
Original Article

Toward a framework for the components of green lodging

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ABSTRACT This article seeks to provide a better understanding of green lodging and its components. The article provides a framework that illustrates how lodging properties interact with the physical environment, the negative environmental externalities created by the interactions and the solutions necessary to eliminate and ameliorate the negative externalities. An inductive approach is utilized, which combines interview data with content analysis. Findings suggest that green lodging is deliberate, and concerted efforts undertaken by lodging operations to mitigate or ameliorate the negative environmental externalities associated with lodging operations. These externalities generally manifest themselves in energy usage, water usage, air quality and waste management. Components of green lodging include the fixtures, facilities, amenities, supplies, equipment, services, consumables, and practices that are adopted, implemented and maintained to reduce or eliminate externalities. Collectively, these components can be described as technical and behavioral components. Technical components are the physical or tangible elements that should be adopted, installed or maintained to eliminate or reduce externalities, whereas the behavioral components relate to behaviors and practices that should be adopted. Future studies are encouraged to explore barriers to implementation of green practices in hotels, lodging managers' and consumers' attitudes toward green practices in the lodging industry, and how hoteliers are managing the 'green' supply chain.

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INTRODUCTION

The green revolution has impacted all facets of society and all sectors of the global economy. This includes the hospitality and tourism industry, which has attempted, over the years, to incorporate sustainable practices in its various segments. In recent years, however, there has been a significant impetus toward incorporating green practices into all areas of the lodging segment. The lodging industry, for the most part, is largely dependent on the physical environments in which hotels operate. This is especially the case for resort properties, which often use the physical environment as part of their unique selling proposition. In general, the industry is not typically perceived or regarded as a major polluter, especially when compared to heavy or 'smokestack' industries (Faulk, 2000; Bohdanowicz, 2003), and historically has received little or no environmental scrutiny and is virtually unaffected by environmental regulations (Cespedes-Lorente *et al*, 2003). Today, the level of environmental scrutiny received by the hospitality industry as a whole has increased, and lodging-related businesses are implicitly expected to conduct business in ways that are deemed environmentally or ecologically responsible. Several factors have led to this change or shift in expectation. These include: consumers' demand for lodging facilities to become more environmentally friendly; increased environmental regulation at all jurisdictional levels; lodging companies' concerns about business ethics and socially responsible business practices; the need for hospitality facilities to be esthetically pleasing; physical plant maintenance issues; and finally, the need to improve customer satisfaction (Foster *et al*, 2000). Despite the growing importance of these factors, the greening of lodging facilities continues to generate considerable debate. Much of this debate has centered on the issue of what constitutes green lodging. Although several lodging operations have fully grasped and incorporated the concept into daily operations, for others, a true definition and understanding of the components of green lodging remains elusive. In fact, some operations simply find the concept confusing (Mandese, 1991).

The purpose of this article is to define, identify and document the components of green lodging. Currently, there is an abundance of literature relating to green lodging and green practices in business. However, such information, for the most part, is widely dispersed and is often difficult to interpret. Further, a definition of green lodging is essential as presently there are several purported definitions for the concept, which can lead to confusion in its application and adoption. Hence, this article seeks to overcome these shortcomings by researching and documenting the components of a comprehensive green lodging program. The article also provides a framework that illustrates how lodging properties interact with the physical environment, the negative environmental externalities created by the interactions and finally, the solutions necessary to eliminate and ameliorate the negative externalities. It is important that such a framework is developed, as stakeholders are increasingly demanding that hotels adopt and incorporate green practices into daily operations. The framework can be used as a guide by lodging operations to ensure that their green lodging program encapsulates all the



components that are critical for success. Although these practices can be incorporated into all five stages of a hotel's life cycle planning, construction, operation, maintenance/renovation/refurbishment and demolition (David, 2006); the article focuses on documenting components germane to the operation stage, as resource consumption and the generation of negative externalities are at their peak during this stage. The article's research design follows an inductive approach that combines interview data with content analysis. Twenty-three interviews were conducted with lodging professionals, energy, waste management and water supply professionals while content analysis was carried out on research and technical reports.

LITERATURE REVIEW

Green practice research has grown steadily since the 1970s (Hartmann and Ibanez, 2006). In recent years, however, there has been a resurgence and renewed vigor among society as it relates to environmental issues and green practices. This has been propelled largely by numerous reports suggesting that human activities are having adverse effects on the environment and are leading toward 'global warming' (Appenzeller and Dimick, 2004). Although some researchers have pointed to an increase in green initiatives among businesses, (Hassan, 2000; Mihalic, 2000; Hu and Wall, 2005; Claver-Cortes *et al.*, 2007), others have noted that marketing green products and services to consumers is on the decline in several sectors of the economy. The purported reason for this is that customers are often skeptical about claims of environmentally friendly products and services, and companies have exercised caution, and are reluctant to publicize their green programs for fear of being labeled as practicing or engaging in 'green washing' (Peattie and Crane, 2005; Hartmann and Ibanez, 2006). Further, others have noted that instead of embracing green initiatives, consumers are often cynical about companies' claims about green products and services (Kangun *et al.*, 1991; Martin and Simitiras, 1995; Davis, 1996; Polonsky *et al.*, 1998).

