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Issues in the Design of a Green Certification Program for Tourism

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Introduction

Tourism is an important economic sector in the Central American region and a key component of the regional strategy for competitiveness and sustainability. In 1998 (the last year for which economic and tourism statistics are available), tourism receipts in Central America represented 4 percent of regional GDP, having grown at an annual rate of 12 percent during the period of 1990–98, relative to a worldwide average of 8 percent (World Tourism Organization 2000; Economic Commission for Latin American and the Caribbean 1999). The relative economic contribution of tourism varies across the countries in the region and is greatest in Costa Rica, Panama, and Belize, and least in El Salvador.[1] International tourism is expected to produce US$621 billion worldwide by the year 2000 and to continue growing at an annual rate of 3 percent over the next decade (World Tourism Organization 2000). Central America expects the importance of tourism in its economies to continue and to represent a source of economic growth. In particular, the region is well positioned to take advantage of two new trends in tourism preferences, ecotourism and "green consumer" tourism. While ecotourism,[2] cultural tourism,

1. The shares of tourism receipts of total GDP within the region in 1998 were as follows: Costa Rica, 9 percent; Panama, 6 percent; Honduras, 4 percent; Guatemala 2 percent; Nicaragua, 4 percent; and El Salvador, 1.1 percent.

2. Ecotourism is an all-encompassing concept covering tourism demand for the visit of unmanaged natural landscapes, fauna and flora in its unspoiled native environment, live culture and spectacular natural phenomenon (volcanoes, animal nesting or migration, etc.)

and soft adventure tourism still only account for 5 percent of the total market, they are growing at a rate of 25–30 percent a year as compared with 2–4 percent for traditional "sun and sand" tourism (Lizano 1997; Inman et al. 1998). As discussed in the prior chapters on tourism, Central America has an abundant supply of tourism opportunities for such travel, including coral reefs, rain and cloud forests, wildlife, and Spanish colonial and indigenous cultural resources.

Further, the region is developing a new policy initiative to take advantage of the trend for "green consumer" niches in retail markets, in which consumers base purchasing decisions in part on perceived environmental impacts (Cook 1993; Ayala 1996; Kretchman and Eagles 1990; Eagles 1992). Costa Rica has designed and is currently implementing the Certificate of Sustainable Tourism (CST) program, a voluntary third-party certification system to verify application of sustainable tourism principles. The other Central American countries are planning to adopt the program.

The purpose of this paper is twofold: to consider the means by which a certification program can be most cost-effectively regionalized, and to evaluate whether voluntary participation by hotels can be expected to be widespread. For the first task we use a simple financial simulation model that compares a regional program to a decentralized country-specific model. We find that there may be significant cost savings associated with a relatively centralized certification program. For the second task, we perform regression analysis to understand what sorts of hotels have volunteered to participate in the CST program in Costa Rica. This analysis should suggest whether countries can hope to have broad participation in a hotel certification program, and whether certification can be used to change the behavior of the hotel industry. While we are limited by a small sample size, our results preliminarily suggest that a certification program may be a valuable tool for governments interested in promoting sustainable growth.

The twin program goals are to enhance tourism demand by attracting the "green tourist" market segment and to protect the fragile resources that provide the base for ecotourism by promoting sustainable management. On the demand side, one critical factor is to educate consumers about sustainability: a recent OECD study found that environmental labels can stimulate latent consumer concern in a number of product categories (OECD 1991). Another key is to promote the credibility of "green" product claims, and thereby to avoid public skepticism and distrust associated with unsubstantiated claims (Blamey et al. 1998; Carlson et al 1996; Kangun et al 1991; Simmons 1995; and Thomas 1989).

On the supply side, damage to or destruction of the resources themselves would reduce the competitive potential of the region. If potential customers

perceive that the countries are not making serious efforts to protect the natural environment, this perception potentially could reduce the marketability of the region to the fastest-growing and most affluent segment of the tourism market. By achieving the twin goals of creating demand and protecting supply, the aim is to improve the long-run competitiveness of the tourism industry.

The Instituto Costarricense de Turismo (ICT) developed the CST program and has underwritten program creation and implementation to date. Because government capacity to continue funding the program is limited, the goal from the beginning has been to establish user fees at the end of a pilot stage. To be financially sustainable in the long run, the operating costs must be covered by the beneficiaries—the tourism sector and their customers.

