel-oriented construction to establish cooperation and integration networks with its neighbors, starting right from the preliminary design stage, the construction stage and involving its future operation. This sustainable social management model involves, during the development of the Terra Bio-hotel project, the participation of social sciences professionals like historians, sociologists and anthropologists, whose management of the community made possible to include the hotel project, during its construction process, in the imaginary of a traditional community of Medellin, embracing a contemporary project as a new neighbor, which stimulates the life in the neighborhood and joins the community with cultural, artistic and environmental management activities. In this social-environmental management stands out the participation of the neighborhood administration board on the projection of its social model with a regional scope, through projects like: agro-ecological market, solid waste comprehensive management and historical memory recovery.

INTRODUCTION

In terms of population and economic dynamism, Medellin is the second largest economy in Colombia and holds a high visibility within the Latin-American region, due to its recent development in urban infrastructure and equipment. It has been a decade since the city was projected as a business destination by promoting and consolidating it internationally. However, its hotel infrastructure –which is expected to host a high volume of visitors and people invited to different fairs, conferences and events- does not differ significantly from a traditional model of hotel industry that makes an intensive use of renewable and non-renewable resources, such as water, energy and food, and its social-environmental management does not differ significantly from a traditional model of hotel industry that makes an intensive use of renewable and non-renewable resources, such as water, energy and food – involving high environmental and social impacts during the life cycle of buildings. In this scenario, alternative experiences serving as a model –or laboratory- are pertinent and useful in order to incorporate the notion of systemic sustainability in Colombia’s and Latin America’s hotel industry.

Terra Biohotel is a hotel project with 41 rooms and an area of 2,666 m² (about 28,697 ft²). From its design phase, it was conceived as a technical and technological innovation proposal based under the principles of “Systemic Sustainability” (El Khouli, 2011), “Territorial Social Responsibility” (in Spanish “Responsabilidad Social Territorial”) (Alquимиа, 2012) and “Glocalization” (Robertson, 2003). These conceptual premises aim to minimize the negative social-environmental impacts and to potentiate the positive impacts of the hotel project throughout its life cycle. In order to carry this out, sustainable strategies were implemented in Terra Biohotel during its design and construction phases, while actions to guide the project sustainability during its operation phase are planned.

SUSTAINABILITY IMPLEMENTED IN THE DESIGN PHASE

Bioclimatic passive design strategies in Terra Biohotel architectonic project are based on the analysis of the location, the environmental preexistences and the variables prioritization such as solar incidence, natural lighting, natural ventilation and noise (García, González, & Salazar, 2006), and were complemented with the method of projecting for the High Environmental Performance Architecture (AADA, for its acronym in Spanish) (Bedoya, 2011). The results of this design exercise made it possible to build a structure whose exposure to direct solar radiation is minimized (See Figure 1, letter a). The project counts on a performance of natural lighting superior to 8 hours a day and a natural ventilation system that allows guests to do a secondary use of the air conditioning system, achieving -this way- energy efficiencies superior to 50%, compared with a conventional building of the hotel industry in Medellin.

SUSTAINABILITY IMPLEMENTED IN THE CONSTRUCTION PHASE

Social-environmental resident building manager: according to the current building policy in Colombia, it is not mandatory to hire this type of professionals in private projects. However, Terra Biohotel decided to employ an environmental engineer, so he could control the environmental impact during the construction phase, as well as the social relationships between the neighborhood residents and the Project.

Construction and Demolition Debris (C&D) comprehensive management: during the construction phase of the project, C&D were constantly separated at source (See Figure 1, letter b), which maximized their subsequent reusing and recycling. The results obtained from these processes are: 514 m3 (about 18,152 ft³) of C&D were reused in a road in a near construction site; 449 m3 (about 15,856 ft³) of concrete, mortar and stone material waste were recycled and concrete blocks for the hotel envelope construction were made with it; 6,900 kg (about 15,211 lb) of wood were reused as biomass; 593 kg (about 1,307 lb) of metallic waste and 188 kg (about 414 lb) of polyvinyl chloride (PVC) were recycled by specialized companies. In the course of the construction process, paper, cardboard, glass and plastic were constantly separated and given to an informal recycler who worked in the neighborhood.

Figure 1  (a) Sample of sun protection element in the building and (b) C&D separation.
Water resources comprehensive management: Throughout the construction phase, a water recirculation system was installed in the block cutter machine and in the concrete mixer. Water losses produced during the cut were supplied with the water resulting from the concrete mixer washing, producing –as a result- a closed cycle for water reusing (See Figure 2, letters a and b). Such strategy made it possible to reuse 34,413 l (about 9,090 US gal) of water which contained a high amount of sediment, and to prevent their discharging as well as the contamination of proximate water sources and possible obstructions in the urban rainwater harvesting systems.