Although consumers have expressed concerns about the environment, these concerns have not translated into purchase or consumption of green products and services (Wong *et al.*, 1996; Peattie, 1999; Crane, 2000). This is because consumers often perceive several green or eco-friendly products and services as expensive and unattractive, especially when compared to similar non-green products and services (Johri and Sahasakmontri, 1998; Lubieniechi, 2002). Further, consumers appear to be price sensitive when buying green products and services (Mandese, 1991), and are generally unwilling to pay a premium for such items (Wasik, 1992; Manaktola and Jauhari, 2007; Kasim, 2004). Consumers who purchase green or environmentally friendly products and services must perceive the quality as equal or superior to the utility provided by traditional non-green ones. This is important as customers are unwilling to accept a lower quality green product or service especially at a higher price (D'Souza *et al.*, 2006). Despite these findings, other empirical research suggests that for some segments, price is not an issue when deciding whether to purchase green goods and services. Instead, value appears to be more important and these customers are willing to pay a

premium for green products because of the intrinsic value obtained from such purchases (Boyce, 1992; Menges, 2003).

Despite the aforementioned findings, the availability of green products and services in the hospitality industry has grown significantly in recent years (Peattie and Crane, 2005). In fact, it has been suggested that as tourism operates in relatively pristine and often fragile environments, and is often dependent on such environments, the principles of sustainable tourism as displayed through green practices are complimentary to tourism development (Hassan, 2000). Studies have also shown that policies and practices geared toward managing and improving the environment can enhance a destination and consequently a lodging property's competitiveness (Hassan, 2000; Mihalic, 2000; Huybers, 2003). Hence, it seems appropriate and beneficial for lodging facilities to adopt policies and practices aimed at minimizing the overall negative impact on the environment (Claver-Cortes *et al.*, 2007). Further, consumers are increasingly indicating that hotels should display concerns about the environment through their practices (Miller, 2003; Hu and Wall, 2005).

Previous studies suggest that corporate motives for adopting green or sustainable practices include regulatory compliance, competitive advantage, pressure from stakeholders, ethical concerns, critical events and senior management efforts (Lawrence and Morell, 1995; Winn, 1995; Bansal and Roth, 2000). Corporate motivations to pursue green initiatives are driven by: the need to maintain *competitiveness*, or using green initiatives to enhance profitability; *legitimization*, or the company's desire for improvement based on established regulations, values, norms and beliefs; and *ecological responsibility*, or the need for the firm to meet its social obligations (Bansal and Roth, 2000); Bansal and Roth (2000) also argued that motivations to 'go green' are driven by three conditions: *issue salience*, or the importance that an organization places on ecological issues; *field cohesion*, or the strength of the organization's ties with its constituents; and *individual concern*, or the extent to which the organization's members value the environment and their propensity to act in the best interest of the environment.

Motives for adopting green initiatives in the lodging industry appear to be benefit and business driven. Thus, it is likely that lodging operations as business entities will evaluate the financial feasibility of investing in green initiatives. Hence, hotels will adopt green initiatives if they lead to profitability factors such as cost savings, competitive advantages, employee loyalty, increased customer satisfaction and retention, or if they enable the hotel to comply with, or circumvent governmental regulations or minimize exposure to operational risks (Graci and Dodds, 2008). Hence, although hoteliers recognize the need for the industry to be more environmentally conscious (Bohdanowicz, 2005) and display genuine concern about the environment and green initiatives (Cespedes-Lorente *et al.*, 2003), such concern appears to be driven by the potential benefits derived from implementing environmental conscious or green initiatives. Further, implementation of green initiatives often requires investments that are not components of traditional hotel core competencies, (Kasmin, 2004) and hence, from a business standpoint, such investments must be



justifiable and result in economic benefits and advantages for the lodging facility. Chief among these benefits is cost savings (Cheyne and Barnett, 2001; Rivera, 2002; Gonzalez-Benito and Gonzalez-Benito, 2005; Lynes and Dredge, 2006; Graci and Dodds, 2008). In fact, cost advantages in the form of financial savings are one of the most important factors that determine whether a company implements environmental initiatives (Graci and Dodds, 2008).

Green practices generally focused on mitigating the negative effects associated with energy and water usage, indoor air quality and waste generation. Energy usage and consumption in hotels differ from other commercial facilities because of the vast number of facilities – guestrooms, restaurants, kitchens, on-premise laundry, recreational facilities, and guest support service centers such as hotel-operated business centers. Lodging facilities collectively rank among the top five in terms of commercial buildings' energy usage (Balaras, 2003). Electricity is by far the most widely used source (60–80 per cent), followed by natural gas and fuel oil (American Hotel & Lodging Association, 2001). However, by following carefully developed green practices, hotels can reduce energy costs by as much as 20 per cent without any major or significant investment (O'Hanlon, 2005).

Water usage in hotels includes use for sanitary purposes, recreation, cleaning, cooking, drinking and heating, ventilating, and air conditioning (HVAC) systems. Like energy, water use in most hotels (some hotels have a relatively high base load unrelated to occupancy levels) varies directly in relation to occupancy levels. Usage also varies based on the levels of service provided and whether the property has an on-premise laundry and full food and beverage production areas. However, in general, most of the water used by a hotel is consumed in guestrooms, which generally consume between 33 and 44 per cent of a property's total water usage, followed by the food and beverage production area: 18–28 per cent; public washrooms: 15–17 per cent; on-premise laundry: 11–20 per cent; pools: 2–3 per cent and HVAC systems: 1–2 per cent (Deng and Burnett, 2002). Linen usage can also significantly affect the amount of water a property uses. Hotels that provide a high level of service typically use more linen than those that offer lower levels of service. Daily linen loads range from 5.6 lbs per room occupied at budget hotels to 13 lbs per room occupied at luxury hotels (Lawson, 1998). The type of laundry equipment used by a hotel can also affect water usage. Each pound of laundry typically requires between 6.1 and 6.9 gallons of water if the laundry system is efficient and more than 8 gallons per pound if the system is inefficient (Lawson, 1998). Further, faucets and piping systems must be checked constantly for leaks, as a single leaking tap can waste approximately 9513 gallons of water each year (International Hotel & Restaurant Association, 1995).