In the next section of the chapter, we provide an overview of the strategic issues in the design of the Certificate for Sustainable Tourism (CST) program, both to achieve financial self-sustainability and, more broadly, to achieve program goals of enhancing tourist demand and protecting the resource base. The discussion provides a context for the empirical analysis of the first stage of implementation, reported in the remainder of the paper. The program is being presented to potential customers for the first time in the 2000 season, so we do not have a full picture of the market response. However we have compiled a unique hotel-level data set with which to analyze who are the "early adopters" of the program and what factors are associated with variations in performance ratings among them. In another section we present the model, develop the hypotheses, and test them. We then discuss the sample and present the empirical results. Finally, we summarize the findings and discuss their implications.

Overview of Strategic Issues in CST Program Design

As stated above, the twin program goals are to improve environmental and social performance and sector competitiveness. Critical goals in program design, therefore, are to stimulate consumer demand for the certified good and to minimize the price increase of the certified good relative to the noncertified good. On the demand side, key factors in designing a successful voluntary certification program are (1) certifying attributes of value to consumers and (2) establishing the visibility and credibility of the program among tour wholesalers (who arrange close to 50 percent of all trips to Costa Rica) and individual tourists. On the supply side, the concerns are establishing the most cost-effective compliance standards and certification process.

In this section we discuss the strategic choices the program has made to address these key factors and identify future challenges in moving from the pilot stage to a mature, self-supporting program.

Defining Sustainability Criteria

The CST evaluation is intended to reflect a concept of sustainability that encompasses community economic development and cultural preservation as well as environmental management concerns. Analogous to the complementary star evaluation system, in which ratings of from one to five stars indicate hotel quality and service levels, the summary CST rating ranges from 1 to 5 green leaves, indicating hotel sustainability levels. The standard evaluates criteria in four areas: physical-biological environment (PBE), hotel facilities (HF), customer relations (CR), and socioeconomic environment (SEE). Table 12-1 summarizes the major elements of each of the categories.

Table 12-1. CST Categories

Subcategories (maximum points)	*Explanation (items with the greatest weight (3), are so marked)*
Physical-biological environment (maximum points = 46)	
PBE1. Policies and programs (6)	Monitors environmental impacts of hotel, designates specific actions to address impacts, participates in organizations to improve environment in region, country
PBE2. Emission and wastes (16)	Monitors waste water, waste water treatment plant (3), water certified by Ministry of Health, reuse water, manage rainwater, Blue Flag (3), report pollution to government
PBE3. Landscaping (7)	Native plants, provide information on plants, no pesticides, fertilizers, herbicides
PBE4. Natural areas (10)	Promotes visitation to natural areas, owns a protected area, supports maintenance of private or public protected areas (3)
PBE5. Protection of flora and fauna (7)	Implements policies to prohibit extraction of native plants, prevents commerce of plants/animals forbidden by law, does not maintain wild animals in captivity, designs lighting, noise to not harm animals
Hotel facilities (maximum points = 107)	
HF6. Management policies (6)	Has a sustainability policy, keeps record of actions to achieve it, provides information about policy to employees, others
HF7. Water consumption (19)	Monitored, has conservation plan with specific goals, water leakage monitored, leaky faucets repaired, water quality monitored by independent lab every 2 months (3), swimming pool water managed with chlorine-free process, monitored periodically (3)
HF8. Energy consumption (27)	Monitored, has conservation plan with specific goals, energy efficient technologies employed, alternative energy systems (solar) used for lighting (3), for heating (3)