Selection of materials: The materials selected for the construction phase of the project were eco-materials, coming –as much as possible- from low-polluting production processes and from recycled materials that could be recycled again at the end of their life cycle. Moreover, in order to prevent a high level of emissions to the atmosphere due to the transportation, materials were locally obtained. The most representative material in the project is the recycled concrete block which was used in the masonry of the building. This material is made up of a 38% of recycled concrete and the block supplier company has been provided with it- as a by-product of the construction phase- by Terra Biohotel. The 95,237 blocks required for the construction phase contain 268 metric tons of recycled concrete, which is equivalent to the same amount (in metric tons) of natural stone aggregates that did not have to be exploited in the quarries of the area.

During the execution of the structural concrete. Fuel Oil N. 2 was replaced by a natural oil coming from the castor oil plant and used as a non-stick and mold release agent for the concrete formworks, avoiding –this way- the generation of a dangerous waste with a high potential of water and soil polluting.

Atmospheric emissions and noise control: The measures implemented to mitigate the spread of particulate matter in air and to reduce the sound pressure levels which the residents living near the project are exposed to were: 1) Covering the fine construction materials and the excess material from excavations. 2) Moistening uncompleted surfaces as well as those ready to be swept. 3) Closing the area intended for the block cutter and concrete mixer since they were potential sources of noise. With the objective of improving the acoustic insulation of these closing areas, part of the expanded polystyrene used in other construction processes was reused. Introducing such measure for reducing air and noise pollutants contributed to the cordial relationship with the people living near the construction, who recognize that Terra Biohotel is a social caring company.

Construction worker training: The project construction workers were constantly trained about sustainability and safety, which contributed to create an environmental awareness and a self-protection consciousness (See Figure 2, letter c). These experiences were later replicated in other construction projects. They also implemented some of the new ideas, such as management and care of water, in their own homes.

Figure 2 (a) Double sedimentation in the process of block cutting, (b) Pumping of clarified water to be reused later in the block cutter and (c) Construction worker training.

Sustainable School-Hotel: During the construction process, the transference of experiences and knowledge was fostered. Terra Biohotel has embraced students and professors from different universities of Colombia who have been interested in going into detail about the sustainable component of the project (See Figure 3, letter a). Some of the undergraduate students are carrying out scientific initiation researches, graduation theses and professional practices about the project development. The initiative of “Sustainable School-Hotel” aims to transmit a message of systemic sustainability to the community, to the government and to the organized civil society, by means of the promotion of networking and mutual learning and citizen awareness about the clear connection between their consumption habits and life style with the environmental degradation and the magnification of the social gap separating individuals in a same community.

Development of a sustainable community: with the goal of putting into practice the systemic sustainability approach, set as one of the most important premises in the project Terra Bio Hotel, it was necessary that the management model went beyond the notions of passive design, energy efficiency and construction under environmental sustainability, towards the development of a sustainable Community. To carry this out, Terra Biohotel unified efforts and works with the Communal Action Board of the neighborhood Los Conquistadores in the city of Medellin, whose leaders and representatives agreed with the objectives to develop sustainable management initiatives in the area of the hotel project. It is also expected that the residents take responsibility –individually and collectively- for their negative social-environmental impacts and take part in the execution of specific tasks, namely the mitigation or reversion of such impacts.

This social collective work, together with the Communal Action Board of the neighborhood Los Conquistadores, favored the spreading of the sustainable systemic initiatives of the project, aiming to go beyond the citizens’ everyday reality to increase their social-environmental culture levels in order to obtain a healthier environment for everybody, by promoting a healthy diet, the sense of caring and belonging of public space, the neighborhood historical memory recovery, the appropriate and conscious use of water sources, and the comprehensive solid waste management by means of recycling. Next, three initiatives that run today with the Communal Action Board of the neighborhood are described:

1. Agro-ecological market: it fosters health care among the residents of the neighborhood by encouraging people to consume food products –free of pesticides and chemical fertilizers- coming from the countryside. This initiative looks forward consumers to be more aware of the environmental quality of the products they eat. And –at the same time- it is expected to provide the neighborhood with a meeting place where people can reinforce the social fabric, by fostering environmental consciousness together with culture and ludic activities. Such enterprise becomes real with the contribution of the community, private companies and the public sector (See Figure 3, letters b and c).

