An Examination of Green Environmental Attributes in Hotel Service Settings

by

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Abstract

This study uses Baker's (1987) conceptualization of the physical environment (referred to from here as service environment framework) as a skeleton to build a new framework that introduces 'green' to service environment literature and proposes additional research opportunities within the field of service marketing. A major shift has been underway in the construction and design community. Architects and designers are using new materials and innovative systems that have been developed to work with and for the environment to encompass the entire building envelope. The implications of this shift to the service environment are significant and ultimately need to be empirically tested.

There is limited research addressing the issue of green design in hotel service settings. Previous studies indicate that consumers would prefer a green hotel over a traditional hotel, but the numbers do not play out in reality (Scoviak, 2008). The problem appears to be that industry has little knowledge of how guests form perceptions that a hotel is green and which green attributes are most likely to have an effect on guest perceptions. To date, conceptual frameworks of traditional design elements have been presented, but the classification of green

environmental attributes within the service environment still remains to be seen. This study developed a classification system of green environmental attributes in hotel service environments based on Baker's (1987) service environment framework. Second, this study created a valid scale to measure consumers' perceived importance of green environmental attributes within hotel service environments. Next, this dissertation also addressed a gap within service environment literature by establishing the presence of green within hotel service environments. Finally, this research has identified multiple research opportunities to the field of service marketing through the study of green environmental attributes within hotel service environments.

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Chapter I: Introduction

Background and Problem Statement

The travel and tourism industry represents 9.2% of the world's gross domestic product and employs nearly 235 million people (World Travel and Tourism Council [WTTC], 2010). In 2009 hotels suffered major losses because of the economic downturn which caused a significant decrease in room occupancy (Wong, 2009). Wong (2009) stated that "revenues per available room have declined approximately 18% year to date; with some segments and geographies experiencing declines in excess of 25%" (p. 4).

Since hotels are 100% dependent on consumers, new objectives must be established that will not only attract consumers, but add to hoteliers' bottom line. One word that identifies a solution for many hoteliers' woes is 'green'. However, green service environments have not been defined in the literature; therefore, for the purposes of this study, green represents a service that is environmentally responsible as well as accountable to and respectful of the people and environment where the service takes place. Green has become the key to increasing market share as well as improving operational efficiencies (Watkins, 2009). In a recent 2009 article for *Lodging Hospitality,* Ed Watkins said, "Perhaps surprisingly to some, the current environment makes the concept of a green hotel no longer an option" (p. 1). This comment has a very different tone

than a hospitality article published two years prior where it was said that green only “received lip-service” and was “allocated the smallest breakout room to prevent panelists from outnumbering the audience” at travel and tourism conferences (Wagner, 2007, p. 1).

Recreational consumers have already spent $768 billion dollars on travel and tourism within the United States this year (WTTC, 2010), with another $245 billion being spent by business travelers in the United States (WTTC, 2010). In 2008 when business travel amounted to $270 billion (WTTC, 2010), a Deloitte survey stated that out of 1,000 business travelers, 95% of the respondents thought that hotels should be taking on green initiatives (Deloitte, 2008). Sustainability and greening of properties needs to be addressed holistically. It has been shown that in order to gain the largest return, sustainability needs to be addressed throughout the entire value chain (Bakshi & Fiskel, 2003).

The travel and tourism industry currently accounts for 5% of global carbon emissions (United Nations Environment Programme [UNEP], 2010). To make sense of this number UNEP states that if this emissions number was compared to that of industrialized countries, it would be the 5th largest polluter worldwide (UNEP, 2010). The industry’s use of fossil fuels and generation of greenhouse gasses (GHG) is what contributes to this number. Travel and tourism is an industry that is growing rapidly. It is predicted that global tourism will increase by 179% and guest nights will increase by 156% by 2035 (UNEP, 2010). These projected numbers, coupled with rising costs in energy and demand from consumers that hoteliers change their ways, create a perfect storm for the

industry that once equated the term efficiency to space allocation and decreased pricing structures. Change in this industry is being driven by numerous outside forces. A 2008 Deloitte Survey identified that "conscientious consumers, increased governmental pressures, competitors' actions, rising costs, and the need to improve operational efficiencies are contributing to the business imperative to go green" ("Deloitte Survey", 2008, p. 2). Additionally, pressures from local code officials will soon add to the stress of going green. Several organizations including the American Institute of Architects (AIA) and the American Society for Testing Materials (ASTM) are writing a new International Green Construction Code (IGCC) with the International Code Council (ICC) (ICC, 2010). The new codes are slated to be launched in 2012.

The amount of money hoteliers have dedicated to the greening of their properties thus far is significant. The reasons for choosing to build sustainably or remodel green are numerous, but the question remains, what attributes of green service environments are important to the consumer? Neale Redington, a Deloitte Hospitality leader was recently quoted, "today, sustainability is a market imperative as customers increasingly hold the nation's hotels accountable for green practices" ("Deloitte Survey", 2008, p. 1). More importantly he stated:

> We found there is often a discrepancy between what travelers expect of hotels and the green initiatives that hotels ultimately undertake. Those that do the best job of delivering their promises of sustainability will win the day with tomorrow's increasingly discerning business travelers ("Deloitte Survey", 2008, p.1).

For years business strategy researchers examining green consumers have been attempting to identify and understand green consumers and their needs. So far there is little consensus about the identity and nature of green consumers, except that they have been something of a disappointment to the marketers who have pursued them (Peattie, 2001). McDonald and Oates (2006) echoed Peattie's (2001) suggestion of moving away from defining the green consumer through socio-demographics and agreed that one option marketers should be exploring is that of situational factors present in the act of purchase itself. Belk (1975) defined situations as, "subunits within an environment" (p. 157). In this study, situations represent the encounters a hotel consumer has with the elements of the service environment that are available to the consumer during a given hotel stay. This research is designed to contribute to literature by providing the consumer's perceptions of the green environmental attributes that are important within a given hotel service environment.

Purpose and Objective Statement

Over the past 30 years, two major frameworks, Baker (1987) and Bitner (1992), have been frequently applied in studying the service environment. Baker (1987) conceptualized the service environment based on ambient, design, and social cues; whereas Bitner (1992) proposed the categorization of ambient, design and layout, and artifacts. These frameworks initiated many research findings in the use of aisle space, carpeting, lighting, wall color, music, scent,

staff, crowding, clutter, and so on and their resulting impact on consumer behavior.

Numerous studies have reviewed many of the attributes within the service environment singularly or as small groupings pulled from a factor that was defined in Baker's (1987) service environment framework. However, there is a lack of research in the study of the attributes as a whole. Besides, environments have changed over the past 20 years, and a holistic study needs to revisit Baker's service environment framework in terms of the modernization of terms and technology and innovations now present within the environment that may have an influence on a consumer's behavior. In addition, the majority of the existing service environment literature has focused on retail service environments and lacks significant precedents in hotel service settings. Furthermore, little consideration has been given to the effect of green environmental attributes within service environments. Finally, through the absence of research within service environment literature, a need has been identified for a classification system that incorporates green design in service environment literature.

Therefore, this research attempted to fill the gap in the literature by considering the importance of green environmental attributes in hotel service settings. The purpose of this research was (1) to introduce green design and related definitions to the service environment literature through a classification system of the green environmental attributes that comprise a green interior environment within a hotel service setting and (2) to develop a scale that

measures consumers' perceived importance of green environmental attributes within hotel service settings. Specifically, the objectives of the study were:

Objective 1: To develop a classification system of green environmental attributes in hotel service environments based on Baker's (1987) service environment framework.

Objective 2: To examine the content validity of the classification system by consulting with a panel of design and marketing professionals.

Objective 3: To create a scale to measure consumers' perceived importance of green environmental attributes (PIGEA) within hotel service environments by refining the classification system.

Objective 4: To establish the validity and reliability of the PIGEA scale using data collected from a consumer sample.

This study consisted of two phases. The first phase addressed the first and second objectives, while the second phase fulfilled the third and fourth objectives.

Definition of Terms

Ambient Design Attributes: Characteristics of a hotel service environment that exist in the background and tend to impact the subconscious mind (Baker, 1987)

Atmospherics: Characteristics of a hotel service environment that produce specific emotional effects in the consumer that enhance his or her purchase probability

Behavioral Attributes: Actions or reactions of consumers and employees contributing to the green hotel service environment

Green: (A product or service that is) environmentally responsible as well as accountable to and respectful of people and place.

Green Environmental Attributes: Characteristics inherent or associated within a hotel service environment that are environmentally responsible as well as accountable to and respectful of the consumers who use the hotel services.

Perceived Importance: The level of importance consumers attach to an object or a concept

Physical Design Attributes: Green architectural or design characteristics that contribute to the overall aesthetic of a hotel service environment

Service Environment: The setting where the service is delivered including exterior architecture, interior architecture and decoration, and atmospheric conditions such as temperature and lighting (Baker, 1987)

Sustainability: The ability to meet the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987)

List of Acronyms

AIA : American Institute of Architects

ASTM : American Society for Testing and Materials

AVE : Average Variance Extracted

CFA : Confirmatory Factor Analysis

CFI : Comparative Fit Index

EFA : Exploratory Factor Analysis

EPA : Environmental Protection Agency

FTC : Federal Trade Commission

GEA : Green Environmental Attributes

GHG : Green House Gasses

IAQ : Indoor Air Quality

ICC : International Code Council

IGCC : International Green Construction Code

ISO : International Standards Organization

LEED : Leadership in Energy and Environmental Design

LOHAS : Lifestyles of Health and Sustainability

MBDC : McDonough Braungart Design Chemistry

NFI : Normed Fit Index

NMI : Natural Marketing Institute

PCE : Perceived Consumer Effectiveness

PIGEA : Perceived Importance of Green Environmental Attributes

RMSEA : Root Mean Square Error of Approximation

TLI : Tucker Lewis Index

UNEP : United Nations Environment Programme

USGBC : United States Green Building Council

VOC : Volatile Organic Compounds

VSL : Volunteer Simplistic Lifestyle

WTTC : World Travel and Tourism Council

Chapter II: Literature Review

The environment and its components are central to many areas of research. Architecture and design, marketing and consumer behavior, and environmental psychology all study the environment (and interior environment) in different ways according to their specific field of study. Architects and designers have been concerned about the physical environment since the beginning of the profession. But, the environment was not studied scientifically until the field of environmental psychology was established (Kotler, 1974). Around the same time environmental psychology was establishing its roots, marketers started acknowledging the merits of researching the built environment within service (retail) atmospheres (Donovan & Rossiter, 1982). The importance of the environment within each of these disciplines is tied together through the acknowledgment that the environment is a trigger for behavior. Architects and designers are interested in the function and aesthetics of the environment, environmental psychology is interested in the interaction of the environment and behavior, and marketers are interested in the environment as a stimulus for buying behavior (Donovan & Rossiter, 1982).

This chapter will provide a discussion of the way architecture and interior design approach the study and design of the service environment. As the environment is being reviewed in both traditional and green terms, a primer on

the state of green hotels will be presented from the viewpoint of hospitality research. Then, environmental psychology research will be reviewed as it ties together the field of architecture and design and the psychological aspects of 'behavior'. Next, research on consumers and green consumption will be identified in order to understand that research on consumption of green services is still in its infancy. Finally, Churchill's (1979) scale development paradigm will be reviewed as a procedural framework followed by this study to develop the perceived importance of green environmental attribute (PIGEA) scale. In order to visually organize the research presented within this chapter, a table was made identifying each researcher and their findings with respect to environmental attributes (see Table 2.1).

Aesthetics and the Environment

Aesthetics are important to this study as they provide a series of referents in order for people to define their experience within a particular environment. The understanding of aesthetics provides a background to the meaning and subsequent importance of attributes within a hotel service setting.

Aesthetics have been examined in academic literature for quite some time. The first evaluation of aesthetics was examined by Gustav Fechner (1876). Fechner was better known for his work in experimental psychology, but his

Table 2.1 Identification of Environmental Attributes

ENVIRONMENTAL ATTRIBUTES			
DISCIPLINE	AUTHOR & YEAR	ENVIRONMENTAL ATTRIBUTE / CUE	FINDINGS
AESTHETICS	Fechner (1876)	pattern perception, sequential experiencing of vistas, definition of complexity and simplicity, form empathy	A metric was developed to evaluate beauty in a psychological way
	Santayana (1896)	sensory aesthetics, formal aesthetics, symbolic aesthetics	Sensory - pleasurableness of environment, arousal, relating to colors, odors, sounds, and textures. Formal - appreciation of shapes, rhythms, complexities, and sequences of visuals; can be extended to the sonic, olfactory, and haptic. Symbolic - appreciation of the associational meanings of the environment that give people pleasure.
PSYCHOLOGY	Lewin (1936)	life space - psychological situation as perceived by the individual	Social, psychological and physical forces at play to define any one situation. Initiated the concept of the 'situation' within physical environment.
ARCHITECTURE	Vitruvius (1960)	firmness, commodity, delight	Firmness - durability; commodity - convenience (comfort); delight - beauty (can refer to intellectual delight, visual delight, or other).
	Barker (1968)	theory of behavior settings	Objective perspective on people environment relations
ENVIRONMENTAL AESTHETICS	Izumi (1968)	artificiality or naturalness of materials	The use of synthetic materials used to simulate natural materials sets up doubt in a viewer as our perception is fooled to believing a material is real visually but the haptic and olfactory do not repute the visual.

Table 2.1 Identification of Environmental Attributes (continued)

ENVIRONMENTAL ATTRIBUTES (CONTINUED)			
DISCIPLINE	AUTHOR & YEAR	ENVIRONMENTAL ATTRIBUTE / CUE	FINDINGS
AESTHETICS	Kasmar (1970)	size, volume, scale, mood, color, texture, function, il-lumination, esthetic quality, climate, odor, acoustical quality, and miscellaneous	220 pairs of adjectives were evaluated. The list was divided into 2; 'words referring to esthetics and mood' and 'words referring to physical attributes'. The 220 pairs were evaluated and now 66 of these pairs comprise the Environmental Description Scale (EDS).
SOCIAL PSYCHOLOGY	Norberg-Schulz (1971)	architectural space, existential space	Architectural space was defined as the concretization of existential space. Existential space was defined as a psychological concept denoting the schemata man develops interacting with the environment in order to get along satisfactorily.
SERVICE ENVIRONMENT	Kotler (1974)	atmospherics	Identified the need to evaluate aesthetics within the atmosphere of a buying space. Identified the physical environment as 'total design', and revealed to marketers that they need to use the physical design as thoughtfully and skillfully as price, advertising, personal selling and public relations.
	Belk (1975)	situational variables	Situations are identified as subunits within an environment that represent the encounters a consumer has with the elements of the physical environment that are available to the consumer during a given event.
	Baker (1987)	servicescapes; ambient factors, design factors, social factors	Introduced the categorization of the physical environment through her conceptualization where she categorized the 'elements' into three groups: design factors, ambient factors and social factors. Baker's categorization was unique in that she researched these elements from the consumer perspective.

Table 2.1 Identification of Environmental Attributes (continued)

ENVIRONMENTAL ATTRIBUTES (CONTINUED)			
DISCIPLINE	AUTHOR & YEAR	ENVIRONMENTAL ATTRIBUTE / CUE	FINDINGS
SERVICE ENVIRONMENT	Bitner (1992)	Servicescape	Proposed the categorization of ambient factors, design and layout factors, and artifacts. Described atmospherics as the physical design and décor that has the potential not only to create a firm's image but also to influence the behavior and feelings of customers and employees.
ENVIRONMENTAL PSYCHOLOGY	Mehrabian & Russell (1974)	SOR - Stimulus Organism Response	Defined the relationship between environment, behavior and situational variables. Their research identified that environmental stimuli are linked to behavioral response by the emotional responses of arousal, pleasure and dominance.
COMMUNITY PSYCHOLOGY	Wicker (1987)	lifecycles of behavior settings	Examined the relationships among behavior settings linked through common people and objectives - and the temporal factors affecting change.
ENVIRONMENTAL MANAGEMENT AND ECOLOGY	Paul and Taylor (2007)	aesthetics, serenity, lighting, acoustics, ventilation, temperature, humidity, overall satisfaction	Approached the study of the environment from a holistic perspective. Research postulated that green buildings provide more overall satisfaction for employees which creates a more productive workforce.

inquiry of empirical aesthetics established that aesthetics are not only subjective. Fechner's work involved using a metric to evaluate beauty in a psychological way, and through this he identified the importance of pattern perception, sequential experiencing of vistas, definition of complexity and simplicity (with regard to shape), and form empathy (Fechner, 1876).

Whereas Fechner's (1876) work established an objective means of identifying beauty, Santayana's (1896) main philosophical work "The Sense of Beauty" was based on the study of aesthetics through a naturalistic basis in human psychology- or through subjective means (Santayana, 1896). In Santayana's research, he rejected the Platonic conception that beauty is an intrinsic characteristic of a thing, and argued that beauty exists only in the mind (and senses, hence the title) of the viewer. The pleasure that beauty gives its audience is universal, but what is beautiful is not universal across audiences.

Santayana's (1896) findings established a basis for research within service marketing through his definition of symbolic aesthetics that identified the appreciation of the associational meanings of the environment that give people pleasure. Other meaningful contributions were also established in his work in reference to the physical environment through identifying the pleasurableness of environment, or arousal, relating to color, odor, sound, and texture (Santayana, 1896). Symbolic aesthetics are important to this study because an observer of an environment often defines his or her experience within the environment through a series of referents. The symbolic meaning of the environment is tied

directly to the emotional qualities that an observer or a user reads into them (Santayana, 1896).

Architecture and design are often taken for granted, although the way in which a person acts and reacts to a specific environment is of utmost importance to the management and marketing of an interior environment. Symbolic meaning identifies the emotional qualities that a person reads into an environment (Lang, 1988). If a person reacts favorably (i.e., approach), he or she will most likely repatronize that environment (Donovan & Rossiter, 1982). Therefore, the symbolism that is inferred from that environment is meaningful. "Human beings are symbol mongers" (as cited in Lang, 1988, p. 15). One way in which people communicate with one another is via symbols (Lang, 1988). Architectural symbolism is one of a set of nonverbal mechanisms that people use to communicate messages about themselves, their backgrounds, social statuses, and world views to others (Lang, 1988). Therefore, it is important to understand the meaning of the elements that comprise the physical environment.

The symbolic meaning of the physical environment becomes clear when we consider its momentary condition and the relationship between environment and human needs (Belk, 1975). It has been shown that people are sensitive to and respond to perceptual cues that are embedded within an interior environment. Cues or attributes reference the function of a given space, the type of people inhabiting an architectural structure, the behavior appropriate to the space, and so on (Kasmar, 1970). Richard Neutra (as cited in Sharp, 1991) made reference to this in describing the relationship between architecture and

people, where he explained that architecture is not only an instrument which caters to requirements, and one that shapes and conditions responses, but it also reflects or mirrors conduct and living . Neutra is significant to this research as he was an architect with a different perspective on design. He was famous for the attention he gave to defining the real needs of his clients, regardless of the size of the project, in contrast to other architects eager to impose their artistic vision on a client. Neutra (as cited in Kasmar, 1970) sometimes used detailed questionnaires to discover his client's needs, and his domestic architecture was a blend of art and practicality.

In 1943, Maslow introduced his model of human motivation (Maslow, 1943). The original model identified five stages including (1) physiological needs followed by (2) safety needs, (3) belonging, (4) esteem and (5) self-actualization. The model was later adapted in order to address cognition and aesthetic needs through the interpretation of Maslow's research (Saeednia, 2009). A series of Maslow's studies documented, for example, that beautiful rooms (vs. ugly rooms) have a significantly different impact on people's perceptions and emotions for both short and long terms (Maslow & Mintz, 1956; Mintz, 1956). Additionally, several researchers have inferred through Maslow's book *Motivation and Personality* (1970) that cognitive and aesthetics needs are extensions of the self-actualization needs (Huitt, 2004; Kenyon, 2004; Lang, Burnette, Moleski & Vachon, 1974). Therefore, aesthetic needs are important to a person's well being and, therefore, are important to the design of a physical environment.

