



# ENVIRONMENTAL MANAGEMENT

## A Study of Vietnamese Hotels

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**Abstract:** The objective of this study was to identify factors influencing the intentions of Vietnamese hotel businesses to adopt environmentally friendly practices. This was approached from the perspective of hotel managers within the framework of the diffusion of innovations theory. Participants were asked to evaluate the potential advantages and barriers to the adoption of selected sustainable tourism practices and to make an adoption/rejection decision based on their judgment. Innovation characteristics were the most influential factors, being highly correlated with the likelihood of adoption. External environment characteristics were also highly correlated with intention to adopt to environmentally friendly frameworks. Organizational characteristics had a weaker relationship with the likelihood of adoption, except for the attitude toward change/level of risk-taking. **Keywords:** environmental innovations, hotel, Vietnam. © 2006 Elsevier Ltd. All rights reserved.

**Résumé:** Gestion écologique: une étude des hôtels vietnamiens. L'objectif de cette étude était d'identifier les facteurs qui influencent les intentions des hôtels vietnamiens quant à l'adoption de pratiques qui respecteraient l'environnement. L'étude s'était basée de la perspective des gérants d'hôtels dans un cadre de diffusion de théorie d'innovations. On a demandé aux participants d'évaluer les potentiels avantages et les barrières à l'adoption de certaines pratiques de tourisme durable et de prendre une décision d'adoption/rejet basée sur leur jugement. Les caractéristiques d'innovation étaient les facteurs les plus influents, cela du fait d'être fortement liés à la probabilité d'adoption. Les caractéristiques environnementales externes étaient aussi fortement corrélées aux intentions d'adopter des pratiques touristiques durables. Les caractéristiques organisationnelles, par contre, présentaient une faible liaison avec la probabilité d'adoption, exception faite pour l'attitude envers le changement ou le niveau de prise de risques. **Mots-clés:** innovations environnementales, Vietnam. © 2006 Elsevier Ltd. All rights reserved.

### INTRODUCTION

Before 1986, Vietnam followed a Soviet-style “development-at-all-cost” economic policy favoring heavy industry and commerce that

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was closed to noncommunist countries. This policy created serious, highly visible environmental problems such as deforestation, soil erosion, contaminated water sources, and reduced wildlife habitat (O'Rourke 1995). Since 1986, Vietnam has been transformed into a market-oriented economy. This switch is often known as *doi moi*. In addition to shifting the economy toward a higher proportion of light industry and joining the international market, sustaining natural resources is a focus of *doi moi*. In 1993, the government promulgated the law on environmental protection, an umbrella environmental law. O'Rourke observes that "since the passage of [this law], the government has issued a wide range of decrees, directives, and circulars that flesh out the law, and create implementation instruments to realize the goals of environmental regulation and enforcement" (2001:5). As part of this movement, the government encouraged the development of environmentally friendly industries as economic substitutes for natural resource exploitation. Tourism, in particular, is expected to play a leading role in achieving the balance between economic development and environmental protection (Vu 2004).

The industry has made several significant contributions to the Vietnamese economy. By 1995, tourism was generating US\$780 million in annual revenue and had created more than 15,000 jobs (Hoang 1998). Because of its contribution to the nation's GDP, as well as its relatively low impact on the environment, tourism seemed to be a promising economic alternative to heavy industry and resource extraction. However, several negative problems associated with its development soon arose. For example, McDonnald (2000) finds that there were growing numbers of wildlife restaurants right outside of national parks. They served wild game including rare or endangered species, which sometimes were illegally poached. A reason given for doing this was the demand from a particular market segment. For such reasons as this, mass tourism is blamed as a major threat to the biodiversity in Vietnam (Dinh 2003).

Explanations for the negative environmental impacts of Vietnam's tourism are many and varied. As a newly emerging industry, tourism has suffered from a lack of oversight and funding from the state. Established in 1960, the Vietnam National Administration of Tourism (VNAT) has been ineffective in strategic planning and management (Hoang 1998). Before 1986, the industry did not really exist as a profit-oriented economic activity, but rather was viewed as a social welfare program which was fully subsidized by the government (Marris, Allcock and Sipaseuth 2003). All resorts and hotels were government properties. These facilities housed state-owned company and government employees who were rewarded with vacations as a bonus for meritorious performance. Privately owned tourism businesses were not legally recognized until the 1986 law. With the 1986 economic restructuring, tourism was forced like other industries to become a profit-oriented economic activity. With little or no experience in managing it as a market-oriented industry with multiple types of business ownerships, VNAT promoted growth but without any strategic management planning (Haley and Haley 1997). As a consequence, growth in tourism was accompanied by unforeseen environmental and cultural impacts.

In particular, accommodation and hospitality services, including hotels, resorts, campgrounds, bed and breakfasts, etc., continue to be the most critiqued tourism component because of their potential negative impacts on the natural and cultural environment. For example, local environmentalists have raised concerns about the impacts of residual chemicals and waste-water run-off from large hotel and golf course landscaping on their surroundings (Haley and Haley 1997). The construction of large-scale resorts throughout the country has further contributed to deforestation (Pham 1997). Hotels and resorts are also blamed for several social problems, including the largest disparity in incomes between local and expatriate staff (Mbaiwa 2003) and abuse of child labor (Haley and Haley 1997).

As the Vietnamese government continuously shows its interest in promoting a more environmentally friendly approach to tourism development (Haley and Haley 1997; Pham 1997), recent studies such as Lindsey and Holmes (2002) have also provided empirical evidence of consumers' awareness and willingness to pay to protect the environment in Vietnam. However, the challenge lies in getting businesses to adopt environmentally friendly practices (EFPs). This requires understanding of the difficulties as well as the motivations and incentives for participation in sustainable tourism practices. Nevertheless, no study on tourism development in Vietnam has addressed this issue. Therefore, this study aims to bridge that gap by examining the factors that influence the perceptions of Vietnam's tourism businesses concerning "likelihood of adoption" (LOA or intention to adopt) of EFPs. In order to promote a more environmentally friendly approach, it is essential to understand the perceptions from both demand and supply sides of the market as tourism development is both "supply-led and demand-driven" (Liu 2003:463).