The agro-ecological market enabled the fact that a group of farmers from the rural area of Medellin could commercialize their products directly with consumers, raising their incomes as well as their quality of life, while the people from the neighbourhood can buy healthy products. Up to June 2014, nine monthly versions of the agro-ecological market have taken place in the neighbourhood Los Conquistadores with the help of Terra Biohotel. The market is now recognized because of its approach of systemic sustainability and other neighbourhoods in the city have replicated the idea. All of this is just an alternative that promotes the responsible consumption, solidarity and collective welfare.

Figure 3 (a) Post-graduate students from Monteria, Colombia visiting the project, (b) Agro-ecological market and (c) Training conference about healthy diet provided by the Mayor’s office within the agro-ecological market.
2. Solid waste comprehensive management: this plan intends to strengthen the resident environmental education in order to motivate them to manage solid waste rightly, to reduce waste in sanitary landfills, to avoid health problems related to the growth of unhealthy vectors, to create formal employments, to reduce the street cleaning tax for residential complexes, and to generate a prototype experience in waste management that could be replicated in another places of the city.

To develop the solid waste management in the neighborhood, there is a team that meets weekly and that is composed by the public sector: Secretary of the Environment and Natural Resources of Medellin (Secretaría del Medio Ambiente del Municipio de Medellin), the private sector: Terra Biohotel, the academy: University Colegio Mayor de Antioquia (Institución Universitaria Colegio Mayor de Antioquia), and the civil society: neighborhood Los Conquistadores residents. The work of this team is now materialized in the proposal of a project dealing with solid waste management for the neighborhood, which will be administered by the Communal Action Board, as a representation of the inhabitants.

3. Historical memory recovery: this project aims to preserve the neighborhood’s identity and historical memory by means of appealing stories about the beginning, the history and the development of the neighborhood. With the narrative and visual material collected, it is expected to organize cultural events that broadcast the recognition of the neighbors with their community. Moreover, elderly population will be invited to participate in the Terra Biohotel initiatives concerning education in systemic sustainability (See Figure 4, letter a). Art, culture and ludic are invited to this project as facilitator elements for this idea become established (See Figure 4, letter b).

SUSTAINABILITY DURING THE OPERATION PHASE

Comprehensive water resources management: Terra Biohotel will re-use the gray water from the building to garden irrigation and hotel toilet flushing. The project has a water purified system the of the phreatic zone, which will allow a quite approximate proportion of 30:1.

Energy efficiency: the bioclimatic design of the building structure will minimize the use of electric energy associated to air conditioning and artificial light consumption in the hotel in a proportion of 50% of a conventional energy operation in hotels of similar type and size. The hotel is provided with high energy efficiency machines, such as LED lamps, solar collectors for heating water and an air conditioning system adapted to the geographical location and climate conditions of the city of Medellin.

Comprehensive solid waste management: in the hotel operation, recyclable waste will be gathered, ordinary waste will be compacted, and organic waste will be composted to minimize the volume of solid waste dumped in the open-air sanitary landfills of the city.

Sustainable destination-hotel: the Terra Biohotel model of systemic sustainability management aims to organize an environmental, gastronomic, cultural, pedagogical, and patrimonial tourist offer which set the city and the region as an interesting sustainable tourist destination.

Broadcasting and sensitzation: besides the commercial and economic management of the hotel project, a constant pedagogical management will be developed and will be oriented to inform the people directly interested in the project -potential clients, employees, suppliers, residents, authorities, students and professors-, so they become sensitized about the problems that the current unsustainable model has, by promoting systemic sustainability: a socio-economic and environmental balance.

CONCLUSIONS

The main contribution of this paper is the exploration of the social dimension in the systemic sustainability incorporated to the building industry, during the phases of construction and life cycle of the building. Regarding Terra Biohotel, it is important to remark its interdisciplinary contributions that go beyond the role of architecture and construction and that aim to reduce the environmental impact caused by construction, to achieve a strong community social incorporation and to create shared value, even in commercial uses, such as hotel industry, whose impacts are not taken into account during the planning, design and operation of a project. This environmental and social facet of systemic sustainability shows the impact of management micropolitics wills, linking the local neighbourhood management with the private sector of construction, in order to point the hotel project towards an exercise of economic sustainability, able to exceed the relation cost-benefit, supported on the environmental and social responsibility of construction.

Experiences developed and documented in this paper highlight the contributions of Terra Biohotel in a social, economic and political context, who management could become a proofing experience, able to contribute with environmental, social and economic analysis elements, in comparison to the problems resulting from the impact that conventional construction has, from the perspective of territorial social responsibility, glocalization, and governance, and to provide alternative solutions that influence the Colombian and Latin American reality.

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REFERENCES