When consumers approach an environment, they immediately form an opinion about the space in terms of the color, odors, sound, and textures that are presented. It should be understood that a designer or organization has no direct access to a consumer's subjective conceptualization of space. The only channels of communication that are open are objective - somatic. It is only through the manipulation of the physical properties of the environment – heat, air, light, color, odor, sound, surface and space – that a designer or organization can communicate intentions; and, only by doing it well - that is, meeting all of the consumer's requirements, objective and subjective - can the designer or organization create a space that consumers find appropriate (Fitch, 1965). A fundamental weakness in most discussions of aesthetics is the failure to relate it to experiential reality (Fitch, 1965). Often times a space is thought to only be perceived through vision, but aesthetics actually derive from the body's total response to, and perception of, the physical environment (Fitch, 1965).

Service Environment

Kotler (1974) was one of the first people who introduced the term 'atmospherics' to the field of marketing. Kotler (1974) defined atmospherics as the "conscious designing of space to create certain effects in buyers" (p. 50). The term represented the need to evaluate aesthetics within the atmosphere of a buying space. Kotler (1974) stated that "buyers respond to the *total product*" (p. 48), and that "one of the most significant features of the total product is the *place* where the product is bought or consumed" (p. 48). Kotler explains the specifics

of the ‘total design’ and identifies how marketers need to use it as consciously and skillfully as they use price, advertising, personal selling, public relations, and other tools within marketing.

Service environments refer to the setting where a service is delivered including exterior architecture, interior architecture and decoration, and atmospheric conditions such as temperature and lighting (Baker, 1987). The remainder of this section will review how attributes have been evaluated within service environments. Then, the literature on green hotel environments and the research that is available on the study of green attributes in hotel environments from a hospitality perspective will be discussed. This section will conclude with the identification of green certification organizations that are dictating the process of green building within the United States, and regulations that complement green certification through the implementation of codes.

Attributes of the Service Environment

Throughout the literature employees and customers have been shown to function better in and relate better to an environment they perceive to be aesthetically pleasing. Marketing academics sought to define how service environments are most effective from a consumer standpoint. Some of these environmental attributes have been examined in detail in terms of the resulting impact on consumer behavior. For example, clutter has been positively linked to avoidance, and negatively linked to satisfaction (Bitner, 1990). Color has been linked to approach (positive consumer response) and positive perceptions of

products or merchandise (Bellizzi, Ayn, Crowley, & Hasty, 1983). Crowding has been shown to change a consumer's satisfaction, enjoyment of the service environment, and use of in-store information (Eroglu & Machleit, 1990; Harrell, Hutt, & Anderson, 1980). Store music has been shown to influence the amount of time consumers spend in stores, traffic flow, sales, arousal, and the perception of visual stimuli in the retail store (e.g., Dube, Chebat, & Morin, 1995; Milliman, 1982; Yalch & Spagenberg, 1993). Other physical factors such as layout and design (Smith & Burns, 1996) and in-store lighting (Baker, Grewal, & Parasuraman, 1994) have also been shown to impact consumer behavior in some form or fashion. The above mentioned literature illustrates that the physical environment within a service setting serves as a meaningful stimulus to customers and perceptions of these environments often shape consumers' experiences within each setting.

Service marketing researchers have recognized that the ability of the physical environment to influence behaviors and to create an image is important to service environments (Baker, Grewal & Levy, 1992; Bitner, 1986, 1992). To enhance the development of service environment research, several researchers have proposed classification schemes in an attempt to categorize the physical elements of a service environment (e.g., Baker, 1987; Bitner, 1992). Baker (1987) classified service environment elements into three factors; ambient, design, and social factors. The ambient factor exists at a more subconscious level and tends to include non-visual elements of the environment such as temperature, music, and scent. Baker (1987) divided ambience into four specific

components; air quality (temperature, humidity, circulation/ventilation), noise (level, pitch), scent, and cleanliness. The design factor referred to stimuli that tend to be visual and included aesthetic and functional components. The functional component included layout, comfort, and signage; whereas the aesthetic component included elements such as architecture, color, scale, materials, texture, pattern, shape, style, and accessories. These stimuli exist at the forefront of the consumer's awareness (Baker, 1987) and are easily evaluated. Finally, the social factor identified people within the environment. It consisted of both employees and customers in the environment. This factor included the number, appearance, and behaviors of persons within the environment (Baker, 1987).

Bitner (1992) stated that:

> In marketing, there is a surprising lack of empirical research or theoretically based frameworks addressing the role of physical surroundings in consumption settings…Managers continually plan, build, change, and control an organization's physical surroundings, but frequently the impact of a specific design or design change on ultimate users of the facility is not understood (p. 57).

Bitner (1992) proposed three dimensions of store environment features that create a service environment, or as she termed it, servicescape: (1) ambient conditions, (2) spatial layout and functionality, and (3) signs, symbols and artifacts. Ambient conditions according to Bitner (1992) include background characteristics of the environment including temperature, lighting, noise, music,

and scent and are conceptually similar to Baker's (1987) ambient factor. A characteristic identified by Bitner that was not present within Baker's (1987) framework is lighting. Bitner noted that ambient conditions usually influence the five senses. Bitner's second and third dimensions, combined, address a similar concept as Baker's design factor. Bitner's second dimension, spatial layout and functionality, identified the way in which machinery, equipment, and furnishings were arranged. The final dimension within her framework identified explicit and implicit cues that communicate meaning to the users of the environment (Bitner, 1992). Signs are explicit in that they can communicate direction (e.g., exit signs) as well as rules of behavior (e.g., no smoking). Symbols and artifacts represent more of the aesthetic of the environment through the style that is represented within the overall design as well as personal artifacts that may be placed throughout the environment in order to represent the firm's or person's identity (Bitner, 1992).

Until Baker's framework was introduced in 1987, most service environment research focused on the marketers' point of view. Baker's framework differed in that she was interested in furthering knowledge on the physical environment in services marketing from the consumer's point of view (Baker, 1987). In Baker's service environment framework (see Table 2.2), she linked environmental cues to customer behavior. Brady and Cronin (2001) identified Baker's framework as the most comprehensive and parsimonious framework in categorizing service environment elements. Therefore, Baker's

(1987) service environment framework will be used for purposes of this research study.

Baker's service environment framework stimulated many empirical studies that investigated the effects of environmental elements on consumer perceptions and behavior (e.g., Baker et al., 1992; Baker et al., 2002; Countryman & Jang, 2006; Michon, Chebat, & Turley, 2005; Wakefield & Blodgett, 1999). For

Table 2.2 Baker's (1987) Service Environment Framework

AMBIENT FACTOR	*Background conditions that exist below the level of our immediate awareness*	**Air Quality** - Temperature - Humidity - Circulation/ Ventilation **Noise (level/pitch)** **Scent** **Cleanliness**	
DESIGN FACTOR *Interior and exterior*	*Stimuli that exist at the forefront of our awareness*	**Aesthetic** - Architecture - Color - Scale - Materials - Texture, Pattern - Shape - Style - Accesories	**Functional** - Layout - Comfort - Signage
SOCIAL FACTOR	*People in the Environment*	**Audience** - Number - Appearance - Behavior	**Service Personnel** - Number - Appearance - Behavior

example, Baker et al. (1992) found that ambient cues (music and lighting) interact with social cues (store employees) to influence arousal and that the social-ambience interaction occurred for pleasure and willingness to buy. Baker et al. (2002) also researched the extent to which the three environmental factors-- social (store employee perceptions), design (store design perceptions) and ambient (store music perceptions) factors-- influenced consumers' assessments of store choice criteria and how those assessments influenced patronage intentions. They found that perceptions of store environment (most directly store design perceptions) had significant effects on store patronage intentions (Baker et al., 2002). Additionally, Wakefield and Blodgett (1999) found that the tangible (design factors) physical environment played an important role in generating excitement in leisure settings, which in turn determined customers' repatronage intentions and willingness to recommend the experience to others. Michon et al., (2005) investigated the effect of scent (an ambient element) on shoppers' emotions and perceptions of the retail environment. They researched the effect for several different density levels (number of people in the retail setting at one time) and found that ambient scent positively influenced shoppers' perceptions in a medium retail density condition. Finally, Countryman and Jang (2006) found color and style (which fit Baker's design factor), and lighting (which represents the ambient factor upon further investigations after Baker's framework) were significantly related to the overall impression of a hotel lobby with color being the most significant environmental element.

The influence of the service environment on consumer behavior, decision making, and service evaluations has been studied primarily in retail environments (Sherry, 1998; Turley & Milliman, 2000; Zeithaml et al., 2006). Although some translations to a hotel environment can be made, little published research has documented how applicable findings from retail environments are to a hotel service environment. Grove, Fisk and Bitner, (1992) suggested that the service environment is like the setting for a play; scenery and props set expectations for the audience as well as create a state of mind for actors. The guests are the audience and service employees are the actors within a hotel service environment. Pine and Gilmore (1999) argued that services can be elevated to experiences by paying attention to themes, cues, and evoked sensations. Experiences are extremely important to hotel service environments because consumers are buying a service; after check-out, all that is left to the guest for the time and money spent is a receipt. Lewis and Chambers (1989) stated, in terms of the intangibility of hotel service, that “a consumer may go away empty-handed, but they better not go away empty-headed” (as cited in Kotler, Bowens, & Makens, 2006, p. 42). Therefore, the ‘stage’ that is set is extremely important as it includes the tangibles of the environment. Tangibles provide signals as to the quality of the intangible service (Kotler et al., 2006). The tangibles include the overall design, or design factor as defined by Baker (1987) (architecture, color, furniture, artwork, finishes, etc.), cleanliness of the space (identified as an ambient factor), and the way employees present themselves which was identified as a social factor by Baker (uniform neatness, modernity if appropriate, style).

Although cleanliness is identified as an ambient factor, Baker (1987) did identify that ambience remains as a background element unless it exists at unpleasant levels. Therefore, this identifies why cleanliness can sometimes be identified as tangible.

Dolcinar and Otter (2003) reviewed 21 studies published between 1984 and 2000 in hospitality, tourism research, and business journals and identified 173 attributes examined in these studies. Some links can be drawn between Baker's (1987) service environment framework and hotel attributes identified by Dolcinar and Otter (2003). Four attributes were identified that would categorize into Baker's (1987) ambient factor. These attributes were cleanliness within the hotel, cleanliness within the hotel room, in-room temperature control mechanisms and well-lit public areas. Further, ten attributes were identified that would categorize into Baker's (1987) design factor. These attributes included size of the hotel, architecture, hotel decoration, aesthetics of the hotel, low pile carpet, lighting equipment, size of the room, aesthetics of the room, luxury size rooms, and bathroom furniture. Finally, six attributes, presence of manager, housekeeping, friendliness of staff, staff attentiveness, service professionalism, and appearance of service personnel, were identified that addressed Baker's (1987) social factor. Although Dolcinar and Otter (2003) demonstrated the relevance of Baker's (1987) service environmental attributes in hospitality research, few studies have fully examined hotel environmental attributes based on Baker's framework, warranting further research.

Green Environment

Being green is being environmentally responsible as well as accountable to and respectful of the people and place where the service takes place. Green environments refer to the physical facility, including exterior architecture, interior architecture and decoration, and atmospheric conditions of a structure, which is green. Green environments may offer a unique component when compared to traditional physical environments. While traditional environments are typically evaluated on physical attributes that are apparent to the average consumer, green environments also involve significant behind-the-scene attributes that may not be obvious to most consumers within these environments. What is not known is if these green initiatives are important to consumers. Do they promote the organization's commitment to sustainability? Do these green initiatives reinforce notions of quality and environmental responsibility? Despite the many developments in the business world, there has been little or no published research focused on green service environments from a marketing standpoint. Furthermore, there has been no attempt to integrate current service marketing frameworks with those used in technical fields such as interior design and architecture where there has been an ongoing discussion on the role of green in creating building interiors and exteriors. This research seeks to unite theories across fields focusing the effort not only on surface environmental cues (which are more commonly examined in the marketing field), but also the use of green in the building process in the context of hotel service environments.

Green Hotel Environment

According to the Green Hotel Association (2007), green hotels are "environmentally-friendly properties whose managers are eager to institute programs that save water, save energy and reduce solid waste—while saving money to help protect our one and only earth" (¶ 1). Kasim (2004) takes the definition one step further through addressing the immediate locality by identifying that a green hotel "operates in a responsible manner towards its employees, the local community, the local culture, and the surrounding ecology" (p. 10).

The economic potential of integrating green in hotel service environments may be substantial. The Green Hotels Organization reported that, "43 million U.S. travelers say they are concerned about the environment" (Vora, 2007, p. 1). Ray Burger of Pineapple Hospitality Group told HOTELS magazine, "I would not encourage any developer to go green to get a rate premium. Going green is more of a market premium. The risk is that "if you don't do it, you could lose business" (Scoviak, 2008, p. 30). Hoteliers are accountable for environmentally responsible business practices because their continued existence is reliant on their environment (Bader & Smith, 2005). Sustainable practices may appear altruistic to the guest, shedding a positive light on a hotel (Bader & Smith, 2005).

There are several examples of best practices in current hotel sustainable practice. For each forward-thinking action there can be an even greater reward (payback). Rezidor's Radisson SAS in Istanbul, Turkey installed 40 solar panels with a projected payback of under two years (Bader & Smith, 2005). Hilton's

Scandic Hotel introduced the 95% recyclable or biodegrable room which dramatically lowered resource consumption and increased guest demand (Bader & Smith, 2005). Within the United States there are extremes in the environmental programs that hotels choose to integrate into operations management (Butler, 2008). A growing number of hotels today are involved in a basic environmental program entitled (or similar to) Project Planet (Project Planet, 2007), which is identified by a hangtag in each guest bathroom. The hangtag invites guests to participate in conserving water by using their bath towels more than once. If a guest wants to participate, they simply hang their towels up; if not, the housekeeper will replace them. Other hotels choose to go beyond status quo and become innovators through the adoption of numerous environmental measures. These measures include incorporation of low-flow showerheads in each guest bath to extreme efforts such as total redesign of a facility to achieve Leadership in Energy and Environmental Design (LEED) certification by the US Green Building Council.

Percentages that are reported in a September 2007 Maritz Research Retail Group survey said that consumers would prefer a green hotel over a conventional hotel (as cited in Scoviak, 2008) – but the numbers do not play out in reality. The problem appears to be that the industry has little knowledge of how guests form perceptions that a hotel is green and which green attributes are most likely to have an effect on guest perceptions.

Green attributes within hotel environments. There is limited research addressing the issue of green attributes in hotel service settings. Two studies have been identified that provide insight into the identification of green attributes and the consumer perception of these attributes within a hotel service setting. The first study by Millar and Baloglu (2008) identified a list of green attributes guests would prefer to have in the guest room of a hotel. The second study by Robinot and Giannelloni (2010) examined how green attributes contribute to hotel customers' overall satisfaction. Both studies provided evidence that the study at hand is important and contributing to a research area with limited academic recognition.

Millar and Baloglu's (2008) study identified 12 green attributes from a study by Gustin and Weaver (1996), International Tourism Partnership and CERES best practice. Attributes that were identified by Millar and Baloglu (2008) are, 'use of energy saving light bulbs in the sleeping area of the room', 'use of energy saving light bulbs in the guest bathroom', 'use of low flow toilets in the room', 'use of low flow faucets in the room', 'use of low flow showerheads in the room', 'refillable soap dispensers instead of bars of soap', 'refillable shampoo dispensers instead of individual bottles', 'a towel re-use program', 'sheets changed only if requested (for stays up to three nights)', 'recycling bins in the guest room', 'occupancy sensors used to control lighting in the room', and 'key cards that turn power to the room on and off'. Of the 12 attributes, seven attributes were favorably received by survey respondents, including 'energy saving light bulbs', low flow plumbing fixtures', 'towel re-use', 'sheets changed

only if requested (for stays up to three nights)', 'recycling bins in the guest room', 'occupancy sensors used to control lighting in the room' and 'key cards that turn power to the room on and off' (Millar & Baloglu, 2008).

The significance of the second article (Robinot & Giannelloni, 2010) is that it linked green attributes to customer satisfaction within a hotel setting. The researchers found that participants classified green attributes into basic (i.e., attributes that reduce overall satisfaction if lacking, while contributing little to satisfaction when evaluated favorably) and plus (i.e., attributes that contribute strongly to the level of overall satisfaction) attributes. Three green attributes were considered in this study. Participants in this study identified two green attributes, quality certification (in this case International Standards Organization [ISO]) and signs about reusing linens, as basic attributes which are integral parts of the service; whereas the remaining green attribute, using clean and renewable energies, was identified as a plus attribute. The researchers only sought data for the three green attributes mentioned above and made several deductions about consumers relating to these limited findings. Both Millar and Baloglu (2008) and Robinot and Giannelloni (2010) provide evidence that green hotel attributes need to be better understood from consumers' perspectives.

Certification and regulation of green hotels. The hotel industry (managers and developers) has the power to aid a building industry where 48% of the world's carbon footprint is made (Architecture 2030, 2010). It is an industry that is on the verge of major change where design, management, and operations are

being challenged by sustainability on every front. The problem seems to be that the hotel industry does not understand what sustainability is and what it means to their properties. Diane Cudworth, Benjamin West's director of quality assurance stated, "if there's not people out there saying that at a minimum this is what you should have to do in order to be classified as green, the phrase in the industry is going to become so meaningless that even if owners try to do something, they won't know if they're doing the right thing" (Mastrelli, 2008, p. 113).

One way hoteliers can start integrating green is through following certification guidelines. There is one major certification program that concerns new construction and major renovations of almost any type of building. That is Leadership in Energy and Environmental Design (LEED), a certification program started by the US Green Building Council (USGBC) in 1998. The objective of LEED is to improve energy savings, water efficiency, CO_2 emissions, indoor environmental quality, and the monitoring (and stewardship) of non-renewable resources (USGBC, 2009). There were approximately 900 LEED certified buildings in the U.S. as of August 1, 2007, among which only four were hotels (Butler, 2008). However, as of September 2009, the number increased; 31 hotels were LEED certified with another 877 registered to be certified (USGBC, 2009).

There are numerous third-party certifying agencies other than LEED that promote green products and services within the lodging industry. One of the best known agencies is Green Seal. This agency certifies many products from construction materials to industrial and household cleaners and has recently

established property certification within the lodging industry for hotels that meet the Green Seal environmental standard (GS-33) (Green Seal, 2010).

In addition to certification, hoteliers will also have to be concerned about regulation within the coming years. Regulation is different from certification in that it represents a type of code that a local municipality or ordinance adopts. Codes are enforceable through law and therefore need to be adhered to in any type of physical environment. This regulation is important as when municipalities adopt the code, hoteliers will need to follow through with the code in order to remain operational.

The IGCC was initiated by the ICC and AIA in recognition of the need to cut carbon emissions. The goal for the new regulations is to be carbon neutral by the year 2030 through reducing energy use and minimizing carbon footprints of new and existing commercial buildings (ICC, 2010). Carbon neutrality is defined as “using no green house gas emitting energy to operate” (Architecture 2030, 2008, ¶ 6). IGCC will be designed to coordinate and integrate with the health and safety features of existing codes and will also be fully compatible with and support existing LEED rating systems (ICC, 2010). IGCC will be useful in that it will provide a step beyond existing administrative provisions in existing codes and respond directly to the jurisdictions. What municipalities will be able to enforce is up to the municipality. The IGCC is a useful and enforceable regulatory framework for building designers, contractors, owners, and inspectors (ICC, 2010). It is recognized through the USGBC and AIA that buildings play a role in the public health and welfare of the citizens within the community.

Jurisdictions that are ready can adopt the IGCC; the code is a completely voluntary tool for safer and more sustainable communities (ICC, 2010).

The IGCC is different from existing code in that organizations will become responsible for their building after construction concludes. Typically, when a building is being built or under renovation, when specific benchmarks are met, a code official appears on site in order to approve the methods that were used until that point (ICC, 2010). After a series of benchmarks are met, the building is allowed to open to the public and the relationship with the code official is ended until additional renovations are permitted. With the new codes, the relationship between the operator and the code official does not end, and the operator will have to meet benchmarks throughout the life of the building (ICC, 2010).

Some forward-thinking managers and owners of green properties that understand the benefits of green are implementing practices to show consumers the way. Jan Peter Bergkvist, the vice president of sustainable business at Scandic Hotels, Stockholm was recently interviewed by Scoviak (2008) and stated, “The ultimate challenge for us is to change the behavioral patterns of people…It’s about being part of the solution. Companies that do that first will become more successful and profitable whilst the rest will lag” (p. 30). The green concept is highly visible in popular hotel literature, but demand from the consumer’s point of view needs to be understood. If consumers are not demanding the benefits of a green hotel, management companies may not be quick to invest money into environmental upgrades of their properties. Thus, the goal of this research is to establish a valid and reliable framework in which

consumers' perceived importance of green attributes can be examined in hotel environments.