Indoor air quality is also of importance in any green lodging program. This issue has gained significant attention in recent years and has been acknowledged by lodging managers as an area of important concern (Emblem, 2001; Hewett, 2001). Clean air practices are directly related to energy efficiency and will reduce exposure to health-related liability, as well have a positive effect on employee and guest relations. The optimal

conditions as they relate to indoor air quality for lodging facilities are addressed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE standard 62), which describes ways in which a lodging facility can achieve acceptable indoor air quality (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 2005). Indoor pollution sources that release gases or particles into the air are the primary cause of indoor air quality problems. Typical indoor pollutants include inorganic gaseous compounds, particulates – (dusts, fibers, fumes, fogs and smoke), bioaerosols – viruses, bacteria and fungi. Other sources of indoor pollutants in hotels include combustion sources such as oil, gas, kerosene, coal, and wood, building materials and furnishings, asbestos-containing insulation, wet or damp carpet, and cabinetry or furniture made of certain pressed wood products, products used for cleaning and maintenance, central heating and cooling systems and humidification devices (Grieve, 1991).

The production of goods and services in the lodging industry generates a tremendous amount of waste, which includes organic waste, oils and grease, cardboard and paper products, glass, plastics, aluminum products, metal items, appliances and furniture, building and construction materials, hazardous waste (batteries, solvents and paints, light bulbs and lighting fixtures, detergents, computer equipments and parts (monitors, central processing units, ink toners and cartridges), linens and clothing items. Lodging operations that implement waste prevention measures can reduce purchasing costs and disposal fees, especially through the adoption of recycling programs (Potts *et al.*, 1994). Thus, waste prevention not only helps protect the environment and conserve natural resources, but it also makes economic sense (Post, 1993).

The literature suggests that there appears to be an increase in green initiatives and environmental awareness among consumers and businesses. Although this awareness has not translated into direct consumption of green products and services in large proportions, it appears as though embracing and implementing green practices can be beneficial to lodging operations. The literature also suggests that the underlying principles of green practices are conducive toward sustainable lodging development and management. Such principles focus on energy and water conservation and management, promotion of good indoor air quality and waste management and reduction. Finally, the literature suggests that adoption and implementation of green practices in the lodging industry are benefit driven, with cost savings being the most important factor.

METHODOLOGY

This article followed an inductive approach and employed two research methods – content analysis and in-depth interviews using a semi-structured format. Content analysis of research and technical reports were used to identify themes related to green lodging and the interviews were used to verify the applicability and categorization of the themes that emerged from the content analysis. Therefore, both methods were closely



linked to enhance the validity of each other. The study applied purposeful sampling and informants were selected based on the contribution they could make to the study (Creswell, 2007).

Content analysis was conducted on secondary data to identify patterns and key themes in green practice and green lodging. The sampled literature was confined to leading hospitality journals, general management journals and technical reports prepared and produced by scholars, government agencies and generally accepted credible and reputable organizations. Articles and reports were initially identified using the keywords *green practices*, *green lodging*, *green hotels*, *best practices in green lodging* and *sustainable lodging*, appearing in the title, abstract or subject terms using EBSCOhost, Proquest and Google search engines. Articles and reports were considered for selection and further review if they were deemed likely to provide information relevant to the subject matter and further, if they could add breadth and depth and enrich the data from which inferences could be drawn. Specifically, articles and reports were considered for selection and further review if the content related to green or conservation practices for commercial facilities and particularly lodging facilities.

Themes that emerged from the content analysis suggested that components of green lodging surrounds practices and procedures geared toward minimizing lodging facilities' impact on the environment through water conservation, energy management and conservation, indoor air quality control and waste elimination, management and control. Once these themes were identified, interview questions were developed from them and interviews conducted to verify the themes and obtain insights into the definition and components of green lodging. The interview questionnaire contained eight questions. The questions and the topics of discussion were developed and designed in direct relation to the main objective of the study: What constitutes green lodging? The interviews began with the broad questioning about interviewees' perceptions and definition of green lodging, the aims and goals of green lodging and what should be included in a green lodging program. Interviews were conducted face to face and over the telephone and lasted between 20 and 45 min and were organized in semi-structured or semi-standardized discussion format. Responses were digitally recorded and transcribed verbatim. Each transcript was then read by the researcher while listening to the audio recordings, and a constant comparison approach was used to identify frequently occurring themes.

A total of 23 interviews were conducted of which 13 were with lodging professionals, four with lodging product suppliers, three with energy management experts, one with a waste management expert and two with water supply management experts. Initially, green-certified full-service hotels were randomly selected from two jurisdictions (Florida and California) in the United States. The hotels were selected from a published list of independently certified green hotels. Participation in each jurisdiction's green certification program is voluntary; however, each state offers incentives designed to induce participation. Certified green hotels were selected for inclusion in the study, as they were considered to be informed about the issue under investigation.