As classified by McIntosh and Goeldner (1990), the industry contains four main components: accommodation and hospitality services; travel agencies and tour companies; attractions including natural, cultural, and historical resources; and transportation services. However, because of the need to limit the scope of the study, this article focuses on the accommodation sector. Referring to this component as hotels for short, the study was intended to explore the types of salient factors that influence the intention of hotels to adopt EFPs. The literature was reviewed to identify EFPs in, or under consideration for, use in sustainable programs, including eco- and green-tourism programs throughout the world. The correlations of these factors with the firms' decisions to adopt or not adopt these EFPs were then explored through the theoretical framework of diffusion of innovations (DOIs).

## PERCEPTIONS TOWARDS ADOPTING EFPs

Although a limited number of studies have addressed tourism business perspectives on adopting EFPs, thousands had been conducted to examine factors influencing businesses to accept their

responsibilities to protect natural resources and improve the quality of the environment. Motivations for integrating environmental practices with business activities have been among the most discussed topics across different industries and different disciplines during the last two decades (Hoffman 2000). Accompanying the wide range of research is a diverse mix of theoretical frameworks. Some of the most widely applied theories include the resource-based view, institutional change, stakeholder and organizational ethics, and diffusion of innovation. Each of these theories has certain merits and limitations in its ability to explain business motivations for adopting EFPs.

The resource-based view theory, for example, is a further development of neo-classical and ecological economic theories. This approach has been applied in various studies, especially Rangel's (2000) research on motivations of Costa Rican hotels to participate in a sustainable tourism program. The main tenet of the resource-based view theory is the link between competitive advantage and the internal resources of the firms. The effectiveness of this link is often measured through customers' perceptions of product improvement based on the adoption of new business practices (Srivastava, Fahey and Christensen 2001). From the resource-based view perspective, businesses are willing to comply with environmental protection practices because they perceive benefits from doing so, such as sustaining competitive advantage (Esty and Porter 1998; Vazques, Santos and Alvarez 2001; Veliyath and Fitzgerald 2000). This is a major departure from classical economic theory which views environmental protection as a high cost activity that companies try to avoid. Because it is rooted in economic theory, the resource-based view theory is criticized for heavily focusing on economical benefits and not on other factors such as sociopolitical exchanges (Lockett and Thompson 2001) and organizational and institutional motivations (Lux 2003).

Institutional and stakeholder theories have been applied in several environmental studies to further explore other motivations besides financial and marketing benefits (Hoffman 2000; Rangel 2000). According to institutional theory, social pressures from other actors in the market, such as government and the general public, are important in determining a firm's intention to adopt or even over-comply with environmentally friendly programs (Rivera 2002, 2004). Stakeholder theory expands further the range of motivations that stimulate a firm's adoption of EFPs from a cost/benefit decision to a moral choice. In addition, stakeholders are not limited to humans but also include the natural environment (Phillips 2003).

Although the resource-based, institutional, and stakeholder theories can help clarify firms' motivations to adopt EFPs, these theories also have limitations. For example, an obstacle to this study was that it was conducted after the SARS outbreak in Asia, resulting in a major decrease in the tourism business. Researchers such as Couch, Hoffman and Lamont (1995) conclude that it is not appropriate to study business ethics at a time when a company's survival is at stake. Given the circumstance, applying stakeholder theory with its main focus on business ethics was not a practical choice for this study.

Further, in comparison to resource-based view and institutional theories, that of diffusion of innovation (DOI) emerged as a more applicable framework for this study. First, as defined by Rogers (1995), innovations are ideas, practices, or concepts perceived as new to the potential adopters. The concept of EFPs, although not a new idea in internationally, is new to tourism companies in Vietnam since this is a relatively new industry. DOI theory provides a framework to study firms’ motivations to adopt new practices. The resource-based view and institutional theory are more applicable in cases of well-established sets of practices.

Second, as shown in Figure 1, the DOI theoretical framework includes a variety of motivations that cover some main tenets of the resource-based view or institutional theory. As Rogers (1995) classifies them, there are three main categories of a firm’s motivation to adopt EFPs: the characteristics of innovations, the characteristics of the organization, and the characteristics of the environment in which the organization operates. The first includes complexity, compatibility, observability, and relative advantages. Complexity is the degree to which an innovation is perceived as difficult to understand and use. The more complex an innovation, the less likely it will be adopted (Rogers 1995). Compatibility is the degree to which an innovation is perceived as being consistent with existing values, past experience, and the needs of potential adopters. Observability is the degree to which the results of an innovation are visible to the firm. Observability is generally understood as the ability to foresee the overall effect of adopting the innovations. The easier it is for individuals or organizations to see the results of an innovation, the more likely they are to adopt it (Rogers 1995). Relative advantage is the degree to which an

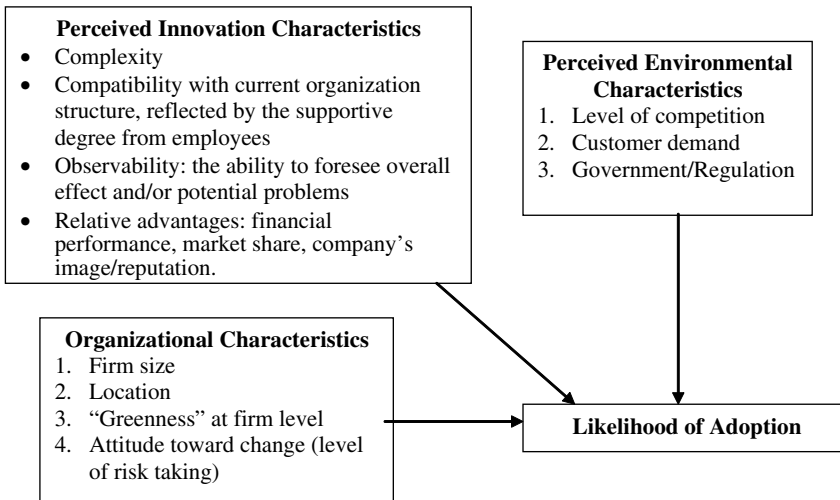


Figure 1. Conceptual Framework Applying Rogers’ Model

innovation is perceived as better than the idea it supersedes or replaces. The higher the perceived relative advantage of an innovation, the more likely it will be adopted. Relative advantages mentioned most in adopting environmental innovations are cost savings, improvement of the firm's reputation, and sales volume or market share (Karagozlu and Lindell 2000).