Environmental Psychology and the Service Environment

Environmental psychology is the study of the interactions between individuals and their physical environment. The environment in which we live, breathe, work, shop, and sleep surrounds us at all times; the environment influences our behaviors, and for that the environment and our behaviors are inextricably linked. There is an obvious cause-and-effect relationship between consumers and the physical environment. The effect that is attributed to a buying environment results from the multiple factors present within the environment. Kopec (2006) proposed that a reaction to an environment is not based on any one perspective; instead, the reaction is analyzed in the aggregate in the context of the behavior-environment relationship.

The idea of the environment affecting behavior was first studied by Lewin (1936). Lewin was a child psychologist who investigated the effect of environmental forces on children. Lewin (1936) defined the environment as 'life-space' meaning that the environment is dynamic. Lewin (1936) argued that there were social, psychological, and physical forces at play to define any one situation, and created a dialogue that initiated research on the environment and its components using psychological terms. Through this research Lewin initiated the concept of the 'situation' within a physical environment which greatly influenced research in environmental psychology as well as service marketing.

Mehrabian and Russell (1974) are among the earliest researchers who applied environmental psychology to understand the effect of service environments on consumer behavior. Mehrabian and Russell (1974) developed the Stimulus-Organism-Response (SOR) framework which postulates that environmental stimuli (S) drive consumers' emotional responses (O), which then influence their behavioral responses through approach or avoidance (R). The SOR framework is rooted in environmental psychology and was initiated by the lack of theory that clearly defines the relationship between environment, behavior, and situational variables. Mehrabian and Russell (1974) stated in the preface of "An Approach to Environmental Psychology":

> There has been an increasing concern with the physical and social environment and its effects on man. Congestion, pollution, and the undisciplined spread of cities, for example are becoming major influences on human feelings, social interactions, the ability to work, and the general physical and psychological well-being (p. 1).

This statement is remarkably valid today as we are still trying to understand our environment and how we live, work, and interact within it.

The SOR framework suggests that people react to their environment in two basic ways: approach and avoidance (Mehrabian & Russell, 1974). Approach behaviors include positive behaviors such as a desire to stay, explore, spend money, and browse in a particular environment. Avoidance, on the other end of the spectrum, includes negative behaviors such as a desire to leave or stay away from a particular environment.

Mehrabian and Russell (1974) set the stage for the study of service environments although their model was not specific to them. Donovan and Rossiter (1982) recognized the value of the SOR paradigm and tested it within a retail setting. The SOR paradigm allowed the researchers to understand all dimensions of the retail environment through measuring the effects of store atmosphere on shopping behavior.

To date the SOR paradigm has not been utilized in service environment research within hotels. Furthermore, the SOR paradigm has not been utilized in understanding the effects of green environmental attributes within hotel service settings on guest behavior. This is partly due to the fact that no clear classification of green environmental attributes within hotel service settings has existed to allow for the manipulation of the stimulus taxonomy. Therefore, the PIGEA scale developed in this study is expected to contribute to the literature by providing a taxonomy of green environmental attributes in hotel service settings that future research can examine through the SOR paradigm.

Consumers and Green Consumption

According to a Nielsen report (2008), one in five U.S. consumers is a passionate, environmentally socially-responsible steward. These findings mirror a 2008 study by Yankelovich which suggested that 22% of all consumers feel they can make a difference when it comes to the environment (Makower, 2007). As the notion of buying green becomes more of a mainstream ideology, and with such significant numbers of consumers willing to purchase products that are environmentally friendly, it is no surprise that marketers, managers, and

researchers are interested in tapping into this segment. As a result, several studies both in the popular press and academia have focused attention on better defining this consumer group (Roberts, 1996; Samdahl & Robertson, 1989; Zimmer, Stafford, & Stafford, 1994).

This consumer segment has demonstrated that it is not a homogenous group. Several studies have shown that consumers of environmentally friendly products/services do not all see green in the same way ("Industry Experts", 2007). Some customers will only buy certain green products while other customers are obsessed with green shopping for every product from ice cream to clothing. In academic research, most of the current literature on green consumerism uses socio-demographic variables to classify the various consumer segments (Peattie, 2001), while the popular press has classified green consumerism more along the lines of benefits wanted. The body of work in the academic arena on green segmentation has yielded mixed responses. Although the general consensus is that the typical green consumer is an affluent, educated, liberal female who lives in a city, with kids in elementary school (Ottman, 1993), there is still a significant amount of debate in the literature as to characteristics of a typical green consumer.

There are several different types of defined behaviors that researchers associate with environmentally responsible behaviors. A consumer group that has been associated with environmentally responsible behaviors is LOHAS consumers ("Industry Experts", 2007). LOHAS is an acronym for lifestyles of health and sustainability. The Natural Marketing Institute (NMI) states that

LOHAS consumers represent 17% of all U.S. adults. They define the LOHAS consumers as dedicated to planetary health through making environmentally friendly purchases while also taking action. These consumers buy green products, support advocacy programs and are active stewards of the environment ("Industry Experts", 2007). LOHAS consumers are not addressed in scholarly literature as their market segment is new.

Voluntary simplifiers (VSLs) are consumers who choose to consume very little (Iwata, 1999). Some of the time the choices of the VSLs (when viewed individually) may not be considered sustainable (Iwata, 1999) since they view the whole picture before making a decision. They look at all of the costs involved in making a purchase before they decide if the purchase is necessary. For example, if they need to purchase a light-bulb- but the closest place to purchase a compact fluorescent bulb (energy efficient light bulb) is not convenient, they may purchase a traditional incandescent because the total price to pay outweighs the value of the bulb. VSLs view themselves as being responsible to live simplistically in order to negate the consumers who continue to over consume. In order to protect the global environment and to secure human survival in the future, VSLs believe that they must help society to change its consumption-oriented lifestyles to voluntary simpler lifestyles oriented toward less consumption (Iwata, 1999).

LOHAS and VSL consumers represent two very different types of behaviors that practice some form of environmental consciousness when making purchase decisions. They are only two of the many types of consumers and

anachronisms that define the different types of behavior that represent green consumer groups. Freegans, Bourgeois Bohemians, and Scuppies are just a few of the groups that are identified in popular press. Each of these groups varies through their behavior, ethics, and altruism towards the environment. Although purchasing a service is different from purchasing a product, it is proposed that consumers who are thinking about green within hotel service settings will seek out the benefits of a lodging establishment that practices green.

Both socio-demographic variables, such as gender, income, and education as well as psychographic variables have been used to identify green consumers (Aaker & Bagozzi, 1982; Roberts, 1996; Roberts & Bacon, 1997; Samdahl & Robertson, 1989; Stern, Dietz & Kalof, 1993; Van Liere & Dunlap, 1981; Zimmer et al., 1994). Most researchers agree, however, that psychographic variables are more predictive of environmental consciousness and green consumer behavior than are socio-demographic variables (Roberts, 1996b; Schlegelmilch et al., 1996; Straughan & Roberts, 1999). Several studies using both demographic and psychographic variables to explain green purchasing behavior consistently found higher predictive and explanatory power with psychographic variables (Roberts, 1996; Schlegelmilch, Bohlen, & Diamantopoulos, 1996; Straughan & Roberts, 1999). A review of the existing body of work in this area includes examining the role of perceived consumer effectiveness (Antil, 1978; Berger & Corbin, 1992; Ellen, Wiener & Cobb-Walgren, 1991; Roberts & Bacon, 1997;Webster, 1975), political orientation (Hine & Gifford, 1991), altruism (Stem et al.,1993), and environmental concern

(Antil, 1984; Kinnear, Taylor & Ahmed, 1974; Roberts & Bacon, 1997; Van Liere & Dunlap, 1981) on green purchasing behavior.

Two studies that were of particular interest to this study are Ellen et al. (1991) and Flynn and Goldsmith (1999). Ellen et al.'s (1991) research focused on perceived consumer effectiveness (PCE). PCE has been used in identifying environmentally responsible behavior in academic research for quite some time (Antil, 1978; Berger & Corbin, 1992; Ellen et al., 1991; Roberts & Bacon, 1997; Webster, 1975). What differentiates Ellen et al.'s (1991) research from other studies is that they observed that the purpose of PCE had become diluted over the years. PCE was originally intended to measure the "extent to which the consumer believes that the efforts of an individual acting alone can make a difference" (Ellen et al., 1991, p. 102). Over time PCE has been combined with other constructs, straying from its original concept and resulting in misleading conclusions about the role of PCE as it was originally intended (Ellen et al., 1991). In order to redirect studies on the subject the researchers reviewed major publications on PCE and established a new study that was able to direct research back to the core of what PCE stands for, that is behavior towards the environment. PCE is important to this study in that it contributes uniquely to the prediction of certain pro-ecological behaviors (Ellen et al., 1991), whereas other measures such as Socially Responsible Consumption (SRC) (Roberts, 1995; Webb, Mohr & Harris, 2008) were focused on environmental concern, not environmental behavior. PCE is considered a good criterion variable against which the validity of the PIGEA scale can be examined in the present study. This

is because we can reasonably draw a conceptual link between PCE and PIGEA in that if a consumer is more aware that his or her own actions will contribute to the improvement of the environment (i.e., the higher the PCE), he or she will more likely to perceive higher importance of green environmental attributes within a hotel service setting (i.e., the higher the PIGEA). For example, Verbeke, Vanhonacker, Sioen, Van Camp, and De Henauw (2007) found that importance attached to sustainability and ethical issues was linked to perceived consumer effectiveness in the context of fish consumption.

Flynn and Goldsmith's (1999) subjective knowledge scale is also of interest to the current study of green environmental attributes. The subjective knowledge scale measures how much consumers of hotel service environments think they know about green. Objective knowledge is what is commonly measured in academic research; it is tangible in that it can be measured by some sort of test that relates to prior product knowledge (Flynn & Goldsmith, 1999). Subjective knowledge is a bit more evasive as it solely relies on what the consumer thinks they know. However, the relationship of perceived importance of sustainability and subjective knowledge was identified by Verbeke et al. (2007) in the context of fish consumption. Therefore, it is reasonable to consider subjective knowledge of green as a criterion variable for testing the validity of the PIGEA scale.

Scale Development

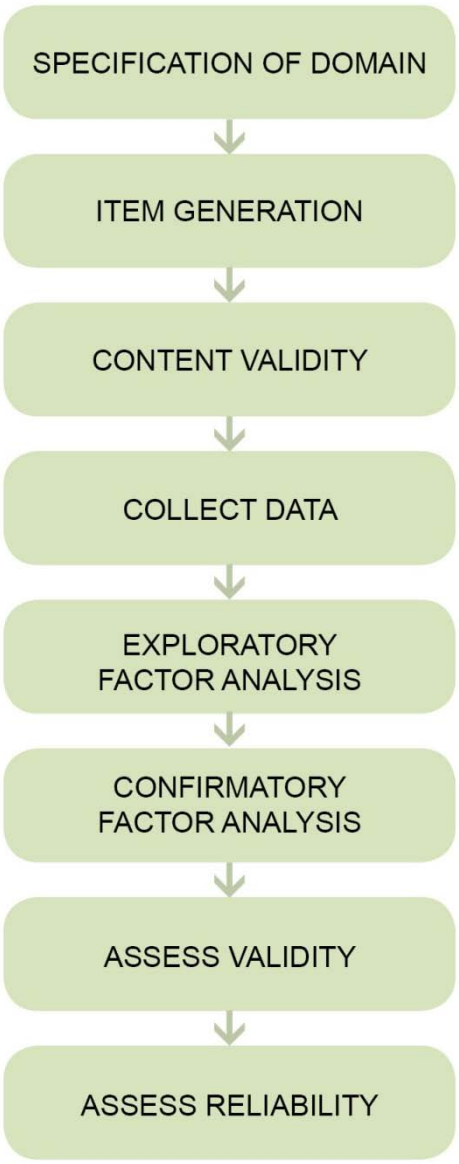
This study followed the scale development paradigm proposed by Churchill (1979). Churchill (1979) outlined a suggested procedure for developing a good measure. Churchill stated that the specification of the domain of the construct is the first step to developing better measures. This step should be followed by the generation of sample items, the collection of data, the purification of the measure, further data collection, and the assessment of reliability and validity.

Based on the literature presented in this chapter, a foundation was established to understand green environmental attribute constructs. In Phase 1 of this study, the domain of green environmental attributes was defined to provide boundaries for the PIGEA scale. Attributes (items) that fit the domain were compiled and subjected to a qualitative study with a panel of experts for the purpose of examining the content validity. Chapter 3 discusses the research methodology and results of Phase 1.

In Phase 2 of this study, the target population was identified and data were collected from a consumer sample from the target population. The data addressed the perceived importance of a set of green environmental attributes refined through Phase 1. The attribute items were purified and finalized into a parsimonious set of items through exploratory and confirmatory factor analyses, each of which was conducted on a subset of the data. With the finalized PIGEA items, construct validity, criterion validity, and reliability were examined. Chapter 4 discusses the research methodology and results of Phase

2. Chapter 5 concludes with a discussion of the results from both phases of the study, theoretical and managerial implications of the study, and future directions for research. Figure 2.1 presents the above mentioned steps of scale development this study followed.

Figure 2.1 Scale Development Process



Chapter III: Phase 1 - Methodology and Results

This chapter describes Phase 1 of the present research which deals with a qualitative study designed to explore the content domain for a Perceived Importance of Green Environmental Attributes (PIGEA) scale. The first objective of this phase was to generate a universe of potential green hotel environmental attributes. The attributes were generated through review of related issues featured in trade and professional publications. The item generation process was guided by Baker's (1987) service environment framework. The second objective of this phase was to subject the generated attribute items to evaluation by a panel of experts consisting of architecture, design, marketing, and hospitality professionals, in order to establish content validity of the items.

Content validity is defined as the extent to which a scale reflects the universe of the construct domain (DeVellis, 2003). In order to identify what is measured (and not measured) by the PIGEA scale, it is important to provide boundaries for the green environmental attribute construct. Based on information available in popular press and trade/professional publications, green environmental attributes are defined in this study as characteristics inherent or associated with a hotel service environment that are environmentally responsible as well as accountable to and respectful of the consumers who use the hotel services.

Green environmental attributes that were established in Phase 1 were adapted as PIGEA scale items and tested in Phase 2 of the study in order to establish the validity and reliability of the PIGEA scale. The remainder of this chapter will first discuss the attribute item generation process and the initial set of green environmental attributes in light of Baker's framework. Then, a description of the procedure of the qualitative study with the panel of experts will be presented, followed by a discussion of findings from the qualitative study.

Green Environmental Attribute Item Generation

Based on the definition presented above of green environmental attributes within a hotel service setting, the researcher first identified potential items that may address this construct through review of green hotel service environment issues presented in trade and professional publications. The publications that were reviewed included *Architectural Record, Buildings, Building Design & Construction, Cornell Hospitality Quarterly, Environmental Design & Construction, Facility Management Journal, Green Lodging News, Hospitality Design, Hotels, Lodging Magazine*, and *Metropolis*. The review of these publications immediately prompted a series of questions. Is the product certified through a third-party? Is it sustainable? Can it be recycled? Is it natural? Is it biodegradable? What percentage of recycled content does it contain? These questions provide meaning to the physical environment and therefore may substantiate reasoning for an hotelier to incorporate the attribute within the hotel service environment.

Through this review process, an initial list of 75 potential green environmental attributes in hotel service settings was generated (see Table 3.1).

The item generation was intended to capture the entire range of characteristics that comprise the construct. There is very little academic literature that conceptualizes green environmental attributes. Therefore, Baker's (1987) renowned framework of service environment was applied in this phase of the study to organize the potential attributes culled from the trade and professional publications. Baker's (1987) framework defined important service environment elements from the consumer's point of view and how these elements could affect a consumer's experience within a given service setting. Her framework identified three areas for research within the service setting. These areas include ambiance, design, and social factors. The ambient factor (e.g., heating, ventilation and air conditioning, lighting, acoustics, scent, cleanliness) exists below the level of our immediate awareness (Baker, 1987); therefore, ambient elements tend to be intangible. The design factor (e.g., layout and comfort, aesthetic components such as architecture, color, and materials) exists at the forefront of our awareness and are tangible in nature. The social factor (e.g., service personnel and customers - or audience) relates to the people within the environment and their behaviors (Baker, 1987).

Baker's (1987) framework was chosen as the skeleton of the classification system for the proposed scale because its usefulness has been evidenced in previous service environment research. For example, Brady and

Table 3.1 Potential Green Environmental Attributes Shared with Experts

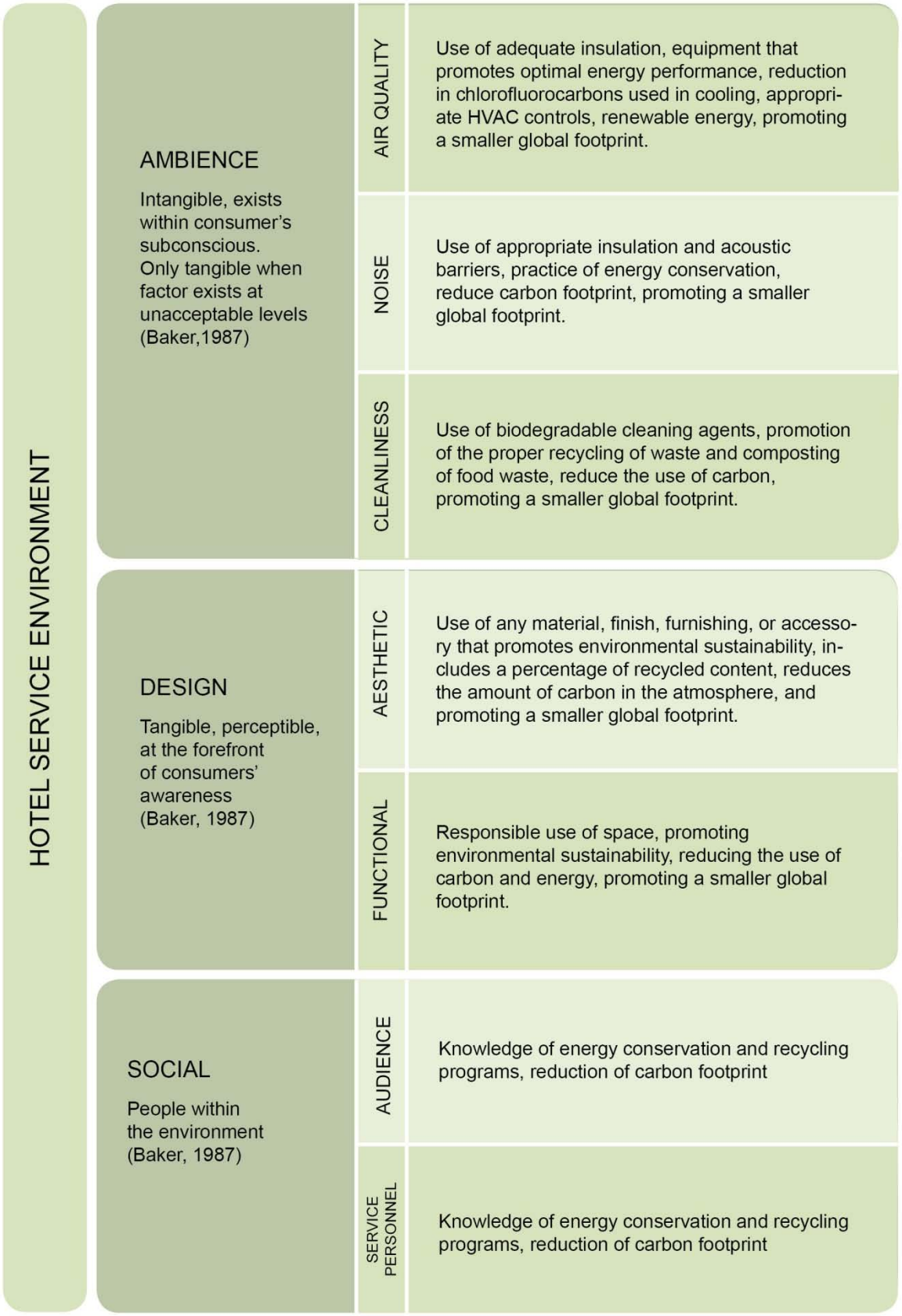
TANGIBLE ATTRIBUTES	NON-TANGIBLE ATTRIBUTES
• optimization of building footprint • use of sun visors • living roof • living wall • windows manufactured from recycled content • operable windows (where possible) • sustainably harvested wood • fly ash concrete • recycled stone • plaster wall surfaces • wool carpet • carpet with recycled content • CRI certified carpet • carpet with no offgassing • linoleum • recycled glass tile • sustainably harvested wood flooring • bamboo flooring • % recycled content wallpaper • natural fiber wallpaper • 0 VOC paint • kirei board walls • paperstone countertops • recycled glass countertops • 0 VOC sealants, adhesives, coatings • furniture made from sustainably harvested wood • furniture made from metal or other material that can be or was recycled • furniture designed for disassembly and recycling or reuse • furniture designed for the environment (DfE) • space optimization • Energy Star rated appliances • Energy Star rated equipment • LEED certification • Cradle-to-Cradle certification • reducing use of paper • access to recycling bins • bed linen program • towel exchange program • shower gel dispensers • rainwater harvesting • public transportation • car share • bicycle storage/rental	• air quality • optimization of lighting (footcandles) • temperature control • use of compact flourescent bulbs • humidity regulation • use of LED lights • fresh air transfer • optimization/use of daylighting • monitoring of temperature • recycling of waste • zoning of interior environments • composting of food waste • acoustic barriers • recycling of cooking oil • use of insulation w/ recycled content • monitoring of carbon footprint • soy based insulation • monitoring of global footprint • no offgassing of materials • use of green cleaning products • steam cleaning • destination conservation • use of low flow water fixtures • efficient heating of water • gray water reuse • energy optimization • energy retainment • use of renewable energy • use of biofuels • use of solar panels • steam recovery system • ground source heat pump

Cronin (2001), in their research on perceived service quality, established significant qualitative data to support that Baker's conceptualization of the ambient, design, and social factors most often represented respondents' perception of the service environment. In addition, numerous empirical studies have confirmed Baker's (1987) framework (e.g., Baker et al., 1992; Baker et al., 2002; Baker et al., 2007; Babin & Darden, 1996; Hui & Bateson, 1991; Wakefield & Blodgett, 1999).