Table 12-1. Continued

Subcategories (maximum points)	*Explanation (items with the greatest weight (3), are so marked)*
HF9. Purchasing practices: (7) • Food & beverage (13) • Cleaning supplies (8) [total = 28]	Has buyers policy, employees aware of it; 50% paper chlorine free • fresh, certified organic (3), local/national dishes, do recycling, re-use of containers • non-toxic, bio-degradable, non-corrosive cleaning products, containers reused/recycled
HF10. Solid waste management (4) • Organic (3) • Inorganic (8) • Final disposal (3) [total = 18]	Monitoring system, by room or region; has plan with specific goals; someone is responsible • deposited separately, composted or recycled • has separate container by type of waste, recycles (3) • stored appropriately, verifies final disposal
HF11. Employee training (9)	Employees informed of sustainability goals, has training program, employees participate in development of goals
Customer relations (maximum points = 34)	
CR12. Communication and involvement (11)	Provides cultural, historical, environmental information about area, about ongoing activities; provides information on sustainable goals, on CST
CR13. Facilitating customer involvement (8)	Information and facilities to allow separation of solid wastes in room (3), allows guests to participate in water and energy conservation, program to promote non-daily washing of linens (3)
CR14. Respect for community and nature (7)	Encourages customers to visit protected areas, and to protect them; has tourist guides
CR15. Customer feedback measurement (8)	Collects and analyzes data about consumer response to CST; in relation to CST has provided some type of guarantee for customer (3)
Socioeconomic environment (maximum points = 59)	
SEE16. Benefits to local labor markets (12)	60% employees from local community (3), provides training, managers are Costa Rican, no illegal/below minimum wage hires, supports training for complete tourism activity.
SEE17. Benefits to local community activities (18)	Provides information about local activities, promotes local activities, promotes use of local products, sells handicrafts from local region (3), Costa Rican handicrafts used to decorate (3), relationship with a micro-enterprise (3), reduced rates for Costa Ricans
SEE18. Contributions to local cultural development (11)	Policy for promoting local projects use of their facilities; prohibits sex harassment, prostitution, drug dealing
SEE19. Contributions to public health (4)	Demand for water, electricity, roads does not compete with those of local communities; participates in preventive health programs; plagues are controlled with substances that are not harmful to people, environment, wildlife
SEE20. Community infrastructure & security (14)	Contributes to maintenance of local infrastructure (3), promotes security programs for tourists, has a code that provides security (3), natural disaster plan

To conduct a hotel evaluation, a multidisciplinary team completes an audit of the site to evaluate 153 yes/no questions designed to assess compliance with a specific practice. A weighted-percentage compliance score is calculated for each area by summing the scores to all questions, weighted by a factor from 1 to 3 reflecting the importance of the question, and dividing by the total possible score (excluding not-applicable questions). These percentages map into band ratings for each area as follows:

Band ratings	Percentage compliance
0	< 20%
1	20–39%
2	40–59%
3	60–79%
4	80–94%
5	> 94%

The ultimate rating of the hotel—its number of green leaves—is equal to its lowest band rating among the four areas. Since no ratings of 0 are awarded, the effective minimum requirement is to achieve at least a 20 percent compliance level in all categories, which is necessary to earn a 1-leaf rating.

Achieving Recognition as a Credible Program

Achieving a high level of recognition of the program among tour wholesalers and individual consumers is crucial to success. In addition to benefiting from inclusion in the annual advertising campaigns of the ICT, the program is planning to market the program to guide book authors and editors and to tourism wholesalers in the United States and Europe.

An image of credibility also is important to the success of a certification program. Like most developing nations, Central American countries lack well-developed national infrastructures for standard setting and accreditation. Credibility has been identified as a serious concern for hotel certification in the region; there are reports of companies offering certification to various international standards for a flat fee, "no inspection required" (Bien 1999).

To address credibility in the Costa Rican program, ICT chose to develop an independent, broad-based accreditation board to oversee the certification process.[3] The accreditation board is comprised of the Executive Director of

3. Accreditation is the process by which an authoritative body, in this case the independent CST Board, verifies that a certifier (currently ICT and its assessors) is competent to carry out its activities. Accreditation bodies set the criteria for evaluating competence using widely recognized international guidelines. In this case, the Costa Rican accreditation body is also custodian of the standards applied by the hotels and used by the assessors to evaluate compliance.

ICT and representatives of leading Costa Rica-based scientific and environmental organizations and academic institutions. For the initial pilot stage of the program, ICT chose to manage the certification program internally and allocated its own staff to conduct the evaluations. This approach was chosen to ensure credibility with hotel owners and to acquire experience with applying the criteria, in anticipation of training "third-party auditors" in the future.

Maintaining Cost-Competitiveness

ICT intends for CST compliance requirements to be straightforward, without the need for potentially costly trainers and consultants. Moreover, broad-based representation on the standards-setting board, including representation from the private sector, is intended to ensure that the cost-effectiveness of the requirements is taken into account in setting standards. During this pilot phase of CST program development, ICT has run the certification process without charging hotels a fee to participate in the program. In the long run, however, it is the government's intention that the program be self-supporting via a participation fee. Design of such a fee program will be important in determining whether the program remains viable.