Full-service hotels were selected because they offered a wider range of services (than limited service hotels) and were deemed likely to have extensive facilities that would need to adhere to green practices as part of their green certification program. Therefore, key informants at these properties were likely to provide an abundance of information related to the components of green lodging.

Selected hotels were contacted and the key informant for the property's green program identified, contacted and solicited for participation in the study. Suppliers and waste management experts were selected following leads generated from the lodging informants. These professionals were contacted via telephone and solicited to participate in this study. Lodging suppliers were selected and included in the study, as hotels that have implemented green programs typically require preferred suppliers to prepare, package, transport and deliver supplies in ways that are considered to be ecologically friendly. Energy and water conservation professionals were selected from their company's website and contacted to participate in the study. These professionals were selected because they could provide critical information on conservation practices in their respective areas. The final sample comprised of 16 women and 7 men. All informants were assured anonymity for themselves and their companies.

RESULTS AND DISCUSSION

Green lodging defined

Findings suggest that green lodging can be defined as concerted and deliberate efforts and practices by lodging operations and their agents to mitigate, ameliorate and eliminate the negative impacts of lodging activities on the environment. To be effective, these efforts and practices should encompass and permeate throughout all business and service delivery processes, and should be supported at all managerial and operational levels of lodging organizations that claim to be 'green', or participate in comprehensive environmentally friendly programs. This suggests that the concept of green lodging, therefore, should not be confused with 'green washing', or the deliberate manipulation of information by companies to portray themselves and their goods and services as environmentally friendly, when upon further in-depth scrutiny, only some or selected components of their operation adhere to the core principles of the green concept. This finding also suggests that for some lodging operations, green lodging and green lodging management entail a shift in attitudes, practices, behaviors and processes toward embracing and incorporating current 'green' or environmentally responsible practices and procedures into all aspects of goods and services production, delivery, consumption and disposal. This also suggests that the first step in understanding and practicing green lodging should be an examination of how each lodging facility impacts the environment in which it operates. In general, lodging facilities are income-producing entities and as such, must install furniture, facilities, equipment and fixture in an effort to create an environment that is esthetically pleasing, safe, secure and physically comforting. Further,



each property tries to ensure that its physical facilities, equipment, mechanical systems, service areas, attractions – both man-made and natural – and other supporting facilities are well maintained and offer guests the utility they desire. These activities require resource inputs that invariably create several negative environmental externalities. Therefore, the overarching goal of any green management program should be to ameliorate, mitigate and eliminate these negative externalities through a combination of technical and behavioral solutions. These findings are captured in Figure 1, which provides a schematic framework of a typical lodging facility's interaction with the physical environment. Figure 1 suggests that lodging facilities require several different types of resource inputs to provide goods and services for their guests. Invariably, the consumption and use of these resources create negative externalities that are manifested in water consumption, energy consumption, air pollution and waste generation. The schematic framework suggests that the components of a green lodging program should be technical and behavioral solutions geared towards ameliorating and eliminating the negative environmental externalities associated with lodging operations.

Components of green lodging

Components of a green lodging program include all activities and efforts aimed at reducing or eliminating the negative environmental externalities of hotel operations. Collectively, these components can be described as either technical or behavioral solutions. Technical solutions refer to adopting and using fixtures, facilities, amenities, supplies, equipment, services and consumables that minimize or eliminate the negative externalities associated with hotel operations. This could entail ensuring that existing equipment meet or exceed efficiency standards through proper maintenance and operation, or installing fixtures and equipment that are classified or certified as green or eco-friendly. Certification and classification of products and services appeared to be a source of contention and misunderstanding, which made it challenging for some respondents to definitively determine or assess whether products and services adhered to green or sustainable practices. A clear understanding of the green certification process is important, as well-intended efforts by lodging operations could be compromised if they secure and use products and services that are not correctly and appropriately certified. This suggests that a clarification of the different levels of certification is required. In general, there are three levels of certification. These are: first-party certification, second-party certification and third-party certification. *First-party certification* is self-certification and is based on an organization's internal assessment of its products and services. This type of certification therefore is not reviewed, certified or validated by any second or third independent body. If a lodging operation decides to procure goods and services that are first-party certified, it behooves the operation to confidentially substantiate the supplier's claims and make every effort to ensure that the certification process adheres to ISO 14021 (Environmental labels and Declarations), which sets the guidelines for independent certifications. *Second-party* certification refers to