In applying Baker's framework to green environmental attributes, a system of many individual components within the broader framework was introduced. Each of these components can contribute to the greater whole, enhancing the performance of the environment and positively affecting occupants' health, comfort, and perception of the space. Figure 3.1 presents a typology of green environmental attributes guided by Baker's (1987) three factors of the service environment. Following is a detailed description of Baker's (1987) three factors of the service environment and how they may be applied in the green hotel environmental issues.

Design factor. Baker (1987) defined design cues in terms of stimuli that exist at the forefront of our awareness. Layout, flow, and clutter are dimensions that Baker identified as design functionality. This research focused on the physical, tangible aspects of design rather than flow and spatial arrangements. For the design factor, the most relevant cues for green service providers would include interior and exterior building materials, applied finishes, furniture, fixtures,

Figure 3.1 Conceptual Identification of Green Environmental Attribute Descriptors



lighting and signage. The first components within this design factor to be addressed are materials and finishes. For the materials and finishes used in a hotel environment to be green, they are to meet at least one of the following criteria: low emitting (zero or low volatile organic compounds [VOC's]), rapidly renewable, recycled, reused, and biodegradable (Fehrenbacher, 2006).

Low emitting or zero VOC materials and finishes refer to products that do not off-gas. Care is normally taken in the specification of green products that they do not emit harmful odors (off-gassing) so that the indoor air quality remains clean at all times (Binggeli, 2009). Rapidly renewable refers to using resources that have short harvest cycles as opposed to petroleum-based products that are non-renewable or old growth forests which take decades, possibly centuries, until harvest (Novitski, 2008). Bamboo, cork, wool, straw, hulls, and sorghum are all rapidly renewable materials that are being manufactured into architectural and design materials to be used both structurally and decoratively. These materials are being veneered to make flooring as well as wallpapers and manufactured into panels in order to make cabinetry (Fehrenbacher, 2006).

Recycled is a term with which more consumers may be familiar. In 1998, the Federal Trade Commission (FTC) expanded its definition of the terms 'recycled' and 'recyclable' to reflect current consumer perceptions (FTC, 1998). The FTC identified that the term, "'recyclable' includes the reuse, reconditioning, and remanufacturing of products or parts in another product" (p. 1). The term, "'recycled' is used for products and packages that contain reused, reconditioned or remanufactured materials, as well as recycled raw material" (FTC, 1998, p. 1).

Products such as carpet, tile, and insulation can all include some sort of recycled content. There are many carpet companies that recycle used carpet through a process that separates the backing from the yarn, recycles the yarn, and then manufactures the repurposed yarn into carpet (Carpet and Rug Institute [CRI], 2008). Porcelain, ceramic, and glass tile can be manufactured from many different types of recycled products, including light bulbs, ceramic, and aluminum (Every day, 1999). The difference between reused and recycled is that the reused product retains its original integrity in a new application whereas a recycled product does not (Fehrenbacher, 2006). An example of a product being reused is wood flooring. Wood flooring may be used as flooring again or as an application on a wall or ceiling treatment. The final term to introduce is biodegradable. Biodegradable refers to products that compost quickly into elements found in nature when they are exposed to air or moisture (FTC, 2010).

Two more design-related attributes can be defined in green hotel environments. They are design for disassembly and design for environment (DfE). Design for disassembly enables the particular product and its parts to be easily reused, remanufactured or recycled at the end of its life (Diener, 2010; Rossi, Charen, Wing, & Ewell, 2006), whereas DfE is a comprehensive, holistic approach to the environmentally-friendly design of a product or building (McDonough Braungart Design Chemistry [MBDC], 2008). This design practice takes into account the characteristics of functionality and disposal of a product before the actual design is initiated. This process is an intelligent optimization of

resources before, during, and after a product's lifespan (DeMendonca & Baxter, 2001; Lenox, King, & Ehrenfeld, 2000; Rossi et al., 2006).

Ambient factor. Baker (1987) defined the ambient factor as, "environmental conditions that exist below the level of customers' immediate awareness, so the customers may be less than totally conscious of these conditions in the environment" (p. 79). In the traditional (vs. green environment) sense, ambient cues include noise, scent, lighting, and to a lesser extent temperature (Baker, 1987; Butler & Biner, 1987; Cobb, 1988; Gifford, 1987; Wineman, 1982; Yalch & Spangenberg, 1993). Figure 3.1 introduces traditional attributes of Baker's (1987) ambient factor and definitions of green environmental attributes that may represent ambience; it also demonstrates the positive environmental impact that green ambient attributes can have above and beyond traditional ambient atmospherics.

The first component within the ambient factor is air quality. Baker (1987) argued that air quality may be conveyed through temperature, humidity, air circulation, and ventilation. Increasing air quality, through monitoring air exchange with the outdoor environment and controlling the level of humidity in an interior environment, results in a more comfortable and noticeably healthier interior environment. Therefore, the air quality of the environment includes temperature and humidity control (heating and cooling) and ventilation. Temperature can be easily controlled through installation of a thermostat that will regulate the interior environment consistently throughout the day (Binggeli,

2009). Ventilation allows for proper heating and cooling of a space as well as the introduction of fresh air. Within a green environment this could happen through the installation of operable windows or through a more complicated technology of using a fresh air exchange system (Binggeli, 2009). From a green perspective, hotel operators have several options when it comes to the efficient use of energy in conditioning their space. Geothermal heat pumps, advanced variable-air-volume (VAV) systems and automated control systems are some possible ways that hoteliers can recoup significant monies related to air quality while greening the hotel environments (Binggeli, 2009).

The next component within the ambient factor is noise. Noise can be controlled through the use of insulation and acoustic barriers. The control of noise is not necessarily a 'green' attribute. But, an increased efficiency rating may be attained through careful selection of materials, therefore, resulting in the conservation of energy and resources (Binggeli, 2009) and mitigation of noise.

Scent is also a component of the ambient factor and like noise is not specific to a green or traditional environment. For purposes within this study, scent can be a trigger for an asthmatic reaction and can also be associated with harmful off-gassing. Therefore, careful attention must be paid to this attribute when specifying materials. Materials that are specified within a green environment usually contain zero or low VOC's. Materials that are composed of any amount of products that contain VOC's, off-gas. VOC's and off-gassing are addressed within the ambient factor as air quality is of particular importance within a green hotel service environment. It is the off-gassing of materials that is

toxic within interior environments. Therefore, it is important to identify this attribute within both the design factor (as off-gassing or no off-gassing may be a component of a material or finish) and the ambient factor (as a component of air quality). Off-gassing results from the release of volatile chemicals into the air through evaporation (Cohen & Johnson, 2010). Almost all of the materials and finishes introduced earlier within the design factor have the ability to off-gas. However, natural materials are known to off-gas less than manufactured materials (Cohen & Johnson, 2010). Through the introduction of new technologies and innovations in manufacturing processes, green builders can access many materials and finishes with very low or zero off-gassing properties. The Environmental Protection Agency (EPA) warns about the health effects of reduced indoor air quality (IAQ) from the off-gassing of VOC's (EPA, 2008).

Cleanliness is another attribute that was included in Baker's (1987) ambient factor. However, since then this element has not been extensively tested. Baker (1987) referred to most ambient elements as those that exist in the subconscious. Cleanliness is often something we take for granted until we are confronted with an environment that does not meet our standards. Service providers need to actively engage themselves in new cleaning systems in a green environment. This is not an easy feat as all housekeeping personnel must be re-educated on how to use these products. There are several organizations devoted to educating service providers about green cleaners. One of the most significant databases of green cleaning resources is cleangredients.org. This

organization is supported through the EPA and was initiated through the practices of greenblue.org (GreenBlue, 2010).

Baker (1987) discussed lighting as an ambient cue (also see Baker, Grewal, & Parasuraman, 1994). Efficient lighting of an interior environment is its own science. The use of natural light or daylighting and the amount (foot candles) and type (color) of light that is dispersed from a light fixture are some of the concerns lighting designers take into account when planning an interior environment (Steffy, 2008).

Daylighting is the practice of using natural light to illuminate interior environments. It optimizes the amount of natural light a physical environment can take advantage of and it is supplemented by artificial light when the use of natural light is not optimal. From a green standpoint, the use of daylighting becomes a green factor because it reduces the reliance on artificial illumination, therefore reducing energy bills (Steffy, 2008). There are also some very interesting statistics stating that productivity, wellness, and attentiveness are all increased through the use of daylighting (Steffy, 2008).

When daylighting is not available, artificial lighting has to be optimized in order to create an environment that promotes contentment. Typically, the type of ballasts, lamps, and optics used in lighting a space are very important when an hotelier wants to elicit an emotional response about a space from the hotel's guests (Steffy, 2008). Therefore, the type of lighting that is optimized within a green environment is important as the goal is to get the most light out of the least amount of energy.

Another variable for greenness when discussing lighting fixtures and equipment/appliances is the use of Energy Star ratings. The EPA's main goal for the Energy Star program is to develop performance-based specifications that determine the most efficient products in a particular category (EPA, 2009). The EPA has designated over 50 different categories of product ratings and has the information published on their website and identifiable through the use of the Energy Star logo on qualifying products.

Social factor. Aside from the ambient and design factors, the social factor can also be represented by green environmental attributes. The social factor addresses people within the environment (Baker, 1987). In this study, both employees and guests are included in this factor in terms of issues related to energy conservation, recycling programs, and carbon footprint reduction. These issues can be addressed by behavior/actions of employees and guests within the hotel service environment.

Recycling and composting were identified within the social factor because these practices are indicative of specific behaviors of employees and guests within a green hotel environment. By actively recycling and composting materials and spent food items, a service provider can reduce the output of materials into the waste stream (Crawford, 2009). These activities can significantly reduce the firm's carbon footprint and increase revenue to their bottom line (Scoviak, 2008).

Additional behaviors that may contribute to a green hotel service environment may come into play when considering the role of the hotelier within the greater community. Reduction of waste to the local landfill, the hotel promoting volunteer opportunities for guests, and community outreach from the hotelier are all behaviors that may further promote the engagement of the hotel into the local community.

Qualitative Study with Panel of Experts

The 75 items (see Table 3.1), which were generated through a literature review as attributes that most represented the green environmental attribute construct, were subjected to a review by a panel of experts in order to confirm each item's appropriateness as a PIGEA scale (i.e., establish content validity) using a qualitative approach. Following is a detailed description of the method used for this qualitative study and a discussion of the findings.

Panel Selection Procedure and Panel Characteristics

Eighteen professionals were invited to participate in the qualitative phase of this study; 11 agreed to participate. The 11 expert participants represented the fields of architecture, interior design, marketing, and hospitality. The panel was split with seven female and four male experts. The majority of the panel (8 experts) was between the ages of 30 and 39, while one expert was between the ages of 40 and 49 with the final two experts between the ages of 60 and 69. Architects (4 experts) had the highest representation in the panel, followed by

interior designers (3 experts) and marketers and hospitality professionals (4 experts, 2 marketing, 2 hospitality). All participants have been in their profession for at least 10 years and had knowledge of green within commercial building and/or hospitality environments.

Instruments and Materials

The purpose of this qualitative study was to determine if the identified green environmental attributes were recognized by professionals and consistent with professionals' definitions of green environmental attributes. Each expert was given via email a packet of materials consisting of (1) the objectives of the study; (2) the definition of the green environmental attribute construct; (3) a table that listed the 75 potential green environmental attributes the researcher initially identified (see Table 3.1); (4) a set of four questions related to each item including (a) Is the item valid? (b) Does the item make sense? (c) Is it redundant? and (d) Is the item relevant?; and (5) a request for additional suggestions on anything that was missing among the 75 attribute items. In addition, the experts were also asked general demographic questions relating to their age and profession.

Although Baker's (1987) service environment framework was used by the researcher in order to gain clarity in the identification of items that would reflect the domain of the construct, it was decided that this information would not be shared with the panel of experts because the researcher did not want to bias the experts in this exploratory stage. It was deemed plausible that providing the

panel of experts with a framework would limit their ability to express their own opinions and reduce the potential quality of feedback received.

To expedite the content analysis, in the item table provided to the experts (see Table 3.1), the green environmental attribute items were categorized as tangible and intangible attributes. This is because these generic terms were easily recognized by professionals and were readily identified in marketing and hospitality literature (Solomon, 1983; Tzschentke, Kirk & Lynch, 2008). Additionally, Baker (1987) also used these terms to explain the ambient (intangible) and design (tangible) factors within her research. Tangibles refer to the attributes that people are immediately aware of such as materials, furniture, color, and overall style of the environment. Intangibles refer to the attributes that people tend not to be immediately aware of such as temperature, circulation of air, humidity, noise levels, and cleanliness of the environment. Baker (1987) identified that consumers only become aware of intangible attributes when they exist below our level of comfort (e.g., when the temperature is too hot, humidity levels are high, or the air is stale).

Data Collection Procedure

Once the panel of experts received via email the materials described in the previous section, they independently reviewed the materials and emailed to the researcher their responses and any questions they had about the items. After reviewing the responses submitted by the experts, the researcher followed up with each member of the panel through phone or face-to-face interviews.

After the attribute items from Table 3.1 were refined based on panel responses, the items were reviewed one last time for ease of understanding by three of the original panel members. The items were then compiled into a PIGEA scale which was field-tested in Phase 2.

Analysis and Findings

Among the 75 initial attribute items, only 27 items were identified as acceptable green environmental attributes by at least 60% of the experts and, thus, were considered for further refinement for inclusion in the PIGEA scale. For example, attributes such as the use of sun visors and Cradle-to-Cradle certification were dropped as these items were not familiar to the majority of the panel of experts.

For the 27 attribute items recognized by 60% or more of the experts, the responses and comments provided through the review process and the follow-up interviews from each expert were documented. Necessary changes to the item wording were made according to expert responses/comments. The first type of changes made to the attributes was merging some of the material-related attributes that addressed similar concepts. For example, many experts pointed out that material and finish related items were too specific, suggesting to identify the application of a material/finish (e.g., flooring, wall surface, countertop surface) over the type. Therefore, attributes such as fly ash concrete, recycled stone, wool carpet, carpet with recycled content, CRI certified carpeting, carpet with no off-gassing, linoleum, recycled glass tile, sustainably harvested wood flooring

and bamboo flooring would all compress into an attribute “flooring (rapidly renewable or recycled)”. Several other material-related attributes were also compiled (e.g., wall-surface, window curtains, window blinds, countertop surfaces, etc.) and reviewed for a second time. As the items were compiled into material-related attributes (i.e., wall-surface [rapidly renewable or recycled], window curtains [rapidly renewable or organic], window blinds [rapidly renewable, recycled or organic]), it was found that materials could be categorized in an easier fashion and simply be identified as rapidly renewable, recycled, organic, low or 0 VOC, and local materials and furniture (see Table 3.2).

Next, some attribute wordings were revised to clarify their meanings. For example, ‘space optimization’ was rephrased as ‘optimization of interior space’ to be more specific to what the attribute was defining (interior space vs. overall square footage of building).

Finally, new attributes were added based on the experts’ comments. For example, two attributes, building shell material and modular building, were additionally identified through experts’ comments and, thus, added to the list of attributes to be considered in Phase 2. Some experts also commented on the social factor related to employee and customer roles within a hotel environment. Therefore, the topic of recycling and energy optimization was expanded by adding new attribute items that addressed behaviors of employees and guests within the hotel service environment. The experts also suggested adding “the extent to which the site of the hotel limits its impact on the environment.” This

Table 3.2 Refined Green Environmental Attributes Resulting from Panel Review

REFINED SCALE ITEMS		
	ATTRIBUTE	ITEM WORDING
DESIGN FACTOR	Site Impact	The site of the hotel limits its impact on the existing/ surrounding environment
	Building Shell Material	The type of material used on the exterior of the building
	Green Roof	A green or living roof
	Green Façade	A living wall (a wall of low maintenance plants) on the exterior of the hotel
	Modular Building	Part of the hotel was built modularly to reduce costs and energy
	Rapidly Renewable Materials	The use of rapidly renewable materials and finishes within the interior environment (such as bamboo or cork)
	Recycled Materials	The use of recycled materials or finishes (such as recycled glass bottles, aluminum cans, or wood plank flooring)
	Organic Materials	The use of organic material or finishes (such as cotton or wool)
	Low or 0 VOC Materials	The absence of volatile organic compounds (VOC's also known as off-gassing) in materials or finishes (such as carpeting or paint)
	Local Materials/ Furniture	The use of local materials, furniture, or artwork within the hotel interior
	Operable Windows	Windows that open in each room to let fresh air in
	Space Optimization	Optimization of interior space
	Graywater Capture/ Rainwater Harvesting	Rainwater harvesting for the watering of indoor and outdoor plants
	LEED Certification	LEED Certification
	Low Flow Shower	The use of low flow (decreased use of water without affecting performance) showers, faucets, toilets
	Energy Star Rated Appliances	The use of energy star rated appliances throughout the hotel

Table 3.2 Refined Green Environmental Attributes (continued)

REFINED SCALE ITEMS		
	ATTRIBUTE	ITEM WORDING
AMBIENT FACTOR	Lighting (Daylight, Compact Fluorescent LED, sensors)	The use of natural light, compact fluorescent bulbs, LED lights or sensors that turn lights on when guest enters hotel room
	HVAC (monitoring and control)	The ability to adjust the temperature in a hotel room
	Air Quality	Air quality, having fresh air transfer continuously into building
	Green Cleaning Products	The use of green cleaning products
	Energy (Optimization Retainment, Renewable)	Energy optimization, retainment, use of renewable energy (such as solar or wind)
SOCIAL FACTOR	Guest Recycling	Other guests' behavior towards recycling
	Employee Recycling	Employees' knowledge of recycling
	Guest Energy Optimization	Other guests' behavior towards energy optimization
	Employee Energy Optimization	Employees' knowledge of energy optimization
	Towel Exchange Program	A towel exchange program that limits the number of times your towels are collected during a stay at a hotel
	Shower Gel Dispenser	The use of shower gel dispensers
	Alternate Transportation	Access to alternate transportation (rental of a bicycle, public transportation, or a car share program)
	Involvement/ Integration into Community	Integration of the hotel into its local community (also known as destination conservation)
	Composting	Composting of food waste by kitchen staff
	Monitoring of Carbon/ Global Footprint	Monitoring of carbon and/or global footprint

attribute was recommended by the experts to be included in addition to the attribute ‘destination conservation’. The reason for adding the hotel site attribute is that the site or location refers to the placement of the hotel during construction whereas destination conservation refers to the way the hotel integrates into the local community throughout its lifetime and attempts to preserve as much land around the site as possible.