Future Challenges

To achieve a mature, self-supporting program, the developers must adapt the organizational structure to privatize the certification process and establish user fees for the system, while at the same time affirming the independent accreditation process based on broad participation by civil society. The goal is a self-sustaining certification program that covers the assessment and administrative costs of certification and accreditation and makes a contribution to the marketing of the program. (From their annual tourism marketing budgets, national tourism agencies will contribute the remainder of the funds necessary to promote awareness and understanding of the program.)

Assessment by qualified assessors is the most significant element in program costs. At this stage, a critical challenge is to expand the program in order to achieve the necessary economies of scale in certification to keep the user fees down.[4] Complementary strategies currently under development include regionalizing the program to Central America and expanding to other segments of the tourism sector, including tour operators, transportation services, and possibly restaurants. ICT has decided that regionalization may be of potentially higher importance than expansion of the CST program beyond

4. Toth 1998.

the hotel sector. Regionalization provides greater opportunity for expanding the demand for certification services and—perhaps more important—brings the added advantages of exposing a larger pool of tourists to CST, generating demand-side spillovers.

Taking the regionalization priority as given, in this chapter we construct a simple financial model to assess under what circumstances, if any, either of two alternative models for regionalization of the hotel segment of CST could reasonably be expected to be self-sustaining.[5] The analysis assumes that six countries will be involved in the program: Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama. In both models, the accreditation board for the certification program(s) would be a regional entity with broad-based multisectoral participation. However, in the centralized model, a regional certification program office would be located at one site; each country participating under the CST umbrella would have a small, independent CST "national board" that provides local input into the standard-making process and periodically provides oversight and monitoring of certifications given in the country. The alternative organizational structure is one of having separate certification programs in each of the six countries, with all certification functions conducted at a national level in each country.

Table 12-2 summarizes the various inputs to the financial model. Variables included in the analysis are:

- number of registered hotel rooms in each country in 1999, the base year (with some adjustments as explained in Table 12-2);
- projected annual rate of increase in hotel rooms in each country (based on historic rates of increase);
- projected level of participation of the program over a five-year time horizon, with all countries achieving the steady state participation rate of 50 percent participation rate by 2005[6];
- an average "contribution margin" of $15 per hotel room per year, representing a user fee of $25 per room, net of average costs of $10 per room;
- estimated annual costs of maintaining the centralized certification program ($177,000) or the individual national certification programs ($301,000); and
- a marketing budget of $135,000 per year, roughly equal to 4.5 percent of revenues for the program at full scale.

5. Details of the simulation are available from the authors.

6. See Bien (1999). CST program managers provided the participation projections, based on country interviews and the experience in Costa Rica. The assumptions are demonstrably conservative for Costa Rica. As of May 1999, 5508 hotel rooms were enrolled, representing 31 percent of total rooms—the target for the year 2000. Eleven months later hotel enrollment had increased 54 percent, bringing room enrollments to over 40 percent of the total—the target for the year 2002.

Table 12-2. Inputs Used to Construct CST Financial Model

	Guatemala	*El Salvador*	*Honduras*	*Nicaragua*	*Costa Rica*	*Panama*
Total number of hotel rooms	15,104	4,517	12,637	2,556	17,659	13,032
Annual growth rate (%) in # of rooms (1996–2000)						
1996–2000	7	8	6	9	7	8
2001	7	8	6	9	7	8
2002	7	6	6	7	7	6
2003	6	6	5	7	6	6
2004	6	5	5	6	6	5
2005 and beyond	3	3	3	3	3	3
Variability in values introduced	± 25%	± 25%	± 25%%	± 25%	± 25%	± 25%
Participation rate (percentage of rooms participating)						
2000	25	20	15	15	30	20
2001	30	25	20	20	35	25
2002	35	30	25	25	40	30
2003	40	35	30	30	45	35
2004	45	40	35	35	50	40
2005 and beyond	50	50	50	50	50	50
Variability in values introduced	± 25%	± 25%	± 25%	± 25%	± 25%	± 25%

Marketing Budget (Annual)		
International	$100,000	$135,000 in first year
Within Central American countries	$ 35,000	$ 50,000 in first year
Contribution Margin		
Average revenue per room evaluated	$ 25	
(Average cost per room evaluated)	($ 10)	
Average contribution margin	$ 15	
Administrative Costs		
Centralized Model	$177,000	
Decentralized model (6 offices)	$301,000	