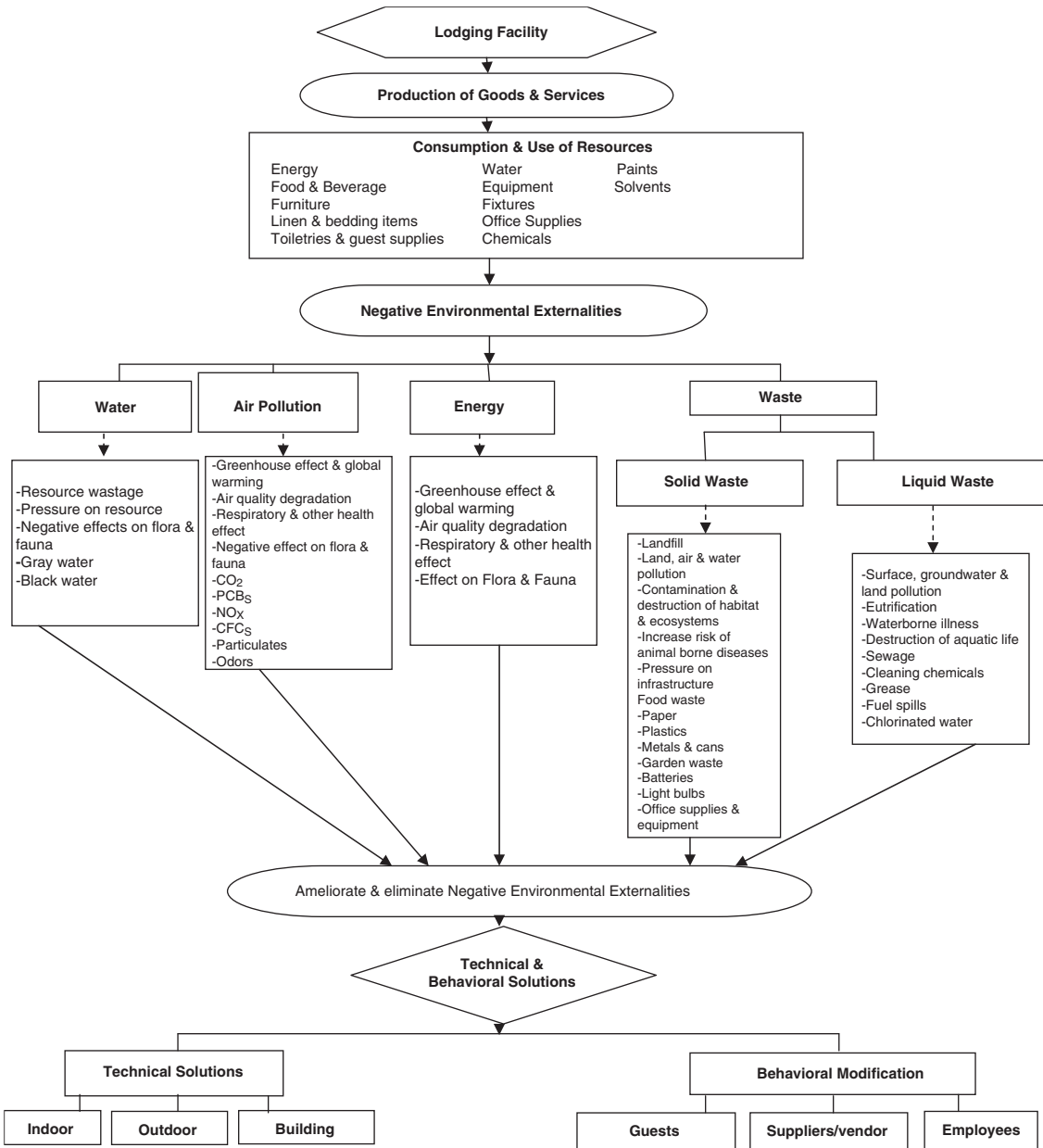


Figure 1: Schematic overview of a typical lodging facility's interaction with the environment, negative externalities generated and technical & behavioral solutions.

assessment and certification of products and services by outside entities who are usually members of the same industry. Products and services may be certified based on one or more of its attributes. Certification of such products and services are usually accomplished onsite or offsite. For example, carpets used by a hotel may be certified by the Carpet and Rug Institute based on its emission of volatile chemicals. Finally, *third-party certifications* are conducted by independent, neutral parties based on predetermined criteria. These bodies have no affiliations with the product or service supplier and usually provide a set of transparent standards



for all clients. Third-party certifications are usually the most stringent of the three and are conducted off-site. Table 1 provides a list of the major third-party eco-certification bodies. Other important tools that provide guidelines that can be used by hotels include the The EU Eco-Management and Audit Scheme, and ISO standard 14001.

The behavioral component of a green lodging program refers to deliberate efforts by lodging operations to communicate their property's green program, its goals and objectives to their stakeholders. The overarching purpose of this effort is to attempt to encourage stakeholders to engage in practices that support the property's green efforts. In some

Table 1: Major third-party certification bodies

<i>Country/region</i>	<i>Eco-label</i>	<i>Description</i>
Canada	EcoLogo Program	The EcoLogo program certifies products and services from the United States and Canada in over 120 categories. Products and services receive certification based on compliance with environmental criteria focused on the life cycle impacts of a product or service. The EcoLogo Program requires third-party verification of compliance with the certification criteria. The program's website lists products and vendors of products meeting the criteria. Certified products include office equipment, paper products and printing services.
European Union	Eco-Label Program (the EU Flower)	The EU Flower program is a Europe-wide program that awards eco-labels to products that have been found to have less of an environmental impact than other similar competing products, based on life cycle considerations. The overarching goal of the program is to encourage businesses to market products and services that minimizes impact on the environment.
Germany	Blue Angel	The Blue Angel program is a voluntary eco-labeling program that certifies products and services in several categories. The Blue Angel is awarded to products and services that are particularly beneficial for the environment in a life cycle consideration and which also fulfill high standards of occupational health and safety and fitness for use.
Sweden	TCO Development	TCO Development provides certification and environmental labeling of office equipment designed to improve both the work and external environment. Products must undergo independent testing and documentation.
Norway, Sweden, Denmark, Finland and Iceland	Nordic Swan	The Swan is the official Nordic eco-label and is the collective effort of five countries: Norway, Sweden, Denmark, Finland and Iceland. Products that satisfy strict environmental standards are allowed to display the environmental product label. Companies applying for a license to use the Swan label must provide results from independent testing to prove that criteria are met. Products are certified in over 65 categories.
Japan	Eco Mark	Eco Mark provides product certification and eco-labeling for several product types. The Japan Environment Association develops environmental standards and permits products to bear the Eco Mark symbol. The certification criteria consider environmental impacts throughout the life cycle of each product.
	Green Purchasing Network	The Green Purchasing Network was established to promote green purchasing among consumers, companies and governmental organizations in Japan. The Network is composed of and governed by a multi-stakeholder group, including government, business, local communities and non-governmental organizations.
Taiwan	Green Mark and Energy Label	These programs provide certification and eco-labeling for green and energy-efficient products.