Organizational characteristics include firm size, firm location, a firm's attitude toward environmental protection, and a firm's attitude towards adopting changes. Generally, firm size and location are indicators of internal resources available to a business. Large firms, for example, are often assumed to have more financial and human resources than small firms to adopt EFPs. A firm's attitude towards environmental protection and adopting change represents organizational and institutional pressures regarding risk-taking in general and the risk of adopting EFPs in particular. External environment characteristics represent how businesses perceive certain attributes of the external environment, such as customer demands, intensity of industrial rivalry, and government policies and regulations. Commonly, the attributes of external environment are measured in terms of perceived certainty levels, meaning the extent to which changes can confidently be predicted (Downs and Mohr 1976). These factors represent social pressures on a firm as a motivation to adopt EFPs.

Another reason that DOI theory is more appropriate for this study is its wide application across geographical regions as well as scientific disciplines. Since Rogers' first publication of the DOI theory in 1962, its consistency has been proven in over 5,000 studies across a variety of different disciplines, including the study of environmentally friendly technology (Nijkamp, Rodenburg and Verhoef 1999). While this is the first time the DOI framework has been used in a Vietnamese cultural context, it has been successfully applied in various studies in non-English speaking cultural settings such as Indonesia (Chaudhuri 1994), Saudi Arabia (Al-Gahtani 2003), and China (Rogers 2003).

To summarize, due to its advantages over other theoretical frameworks, the DOI theoretical framework is applied in this study, whereby firms' motivations to adopt EFPs are categorized into three main constructs which are innovation characteristics, organizational characteristics, and external environment characteristics. All of the former (relative advantages, observability, and compatibility), except for complexity, were hypothesized to have a positive correlation with the LOA of environmental innovations. Relative advantages were measured by several variables including financial costs and benefits, increase in sales volume/market shares, and increase in the firm's reputation. Organizational characteristics include firm size, firm location, greenness level, and level of risk-taking. The last two were hypothesized to have a positive influence on a firm's intention to adopt environmental innovations. Because firm size and location were exploratory variables, no hypotheses were proposed. External environment characteristics include perceived certainty of the level of competition, of changes in customer demand, and of changes in government policies. They were hypothesized to be positively correlated with LOA.

### *Study Methods*

Since there was no standard set of sustainable tourism practices in Vietnam at the time of this study, a generic list of practices was created from existing programs such as the Nature and Ecotourism Accreditation Program (Ecotourism Australia 2003) in Australia, the Ecotourism Program from Costa Rica (2003), and “Green Hotel” criteria from the Hyatt Corporation (Enz and Sigauw 1999). The list was then redefined by two expert panels through a semi-Delphi routine recommended by Delbecq, Van de Ven, and Gustafson (1975) as the most effective for generating management criteria and decisions given time and budget constraints.

The first expert panel included English-speaking experts in the field of sustainable tourism development from Australia, the United States, and Malaysia. The experts were selected based on their knowledge and experience of working in sustainable tourism projects in developing countries. They were asked to select practices they perceived to be important and practical in the context of developing countries like Vietnam. A list of common selected practices was then emailed back to the experts for confirmation. After three rounds of independent reviews, the experts unanimously selected 56 practices.

The list was then translated into Vietnamese and retranslated into English to ensure accuracy and minimize language issues. Five Vietnamese experts were selected from academic institutions, government administration of tourism, and business organizations based on their wide variety of experiences. The experts were used to confirm items on the translated list, to reduce the number of items to a researchable size, and to make sure the important items were not left out. Panelists were instructed to independently identify practices most important and applicable to the tourism industry in Vietnam. After the first round, 35 practices selected by at least three experts remained on the list. This list was then sent to the experts for a second review. After the second round, 15 practices were unanimously selected. A personal interview with each expert was conducted to confirm agreement on 15 practices covering such hotel business activities as use of water, electricity, building design, landscaping, air and noise pollution, recycling, direct contributions to preservation, and working with local communities.

Scale items measuring variables for three key constructs were utilized from various research as shown in Table 1. Innovation characteristics variables were measured on a semantic differential scale from 1 to 7, with 1 being extremely complex/difficult/disadvantaged; 4 being no effect or no change; and 7 being extremely simple/easy/advantaged, according to the wording of each innovation attribute. Variables representing organizational characteristics, except for firm size and location, were measured with a 7-point Likert-type scale with 1 being “strongly disagree” and 7 being “strongly agree.” Firm size was determined using several proxy measures for hotels as suggested by Rangel (2000). These proxies included star ratings, total assets, number of rooms, and number of employees. Firm location was presented as a