As a result of this attribute item refining process, 31 attributes (see Table 3.2) were generated as the universe of attributes that represented the green environmental attribute construct to be field-tested in Phase 2. The refined 31 items were considered to address Baker’s three factors of service environments and closely resemble the definitions presented within the conceptual framework in Figure 3.1, which indicates evidence for the content validity of the 31 green environmental attribute items.

Chapter IV: Phase 2 - Methodology and Results

The researcher created 31 potential items for a perceived importance of green environmental attributes (PIGEA) scale within hotel service environments using the 31 green environmental attributes refined in Phase 1. The objectives of this phase of the study were (1) to create a PIGEA scale and (2) to establish the validity and reliability of the scale using data collected from a consumer sample.

The remainder of this chapter will first explain the methods used to collect data to empirically examine the psychometric characteristics (validity and reliability) of the proposed PIGEA scale, including sampling and data collection procedure, sample characteristics, and the instrument used for the data collection. Then, the data analysis procedure will be explained, followed by a discussion of results.

Sampling and Data Collection Procedure

The study was conducted using an online survey method through fluidsurveys.com. The targeted population was consumers over the age of 18 who have stayed in a hotel at least once over the past year. A snowball sampling method proposed by Bush, Bush, and Chen (1991) was used to collect the data. Students that attended one of the three universities (Auburn University

in Auburn, AL; La Roche College in Pittsburgh, PA; University of the Pacific in Sacramento, CA) aided in recruiting respondents for the study.

Upon obtaining permission from the Office of Research Compliance, Institutional Review Board (IRB) with regard to the use of human subjects and permissions from the schools and class instructors, students in classes on various subjects such as interior design (sophomore and senior studios), environmental literature, buyer behavior and marketing were invited through an invitation letter presented by the class instructor (Auburn University, University of the Pacific) or in person by the researcher in class (La Roche College) to volunteer their participation in recruiting respondents for the online survey. The students were assured that non-participation in the survey participant recruiting would not affect their grades in the courses in which they were presently enrolled or any other courses that they might take. The students were introduced to the study purpose and given introductory materials including directions for the survey (to share with potential respondents they recruited) and a form to record potential respondents' email addresses. Survey instructions were only handed out to those students who voluntarily consented to recruit potential respondents. To avoid a 100% student sample, student recruiters were asked to approach parents, relatives, friends, and coworkers who had stayed in a hotel within the past year to see if they would be willing to take a survey online. Each recruiter was asked to collect 10 or more potential respondents' email addresses. A total of 127 students volunteered to recruit potential respondents for the survey. Sixty students were from La Roche College, 50 students were from University of the

Pacific, and 17 students were from Auburn University. Email addresses of potential survey participants collected by the student recruiters were emailed or written onto the form provided with the instruction materials and mailed to the researcher.

To ensure that the student recruiters were not repeatedly taking the survey, an individual email was sent to each email address received from the student recruiters containing information about the study as well as the consent letter (see Appendix C). The link to the survey was located at the end of the consent letter. Respondents expressed their consent to participate in the online survey by clicking the link to take the survey. Filters available on fluidsurveys.com were used in order to ensure anonymity and to restrict duplicate IP addresses.

From the 127 student recruiters, a total of 1,432 potential respondents' email addresses were collected. From the 1,432 survey invitation emails sent, 797 respondents submitted their responses through the online survey. Of the 797 responses, 143 surveys were not usable due to incomplete answers. Therefore, the usable responses numbered 654, for a 46 % usable response rate.

Sample Characteristics

Characteristics of the final sample in this phase of the research are summarized in Table 4.1. Of the 654 respondents, the majority were female (61%) and predominantly Caucasian (78%). The sample reported a median income bracket of $50,000-75,000. The majority of the respondents (90%) had

some sort of post-high school education. These characteristics are very close to characteristics present in the population as outlined in the US 2008 Census. The mean income for the 2008 Census was $50,303, and 79.8% of the U.S. population was Caucasian (US Census Bureau, 2009), very similar to the income and ethnicity breakdown in Table 4.1.

Instrument

The survey questionnaire consisted of six sections. Detailed explanations on each section of the questionnaire are as follows. Please see Appendix D for the full questionnaire.

Section 1: Introductory Questions

The first section of the questionnaire addressed respondents' experiences with the type of travel they had done and hotels they had stayed in over the past year and their familiarity with the term 'green'. Green familiarity questions were asked first including 1) if respondents were familiar with the term 'green' or the action of 'going green' as it relates to consumer products and services (yes/no) and 2) what the term going green means to the respondent (check one) from purchasing environmentally responsible products, using a canvas bag when food shopping, turning off the water while brushing your teeth, making a conscious decision to limit your impact on the environment, and all of the above). These questions were followed by the hotel and travel experience questions: 3) how

Table 4.1 Descriptive Statistics of Phase 2 Sample Characteristics

DESCRIPTIVE STATISTICS	
Gender	
Male	39.3%
Female	60.7
Ethnicity	
Caucasian	78%
African-American	3.4
Hispanic	4
Asian-American	8.5
Pacific Islander	1.4
Native American	1.2
Education	
Some High School	1.1%
High School Graduate (or Equivalent)	6.5
Trade or Vocational Degree	1.2
Some College	21.4
Associate Degree	4.3
Bachelor's Degree	37.3
Graduate or Professional Degree	26.4
Prefer Not to Answer	1.8
Yearly Income	
Under $20,000	8%
$20,000 - $30,000	4
$30,000 - $40,000	7
$40,000 - $50,000	8
$50,000 - $75,000	16%
$75,000 - $100,000	21%
$100,000 - $150,000	18%
$150,000 or more	14%

Note: Sample size (n) = 654

many times the respondent stayed in a hotel this past year (1, 2, 3, 4, or more than 4), 4) whether the stay was for business or pleasure, 5) whether the hotel was an independent hotel or part of a chain, and 6) whether the hotel was in an urban setting (yes/no). Respondents were then asked 7) if they were aware of

the hotel's green or sustainable practices (yes/no), 8) if the hotel did engage in green practices, how did the respondent become aware of the policies or practices (e.g., notified by staff, notified by signage within room, notified when reservations were made—[Check one that applies]). The final question in this section asked 9) whether it was mandated through the respondent's employer that they stayed in a green hotel when on business (yes/no). This section was designed to recall the respondent's experiences with hotels over the past year in order to prepare them for the next section of the questionnaire.

Section 2: Perceived Importance of Green Environmental Attributes

The second section presented 31 green environmental attributes refined in Phase 1 (see Table 4.2). Respondents were asked to indicate how important each of the presented attributes was to them using a 7-point Likert-type scale with 1 for 'not at all important', 4 for 'slightly important', and 7 for 'very important'.

The 31 attributes were listed in the order in which a customer would have encountered them from the approach to the exterior of the hotel to interior space, from public (reception desk) to private (guest room) space in the hotel on their last stay. Operational items (e.g., energy use, monitoring of carbon footprint) were left for the end of this section, along with a few questions relating to employee and guest interaction.

Table 4.2 Perceived Importance Items

PERCEIVED IMPORTANCE ITEMS
• LEED certification (Leadership in Energy and Environmental Design)
• The site of the hotel limits its impact on the existing/surrounding environment
• The type of material that is used on the exterior of the building
• A green (or living) roof
• A living wall (a wall of low maintenance plants) on the exterior of the hotel
• Part of the hotel was built modularly to reduce costs and energy
• Windows that open in each room to let in fresh air
• The use of natural light, compact flourescent bulbs, LED lights or sensors that turn lights on when a person enters a hotel room
• Optimization of interior space
• The use of rapidly renewable materials and finishes within the interior environment (such as bamboo and cork)
• The use of recycled materials or finishes (such as recycled glass bottles, aluminum cans, or wood plank flooring)
• The use of organic materials or finishes (such as cotton or wool)
• The absence of volatile organic compounds (VOC's also known as offgassing) in materials of finishes (such as carpeting or paint)
• The use of local materials, furniture, or artwork within the hotel interior
• Being able to adjust the temperature in a hotel room
• The use of low flow (decreased use of water without affecting performance) showers, faucets, and toilets.
• A towel exchange program that limits the number of times your towels are collected during a stay at a hotel.
• The use of shower gel dispensers
• The use of green cleaning products by hotel cleaning staff
• The use of Energy Star rated appliances throughout the hotel
• Composting of food waste by kitchen staff
• Energy optimization, retainment, use of renewable energy such as solar or wind power
• Rainwater harvesting for the watering of indoor and outdoor plants
• Air quality, having fresh air transfer continuously into building
• Monitoring of Carbon and/or Global footprint
• Integration of the hotel into its local community (also known as destination conservation)
• Access to alternative transportation (rental of a bicycle, public transportation, or a car share program)
• Employees knowledge of recycling
• Employees knowledge of energy optimization
• Other guests behavior towards recycling
• Other guests behavior towards energy optimization

Section 3: Perceived Consumer Effectiveness (PCE)

Sections 3 through 5 included measures for the criterion variables against which the criterion validity of the proposed PIGEA scale was assessed. The third section of the survey presented the 2-item perceived consumer effectiveness (PCE) scale (Ellen et al., 1991) which assessed the extent to which the respondent believes that his or her individual efforts on environmentally and socially motivated activities can make a difference. Researchers have established that PCE is linked to socially conscious attitudes and contributes to the prediction of certain pro-ecological behaviors (Ellen et al., 1991). Therefore, PCE was deemed appropriate as a criterion variable for assessing the validity of the PIGEA scale. The two PCE items were "there is not much that any one individual can do about the environment" and "the conservation efforts of one person are useless as long as other people refuse to conserve". Respondents were asked to indicate their level of concern with the issue described in each item using a 5-point Likert-type scale with 1 for 'not at all concerned', 3 for 'slightly concerned', and 5 for 'very concerned'.

Section 4: Subjective Knowledge of Green

As another criterion for the PIGEA validity check, the fourth section addressed the consumer's subjective knowledge of green. Research has shown that knowledge, in general, is directly related to many consumer behaviors (Flynn & Goldsmith, 1999). The developers of the Subjective Knowledge scale, Flynn and Goldsmith (1999), defined subjective knowledge as a consumer's perception

of the amount of information they have stored in their memory. This scale was adapted in this study to measure how much consumers think they know about green. This measure is considered appropriate as a criterion variable for the PIGEA scale because the relationship between perceived importance of sustainable and ethical consumption and subjective knowledge was found to be positively correlated by Verbeke et al. (2007) in fish consumption settings. Additionally, Ellen (1994) investigated the relationship between objective and subjective knowledge effects on pro-ecological behavior and found that subjective knowledge positively affected committed recycling, source reduction and political activism. Five items used to measure subjective knowledge of green included 1) "I know pretty much about 'green'", 2) "I do not feel very knowledgeable about 'green'", 3) "Among my circle of friends, I'm one of the experts about 'green'", 4) "Compared to most other people, I know less about 'green'", and 5) "When it comes to 'green', I really don't know a lot". Respondents were asked to indicate their level of agreement with the issue described in each item using a 7-point Likert scale with 1 for 'strongly disagree', 4 for 'neither agree or disagree', and 7 for 'strongly agree'.

Section 5: Green Consumption Practices

Section 5 included 12 items developed by the researcher in order to identify the respondents' level of engagement with green consumption practices (see Table 4.3). Pedersen (2000) found that an increase in green consumption practices within the realm of food consumption was associated with recycling

behavior and energy consumption. Pedersen's finding leads to a speculation that a consumer's green practices in different domains are interrelated. Therefore, it is expected that consumers who place greater importance on green hotel environmental attributes are more likely to engage in various green consumption practices. Therefore, the green consumption questions were used in this study as another criterion variable for the PIGEA scale validity assessment. For the 12 green consumption practices, respondents were asked to rate how engaged they were with each of them using a 7-point Likert-type scale with 1 for 'not at all', 4 for 'somewhat', and 7 for 'extensive'.

Table 4.3 Green Consumption Practices Items

ITEMS
• Recycling of paper, aluminum, glass, plastic
• Recycling of batteries, print cartridges, personal electronics
• Installation and use of energy efficient appliances
• Driving a hybrid vehicle
• Use mass transportation or alternative transportation
• Purchase local produce
• Purchase/consume organic food
• Purchase/drink organic milk
• Compost food waste
• Purchase/use recycled paper products
• Purchase/wear organic clothing
• Purchase/wear vegan shoes

Section 6: Demographic Items

The final section of the questionnaire asked for demographic information for sample profiling purposes. The questions addressed gender, ethnic background, education, and annual income.

Data Analysis

After the data were collected, they were exported into Predictive Analytics Software (PASW statistics formerly SPSS) version 18 from fluidsurveys.com to create a data file. Once the file was opened in PASW, each participant was numbered and the data were then reviewed for completion and accuracy. Skewness and kurtosis of the items were also reviewed (see Appendix E).

For data analysis, first, exploratory factor analysis (EFA) was conducted for the PIGEA scale items in order to explore potential dimensions within the items and a possibility to reduce the items. Once the EFA was conducted, a covariance matrix was reviewed (see Appendix F). The EFA was followed by confirmatory factor analysis (CFA) of the PIGEA items retained from the EFA to finalize the scale. Then, the construct validity (i.e., convergent and discriminant validity) and reliability of the finalized PIGEA scale were assessed. Next, relationships of the finalized PIGEA scale with the criterion variables were tested using correlation analyses to establish the criterion validity of the scale.

Exploratory Factor Analysis

The primary objective of the EFA was to explore dimensions that underlie the PIGEA scale items and to reduce the items to a more parsimonious set of items for the PIGEA scale. Principal Components Analysis with a Direct Oblim rotation was used for the EFA.

For the EFA, first, the data were split into two sub data sets so that data from half of the respondents were used for the EFA and data from the remaining respondents were used for the CFA later. To determine the appropriate number of factors to retain, a series of EFAs were conducted, and results were reviewed based on 1) Kaiser's criterion (retaining factors whose eigenvalues were greater than 1.0), 2) scree plots, and 3) conceptual meanings of the items loading on each factor. Only items with factor loadings that were .50 or higher were considered for the final scale item selection as these loadings are considered practically significant (Hair, Black, Babin, Anderson & Tatham, 2006).

Confirmatory Factor Analysis

The primary objective of the CFA was to determine whether the PIGEA scale factor structure suggested from the EFA provided an acceptable fit to the second data set as well and to establish the construct validity of the scale. The CFA was conducted using Analysis of Moment Structures (AMOS) 18 employing the Maximum Likelihood estimation method.

The standardized estimates for factor loadings were reviewed to determine the appropriateness of items to their corresponding factors. Values

of.50 or higher were considered acceptable as this level of loading is necessary for practical significance (Hair et al., 2006).

The factor analysis model fit was examined using various fit indices such as chi-square statistic, root mean square error of approximation (RMSEA), and incremental fit indices including comparative fit index (CFI), Tucker Lewis index (TLI) and normed fit index (NFI). Incremental indices such as CFI, TLI, and NFI indicate the improvement in fit of the specified model to a baseline model with all indicators uncorrelated (Hu & Bentler, 1999). The closer the value is to 1.0, the better the fit. Values of .94 or greater were considered to indicate a good fit in this study (Hu & Bentler, 1999). The RMSEA estimate of .05 or smaller is considered to indicate a close fit, an estimate between .05 and .08 indicates a fair fit, estimates between .08 and .10 indicate a mediocre fit, and anything above .10 indicates an unacceptable fit (Browne & Cudeck, 1992).

Construct Validity Assessment

Validity "is inferred from the manner in which a scale was constructed, its ability to predict specific events, or its relationship to measures of other constructs" (DeVellis, 2003, p. 49). There are three different types of validity that should be addressed when developing a scale: content, construct, and criterion validity. The first form of validity that should be addressed is content or face validity. Content validity should be established through the researcher taking the time to clearly define what the construct is, producing a significant number of items, and then refinement of the items. Content validity concerns item sampling

adequacy which is the extent to which a specific set of items reflects the domain of the construct (DeVellis, 2003). Content validity was established in Phase 1 through the qualitative study with the panel of experts.

Construct validity is "directly concerned with the theoretical relationship of a variable to other variables" (DeVellis, 2003, p. 53). To establish the construct validity of a scale, its convergent validity (the degree to which measures of the same construct are correlated) and discriminant validity (the degree to which conceptually similar concepts are distinct) should be demonstrated (Hair et al., 2006).

Convergent validity. For scale items to exhibit convergent validity, according to Hair et al. (2006), indicators of the same concept (i.e., factor) should share a high proportion of the variance of the concept. Therefore, the average variance extracted (AVE) method outlined by Fornell and Larcker (1981) was used for the assessment of convergent validity of the PIGEA scale. AVE is a summary indicator of convergence calculated using the following equation with factor X and indicators (items) x_1, x_2,…, x_n:

$$\text{AVE} = \frac{\Sigma[\lambda_i^2]\text{Var}(X)}{\Sigma[\lambda_i^2]\text{Var}(X)+\Sigma[\text{Var}(\varepsilon_i)]}$$

where λ_i is the loading of x_i on X, Var signifies variance, ε_i is the measurement error of x_i, and Σ denotes a sum (Fornell & Larcker, 1981). AVE varies from 0 to 1, and it represents the ratio of the total variance of the indicators (items) that is

due to the latent variable (factor). According to Dillon and Goldstein (1984) and Bagozzi (1991), a variance extracted of greater than .50 indicates the validity of the scale items.

Discriminant validity. The assessment of discriminant validity reflects the extent to which the measure is unique and not a reflection of other variables (Peter & Churchill, 1986). That is, items for each factor within the PIGEA scale should measure the unique meaning of the factor and should not reflect meanings of the other factors. Discriminant validity was assessed by examining the factor correlations and their confidence intervals (plus and minus two standard errors around the factor correlation coefficients) (Hair et al., 2006). For scale items to be discriminant valid, none of the confidence intervals for the factor correlation coefficients should contain 1.0 (Anderson & Gerbig, 1988).

Another way that discriminant validity was assessed for this model was through a chi-square difference test between the final CFA model and three additional CFA models (restricted models) created by adding a restriction for each factor correlation to be 1. For discriminant validity between the factors to be established, the fit of the restricted models should be significantly worse than the final CFA model fit (Hair et al., 2006).

Reliability Check

Reliability is fundamental to the successful construction of a measurement scale. Reliability is the degree to which a set of indicators of a latent construct is

internally consistent in their measurements (Hair et al., 2006). Reliability is necessary, but not sufficient, for validity of a measure; even measures with high reliability may not be valid in measuring the construct of importance (Hair et al., 2006). Internal consistency, a kind of reliability that refers to the consistency among the items measuring the same construct (Hair et al., 2006), is of special interest in this study because the PIGEA scale contains multiple items that are supposed to measure various dimensions of the PIGEA construct. Thus, the reliability of the finalized PIGEA scale was assessed for internal consistency using Cronbach's alpha coefficients. Cronbach's alpha of.70 or higher was considered to indicate adequate reliability of the items (Nunnally & Bernstein, 1994).

In addition, composite reliability, a measure of the overall reliability of a collection of heterogeneous but similar items (Fornell & Larcker, 1981), was calculated through the following formula:

$$\rho_\eta = \frac{\left(\sum_{i=1}^{p} \lambda_{yi}\right)^2}{\left(\sum_{i=1}^{p} \lambda_{yi}\right)^2 + \sum_{i=1}^{p} \mathrm{Var}\,(\varepsilon_i)}$$

Where ρ_η is the reliability of the construct, λ_i is the loading of y_i on Y, Var signifies variance, ε_i is the measurement error of y_i, and Σ denotes a sum (Fornell & Larcker, 1981) It is recommended by Hair et al. (2006) that a composite reliability above .70 is acceptable.

Criterion Validity Assessment

Criterion validity is defined as the degree to which a scale has "an empirical association with some criterion or 'gold standard'" (DeVellis, 2003, p. 50). As explained above in the Instrument section, two items from Ellen et al.'s (1991) Perceived Consumer Effectiveness (PCE) scale and a scale that measures subjective knowledge of green adapted from Flynn and Goldsmith's (1999) Subjective Knowledge scale were used as criterion variables against which criterion validity of the finalized PIGEA scale was assessed in this study. In addition, 12 items that were developed by the researcher to measure the level of engagement with green consumption practices were also used as a criterion variable.