*Basic data are the number of rooms reported to the World Tourism Organization by all the tourism agencies of each of the countries during the 1996/99 period. Not all hotels are registered with the tourism agencies. However, Honduras and El Salvador each conducted a tourism census during 1999 that is reflected in their numbers, and Guatemala and Nicaragua claim to have registered more than 80% of the total population, so we use the official data for these four countries. Because Costa Rica and Panama estimate they have registered only 51% and 65% of their total population of hotel rooms, respectively, we made adjustments to include nonregistered hotels. For Costa Rica, the number represents all rooms in 347 hotels registered with ICT, the tourism agency, plus a conservative estimate of 25% of the remainder of the hotel rooms in the country. This adjustment is consistent with assuming that 64% of the hotel rooms in non-registered hotels meeting the size limit for registered hotels (10 rooms) are candidates for participation, (and none of the other hotels); this adjustment increases the number of hotel rooms by 25%. For Panama, potential CST participants include all registered hotels, and 25% of the unregistered hotels; this adjustment increases the number of hotel rooms by 14%.

Based on the inputs to the model, expected costs and revenues were projected into the future and discounted at 10 percent per year. Potential variability was introduced into the model, from which a probability analysis was constructed.

Table 12-3 presents the central estimates of net present value, based on the probabilistic analysis. These results suggest that a centralized program model may stand a better chance of covering administrative costs without external subsidies and of contributing to the CST marketing budget. The program may require loans or other up-front financing in the early years of the program, due to a relatively large marketing budget and the phased-in entry of hotels into the program.

On the other hand, under the decentralized model, the program may be able to operate only with significant cross-subsidies from Guatemala and Costa Rica to the other countries and stands a relatively poor chance of success in contributing funding to the marketing budget. Because it is relatively expensive to run a separate full-scale certification program in each country, some countries may not have enough hotel rooms to generate program revenues to cover administrative costs.

Table 12-3. Results of Financial Simulation of Alternative Models for Creating a Central American CST Program

Central estimates of net present value, based on probabilistic analysis	
Centralized Model	
NPV of first 5 years of operation, not including international promotion costs:	$ 437,746
NPV of international promotion—first 5 years	(410,897)
NPV of net operating revenues and international promotion costs for remainder of 20-year period	956,291
NPV of Total Value—25 years	**$ 981,140**
Decentralized Model	
NPV for 5 years of operation, not including international promotion costs, by country:	
Costa Rica	$ 240,855
El Salvador	101,820)
Guatemala	103,091
Honduras	(22,994)
Nicaragua	(143,257)
Panama	59,759
Subtotal—Regional NPV of operations—first 5 years	$ 135,634
NPV of International Promotion—first 5 years	(410,897)
NPV of net operating revenues and international promotion costs for remainder of 20-year period	736,841
NPV of Total Value—25 years	**$ 488,578**

Model and Hypotheses Regarding CST Enrollment and Performance

We have compiled a unique hotel-level data set consisting primarily of all hotels registered with ICT, which will allow us to analyze the characteristics of the "early adopters" of CST, and the determinants of their performance ratings. The results will provide us with indicators of the breadth of appeal within the hotel sector at the early stages of the program. This analysis allows us to assess the usefulness of a green certification program as a means of influencing the environmental behavior of hotels in Central America. Before presenting our model and hypotheses, we first summarize some relevant literature.

Literature Review

We are not aware of any empirical study examining the determinants of participation and performance in green certification programs. However, Lyon and Maxwell (1999) recently completed a literature review of voluntary approaches to environmental regulation, which provides some interesting insights that may be relevant. In their framework, firms undertake voluntary environmental compliance actions if they perceive that such actions increase direct profitability, improve the firms' ability to preempt tighter regulations, aid in lobbying for weaker regulations, or attract favorable (or reduce unfavorable) publicity and therefore increase business. Firms also consider if they have sufficient financial resources and the technical know-how to accomplish program goals.