**Table 1. Results of Factor Analyses**

Variable	Rotated Factor Pattern					
	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6
<b>Innovation characteristics</b>						
	Complexity	Sale increase	Cost saving	Observability	Reputation Increase	Compatibility
TECH1 <sup>a</sup>	<b>0.925</b>	0.111	0.122	0.062	0.043	0.073
TECH2 <sup>a</sup>	<b>0.911</b>	0.118	0.167	0.117	0.050	0.093
TECH3 <sup>a</sup>	<b>0.684</b>	0.086	0.232	0.449	0.157	0.086
SALE <sup>b</sup>	0.130	<b>0.825</b>	0.046	0.239	0.388	0.086
FIN <sup>b</sup>	0.206	<b>0.681</b>	<b>0.480</b>	0.088	0.019	0.365
FLEXCOST <sup>b</sup>	0.281	0.143	<b>0.913</b>	0.148	0.057	0.080
OBSER <sup>a</sup>	0.234	0.230	0.144	<b>0.856</b>	0.166	0.231
REPU <sup>b</sup>	0.103	0.265	0.055	0.161	<b>0.881</b>	0.280
COMPA <sup>c</sup>	0.139	0.205	0.115	0.238	0.319	<b>0.855</b>
<b>External environment characteristics</b>						
	Certainty about government		Certainty about customers		Perceived level of competition	
GOV3 <sup>d</sup>	<b>0.810</b>		0.206		0.033	
GOV4 <sup>d</sup>	<b>0.804</b>		0.042		0.097	
GOV1 <sup>d</sup>	<b>0.772</b>		0.115		0.020	
GOV5 <sup>d</sup>	<b>0.750</b>		0.185		0.070	
GOV2 <sup>d</sup>	<b>0.635</b>		0.361		0.081	
CUST1 <sup>d</sup>	0.152		<b>0.822</b>		-0.160	
CUST2 <sup>d</sup>	0.281		<b>0.744</b>		0.082	
COMPE1 <sup>c</sup>	-0.021		0.143		<b>0.891</b>	
COMPE2 <sup>c</sup>	0.197		-0.250		<b>0.776</b>	
<b>Organizational characteristics</b>						
	Greenness level			Risk taking level		
GREEN1 <sup>f</sup>	<b>0.899</b>			0.183		
GREEN2 <sup>f</sup>	<b>0.835</b>			0.266		
GREEN4 <sup>f</sup>	<b>0.683</b>			0.492		
GREEN3 <sup>f</sup>	<b>0.510</b>			0.124		
RISK1 <sup>g</sup>	0.111			<b>0.883</b>		
GREEN5 <sup>f</sup>	0.268			<b>0.814</b>		
RISK2 <sup>g</sup>	0.416			<b>0.698</b>		

This table contains abbreviations of the scale items used to measure three key constructs.

<sup>a</sup> Complexity and observability scale adopted from McCabe (1987). <sup>b</sup> Relative advantage scale adopted from Karagozoglu and Lindell (2000). <sup>c</sup> Compatibility item adopted from Kocis (1986). <sup>d</sup> Perceived customer and government certainty scale adopted from Miles and Snow (1978). <sup>e</sup> Perceived competition scale adopted from Jaworski and Kohli (1993), and Appiah-Adu and Singh (1998). <sup>f</sup> Greenness scale adopted from Horobin and Long (1996). <sup>g</sup> Risk taking attitude scale adopted from Miles and Snow (1978) with revisions from Hurley and Hult (1998), and Vazques et al (2001).



dummy variable, with 0 for the hotels located in a non-natural resource area and 1 for hotels within a natural resource area. External environment characteristics were measured with a 7-point Likert-type scale, with 1 being "highly unpredictable" and 7 being "highly predictable."

The questionnaire was translated into Vietnamese and back into English to ensure the transferability and accuracy of terminologies. The final product was a cover letter and a 9-page-long questionnaire. Two pilot tests of the survey instrument among 30 hotel managers were conducted. Participants were asked to note the ease of understanding instructions and measurement scales, and the accuracy of word choice. Except for some minor changes in wording, participants reported no difficulties or misunderstanding in answering the questionnaire.

The number of accommodation providers in Vietnam, as published in the VNAT website as of November 2002, including hotels, resorts, villas, tourism villages and apartment rentals, was 3,267. However, VNAT refers to this figure as "unofficial" (Vietnam National Administration of Tourism 2003). A request was sent to VNAT regional offices to provide contact information including business names, managers' names, and addresses of these hotels. A randomly selected sample of 497 hotels was chosen from a combined database of all regions. Because this study focuses on management decisions related to the adoption of environmental innovations, the desired participants were owners, managers, or members of decisionmaking units in hotel organizations. This logic follows that of other organizational studies (Damanpour 1991; Wolfe 1994).

The survey period was from August to December 2003. The surveyors first attempted to set up appointments with the participants. They arranged brief face-to-face meetings during which they gave the participants the questionnaires with a pre-paid return envelopes. They explained the purpose of the study, gave instructions on how to fill out and return the questionnaires, and answered clarification questions. They then came back to retrieve the questionnaire a couple of days later according to the arrangement with the participants. This method has been used to increase response rates in other tourism studies (Vincent and Santos 1996). If the questionnaires were not completed at the second meeting, participants were asked to return them by mail. If the participants had not returned the questionnaire by mail, a reminder telephone call was made and a letter sent one and two weeks after the meeting.

### *Study Results*

After sample selection, it was found that 33 participants were actually duplicates because they also manage another hotel on the list. That reduced the number of selected participants to 464. In addition, 27 were unreachable during the survey period because the hotels were closed for reconstruction or for renovation. Among 437 remaining participants, 193 returned the questionnaires, resulting in a response rate of 47%. Of those, three sent back a blank questionnaire, reducing the number of usable samples to 190.

Several incidents before and during the survey period also reduced the number of hotel businesses in the study population. The first incident was the SARS outbreak in Asia earlier in 2003, which dramatically reduced the number of international tourists. This was followed by the Avian flu, or bird flu, which affected the southern part of Vietnam from November 2003 to March 2004, resulting in further cancellations of international and domestic tours. Without customers, many hotels, especially small ones with limited financial resources, faced bankruptcy and closure. To survive, these businesses were forced to merge, or to sell their properties to other hotel companies, or to change their operations into restaurants, night clubs, and karaoke clubs in order to serve local customers. According to the authors' estimation, the actual population was closer to 2,500 hotels at the time of the study. Using 193 responses, the sampling error for this survey was calculated to be 8% according to Salant and Dillman (1994).