Criterion validity was examined by the correlation between each of the criterion variables and each factor of the PIGEA scale. Before running the correlations, criterion variable scores and PIGEA factor scores were calculated for each respondent by averaging scores of the items measuring each variable or factor. For the criterion validity to be established, the correlations should be statistically significant (Cronbach & Meehl, 1955).

Results

This section will first present the results from the EFA and CFA. Next, results from construct validity assessment will be presented, followed by results related to the reliability and criterion validity assessment.

Exploratory Factor Analysis

According to both Kaiser's criterion and the scree plot, the initial principal components analysis with oblique rotation with the 31 initial PIGEA items suggested that three factors might exist under the PIGEA construct. Based on the initial EFA results, 13 items were eliminated because they cross-loaded on two or three factors with very little difference (<.10) among the factor loadings, indicating that their conceptual meanings were not clear. Besides, deleting these items did not appear to diminish the unique meaning of each factor based on the retained items. As a result, 18 out of the 31 initial items were retained for a second EFA, which resulted in a clear 3-factor solution with all 18 items showing loadings that were greater than .50 on their corresponding factor (see Table 4.4).

The first factor, labeled as Physical Design Attributes, consisted of nine items that addressed the interior and exterior physical design attributes of the green hotel environment (see Table 4.4). This factor closely resembled the design factor from Baker's (1987) service environment framework in that it identified green environmental attributes relating to architecture and materials.

The next factor was labeled as Behavioral Attributes. Six items were identified within this factor with loadings greater than .50 (see Table 4.4). This factor had some similarities with the social factor from Baker's (1987) service environment framework because items under this factor addressed green actions and activities that a guest or employee would perform.

Table 4.4 PIGEA Factor Analysis Results

ITEM LABELS	PIGEA SCALE ITEMS	EIGEN VALUE	% VARIANCE EXPLAINED	FACTOR LOADINGS		
				Physical	Behavioral	Ambient
Physical 1	A green or living roof	17.784	57.368	.862		
Physical 2	The type of material that is used on the exterior of the building			.877		
Physical 3	LEED certification			.793		
Physical 4	A living wall (a wall of low maintenance plants) on the exterior of the hotel			.835		
Physical 5	Part of the hotel was built modularly to reduce costs and energy			.822		
Physical 6	The site of the hotel limits its impact on the existing/ surrounding environment			.789		
Physical 7	The use of rapidly renewable materials and finishes within the interior environment (such as bamboo or cork)			.858		
Physical 8	The use of recycled materials or finishes (such as recycled glass bottles, aluminum cans, or wood plank flooring)			.853		
Physical 9	The use of organic material or finishes (such as cotton or wool)			.820		

Table 4.4 PIGEA Factor Analysis Results (Continued)

ITEM LABELS	PIGEA SCALE ITEMS	EIGEN VALUE	% VARIANCE EXPLAINED	FACTOR LOADINGS		
				Physical	Behavioral	Ambient
Behavioral 1	Employees knowledge of recycling	1.978	6.382		.861	
Behavioral 2	Other guests behavior towards recycling				.870	
Behavioral 3	Other guests behavior towards energy optimization				.861	
Behavioral 4	Employees knowledge of energy optimization				.861	
Behavioral 5	A towel exchange program that limits the number of times your towels are collected during a stay at a hotel				.723	
Behavioral 6	The use of green cleaning products				.794	
Ambient 1	Fresh air transfer	1.382	4.458			.804
Ambient 2	Operable windows					.695
Ambient 3	Space utilization					.739

Table 4.4 PIGEA Factor Analysis Results (Continued)

ITEM LABELS	PIGEA SCALE ITEMS	EIGEN VALUE	% VARIANCE EXPLAINED	FACTOR LOADINGS		
				Physical	Behavioral	Ambient
Discarded 1	A green The absence of volatile organic compounds (VOC's also known as offgassing) in materials or finishes (such as carpeting or paint)					
Discarded 2	The use of local materials, furniture, or artwork within the hotel interior					
Discarded 3	The use of natural light, compact fluorescent bulbs, LED lights or sensors that turn lights on when a person enters a hotel room					
Discarded 4	The ability to adjust the temperature in a hotel room					
Discarded 5	Energy optimization, retainment, use of renewable energy such as solar or wind power					
Discarded 6	Composting of food waste by kitchen staff					
Discarded 7	The use of energy star rated appliances throughout the hotel					
Discarded 8	Monitoring of carbon and/or global footprint					
Discarded 9	Rainwater harvesting for the watering of indoor and outdoor plants					
Discarded 10	Integration of the hotel into its local community (also known as destination conservation)					
Discarded 11	The use of low flow (decreased use of water without affecting performance) showers, faucets, and toilets					
Discarded 12	Access to alternative transportation (rental of a bicycle, public transportation, or a car share program)					
Discarded 13	The use of shower gel dispensers					

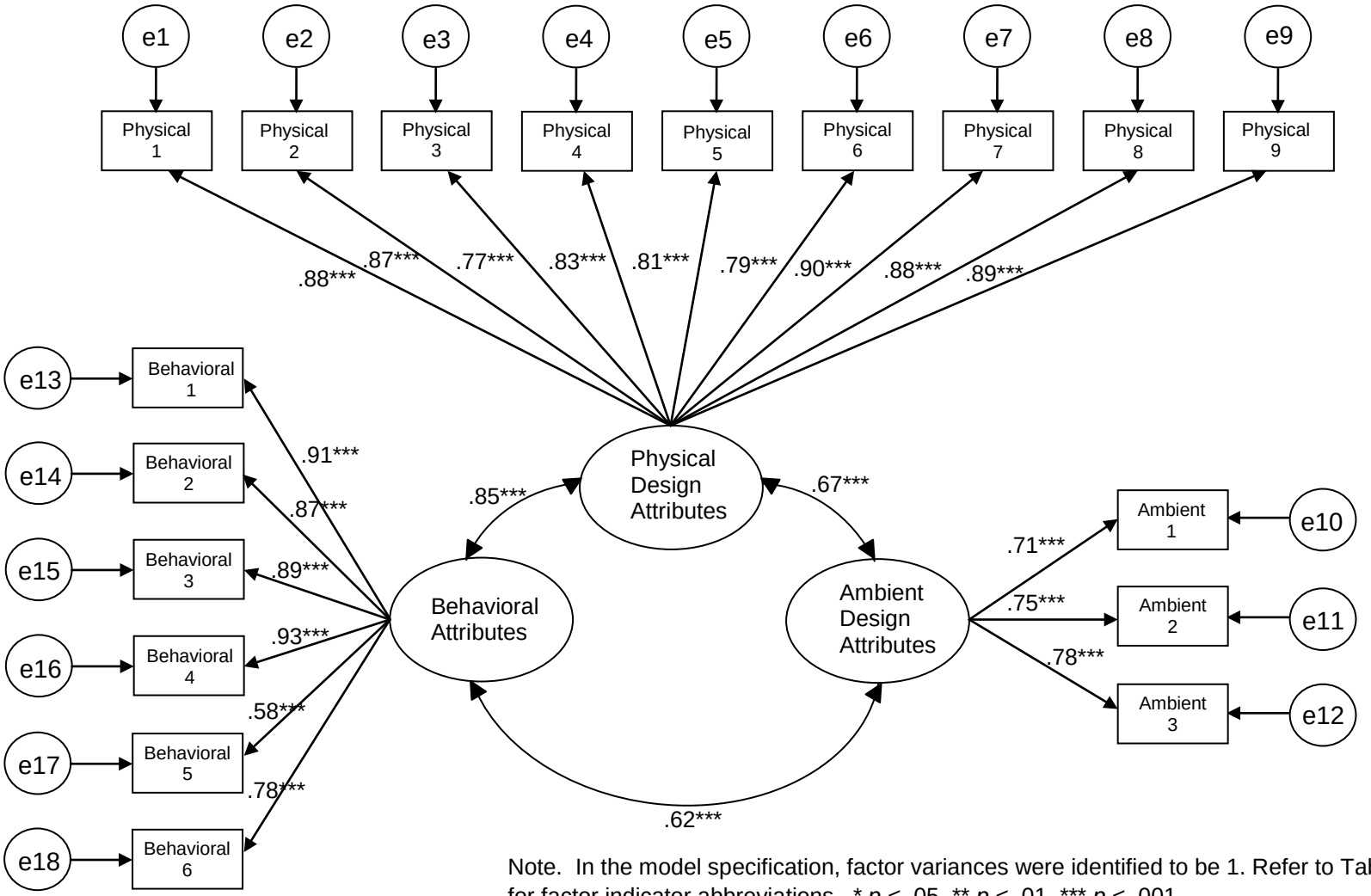
The final factor was named Ambient Design Attributes. Three items were identified for this factor (see Table 4.4). The three items addressed green environmental attributes within the physical environment that exist at a subconscious level. Baker (1987) identified the ambient factor as "background conditions that exist below the level of our immediate awareness" (p. 79). Therefore, the last factor is conceptually consistent with Baker's ambient factor.

Confirmatory Factor Analysis

A CFA model was specified based on the 3-factor, 18-item model suggested by the EFA results and run with the second data set. In the initial CFA model (see Figure 4.1), all error variances were specified to be uncorrelated. The initial CFA results revealed that factor loadings were all greater than .50, and all parameter estimates including factor loadings, factor covariances, and error variances were positive. All of the standard errors observed for the factor loadings appeared to be small which confers the stability of the estimates. Additionally, no erroneous factor correlations (> 1.0) were found.

However, the fit of the initial CFA model was not good. For examining the model fit, chi-square statistic (X^2 = 960.229, df = 149, p < .001) was first evaluated. The chi-square statistic indicated an imperfect fit of the model to the data. However, as this statistic is rather sensitive to sample size (Hair et al., 2006), other fit indices such as RMSEA and incremental indices (CFI, TLI, NFI) were used to infer the model fit. The RMSEA (.129) of the initial CFA model indicated an unacceptable fit (>.10) suggesting that a model respecification

Figure 4.1 Initial Confirmatory Factor Analysis Model of the PIGEA Scale



Note. In the model specification, factor variances were identified to be 1. Refer to Table 4.4 for factor indicator abbreviations. * $p < .05$, ** $p < .01$, *** $p < .001$

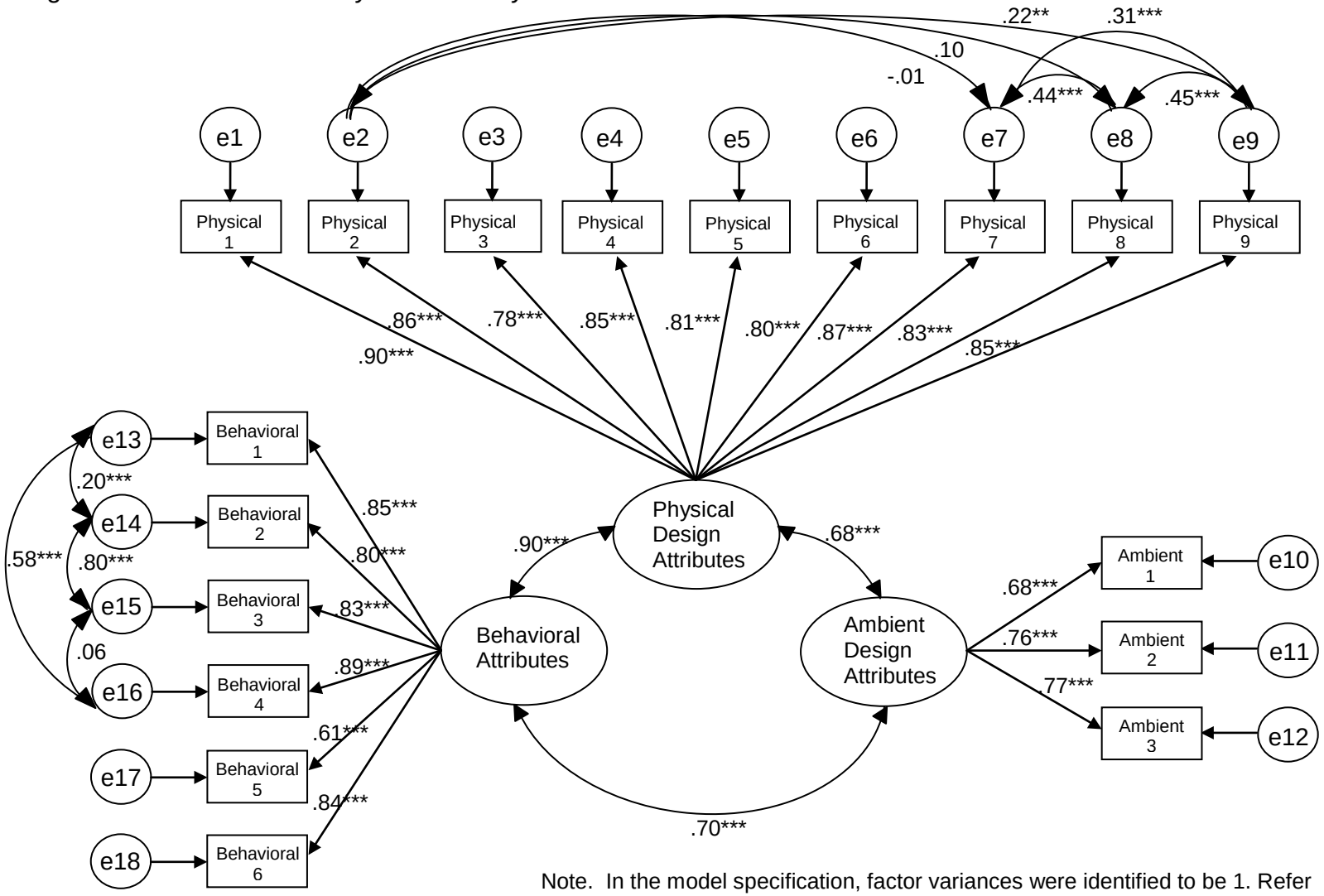
was needed for a more acceptable fit. Incremental fit indices (CFI = .865, TLI = .845, NFI = .845) were all lower than .94, echoing this speculation.

For the model respecification, the following adjustments were made to the initial CFA model. First, within the physical design attribute factor, there were four items (Physical 2, Physcial 7, Physcial 8, Physical 9) that addressed materials used for building the physical environment of the hotel. Since these four items address materials, they were identified as being conceptually more linked than the other physical design attribute items. Therefore, covariances were added between errors of the four material items.

Next, among the six behavioral attribute items, two items (Behavioral 2, Behavioral 3) addressed guest behaviors, whereas the other two items (Behavioral 1, Behavioral 4) were related to employee behaviors. Thus, an error covariance was added to the model for each of the above item pairs. Furthermore, two of the behavioral attribute items (Behavioral 1, Behavioral 2) addressed recycling, whereas the other two (Behavioral 3, Behavioral 4) examined energy optimization. Therefore, an error covariance was deemed appropriate for each of these pairs of items as well.

Figure 4.2 presents the respecified model with the added error covariances. The chi-square statistic (X^2 = 359.289, df = 122, p < .01) again indicated an imperfect fit of the model. But, as stated previously, the chi-square statistic is sensitive to sample size, so the other fit indices were reviewed, which all suggested an acceptable fit of the respecified model. The RMSEA (.077) of

Figure 4.2 Final Confirmatory Factor Analysis Model of the PIGEA Scale



Note. In the model specification, factor variances were identified to be 1. Refer to Table 4.4 for factor indicator abbreviations. * $p < .05$, ** $p < .01$, *** $p < .001$

the respecified model indicated a fair fit, while incremental fit indices all indicated a good fit (CFI =.960, TLI =.950, NFI =.941). Therefore, the respecified model was determined to be the final CFA model for the PIGEA scale and further scale validity and reliability assessment was conducted based on the factor structure suggested in this final CFA model.

Convergent Validity

Convergent validity was evaluated using the average variance extracted (AVE) method as outlined by Fornell and Larcker (1981). AVEs of .711, .657, and .550 were obtained for physical design, behavioral, and ambient design attributes, respectively. Since the AVEs from all factors exceeded .50, the convergent validity of the scale items was established.

Discriminant Validity

According to the assessment of factor correlations and their standard errors, none of the confidence intervals for the factor correlation coefficients from the finalized model contained 1.0 (see Table 4.5), which provides evidence of discriminant validity.

Discriminant validity was also assessed through chi-square difference tests between the final CFA model and each of three additional models with a restricted correlation (= 1) for each pair of the factors in the final CFA model. The first restricted model was specified with the factor correlation of 1 between Physical Design Attributes and Behavioral Attributes. The chi-square difference

Table 4.5 Factor Pair Correlations

FACTOR PAIR	CORRELATION COEFFICIENT	STANDARD ERROR	CONFIDENCE INTERVALS
Physical Design – Behavioral	.899	.016	[.867, .931]
Physical Design – Ambient Design	.684	.039	[.606, .762]
Ambient Design – Behavioral	.700	.040	[.620, .780]

test was significant (ΔX^2 = 92.525, Δdf = 1, p < .01), indicating that the restricted model had a significantly poorer fit than the unrestricted model (i.e., the final CFA model). The second restricted model was specified with the factor correlation of 1 between Physical Design Attributes and Ambient Design Attributes. The chi-square difference test was again significant (ΔX^2 = 208.025, Δdf = 1, p < .01). The final restricted model was with the factor correlation of 1 between Ambient Design Attributes and Behavioral Attributes. The chi-square difference test was again significant (ΔX^2 = 122.193, Δdf = 1, p < .01). Therefore, all three chi-square difference test results confirmed a superior fit of the final CFA model which did not restrict the factor correlations to be 1. These results indicate that the three factor correlations are not 1, which means the three factors are discrimant-valid.

Reliability

Cronbach's alpha coefficients were calculated to examine the reliability among the items from each factor of the finalized PIGEA scale using the entire data set. The Cronbach's alphas for items from all three factors exceeded .75 (.95 for Physical Design Attributes, .78 for Ambient Design Attributes, and .93 for Behavioral Attributes), indicating adequate internal consistency of the items.

Additionally, composite reliability was calculated to further assess reliability of the finalized PIGEA scale. Composite reliability scores of .96, .79, and .92 were obtained, from the data used for the CFA, for Physical Design, Ambient Design, and Behavioral Attributes, respectively, all of which exceeded .70, revealing additional evidence for the reliability of the PIGEA scale.

Criterion Validity

The final step for the validation of the PIGEA scale addressed the criterion validity of the scale. The criterion validity was assessed using correlation analysis between the PIGEA factor scores and scores of the three criterion variables (PCE, subjective knowledge of green and green consumption practices). Before conducting the correlation analysis, the unidimensionality of the subjective knowledge scale was assured through a principal component analysis. Additionally, a principal component analysis with oblique rotation was also run on the 12 items of green consumption practices to refine the items. Out of the 12 items, 7 items were retained with factor loadings above .50. The seven items loaded into three factors identified as disposal (recycled batteries, recycled

paper), food consumption (organic food, organic milk), and material consumption (vegan shoes, hybrid car, organic clothing). Reliability of the criterion measures was established through Cronbach's alphas for subjective knowledge of green (α = .827) and material consumption (α = .668) whereas correlation analysis was used to establish reliability for perceived consumer effectiveness (r = .908), disposal (r = .762), and food consumption (r = .803).

Correlation coefficients calculated between the three PIGEA factor scores and the criterion variable scores were all significant ($p < .001$) (see Table 4.6). Thus, the criterion validity of the PIGEA scale was established.

Table 4.6 Correlations between the PIGEA Factors and Criterion Variables

CRITERION VARIABLES	PCE	SUBJECTIVE KNOWLEDGE	DISPOSAL	FOOD CONSUMPTION	MATERIAL CONSUMPTION
Physical Design Attribute	.490	.282	.314	.368	.312
Ambient Design Attribute	.366	.333	.292	.282	.131
Behavioral Attribute	.547	.296	.384	.384	.269

Note. All correlation coefficients on the table were significant at $p < .001$

Chapter 5: Discussion

The objectives of this research were to construct a framework of green environmental attributes and to develop an empirically validated measurement scale that identifies consumer perceived importance of green environmental attributes within a hotel service setting. The PIGEA scale was developed and validated, supporting the theoretical framework proposed by Baker (1987). Three factors of green environmental attributes--physical design attributes, ambient design attributes, and behavioral attributes-- were identified through a consumer survey of recent hotel guests. Through this study many opportunities for the advancement of research within the service environment have been recognized.