Table I *Continued*

<i>Country/region</i>	<i>Eco-label</i>	<i>Description</i>
US Programs	US Environmental Protection Agency (EPA), Comprehensive Procurement Guidelines	The US EPA's Comprehensive Procurement Guideline program promotes the use of materials recovered from solid waste by designating products that are or can be made with recovered materials and by recommending practices (minimum recycled content) for buying these products.
	US Environmental Protection Agency, ENERGY STAR®	ENERGY STAR is a voluntary partnership between the US Department of Energy, the US EPA, product manufacturers, local utilities and retailers, promoting energy efficient products by labeling with the ENERGY STAR logo and educating consumers about the benefits of energy efficiency. ENERGY STAR focuses on certifying energy-efficient products.
	US Department of Energy, Federal Energy Management Program	The Federal Energy Management Program (FEMP) provides services to US federal agencies to assist them in reducing the cost of government through energy efficiency, water conservation, and the use of solar and other renewable energy. FEMP designates energy-efficient products not covered by ENERGY STAR.
	US Environmental Protection Agency, Database of Environmental Information for Products and Services	The Environmentally Preferable Purchasing Database is a searchable database of product-specific information (for example, environmental standards and guidelines or contract language) developed by government programs, both domestic and international, as well as third parties.
	Green Seal	Green Seal provides certification of products and services based on the International Standards for Environmental labeling programs (ISO 14020/14024). Products and services are evaluated based on their life cycle impact on the environment.

instances, this might entail behavior modification of stakeholders. Specific stakeholders who should be addressed in the behavioral component include, employees, suppliers and guests. Respondents' interviewed suggested that elements of the behavioral component can be best addressed if each property develops its own green lodging program, germane to the property with serious consideration given to its facilities, location and services offered. Hence, although some lodging chains have developed chain-wide green programs, modifications should be made at the individual property level to ensure that the program caters to the needs of the property.

Implementation of the behavioral component should start with communication. Each property's program should be communicated to the property's constituents, with the goal of obtaining 'buy-in'. This can be accomplished through the development of a green team, which should be charged with interpreting, understanding, communicating and executing the property's green initiatives. This team should include members from all functional departments. In fact, respondents noted that the success of a property's green lodging program is contingent on all departments working in concert to achieve the property's green objectives. Each green team member should be encouraged to contribute to the property efforts by providing information about how they can change or maintain practices in their respective areas and contribute in making their respective areas green. Each property should also ensure



that its program is communicated to guests, and most importantly, ask guests how they can modify (or maintain) their behaviors and assist the property in achieving its green objectives. For example, respondents noted that flyers and notices were placed in guestrooms informing guests about the property's program and asking guests to modify their use of the property resources (for example, participate in the property's towel recycle program or ensuring that lights and air conditioning units were turned off when not needed). Other methods used by respondents to communicate their properties' green program included information in guest books, media boards, in-house television, posters and brochures. Respondents also indicated that guests did not display outward resistance to their green programs. This could be owing to the fact that some guests may be familiar with recycling and other conservation practices at their homes and places of employment and were likely to continue these practices when they stayed in hotels. This suggests that lodging facilities should provide appropriate receptacles in guest spaces to encourage green practices such as recycling.

Combining technical and behavioral solutions to gain benefits

Hotels adhering to the principles of green lodging are constantly faced with the challenge of striving to satisfy the ever-changing needs of guests, while at the same time engaging in practices that will minimize the overall negative impact on the physical environment. As such, green lodging programs should be dynamic programs that combine both technical and behavioral components. To ensure program legitimacy and buy-in from constituents, each area of the facility should be targeted (indoor, outdoor and the building envelope), and the most cost-effective technical and behavioral solutions for the specific area adopted and maintained. Further, to ensure behavior modification, buy-in and program adoption, the reasons for implementing the practice or technical solution should be highlighted and the benefits to the property and the environment emphasized and conveyed to constituents. As the negative externalities generally manifest themselves in energy usage, water usage, air quality control and waste management, dynamic technical and behavioral solutions should aim at eliminating and mitigating externalities generated in these areas. A green program therefore should include sub-components that address each of these critical areas. Table 2 provides an example that combines technical and behavioral solutions for energy, air quality, waste reduction and water management. The example illustrates how an area should be targeted, the best green practice for the area (as determined by the lodging facility), the reason for implementing the practice/adopting the technical solution and the benefit to the hotel.