In this survey, because the unit of analysis was a hotel, it was most appropriate to assess the non-response bias based on the characteristics of the organizations (Dey 1997; Stoop 2004). Therefore, the star ratings (from 0, or nonclassified, to 5-star hotel) and types of ownership (state-owned, privately owned, and joint-venture between a domestic and a foreign partner) were used to check non-response bias. With  $\chi^2$  equals 8.41 ( $p$ -value  $> 0.1$ ), the proportion of star categories among non-respondents was not statistically different than that of respondents. The chi-square test of the proportion of ownership types between respondents and non-respondents also results in a  $\chi^2$  of 4.09 and  $p$ -value greater than 0.1, indicating no difference between respondents and non-respondents in terms of type of ownership. Because differences between the two groups were not found in either of the two tests, the non-response bias was judged to be insignificant.

*Measurement Validity and Reliability.* Figure 1 depicts the three main constructs examined in this study. Table 1 shows the scale items and reliability scores for the scales of those constructs. Variables within the innovational characteristics construct were measured by nine items. Ten items were used to measure variables representing the external environment characteristics. Greenness level and risk taking level were the two variables representing organizational characteristics being measured by nine equal-interval scale items. Cronbach's coefficient alpha was used to determine the internal consistency of the measurement scale items that were used to operationalize these constructs. According to DeVellis (1991), Cronbach's coefficient alpha levels below 0.60 are unacceptable and indicate a problem with the internal consistency of the questionnaire items. However, Nunnally (1978) argued that in the early stages of research, reliabilities of 0.50–0.60 would suffice. Following this logic and given that this study was at the early stage of sustainable tourism development research in Vietnam, the coefficient alpha of 0.527 for attitude toward change scale was deemed acceptable.

However, items RISK3, RISK4, and COMPE3 were all worded negatively, with the coefficient alphas calculated based on the reverse scores of these items. These items all had low correlation with their totals (less than 0.3), and COMPE3 even had a negative correlation with the total. The partial correlation scores were examined, RISK3, RISK4 ( $p$ -value ranged from 0.47 to 0.78 for both items), and COMPE3 ( $p$ -value ranged from 0.118 to 0.664) all had insignificant partial correlations with the other items in their scales, suggesting that there may be a Vietnamese language/cultural issue with responding to negatively worded statements. Therefore, even though the Cronbach's alpha for external environment was acceptable according to Nunnally (1978), items RISK3, RISK4, and COMPE3 were removed. After removing these items, the Cronbach's alpha was a very respectable 0.722 for the attitude toward change scale and 0.793 for the external environment characteristics scale.

*Confirmatory Factor Analysis to Identify Variables Related to Proposed Model.* As shown in Table 1, this study adopted measurement items from other studies. Because all items were extracted from studies in English and some were not original to tourism studies, there is a potential for discrepancy between the theoretical construct and respondents' understanding of the items in each construct. Therefore, factor analysis was conducted for two purposes. The first purpose was to identify any discrepancy between the theoretical constructs and respondents' understanding of how the scale items related. The second was to create statistically independent variables from respondents' constructs to be used in a regression analysis. The results of three factor analyses are presented in Table 1. The first factor analysis confirmed the operationalized variables that measure the innovation characteristics with six factors emerging from the varimax rotation. These explained 90% of the total variance. Most loaded in a pattern consistent with the study's theoretical assumptions. For example, all technical indicators (TECH1, TECH2, and TECH3) loaded in factor 1, which represents the complexity issue of innovation characteristics, as shown in Table 1. The second factor analysis was used to determine the operationalized variables that represent the construct of external environment characteristics. Varimax rotation revealed three factors that were consistent with the theoretical construct and explained 76% of total variance. For example, all government certainty items (GOV1, GOV2, GOV3, GOV4, and GOV5) loaded in factor 1 indicating the level of certainty about governmental changes in regulatory policy. Other factors (customer demand and industry rivalry) were also consistent with the theoretical construct.

The third factor analysis was used to detect variables measuring organizational characteristics. Varimax rotation resulted in two factors describing organizational characteristics. These two factors explained 71% of the total variance. GREEN1, GREEN2, GREEN3, and GREEN4 loaded in Factor 1 indicating greenness level. Participants, however,

**Table 2. Logistic Regression Analyses**

<b>Variable</b>	<b>Overall model</b>	<b>Prac. 1 Do not use residual chemical treatment in landscaping</b>	<b>Prac. 2. Collect and use rainwater, storm water whenever possible</b>	<b>Prac. 3. Utilize automatic run-off taps to save water</b>
-2 Log (model fit)	1809a	99.6a	64.5a	109.9a
Pseudo R <sup>2</sup>	0.183	0.282	0.499	0.287
% of correct classification	66%	72%	84%	73%
Complexity	0.486a	1.060a	1.049b	0.665a
Cost saving	0.141a	1.333b		
Sale increase	0.204a			
Compatibility	0.204a		1.117b	
Observability	0.435a		0.879b	
Firm image	0.143b			
Location	-0.243b	-1.166b		
Firm size	0.174c			
(Firm size) <sup>2</sup>				
Greenness				-1.129c
Risk taking	0.115b			0.832a
Rivalry	0.065b		1.267a	
(Rivalry) <sup>2</sup>			0.951b	0.787b
Customer certainty	0.177a		0.555c	
(Customer certainty) <sup>2</sup>				
Government certainty				
	<b>Prac. 4</b>	<b>Prac. 5 Retain and</b>	<b>Prac. 6 Use</b>	<b>Prac. 7 Control</b>
	<b>Compatible building forms with the landscape</b>	<b>include native vegetation</b>	<b>movement sensor switches for outdoor lighting</b>	<b>electric use in guest rooms</b>
-2 Log (model fit)	110.4a	102a	86.2a	115.9a
Pseudo R <sup>2</sup>	0.207	0.339	0.265	0.225
% of correct classification	69%	67%	78%	71%
Complexity		0.691b	0.953a	0.438b
Cost saving		0.577c		
Sale increase	0.497b			
Compatibility		0.843b		
Observability		1.144a	0.533c	
Firm image				
Location				
Firm size	1.802b	0.648c		
(Firm size) <sup>2</sup>	-0.769b		-0.550c	
Greenness		-0.987c		
Risk taking	0.620b			
Rivalry				0.824a
(Rivalry) <sup>2</sup>				
Customer certainty	0.406c	0.577b		
(Customer certainty) <sup>2</sup>				
Government certainty				