The remaining chapter will discuss the PIGEA scale developed in this study. Theoretical as well as managerial implications will be suggested, and limitations of the study will be discussed. Finally, future research will be recommended.

PIGEA Scale

This section discusses in detail the three factors addressed by the PIGEA scale developed in this study in comparison to Baker's (1987) framework of service environment elements (see Table 5.1).

Physical Design Attributes

Physical Design Attributes is the factor that identifies green components and materials used on or within the hotel structure. This factor includes the most items (9) and explains the largest percent of the variance of the PIGEA construct as identified in the EFA.

This factor resembles the design factor in Baker's (1987) service environment framework (see Table 5.1). Baker (1987) identified two components (aesthetic and functional components) within the design factor. It should be noted that items identified within the physical design attribute of this study addressed more of the aesthetic component than of the functional component within Baker's (1987) framework.

Five of the physical design attribute items relate to the exterior of the green hotel building such as green roof, exterior material, living wall, modular building, and site impact; whereas three items addressing rapidly renewable materials or finishes, recycled materials or finishes, and organic materials or finishes relate more specifically to the interior of the hotel. The remaining item, "LEED certification", addresses the importance of certification which signifies that

Table 5.1 Comparison of the PIGEA Scale and Baker's (1987) Framework

BAKER	DESIGN FACTOR	SOCIAL FACTOR	AMBIENT FACTOR
	Aesthetic • Architecture • Color • Scale • Materials • Texture, Pattern • Shape • Style • Accesories Functional • Layout • Comfort • Signage	Audience • Number • Appearance • Behavior Service Personnel • Number • Appearance • Behavior	Air Quality • Temperature • Humidity • Circulation/ Ventilation Noise (level, pitch) Scent Cleanliness
PIGEA	PHYSICAL DESIGN ATTRIBUTES	BEHAVIORAL ATTRIBUTES	AMBIENT DESIGN ATTRIBUTES
	Green Roof Exterior Material LEED certification Living Wall Modular Building Site Impact Rapidly Renewable Materials Recycled Materials Organic Materials	Employee Recycling Guest Recycling Guests Energy Optimization Employee Energy Optimization Towel Exchange Green Cleaning	Fresh Air Transfer Operable Windows Space Utilization

the building meets some of the most rigorous building design practices when it comes to energy efficiency and the reduction of the carbon footprint.

Behavioral Attributes

Behavioral Attributes consist of four items that identify behaviors hotel staff and guests would participate in to support the hotel's green efforts. In Baker's (1987) framework, she identified two components within the social factor, 'audience' and 'service personnel'. In each component Baker was concerned with the number of people and their appearance and behavior. The behavioral attribute factor of the present study closely resembles Baker's (1987) social factor in that behaviors of guests (audience) and employees (service personnel) are identified. Four of the behavioral attribute items relate to guests and employees' recycling and energy optimization practices, and thus these items corroborate with the recycling and energy behavior emphasized within the environmental psychology (Bagozzi & Dabholkar,1994), environmental planning (Caird, Roy & Herring 2008; Roberts, 1996; Thogersen, 1994), and consumer behavior (Webster, 1975) literature.

Ambient Design Attributes

Ambient Design Attributes include three items that address fresh air transfer, operable windows, and space utilization (through the efficient use of space, less material is used, therefore resulting in less of an impact on the environment). In the initial list of green environmental attributes (see Table 3.1) subjected to review by the panel of experts in Phase 1 of the study, over 15 attributes were included as potential ambient attributes according to Baker (1987). However, when the attributes were introduced to the panel of experts,

many were discarded because they were recognized by less than 60% of the experts or grouped into a broader category. Besides, among the 7 ambient attributes that survived from the expert review in Phase 1 (see Table 3.2) and thus were subjected to the EFA in Phase 2, only three attributes remained in the final PIGEA scale to address ambient design attributes. This was because many of the ambient attributes subjected to the EFA in Phase 2 were eliminated due to the lack of clarity of their meanings (as indicated by cross-loadings).

For example, lighting is an area that has been studied rather extensively within service environment literature. Lighting can be a very important green environmental attribute because there are many options for lighting that can be implemented within green hotel environments. Daylighting is one of these options that has been studied within retail and office environments ("Natural Foods", 2004). However, four lighting related attributes initially suggested by the researcher were compiled into one single item rather than four individual items after the review of the panel of experts in Phase 1. Then, the one lighting related item included in the Phase 2 survey "the use of natural light, compact fluorescent bulbs, LED lights or sensors that turn lights on when a person enters a hotel room" was not retained in the final scale due to cross-loadings.

A potential reason for the cross-loading results of the items that were initially thought to be ambient attributes (e.g., "the use of natural light, compact fluorescent bulbs, LED lights or sensors that turn lights on when a person enters a hotel room", "the ability to adjust the temperature in a hotel room", "energy optimization, retainment, use of renewable energy such as solar or wind power")

may be that the items were worded unclearly (e.g., too many sub-concepts were presented in one item). Another reason for the cross-loadings may be that the items did not represent the ambient attribute domain. Perhaps as consumers become more aware of these attributes, they assimilate them as a more operational (i.e., behavioral) aspect of the environment rather than just an ambient factor. This speculation is supported in part by the fact that the item "the use of green cleaning products", which was expected to belong to the ambient design attribute factor, in fact loaded into the behavioral attribute factor.

In conclusion, the limited number of items that remained in the ambient design attribute factor suggests the need for further research to achieve a clearer understanding of the meaning of this factor in green hotel environments and specific attributes that might be included in this factor.

Theoretical Implications

The first theoretical contribution of the study is the integration of green environmental attributes into the service marketing research base, specifically for hotels. This research is the first attempt to empirically establish green environmental attributes in the service marketing literature. This study completed a first step toward creating a valid and reliable scale to assess constructs related to green service environmental attributes. The PIGEA scale developed in this study includes a good set of items to explore further within many green service environments beyond the hotel environment.

Second, this study reveals the need for future research within green service environments in order to identify the complexities present within a green physical environment as compared to a traditional service environment. As identified in Chapter 2, the green environmental attributes addressed in the PIGEA scale represent the stimulus taxonomy of Mehrabian-Russell (1974) S-O-R model. The S-O-R model provides a framework in which customers' approach-avoidance behavior (R) is understood through the emotional states (pleasure, arousal, dominance) influenced by environmental situations (S) (Mehrabian & Russell, 1974). The S-O-R model was adopted by service marketing researchers such as Donovan and Rossiter (1982) in order to study the effects of service environments on customer behavior. This research provides the first step to understanding the way a green hotel service environment influences hotel customer behavior through the identification of green environment stimulus taxonomy (i.e., green environmental attributes) through the PIGEA scale development. The attributes addressed in the PIGEA scale are expected to set a stage for a stream of future research that will examine the effects of these attributes on hotel customers' emotional states and approach and avoidance behavior.

Finally, this study makes a theoretical contribution by expanding the application of Baker's (1987) service environment framework to the green hotel service environment. The three factors within the PIGEA scale closely parallel Baker's (1987) three factors of service environmental elements, validating the classic framework. The PIGEA scale developed in this study is not yet complete

in that more green attributes need to be considered for further refining the scale in the future, especially for the ambient design attribute factor. However, the PIGEA scale does offer a significant number of new ‘green’ terminologies to apply in service environment research within Baker’s (1987) framework.

Managerial Implications

Although green is not addressed in the service marketing literature, it is not a new term to hoteliers. It was an idea that was initiated many years ago when forward thinking managers realized the implications of a business that caters to large numbers of guests on individual levels. Now, as green is beginning to change the way hotels operate, it is necessary to understand the importance of green from the consumer’s viewpoint.

This study generates a variety of managerial implications for hoteliers and architects and interior designers involved with hotel construction and remodeling. First, the PIGEA scale will be a resource for use by managers and developers in order to assess their target consumers’ opinions relative to “green” and, thereby, to improve the environment of their hotel with respect to sustainability. By creating a framework to identify green environmental attributes within a hotel service setting and developing a scale to measure consumers’ perceived importance of green environmental attributes, this study sets the first step to educating hoteliers on the relative significance of various green hotel service environment attributes.

Next, the PIGEA scale can be adapted to measure consumers' perception of green environmental attributes within a particular hotel. Used along with an outcome measure of interest (e.g., customer satisfaction, patronage intention), customers' green environmental attribute perception assessment can provide hoteliers with an insight into which green environmental attributes are most conducive to generating a desirable outcome (e.g., high satisfaction and patronage intention).

Finally, the consumer perspective which can be obtained through the use of the PIGEA scale and other adapted measures can help hotel developers, managers, and designers set priorities among numerous green hotel environment attributes in which they may consider investing. Designing green may be initially expensive although it may eventually facilitate significant savings via energy conservation and recycling efforts. Therefore, understanding consumers' perspectives is essential in developing a viable plan toward building a green hotel environment.

As identified in the literature review some municipalities within the United States will start adopting IGCC which will force hoteliers into not only implementing green, but also to upholding minimum standards as proposed by the joint effort of the ICC (International Code Council), AIA (American Institute of Architects), ASTM (American Society for Testing and Materials), ASHRAE (The American Society of Heating, Refrigerating and Air-Conditioning Engineers), USGBC (U.S. Green Building Council) and IES (Illuminating Engineering Society). Green promotes long term sustainability, not short term profitability

mindsets. Most marketers understand that significant savings in overhead costs often translates into higher profit margins in the long run. Additionally, the adoption of green standards for a property over a longer period of time will allow for proper implementation and comprehension of green environmental attributes by the entire hotel staff. It has been shown that as green and sustainable methods are implemented, employees take on more responsibility in order to ensure proper implementation (Anderson, 1998). Direct responsibility within the environment translates to self-importance which translates to higher retention of employees (Anderson, 1998).

Limitations

Limitations exist with any study. The PIGEA scale development was carried out with utmost care to establish the validity and reliability of the scale. However, as discussed earlier, needs are recognized for additional research to refine the scale further due to the novelty of the construct. For example, a limited number of ambient attributes were identified within the final scale. More research needs to take place to see what additional ambient attributes exist within a green hotel service environment. Additionally, behavioral attributes identified within the scale are limited in scope. More research needs to be done to identify other green behavioral attributes that can exist within a hotel service environment.

To further refine the PIGEA scale, it would be prudent to include a consumer panel in addition to the expert panel during the content validity establishment stage to incorporate consumers' opinions of the green

environmental attributes. In addition, pretests of the scale prior to a field test would reduce clarity issues of the wording of some of the items.

Next, the sampling method used in this study also suggests a limitation. The sample for Phase 2 of this study was obtained using a snowball sampling procedure. Respondents were recruited from colleagues, friends, and family members of a body of students. Although the final sample was similar to the wider U.S. population, the constraints of not using a random sampling method are recognized.

Finally, findings from this study need to be interpreted with caution due to social desirability bias that usually resides in consumer survey data. Social desirability is defined as the "tendency of individuals to present themselves in the most favorable manner relative to prevailing social norms" (King & Bruner, 2000, p. 79). The nature of the PIGEA scale incites social desirability bias. As the study explored the perceived importance of green environmental attributes within a hotel service setting, consumers might have immediately heard the word 'green' and identified it as a socially desirable thing and responded in a positive way without much thought on the meaning of each individual item. Therefore, adding a measure to assess respondents' tendency to respond in a socially desirable way would have helped avoiding inclusion of the socially desirable responses in the data analysis.

Future Research Recommendations

This study identifies many potential future research topics related to green service environments. First, within the physical design attributes of the PIGEA

scale developed in this study, there are three items that best identify with materials used in the interior environment. Each of these three items, rapidly renewable materials, recycled materials, and organic materials, represents an upper-level concept which combines many small attributes listed in the initial pool of attributes subjected to review by the panel of experts in Phase 1. It would be sensible to further investigate these material attributes to see what kind of responses the materials addressed in the three items elicit from consumers

Second, the complexity of the behavioral attribute factor needs to be further addressed in future research. Ethics and engagement are topics that could be addressed in terms of behaviors of guests and hotel staff. For example, related to ethics of the environment, questions such as 'how are ethics portrayed by green environmental attributes', 'how do ethics contribute to patronage and the actions of guests within a green hotel environment', and 'can an individual's ethics be influenced through green environmental attributes within a given hotel environment' should be addressed by future research.

When incorporating green into an environment, the entire value chain within the service environment changes. Not only are these actions being incorporated to promote environmental well being and increase health benefits, e.g., through the elimination harmful cleaning agents and the increase in the quality of the air within the physical environment; they may also give employees a sense of purpose beyond their defined job description. Within organizational behavior literature, engagement has been defined as task behaviors that promote connections to work and to others which are expressed physically,

cognitively, and emotionally to stimulate personal development and increase employee motivation (Kahn, 1990). Engagement should be looked at in detail to identify employees' engagement within green service environments.

Next, in Baker's (1987) framework of service environment elements, she discusses ambience and how it typically impacts the subconscious unless the levels exist at unpleasant or uncomfortable levels. However, she also argues that although this is typical for many retail establishments, it is not always the case. In this study although not that many ambient attributes were identified in the final scale, it may be that ambience within a green hotel takes on a different meaning. More research needs to be done in order to understand the full scope of ambience within a green hotel service setting. Therefore, several questions have been identified to explore the effect of ambience within a green hotel service setting: What happens when the ambient factor is directly related to the product or service being marketed? If a hotel is being marketed as green, what ambient factors are more important to customers and therefore elicit their approach behaviors and possibly increase re-patronage of the hotel?

For example, service providers will have to find ways to inform their consumers of the greening steps they are taking within their environments; in many instances this can be done through proper signage. Signage was not a significant part of Baker's (1987) framework, but it was more significant in Bitner's (1992) framework. Although ambiance may not be directly identified by a consumer, it may be wise to identify the additional, less tangible greening measures a hotel embraces. Pointing out green environmental attributes through

signage could indicate to consumers that an hotelier is constantly monitoring their environment in order to be as frugal with energy as possible in an effort to limit emissions or waste; which may or may not be an important factor for today's socially and environmentally conscious consumer.

Finally, as identified previously, an SOR model has three components, stimulus taxonomy, a set of mediating variables (organism), and taxonomy of responses. Previous research based on the SOR model have provided ample information on potential mediating and response variables that can be considered in green hotel service environments. However, the stimulus taxonomy regarding green hotel service environments has been untouched. This research has started to address this issue by providing a framework of green environmental attributes present within a green hotel environment. Additional investigation needs to be done in order to understand the effects of green hotel environmental attributes within the full SOR framework so that relevant mediating and response variables can be identified. For example, Mehrabian and Russell (1974) identify three basic emotional states (pleasure, arousal, dominance) that lead to approach-avoidance behavior. Research needs to be done in order to understand if these emotional states adequately play the mediating role within a green hotel service environment. Furthermore, the dynamics of a green environment present the opportunity for further investigations into how the response taxonomy (approach/avoidance) is applied within a green hotel service environment.

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APPENDIX A

PHASE 1 EXPERT REVIEW MATERIALS

The main objectives of this research are the following:

- To develop and validate a framework of green environmental attributes in hotel service environments

- To develop an empirically validated instrument (scale); based on consumers perceptions, which measure the importance of green environmental attributes within hotel service environments.

Green within this study refers to a product or service that is environmentally responsible as well as accountable to and respectful of the people and places that live and use them.

Green environmental attributes are defined as characteristics inherent or associated with a green physical environment.

For the items on page two, please review these questions below for each item when making your comments. Additionally, please be sure to note if you feel there is anything missing from the list.

1. Is the item valid?
2. Does the item make sense?
3. Is the item redundant?
4. Is the item relevant?

At the end of your response, please let me know your age and profession in case that information is needed within the study.

TANGIBLE ATTRIBUTES	NON-TANGIBLE ATTRIBUTES
• optimization of building footprint • use of sun visors • living roof • living wall • windows manufacutred from recycled content • operable windows (where possible) • sustainably harvested wood • fly ash concrete • recycled stone • plaster wall surfaces • wool carpet • carpet with recycled content • CRI certified carpet • carpet with no offgassing • linoleum • recycled glass tile • sustainably harvested wood flooring • bamboo flooring • % recycled content wallpaper • natural fiber wallpaper • 0 VOC paint • kirei board walls • paperstone countertops • recycled glass countertops • 0 VOC sealants, adhesives, coatings • furniture made from sustainably harvested wood • furniture made from metal or other material that can be or was recycled • furniture designed for disassembly and recycling or reuse • furniture designed for the environment (DfE) • space optimization • energy star rated appliances • energy star rated equipment • LEED certification • Cradle to Cradle certification • reducing use of paper • access to recycling bins • bed linen program • towel exchange program • shower gel dispensers • rainwater harvesting • public transportation • car share • bicycle storage/rental	• air quality • optimization of lighting (footcandles) • temperature control • use of compact flourescent bulbs • humidity regulation • use of LED lights • fresh air transfer • optimization/use of daylighting • monitoring of temperature • recycling of waste • zoning of interior environments • composting of food waste • acoustic barriers • recycling of cooking oil • use of insulation w/ recycled content • monitoring of carbon footprint • soy based insulation • monitoring of global footprint • No offgassing of materials • use of green cleaning products • steam cleaning • destination conservation • use of low flow water fixtures • efficient heating of water • gray water reuse • energy optimization • energy retainment • use of renewable energy • use of biofuels • use of solar panels • steam recovery system • ground source heat pump

APPENDIX B

IRB HUMAN SUBJECT REVIEW EXEMPTION
(PROTOCOL NUMBER: 10-042 EX1003)

APPROVED

AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD for RESEARCH INVOLVING HUMANSUBJECTS

RESEARCH PROTOCOL REVIEW FORM

For Information or help contact **THE OFFICE OF HUMAN SUBJECTS RESEARCH**, 307 Samford Hall, Auburn University
Phone: 334-844-5966 **e-mail:** hsubjec@auburn.edu **Web Address:** http://www.auburn.edu/research/vpr/ohs/

Complete this form using Adobe Acrobat Writer (versions 5.0 and greater). Hand written copies not accepted.

1. PROPOSED START DATE of STUDY: March 8, 2010

PROPOSED REVIEW CATEGORY (Check one): ☐ FULL BOARD ☐ EXPEDITED ☑ EXEMPT

2. PROJECT TITLE: An Examination of Green Environmental Attributes in Hotel Service Settings.

3. Nicole Bieak Kreidler (PRINCIPAL INVESTIGATOR) | Ph.D. Candidate (TITLE) | ITAS (DEPT) | (484)788-4539 (PHONE) | bieakni@auburn.edu (AU E-MAIL)
225 Sunset Rd.; Pittsburgh, PA 15237 (MAILING ADDRESS) | (412)536-1093 (FAX) | nbkreidler@gmail.com (ALTERNATE E-MAIL)

4. SOURCE OF FUNDING SUPPORT: ☑ Not Applicable ☐ Internal ☐ External Agency:_____ ☐ Pending ☐ Received

5. LIST ANY CONTRACTORS, SUB-CONTRACTORS, OTHER ENTITIES OR IRBs ASSOCIATED WITH THIS PROJECT:

6. GENERAL RESEARCH PROJECT CHARACTERISTICS

6A. Mandatory CITI Training

Names of key personnel who have completed CITI:
Nicole Bieak Kreidler
Carol Warfield, Ph.D.
Wi-Suk Kwon, Ph.D.

CITI group completed for this study: ☑ Social/Behavioral ☐ Biomedical

Protocol-Specific modules completed:
☐ Genetic ☐ Vet.'s Administration
☐ International ☐ Prisoner Research
☐ Public School Students ☐ Pregnant Women/Fetuses
Other _____

6B. Research Methodology

Please check all descriptors that best apply to the research methodology.