As previously noted, green lodging includes embracing solutions that address energy usage, water usage, indoor air quality control and waste management. As energy is a controllable cost, a reduction in consumption will result in direct cost savings for hotels. Respondents indicated that by choosing energy-efficient equipment and fixtures, as well as implementing and practicing sound energy conservation practices, their hotels were able to reduce energy expenses, while at the same time



Table 2: Technical and behavioral solutions for energy, air management, water and waste management-example

Target area	Practice	Reason	Benefit
<i>Energy</i> Lighting	Use occupancy sensors to detect the presence or absence of people and turn lights on and off accordingly.	Occupancy sensors may reduce lighting energy consumption by 50% or more in some circumstances. They are used most effectively in spaces that are often unoccupied, including some offices, warehouses, storerooms, restrooms, loading docks, corridors, stairwells, office lounges and conference rooms.	Occupancy sensors are anticipated to pay for themselves through cost savings in 2 years and result in a 20% savings in energy costs (Vaughan, 2007).
Housekeeping	Limit the amount of hot water used for cleaning.	Limiting the amount of hot water used for cleaning will save water heating costs.	Savings are realized in both the short and long run. For example, the Sheraton Auckland hotel determined that 35% of their laundry energy needs came from washing, and that the other 65% from drying. The hotel changed the temperature of their wash cycle and saved US\$2000 in the first 3 months (which equals around \$666 dollars per month and \$22 per day) (Vaughan, 2007).
<i>Air quality management</i> Atrium and other public and other indoor public spaces	Grow native plants in atriums and public spaces.	Studies have shown that the atmosphere in indoor spaces filled with houseplants typically contains substantially cleaner air and 50–60% fewer mold spores and bacteria. One tree can filter up to 60 pounds of pollutants from the air every year. Native plants are more pest resistant and healthier (Williams, 2008).	Plants can naturally filter indoor air, while at the same time add to the esthetics of the property. Native plants are also more pest resistant and healthier, thus requiring less fertilizers and pesticides. Long-lived, hardier vegetation can save money by lowering labor costs and money spent on maintenance supplies.
<i>Waste reduction and management</i> Food and beverage	Donate used cooking oil.	Donating used cooking oil is a good way for food and beverage operations to dispose of form of waste. This used oil can be recycled and used to make other products such as biodiesel and animal food. It also represents a way for properties to contribute to a new and growing trend in conservation. For example, several jurisdictions have companies that will collect used cooking oil and process it into biodiesel.	Donating used cooking oil can provide savings for a property. For example, one restaurant chain reported savings of \$100,000 in haulage and other disposal charges (GreenScapes, 2010).



General	Encourage a philosophy that supports the purchase and use of local, organic and sustainable farming. Encourage and follow an eco-purchasing program	Supporting the use of locally grown and produced food items helps to protect the environment and helps the growth of the local economy. Following an eco-purchasing program will help the property close the recycling loop. Purchase paper products that use post-consumer recycled content: letterhead, stationery tissues, toilet paper, paper towels, writing and computer paper, office supplies and other equipment.	Locally grown items may be less costly because of lower transportation cost. Some industry publications estimate that the average meal travels approximately 1500 miles before it reaches your table. Eliminating air travel and shorter transit distances drastically reduces the amount of fossil fuel consumed in bringing foods from the farm to the table. Following such a program results in less waste being generated, as packaging will be minimized.
<i>Water usage and management</i>	Reuse gray water	If local code allows, reuse gray water (rinse water not contaminated with chemicals) to water plants. Water from stream tables and used ice are especially good for reusing.	Reusing gray water minimizes resource use and saves in irrigation and watering costs.
Landscape/grounds	Maximize mulching	Mulch keeps moisture in the soil, moderates soil temperature, and reduces erosion and weeds. Good mulching will reduce the amount of watering required to keep plants watered. Keep a 2-3 inch layer of organic mulch over the roots of trees and shrubs and in plant beds. Create self-mulching areas under trees so that leaves can stay where they fall. Use by-products or alternative mulches such as pine bark, eucalyptus and melaleuca, or use recycled mulches when available from your community.	Mulching flower beds, shrub beds and trees has several benefits. It helps the soil absorb water; allows water to better penetrate plants root systems, reduces unwanted weed growth, and insulates plants from changes in temperature. As the mulch decomposes, the organic content of the soil is increased. Mulch also increases the attractiveness of areas.

contributing towards protecting the environment. Practices for water management were aimed at reducing contamination, wastage and increasing efficiency. Benefits reported included direct cost savings realized through decreased water bills, electricity costs, sewage bills and chemical usage and costs. A combination of behavioral modification and using water saving equipment were reported as the best ameliorative practice. For example, respondents indicated that water- and energy-efficient washing machines used in combination with their properties' linen and towels reuse program saved their respective properties significantly through reduced labor and laundry expenses. Indoor air quality practices address the issue of clean air supply, how it is conditioned and how contaminants are removed using ventilation and air conditioning systems. Hence, technical solutions reported by respondents included air filtration systems that met or exceeded each property's stated filtration thresholds. Filtration thresholds were established based on generally accepted industry standards. Respondents also indicated that indoor air quality appeared to be one of the most daunting tasks for a lodging facility's green management program, as virtually all indoor hotel activities generate particles that could potentially contaminate indoor air quality. Coupled with this is the fact that air usually migrates from one area to another, which makes it difficult to target and isolate specific areas. Behavioral modification included accepting the realization that some solutions can be natural, (for example, using plants in lobby as a natural filtration system), as opposed to purely technical ones. Respondents indicated that the best way for lodging facilities to deal with waste generation is to develop policies designed to reduce waste at their source. Such policies should encourage recovery, reuse and recycling, which ultimately prevent pollution and reduce or eliminate treatment and disposal cost.