**Table 2 (continued)**

Variable	Prac. 8 Control noise level from hotel's activities	Prac. 9 Do not allow idly running vehicles	Prac. 10 Control air emission from hotel's activities	Prac. 11 Provide recycle bins for guest rooms
-2 Log (model fit)	99.1a	98.3a	95.8a	67.7a
Pseudo R <sup>2</sup>	0.314	0.232	0.304	0.445
% of correct classification	78%	80%	77%	79%
Complexity		1.058a	0.571c	1.574a
Cost saving				0.748b
Sale increase				
Compatibility				
Observability	1.209a	0.601c	1.017a	1.854a
Firm image	0.883c			0.924c
Location	-1.247b		-1.191b	
Firm size (Firm size) <sup>2</sup>				
Greenness				
Risk taking				
Rivalry (Rivalry) <sup>2</sup>				
Customer certainty (Customer certainty) <sup>2</sup>		0.435c		
Government certainty	0.468c			
	Prac. 12 Provide financial and other assistance to clean up tourist attractions	Prac. 13 Provide financial and other assistance to rehabilitate tourist attractions	Prac. 14 Employ local residents with fair wages	Prac. 15 Facilitate cultural understanding between tourists and host community
-2 Log (model fit)	103.4a	69.7a	71.5a	114.4a
Pseudo R <sup>2</sup>	0.390	0.455	0.477	0.230
% of correct classification	78%	87%	82%	70%
Complexity	1.447a		1.696a	0.713b
Cost saving	1.005a		1.024b	
Sale increase		1.074a		
Compatibility	0.739a	0.990b		
Observability				
Firm image				
Location			-2.146a	-0.890c
Firm size (Firm size) <sup>2</sup>			-1.065c	
Greenness				
Risk taking		1.029b	0.918b	0.485b
Rivalry (Rivalry) <sup>2</sup>		-0.973a		
Customer certainty (Customer certainty) <sup>2</sup>			-0.548c	
Government certainty		0.310c	-0.506a	

Correlation Coefficients are statistically significant with (a) *p*-value < 0.01; (b) *p*-value between 0.01 and 0.05 and (c) *p*-value between 0.05 and 0.1. Correlation Coefficients in blank cells are not significantly different from 0 (*p*-value > 0.1). The corresponding factors have no effect in the selected model.

seemed to interpret the statement “we can all respond to the need to protect the environment, for example by altering some of our everyday business activities” as being more associated with a risk-taking action than with a positive attitude toward sustainable tourism. Item GREEN5, which was assumed to be a greenness indicator, became one of the risk-taking attitude items loading on factor 2 (Risk taking).

Two variables, firm size and location, are not included in Table 2 because they were not measured by scale items but by other proxies. Among the respondents, 12% indicated their hotels were 1-star, 32.2% were 2-star, 16.95% were 3-star, 9% were 4 or 5-star, and 15% were non-classified, according to hotel standards classified by VNAT. The non-classified hotels included those that were new and thus had not yet finished their application for classification; and others that did not meet the requirement of any star rating. Although the star ratings were generally correlated to the size of the hotels, because of the large number of not-yet-classified hotels, the star rating was not included as a proxy measure of firm size. Other proxies, including number of rooms, total assets, and number of employees, were highly correlated to each other (partial beta were 0.65, 0.70, and 0.92, pair-wise sequentially with  $p$ -value less than 0.0001). A variable was created using a factor component of these three variables to measure firm size.

**Logistic Regression of Relationships between LOA and Independent Variables.** Logistic regression analysis was used to examine the influence of innovation, organization, and external environment characteristics on a firm’s decision to adopt sustainable tourism practices. LOA as the dependent variable was measured in terms of a binary response decision, with 0 being rejection and 1 being adoption. A multivariate probability plot was graphed to examine the relationship between dependent and independent variables in the logistic regression model. The graph shows a curvilinear feature indicating some potential quadratic relationships. Scatter plots were then created to provide visual information of the partial relationship among these variables with the LOA. The variables that show potential quadratic form were firm size, perceived competition, and perceived customer certainty. Therefore, the overall model of logistic regression became:

$$\begin{aligned}
 \text{Adoption likelihood} = & \text{Intercept} \\
 & + \beta_1^* (\text{perceived decreasing level of complexity}) \\
 & + \beta_2^* (\text{perceived cost saving}) \\
 & + \beta_3^* (\text{perceived increase in firm's reputation}) \\
 & + \beta_4^* (\text{perceived increase in sale}) \\
 & + \beta_5^* (\text{perceived compatibility}) \\
 & + \beta_6^* (\text{perceived observability}) \\
 & + \beta_7^* (\text{firm location}) + \beta_8^* (\text{firm size}) \\
 & + \beta_9^* (\text{firm size})^2 + \beta_{10}^* (\text{greenness level}) \\
 & + \beta_{11}^* (\text{risk taking level})
 \end{aligned}$$

$$\begin{aligned}
& + \beta_{12}^* (\text{perceived competition}) \\
& + \beta_{13}^* (\text{perceived competition})^2 \\
& + \beta_{14}^* (\text{perceived customer certainty}) \\
& + \beta_{15}^* (\text{perceived customer certainty})^2 \\
& + \beta_{16}^* (\text{perceived government certainty})
\end{aligned}$$

Logistic regression utilizing backward elimination was run first with the overall model of all 15 practices, and then with each individual practice. Overall, eight factors were found to have statistically significant relationships with the LOA ( $p$ -value < 0.05), as shown in Table 2. All variables representing innovation characteristics were significantly correlated with the LOA in the hypothesized direction. Firm size, firm location, and level of risk-taking were variables within organizational characteristics that significantly affect the LOA. However, firm size, even though the correlation was positive, has a weak relationship with the LOA, as its  $p$ -value was over 0.05. Perceived level of competition and customer certainty were factors found to be significant among the external environment characteristics. None of the quadratic effects was found significant in the overall model.