Data Source(s): ☑ New Data ☐ Existing Data

Will data be recorded so that participants can be directly or indirectly identified? ☐ Yes ☑ No

Data collection will involve the use of:
☐ Educational Tests (cognitive diagnostic, aptitude, etc.)
☑ Surveys / Questionnaires
☐ Internet / electronic
☐ Audio / Video / Photos
☐ Interview / Observation
☐ Physical / Physiological Measures or Specimens (see Section 6E.)
☐ Private records or files

The Auburn University Institutional Review Board has approved this document for use from 3/10/10 to 3/9/11 Protocol # 10-042 EX 1003

6C. Participant Information

Please check all descriptors that apply to the participant population.
☑ Males ☑ Females ☑ AU students

Vulnerable Populations
☐ Pregnant Women/Fetuses ☐ Children and/or Adolescents (under age 19 in AL)
☐ Prisoners

Persons with:
☐ Economic Disadvantages ☐ Physical Disabilities
☐ Educational Disadvantages ☐ Intellectual Disabilities

Do you plan to compensate your participants? ☐ Yes ☑ No

6D. Risks to Participants

Please identify all risks that participants might encounter in this research.
☐ Breach of Confidentiality* ☐ Coercion
☐ Deception ☐ Physical
☐ Psychological ☐ Social
☑ None ☐ Other _____

*Note that if the investigator is using or accessing confidential or identifiable data, breach of confidentiality is always a risk.

RECEIVED 2010 Office of Human Subjects Research

6E. Institutional Biosafety Approval

Do you need IBC Approval for this study? ☑ No ☐ Yes - BUA #_____ Expiration date _____

FOR OHSR OFFICE USE ONLY

DATE RECEIVED IN OHSR: revisions 3/26/10 by BKH
DATE OF IRB REVIEW: 3/10/10 by VJE
DATE OF IRB APPROVAL: _____ by _____
PROTOCOL # 10-042 EX 1003
APPROVAL CATEGORY: 45 CFR 46.101 (b) (2)
INTERVAL FOR CONTINUING REVIEW: 1 year
COMMENTS: original received 2/11/10; IRB reviewed 3/10 as APR revisions reviewed in office

APPENDIX C

CONSENT LETTER USED IN PHASE 2 ONLINE SURVEY

AUBURN
UNIVERSITY

COLLEGE OF HUMAN SCIENCES

DEPARTMENT OF CONSUMER AFFAIRS

Nicole Bieak Kreidler

308 Spidle Hall
Auburn, AL 36849-5601

Telephone:
334-844-4894

Fax:
334-844-1340

www.auburn.edu

INFORMATION LETTER
for a Research Study entitled
"Perceived Importance of Green Environmental Attributes within a Hotel Service Setting"

You are invited to participate in a research study to investigate consumer behavior regarding green environmental attributes within hotel service settings. The goal of this survey is to gain insight into how customers evaluate the atmosphere of green hotels. The study is being conducted by Nicole Bieak Kreidler, under the direction of Dr. Carol Warfield in the Auburn University Department of Consumer Affairs. You were recruited as a possible participant because you have stayed in hotel within the past year and are of the legal age of consent in your respective state or older.

What will be involved if you participate? Your participation is completely voluntary. If you decide to participate in this research study, you will be asked to give your email address to your student recruiter. Once your email address is received your student recruiter will send your e-mail address to Nicole Bieak Kreidler and a unique invitation code will be generated and emailed to the address provided. Please look for this email from the address : bieakni@auburn.edu. Your total time commitment will be approximately 15 minutes.

There is no risk or discomfort if you agree to participate in the study, just the time to complete the survey.

Are there any benefits to yourself or others? If you participate in this study, there are no direct benefits to you.

There is no compensation received for participating.

If you change your mind about participating, you can withdraw at any time by closing your browser window. If you choose to withdraw, your data can be withdrawn as long as you have not pressed the submit button to send your data to me. Once you have submitted anonymous data, it cannot be withdrawn since it will be unidentifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Consumer Affairs or La Roche College.

Any data obtained in connection with this study will remain anonymous. We will protect your privacy and the data you provide through the use of a password. Information collected through your participation will be used in the completion of a dissertation and may be presented at a conference or published in a professional journal.

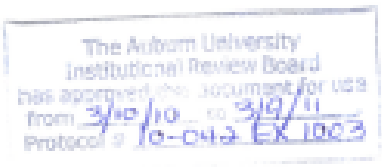
If you have questions about this study, please ask them now or contact Nicole Bieak Kreidler at Nicole.Kreidler@laroche.edu; Bieakni@auburn.edu or (412)536-1081. Or you may contact Dr. Carol Warfield at cwarfield@auburn.edu.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334)844-5966 or email at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. IF YOU DECIDE TO PARTICIPATE, PLEASE CLICK ON THE LINK BELOW. YOU MAY PRINT A COPY OF THIS LETTER TO KEEP.

01.06.10

Investigator Date



http://fluidsurveys.com/account/surveys/5341

The Auburn University Institutional Review Board has approved this document from March 10, 2010 to March 9, 2011.

Protocol # _10-042 EX 1003.

Nicole Bieak Kreidler

INFORMATION LETTER
for a Research Study entitled
"Perceived Importance of Green Environmental Attributes within a Hotel Service Setting"

You are invited to participate in a research study to investigate consumer behavior regarding green environmental attributes within hotel service settings. The goal of this survey is to gain insight into how customers evaluate the atmosphere of green hotels. The study is being conducted by Nicole Bieak Kreidler, under the direction of Dr. Carol Warfield in the Auburn University Department of Consumer Affairs. You were recruited as a possible participant because you have stayed in hotel within the past year and are of the legal age of consent in your respective state or older.

What will be involved if you participate? Your participation is completely voluntary. If you decide to participate in this research study, you will be asked to give your email address to your student recruiter. Once your email address is received your student recruiter will send your e-mail address to Nicole Bieak Kreidler and a unique invitation code will be generated and emailed to the address provided. Please look for this email from the address : bieakni@auburn.edu. Your total time commitment will be approximately 15 minutes.

There is no risk or discomfort if you agree to participate in the study, just the time to complete the survey.

Are there any benefits to yourself or others? If you participate in this study, there are no direct benefits to you.

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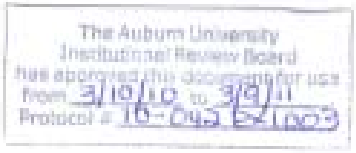

Any data obtained in connection with this study will remain anonymous. We will protect your privacy and the data you provide through the use of a password. Information collected through your participation will be used in the completion of a dissertation and may be presented at a conference or published in a professional journal.

If you have questions about this study, please ask them now or contact Nicole Bleak Kreidler at Nicole.Kreidler@laroche.edu; Bleakni@auburn.edu or (412)536-1081. Or you may contact Dr. Carol Warfield at cwarfield@auburn.edu.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334)844-5966 or email at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. IF YOU DECIDE TO PARTICIPATE, PLEASE CLICK ON THE LINK BELOW. YOU MAY PRINT A COPY OF THIS LETTER TO KEEP.

01.06.10

Investigator Date

http://fluidsurveys.com/account/surveys/5341

The Auburn University Institutional Review Board has approved this document from March 10, 2010 **to** March 9, 2011 **, Protocol #** 10-042 EX 1003

APPENDIX D

PHASE 2 SURVEY QUESTIONNAIRE

Perceived Importance of Green Environmental Attributes Survey

Hello:

Thank you for participating in this study. We are investigating how people perceive green attributes within a hotel. You are being asked to give your honest opinion about the physical and operational attributes within a hotel.

To better gauge your experience with hotels, please answer the following questions:

1. Are you familiar with the term 'green' or the action of 'going green' as it relates to consumer products and services?

- ○ Yes
- ○ No

2. What does the term 'green' or 'going green' mean to you?

Please select the response that best fits your perspective.

- ○ Purchasing environmentally responsible products
- ○ Using a canvas bag when food shopping
- ○ Turning off the water while brushing your teeth
- ○ Making a conscious decision to limit your impact on the environment
- ○ All of the above, and more

3. In the past year, how many times have you stayed in a hotel?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ More than 4

4. Was your last stay in a hotel for business or pleasure?

- ○ Business
- ○ Pleasure

5. Did you stay in a chain or independent hotel?

- ○ Chain hotel (ex. Marriott, Residence Inn, Hilton, etc.)
- ○ Independent (or Boutique) Hotel
- ○ Do not know

6. Was this hotel in an urban setting?

- ○ Yes
- ○ No

7. Do you know if the hotel you stayed in engaged in green and sustainable practices?

- ○ Yes
- ○ No (if no, please skip to question 9)

8. If your hotel did engage in green practices, how did you become aware of these policies or practices?

- ○ Notified by staff
- ○ Notified by signage within hotel
- ○ Notified by signage within room
- ○ Notified when I made my reservations

Other, please specify _____

9. If your travel was for business, does your corporation mandate that you stay at a green or sustainably-oriented hotel?

- ○ Yes
- ○ No

PERCEIVED IMPORTANCE

This section examines how IMPORTANT green environmental attributes are to you.

Please indicate the level of importance of the following items	Not at all Important			Slightly Important			Very Important
10. LEED certification (Leadership in Energy and Environmental Design).	1	2	3	4	5	6	7
11. The site of the hotel limits its impact on the existing/surrounding environment.	1	2	3	4	5	6	7
12. The type of material that is used on the exterior of the building.	1	2	3	4	5	6	7
13. A green (or living) roof.	1	2	3	4	5	6	7
14. A living wall (a wall of low maintenance plants) on the exterior of the hotel.	1	2	3	4	5	6	7
15. Part of the hotel was built modularly to reduce costs and energy.	1	2	3	4	5	6	7
16. Windows that open in each room to let in fresh air.	1	2	3	4	5	6	7
17. The use of natural light, compact fluorescent bulbs, LED lights or sensors that turn lights on when a person enters a hotel room.	1	2	3	4	5	6	7
18. Optimization of interior space.	1	2	3	4	5	6	7
19. The use of rapidly renewable materials and finishes within the interior environment (such as bamboo and cork).	1	2	3	4	5	6	7
20. The use of recycled materials or finishes (such as recycled glass bottles, aluminum cans, or wood plank flooring)	1	2	3	4	5	6	7
21. The use of organic materials or finishes (such as cotton or wool).	1	2	3	4	5	6	7
22. The absence of volatile organic compounds (VOC's) in materials or finishes (such as carpeting or paint).	1	2	3	4	5	6	7
23. The use of local materials, furniture, or artwork within the hotel interior.	1	2	3	4	5	6	7
24. Being able to adjust the heating and cooling in a hotel room.	1	2	3	4	5	6	7
25. The use of low flow (decreased use of water without affecting performance) showers, faucets and toilets.	1	2	3	4	5	6	7
26. A towel exchange program that limits the number of times your towels are collected during a stay at a hotel.	1	2	3	4	5	6	7
27. The use of shower gel dispensers.	1	2	3	4	5	6	7
28. The use of green cleaning products by hotel cleaning staff.	1	2	3	4	5	6	7
29. The use of Energy Star rated appliances throughout the hotel.	1	2	3	4	5	6	7

30. Composting of food waste by kitchen staff.	1	2	3	4	5	6	7
31. Energy optimization, retainment, use of renewable energy such as solar or wind power.	1	2	3	4	5	6	7
32. Rainwater harvesting for the watering of indoor and outdoor plants	1	2	3	4	5	6	7
33. Air quality, having fresh air transfer continuously into building.	1	2	3	4	5	6	7
34. Monitoring of carbon and/or global footprint.	1	2	3	4	5	6	7
35. Integration of the hotel into local community (also known as destination conservation)	1	2	3	4	5	6	7
36. Access to alternative transportation (rental of a bicycle, public transportation or a car share program)	1	2	3	4	5	6	7
37. Employees' knowledge of recycling	1	2	3	4	5	6	7
38. Employees' knowledge of energy optimization	1	2	3	4	5	6	7
39. Other guests' behavior towards recycling	1	2	3	4	5	6	7
40. Other guests' behavior towards energy optimization	1	2	3	4	5	6	7

PERCEIVED EFFECTIVENESS

This section examines the extent to which you believe your actions make a difference.

Please indicate the level of concern for the following items	Not at all Concerned		Slightly Concerned		Very Concerned
41. There is not much that any one individual can do about the environment.	1	2	3	4	5
42. The conservation efforts of one person are useless as long as other people refuse to conserve.	1	2	3	4	5

SUBJECTIVE KNOWLEDGE

This section examines the extent to which you believe your actions make a difference.

Please indicate the level of agreement with the following statements.	Strongly Disagree		Neither Agree or Disagree				Strongly Agree
43. I know pretty much about 'green'.	1	2	3	4	5	6	7
44. I do not feel very knowledgeable about 'green'.	1	2	3	4	5	6	7
45. Among my circle of friends, I'm one of the experts on 'green'.	1	2	3	4	5	6	7
46. Compared to most other people, I know less about 'green'.	1	2	3	4	5	6	7
47. When it comes to 'green', I really don't know a lot.	1	2	3	4	5	6	7

ADDITIONAL QUESTIONS

Please indicate the level of your agreement with the following statements.	Never		Sometimes		Almost Always
48. How often do you discuss environmental matters?	1	2	3	4	5

Please indicate your level of engagement in the following practices.	Not at all		Somewhat				Extensive
49. I have studied or am knowledgeable about 'green' technology and practice.	1	2	3	4	5	6	7
50. My business or corporation utilizes 'green' technology and practices	1	2	3	4	5	6	7
51. I try to be 'green' in my own personal life	1	2	3	4	5	6	7
In my personal life I engage in the following:							
52. Recycling of paper, aluminum, glass, plastic	1	2	3	4	5	6	7
53. Recycling of batteries, print cartridges, personal electronics	1	2	3	4	5	6	7
54. Installation and use of energy efficient appliances	1	2	3	4	5	6	7

55. Driving a hybrid vehicle	1	2	3	4	5	6	7
56. Use mass transportation or alternative transportation	1	2	3	4	5	6	7
57. Purchase local produce	1	2	3	4	5	6	7
58. Purchase/consume organic food	1	2	3	4	5	6	7
59. Purchase/drink organic milk	1	2	3	4	5	6	7
60. Compost food waste	1	2	3	4	5	6	7
61. Purchase/use green cleaning products	1	2	3	4	5	6	7
62. Purchase/use recycled paper products	1	2	3	4	5	6	7
63. Purchase/wear organic clothing	1	2	3	4	5	6	7
64. Purchase/ wear organic shoes	1	2	3	4	5	6	7

BACKGROUND INFORMATION

65. My gender is:

○ Male

○ Female

66. My ethnic background is:

○ Caucasian/White

○ African American/Black

○ Hispanic/Spanish/Latino

○ Asian

○ Pacific Islander

○ Native American

○ Other

67. The highest level of education I have completed is:

○ Some High School

○ High School Graduate or Equivalent

○ Some College

○ Associates Degree

○ Bachelor's degree

○ Graduate or Professional Degree

○ Prefer Not to Answer

68. Please list your occupation:

_____

69. State of residence:

_____

70. Would you categorize where you live as rural (country), urban (city) or suburban?

○ Rural

○ Urban

○ Suburban

71. Annual household income:

○ $19,999 or less

○ $20,000 –39,999

○ $40,000 – 59,999

○ $60,000 – 79,999

○ $80,000 – 99,999

○ $100,000 or more

72. Please identify the student who recruited you so that he or she may receive credit for your completed response:

Student _____

73. What college or university do they attend?

○ Auburn University

○ La Roche College

○ University of the Pacific

Thank-you for your participation, if you have any questions or would like a summary of the results please email me at : bieakni@auburn.edu.

APPENDIX E

SKEWNESS AND KURTOSIS STATISTICS OF THE INITIAL PIGEA SCALE ITEMS

Items	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
LEED certification	-.226	.094	-.756	.187
Site impact	-.443	.094	-.517	.188
Building Shell Material	-.228	.094	-.810	.188
Green Roof	-.027	.094	-.961	.188
Green Façade	-.046	.094	-.859	.188
Modular Building	-.259	.094	-.838	.188
Operable Windows	-1.066	.094	.715	.188
Lighting (Daylight, Compact Fluorescent, LED, sensors)	-.921	.094	.240	.188
Space Optimization	-.885	.094	.337	.188
Rapidly Renewable Materials	-.403	.094	-.729	.188
Recycled Materials	-.447	.094	-.686	.187
Organic Materials	-.462	.094	-.688	.188
Low or 0 VOC Materials	-.657	.094	-.564	.188
Local Materials/Furniture	-.535	.094	-.600	.188
HVAC (monitoring and control)	-1.617	.094	2.732	.188
Low Flow Shower	-.787	.094	-.251	.188
Towel Exchange Program	-.659	.094	-.432	.188
Shower Gel Dispenser	.028	.094	-.976	.188
Green Cleaning Products	-.634	.094	-.498	.188
Energy Star Rated Appliance	-.742	.094	-.423	.188
Composting	-.391	.094	-.901	.188
Energy (Optimization, Retainment, Renewable)	-.572	.094	-.514	.188
Graywater Capture/Rainwater Harvesting	-.428	.094	-.740	.188
Air Quality	-1.388	.094	1.732	.188
Monitoring of Carbon/Global Footprint	-.500	.094	-.631	.187
Involvement/Integration into Community	-.505	.094	-.496	.188
Alternate Transport	-.532	.094	-.449	.188
Employee Recycling	-.635	.094	-.463	.188
Employee Energy Optimization	-.565	.094	-.585	.188
Guest Recycling	-.430	.094	-.817	.188
Guest Energy Optimization	-.364	.094	-.928	.188

Note: Please see Table 3.2 for Item descriptions

APPENDIX F

COVARIANCE MATRIX FROM THE ENTIRE DATA SET (n = 654) IN PHASE 2

	LEED certification	site impact	exterior material	green roof	living wall	modular building
LEED Certification	2.959					
Site Impact	1.877	2.623				
exterior material	2.072	2.075	3.124			
Green Roof	2.212	1.913	2.496	3.125		
Living Wall	1.890	1.824	2.165	2.479	2.938	
Modular Building	1.897	1.833	2.036	2.162	2.201	2.945
Operable Windows	.948	1.217	1.081	1.147	1.101	1.112
Space Utilization	.947	1.148	1.249	1.120	1.142	1.161
Rapidly Renewable Materials	2.040	1.962	2.396	2.549	2.289	2.181
Recycled Materials	2.041	1.885	2.372	2.294	2.101	2.158
Organic Materials	2.046	1.991	2.487	2.344	2.117	2.156
Towel Exchange	1.132	1.279	1.286	1.379	1.242	1.184
Green Cleaning	1.961	2.070	2.113	2.259	2.000	1.983
Fresh Air Transfer	.922	1.051	.972	.935	.949	.807
Employee Recycle	1.735	1.805	1.917	2.030	1.971	1.902
Employee Energy Optimization	1.915	1.993	2.166	2.192	2.027	1.974
Guest Recycling	1.699	1.658	1.965	2.050	1.864	1.859
Guest Behavior Energy Optimization	1.813	1.809	2.179	2.187	1.968	1.958

	operable windows	space utilization	rapidly renewable materials	recycled materials	organic materials	towel exchange
LEED Certification						
Site Impact						
exterior material						
Green Roof						
Living Wall						
Modular Building						
Operable Windows	2.207					
Space Utilization	1.334	2.247				
Rapidly Renewable Materials	1.286	1.464	3.261			
Recycled Materials	1.171	1.394	2.745	3.238		
Organic Materials	1.251	1.388	2.645	2.677	3.152	
Towel Exchange	.907	1.050	1.530	1.482	1.488	3.055
Green Cleaning	1.303	1.334	2.415	2.344	2.389	1.839
Fresh Air Transfer	1.112	1.135	1.097	1.070	1.215	.926
Employee Recycle	1.187	1.078	2.105	2.115	2.086	1.528
Employee Energy Optimization	1.198	1.228	2.294	2.262	2.224	1.569
Guest Recycling	.920	.909	2.129	2.107	1.950	1.654
Guest Behavior Energy Optimization	1.025	1.085	2.320	2.299	2.098	1.732

	green cleaning	freah air transfer	employee recycle	employee energy opt	guest recycling	guests behavior energy op
LEED Certification						
Site Impact						
exterior material						
Green Roof						
Living Wall						
Modular Building						
Operable Windows						
Space Utilization						
Rapidly Renewable Materials						
Recycled Materials						
Organic Materials						
Towel Exchange						
Green Cleaning	3.376					
Fresh Air Transfer	1.431	2.122				
Employee Recycle	2.221	1.191	3.103			
Employee Energy Optimization	2.463	1.179	2.862	3.256		
Guest Recycling	2.053	1.014	2.557	2.489	3.408	
Guest Behavior Energy Optimization	2.219	.994	2.519	2.696	3.251	3.553