CONCLUSION

This study sought to define green lodging and succinctly identify and describe its components. Findings indicate that green lodging refers to deliberate and concerted efforts and activities taken to reduce or eliminate the negative environmental externalities associated with hotel operations. These negative externalities typically manifest themselves in energy usage, water usage, waste generation and air quality degradation. The components of green lodging are the fixtures, facilities, amenities, supplies, equipment, services, consumables and practices that are adopted and implemented or maintained in ways that reduce or eliminate negative environmental externalities associated with these areas. Collectively, these components can be described broadly as technical components and behavioral components. Technical components refer to the physical or tangible elements that must be adopted, installed, maintained or operated in ways that eliminate or reduce negative environmental externalities, whereas behavioral component relates to practices that must be adopted and maintained. It should be noted that technical components do not necessarily suggest any structural redesign, but instead adopt the best technical solution that each property deems appropriate.



To ensure success, each property's green program should be communicated to its constituents in an effort to garner acceptance and 'buy-in'. Effective green lodging, as opposed to green washing, should be inclusive of all functional areas within a lodging facility as well as the services offered by the lodging facility.

Green lodging sub-components to mitigate the negative consequences of energy usage should include energy conservation practices and policies developed and designed to help the property save energy, choose energy-efficient facility designs, select and install energy-efficient fixtures and equipment, and operational procedure that ensure proper maintenance and operation of fixtures and equipment. The overarching goal of adopting green components to mitigate indoor air quality is to minimize or eliminate the sources of poor indoor air quality. This includes using eco-friendly chemicals and equipment, as well as installing and maintaining appropriate filtration systems. Hotels invariably generate a tremendous amount of waste in the production of goods and services. Green lodging properties should engage in practices that embrace waste reduction and further, develop policies designed to reduce waste at their source. Hence, such properties should embrace and support eco-purchasing. Overall success of a lodging property's waste management program is contingent on communicating the property's waste management program to its respective constituents who should be encouraged to support recovery, reuse and recycling. In most instances, water usage in hotels varies based on the type of hotel and levels of services offered. Green practices in water usage and management should be geared towards reducing wastage, contamination and increasing overall usage efficiency. This can be achieved through use of water-efficient equipment and fixtures, as well as through direct and indirect behavioral modification practices and initiatives. Hotels adhering to green practices in water usage can enjoy the incremental benefit of direct long-term cost savings.

This impetus towards sustainable and green practices within the lodging industry has been driven in part by potential benefits and societal pressures. Currently, several lodging operations have embraced and adopted green practices into daily operations, and some have reported incremental benefits. However, caution should be exercised before there is a resounding cry for all hotels to adopt and embrace the green concept. Lodging facilities are income-producing assets, and therefore programs such as green lodging or adoption of green initiatives should only be fully embraced and implemented if they can in some ways help the establishment achieve its financial strategic objectives. Thus, from a practical standpoint, green lodging for companies must make sound business sense. Hence, if adoption of green lodging components results in reduced product and service quality, hotels run the risk of losing customers, which could negatively affect profitability and viability. Therefore, adoption of green practices should not be done at the expense of product quality or service and financial viability. Consumers should also be aware that some hotels will not have the financial resources to fully adopt and embrace all aspects of a full and comprehensive green lodging program, especially those 'prescribed' by jurisdictional or other

green certification bodies. Hence, such hotels might be inadvertently marginalized by such bodies because they simply lack the resources to fully implement all the requirements of a 'prescribed' green program. Further, for some properties, adopting or using certified technical components might not necessarily be required, as existing equipment can sometimes be made more efficient through proper maintenance and operation. Therefore, non-certified hotels should not be broadly penalized as not engaging in any green practice. In this regard, it is therefore important to note that the aim of this article is not to suggest that certification by independent bodies is a requirement, as some properties may choose not to obtain such certifications. Instead, certification might be a tool to differentiate green properties from the average properties.

It is also important to note that green lodging programs are not panaceas for saving the environment. In fact, it should be noted that there might even be environmental trade-offs when hotels adopt green practices. For example, hotels that shift from using plastic utensils and flatware to reduce waste flowing to landfills might end up using more heated water and detergent to wash utensils and ceramic flatware. Despite these setbacks, it appears as though increasingly, hotels will embrace and adopt green practices, especially if cost-benefit analyses indicate that adoptions will enhance their bottom line.

Like most studies, this study had several limitations. It is largely based on informants' perceptions and secondary data obtained through content analysis. Hence, in some respects, it might not be based entirely on 'objective' reality. Another potential limitation is that the subjects were drawn from two US states and the lodging professionals interviewed were from hotels that implemented green lodging programs. Exclusion of other US states and other international jurisdictions may have constrained the perspective of the study. Finally, the findings presented cannot be interpreted as broadly generalizable in a statistical sense. Nonetheless, by including a heterogeneous sample of lodging professionals, lodging suppliers, energy management experts, waste management experts and water supply management experts as well as multiple data collection and interpretation techniques, the validity and reliability of the findings were increased. Future studies are encouraged to explore implementation and adoption challenges, barriers to implementation of green practices, as well as lodging managers' and consumers' attitudes toward green practices in the lodging industry. Future studies are also encouraged to examine how today's hoteliers are managing the 'green' supply chain as these areas are within their direct control.

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