#### *Vietnamese Hotel Manager Perceptions towards Environmental Management*

The objective of this study was to identify factors that influence the LOA of sustainable tourism development practices among accommodation providers in Vietnam. The overall adoption/rejection ratio was 51% and 49%, with the lowest adoption rate being 23% (practice 2: rainwater/stormwater are collected to use in hotel whenever possible), and the highest adoption rate that of 74% (practice 14: Local residents are employed in some aspect of the operation with a fair wage).

*Innovation Characteristics.* The results of this study confirm the conclusion by Rogers (1995) that innovation characteristics are the most influential factors affecting the LOA. Complexity and observability, in particular, were most often found significant (12 out of 15, and 7 out of 15 practices respectively) in this study. As Damanpour (1991) notes, it is important to distinguish between technical and administrative innovations because the adopters may perceive them differently. Most of the innovations were technical, except for practices 11–15 which involve working with local communities. The correlation between LOA and complexity was significant regardless of the type of innovation.

The fact that observability is significantly correlated with the LOA indicates that innovations with higher explicit and visible overall results will be more likely to be adopted. This result was consistent with findings in sustainable development studies by Dewhurst and Thomas (2003) and Liu (2003), who find that the best way to motivate tourism businesses to adopt environmentally friendly practices is to show them

an example of other businesses who successfully adopted them. Successful adoption, in this case, means that the practices significantly improve the environmental performance of the firm as well as produce visible economic results.

Similarly, relative advantages (measured in term of cost savings, increase in sales volume, and increase in firm's reputation) also appear to be effective motivations to adopt environmental practices. However, increase in firm image does not appear as strong an influence as other relative advantages. The overall model shows a significant positive correlation between strengthening the firm's image and the LOA. No significant correlation between strengthening firm image and LOA was found (at  $\alpha = 0.05$ ). Improved firm image was hypothesized to be positively correlated with the LOA, indicating that practices helping companies advertise themselves as environmentally friendly would more likely be adopted, as found by Rangel (2000). However, it did not appear to be the case among hotel businesses in Vietnam. One of the common concerns among tourism businesses in Vietnam is the difficulty of advertising to the international market. Firms lack the resources and knowledge in international marketing to use effectively the attribute of being environmentally friendly to improve their image.

The correlations between innovation characteristics and LOA followed a pattern similar to that described by Rogers (1995). As Rogers (1995) observes, at the early stage of diffusing an innovation, firms generally do not have complete information about its characteristics. Thus, correlations between LOA and innovation relative advantages may not be explicit. At this early stage, firms tend to pay more attention to the complexity of the innovation and prefer innovations with observable results.

*Organizational Characteristics.* Among organizational characteristics, firm size and location, and level of risk-taking were the variables which were found to be statistically significant in the overall logistic regression model ( $p$ -value  $< 0.05$ ). The most significant relationship was a positive correlation between level of risk-taking and the LOA. It was found to be significant in the overall model and for 4 out of 15 practices. This finding was consistent with findings from the literature (Rogers 1995). Firms that are more open to new ideas and changes are also more likely to adopt environmental management practices. In addition, this correlation also presents characteristics of early adopters who, as Rogers (1995) concludes, are often more dynamic and high risk-taking firms.

The relationship between firm size and LOA has been a controversial topic. In regard to adoption of sustainable tourism, Bramwell, Henry, Jackson, Prat, Richards, and van der Straaten (1996:11) note that small firms "generally lack the resources to keep them abreast of developments and act individually on issues such as sustainability." However, Dewhurst and Thomas (2003) find that small hotels have a stronger sense of attachment to the area where their business is located, and, for that reason, are more concerned about the quality of the environment than pursuing profit maximization.



The results of this study show a complicated relationship between LOA and firm size. Several correlations were significant, but some were positive, some negative, and some quadratic. For example, the adoption of practice 14 (local people are employed in some aspects of the hotel with a fair wage) was negatively correlated with the LOA, indicating small firms favor this practice. Smaller hotels often offer fewer services which require less staff training. Therefore, one reason that it is easier for smaller hotels to employ local people is that they can hire local people without an intensive investment in staff training programs. Another negative correlation, but in quadratic form, was found for practice 4 (hotel building designs are compatible with the landscape): both small and large firms did not favor this practice in comparison to medium-size firms. A possible explanation is that it is more difficult to design a very small or a very large hotel to be compatible with the landscape. The results show that the relationship between firm size and LOA among hotels in Vietnam should not be demonstrated as a linear correlation. Rather, this relationship varies depending on the type of innovation. Therefore, it would be more appropriate to address what types of innovation small or large firms are in favor of, rather than how many innovations they would be likely to adopt.

Firm location and “greenness level” also exhibited complicated relationships with LOA. Individual correlation analyses suggest that firm location has a negative correlation with LOA in 5 of 15 practices. The negative correlation indicates that firms which are located in natural resource areas are less likely to adopt environmental management practices. This result contradicts findings in the literature that suggest firms located in close proximity to natural areas are more likely to “go green” because they are more conscious about their business impacts on the natural environment (Dewhurst and Thomas 2003). Natural resource areas in Vietnam are often also rural areas. The tourism firms in these areas may be less likely to adopt environmentally sustainable practices because they lack certain resources or information, rather than because they are ignorant of business impacts on the environment. While the data from this survey were insufficient to explain this relationship fully, the negative correlations suggest that firms located in natural resource areas may have some special barriers that need to be studied further.

No correlation was found between “greenness level” or attitude toward EFPs, and LOA of most practices (at  $\alpha = 0.05$ ). However, LOA of practice 3 (automatic run-off taps are utilized in the hotel to save water) and practice 6 (pathways, corridors, and external areas are lit by movement sensor switchers with light off most of the time,  $\alpha = 0.01$ ) were negatively correlated with greenness at  $\alpha = 0.1$ . Even though these relationships were not statistically significant, the potential negative correlation requires some attention. Researchers tend to agree that the relationship between “greenness level” and the likelihood of adopting environmentally sustainable practices is one of the most complex relationships and difficult to interpret (Dewhurst and Thomas 2003; Horobin and Long 1996; Liu 2003). Schwepker and Cornwell (1991) reviewed 17 studies from 1972 to 1991 concerning the relationship

between consumer attitudes towards the environment and their intentions to purchase environmentally sound products. The common finding was that attitude toward the environment, or the “greenness level” itself, was not sufficient to explain willingness to pay or intention to adopt. Rather, this relationship needs to be studied in consideration of other factors, such as the available resources and level of information that the potential adopters can obtain. For example, in this study saving energy and water can be easily interpreted as a cost-saving action rather than a “green” action. Because the relationship between “greenness level” and LOA in this study was very weak, it was inappropriate to make a general conclusion. However, further investigation of the practices in which greenness may be negatively correlated with the LOA may help to explain this unusual relationship.

*External Environment Characteristic.* Perceived competition, or level of perceived industry rivalry, was found to be most significantly correlated with the LOA in this study. In some situations (the overall model, practice 2, practice 3, and practice 7), the level of perceived competition in the tourism industry was positively correlated with the LOA. This finding confirms the theoretical proposition that firms perceiving a higher level of competition would be more proactive in adopting EFPs in order to sustain their competitive advantages (Veliyath and Fitzgerald 2000). In addition, in various studies, researchers found that “going green” has become a common practice to gain competitive advantage in highly competitive environments (Appiah-Adu and Singh 1998; Hurlley and Hult 1998; Rangel 2000). However, a negative correlation in quadratic form was found significant in the case of practice 13 (the company actively provides physical, financial or in-kind assistance for the rehabilitation of areas subject to negative visitor impact). A possible explanation for this finding was that the practice requires some form of direct financial support for conservation. In a less competitive environment, the firms may not see the advantages of direct contribution to preserving tourism resources. However, in more competitive environments, firms may be more cautious in allocating financial resources to purposes beyond their normal operations.

Perceived customer certainty was another external environment characteristic that was positively correlated with the LOA, although the relationship was very weak. It confirms the hypothesized relationship that firms with a better understanding of their customer demands toward sustainable tourism would be more likely to adopt sustainable tourism innovations. However, one negative correlation found (practice 14) may also indicate that accommodation businesses in Vietnam were willing to be proactive and create sustainable products prior to market needs. Perceived government certainty was the only external factor that was not found to be significantly correlated with the LOA (at a confidence level of 0.05). This was a particularly interesting finding since Vietnam has just transitioned from a top-down, state controlled, economic management system to a market-oriented economy. With this change, it was hypothesized that the firms will be more sensitive to changes in government’s policies.

## CONCLUSION

Vietnam is in the early stage of introducing EFPs to the tourism industry, and the results of this study were consistent with Rogers' (1995) conclusion about the characteristics of firms' behaviors. Innovation characteristics, especially complexity, play the most important role in the decision of hotel businesses to adopt environmental management practices. Strong correlations of observability and risk-taking with the LOA also emphasize firms' skeptical attitude toward adopting EFPs at this early stage of diffusion. Rogers also pointed out that, at the early stage of diffusion, firms often lack information about benefits of innovations, making the correlation between innovation relative advantage and LOA less explicit. For example, one of the most common benefits of hotels adopting EFPs mentioned in literature is strengthening firms' marketing image (Kotler, John and Makens 2003). In a more established environment such as the Costa Rican Sustainable Tourism program, strengthening hotels' marketing image and thus gaining competitive advantage was found to be the most important motivation for firms' voluntary participation in an environmental protection program (Rangel 2000). However, the correlation between strengthening firm image and LOA was not significant in case of Vietnamese hotels in this study, which may be the result of a lack of information.

In addition, other factors such as social pressures to adopt EFPs had a weak influence on firms' decisions to adopt EFPs. While perceived competition and customer demands had a certain pressure on LOA, perceived changes in government policies were not significantly correlated with the firm's decisions. As numerous decrees, regulations, and policies from the Vietnamese government have been promulgated in recent years, the state shows its strong support for environmental protection and sustainable development. Perhaps Vietnamese hotels sense a strong commitment from the government in encouraging them to adopt EFPs, which may explain the nonsignificant relationship between perceived certainty about government policy and LOA. Another plausible explanation was that at the early stage of adopting innovations, firms have not yet sensed a strong social pressure to adopt EFPs. Again, in the case of a more established sustainable tourism environment such as Costa Rica, institutional pressure was found to be an important factor in a firm's decision to comply and overcomply with sustainable tourism standards (Rivera 2002, 2004).

This study falls into a category of innovation research which views hotels' intention to adopt EFPs as having an "organic" and "static" status, with the adoption/rejection decision occurring at the time of study (Wolfe 1994). In reality, decisionmaking is often a process itself (Ravichandran 1999). A hotel may decide to reject an innovation at the time of study but will adopt it later on if its benefits become more explicit. In contrast, a hotel may also adopt an innovation, but later reject it, if its disadvantages become apparent to the business. Another weakness identified in hindsight was that open-ended questions were not included as a follow up to closed-ended items. Therefore, some relationships, such as the negative correlation between greenness level

and adoption intention cannot be fully explored. A qualitative study to further explore the nature of the relationships identified, or a follow-up study that examines firms' decisionmaking processes, would be helpful in providing more complete insights into the adoption intentions of tourism hotels and businesses.

Despite these limitations, this study was one of the few, if not the first, attempts to explore Vietnamese tourism business perceptions toward adopting environmental management practices. It provides some preliminary insights into the barriers and advantages that tourism firms face when deciding on whether or not to adopt sustainable tourism practices. The findings offer clues for promoting sustainable tourism practices in Vietnam. For example, at this early stage of diffusion, information about innovations is crucial to a firm's decision. VNAT can promote EFPs by providing information to hotels. A good starting point would be to develop a set of codified standards for EFPs. In addition, VNAT can also encourage or sponsor several hotels of different sizes to develop models of environmentally friendly businesses. These businesses can then be used as examples for other firms to observe. Ability to observe, as found in this study, will reduce perception of adopting EFPs as risk-taking action and thus promote more businesses to adopt them. **A**

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