In their review of various studies, the likelihood of participation in voluntary programs was greater for larger firms, greater for firms with poor environmental records, and increasing in perceived levels of future government action and strength of community, environmental, and industry group pressure. In terms of firm response, the findings relating to the influence of green consumers on corporate decisions were not consistent. Specifically, the literature suggests that industries that supply directly to consumers were more likely to participate than those that supply intermediate goods; but which firms within the industries participate does not seem to be related to firm advertising-to-sales ratios. However, firms do appear to respond to penalties from investors for higher than expected levels of toxic emissions by improving environmental performance. (Arora and Cason 1995, 1996; Khanna and Damon 1998; Khanna, Quimio and Bojilova 1998; Konar and Cohen 1997a, 1997b; and Maxwell, Lyon, and Hackett 1998).

Model and Hypotheses

In our model we want to explain the determinants of hotel participation in the program and the determinants of observed hotel performance. Because ICT had not evaluated all of the enrolled hotels as of June 1999 (when ICT provided us with the data), we also model the ICT choice to evaluate enrolled hotels by that time. As a result, we construct a three-equation model, explaining (1) the hotel choice to enroll, (2) the ICT choice to evaluate the enrolled hotel by June 1999 (conditional upon enrollment), and (3) the CST performance levels (conditional upon enrollment and evaluation). We present the statistical model in an appendix to this chapter.

Hotel participation rates and investments to improve CST performance are expected to increase with the expected net benefits of certification (and good performance). Because the program has a multilevel rating scale, hotels can choose what level of compliance with the standards to aim for, so long as they achieve a 20 percent compliance level in all categories, the minimum requirement for receiving a rating of 1 leaf. One can think of a two-stage decision-making process. In the first stage, the firm evaluates the expected net benefits of different levels of compliance and identifies what compliance level(s) appear most financially advantageous. In the second stage, the firm decides whether the expected net benefits suggest it will be worthwhile to enroll in the program. We hypothesize that the performance of enrolled hotels (particularly in the first wave of enrollment) is significantly better than the performance in the full population of ICT-declared hotels. Our econometric model will allow us to correct for any sample selection bias that would result from the sample not being representative of the full ICT population so that we can extrapolate our results for enrolled hotels to the ICT population.

Net benefits depend upon the costs of achieving certification at a given performance level, as well as any associated increase in revenues. On the revenue side, the presence of a certification program can stimulate demand among green consumers willing to pay more for a hotel certified to be environmentally friendly. On the cost side, certain sustainability practices included in the CST certification may be cost-effective, independent of any positive consumer feedback from a certification program. Firms may have implemented some of the elements of the program prior to introduction of the certification program; alternatively, introduction of the program may have provided an impetus to overcome management inertia for many elements, including those that are apparently cost-effective even without the benefits of certification (Porter 1991; Porter and van der Linde 1995). On the other hand, to make the investment in other practices economical, the potential for increased revenues from certification may be necessary.

First, we outline predictions about how compliance levels will vary across the different categories of requirements, based on our assessment of average sectoral net benefits. Then based on the Lyons/Maxwell framework, we develop several hypotheses about the determinants of participation and performance to test in our analysis. Finally, we present hypotheses regarding the probability of ICT evaluation of a hotel within the specified time frame.

Expected Variations in Performance Levels across Subsets of Standards

Our predictions for the individual areas are as follows:

- In general, we expect *environmental management measures* (monitoring performance measurement, registries, training and awareness) to perform the weakest, and to be the last to improve since there is limited opportunity for quick fixes. Elements of environmental management measures appear in performance factors PBE1,2 and HF 6,11.
- On the other hand, we expect that all hotels will be interested in improving in the areas of *solid waste management, energy consumption, and water consumption*, due to numerous cost-saving opportunities. This effect is predicted to show up in HF7, 8, 10 and PBE2.
- We predict hotels will have a hard time complying with the *general supplies purchasing-related items* due to difficulties in local supply (i.e., reusable containers, organic produce), though city hotels are least likely to have access difficulties (HF4).
- We predict compliance costs will tend to be low, and therefore compliance rates high, for information provision activities, such as promoting local activities and providing cultural, historical, and environmental information about the area (SEE17 and CR12).

Determinants of Participation and Performance Levels

(a) Demand factors:

1. *Market niche/location*: We divide hotels into three categories, based on their market niche linked to geographical location: city, beach, and natural area (with an emphasis on access to wildlife). We hypothesize that hotels closer to parks and wildlife areas will be more likely to attract customers who value the "green" certification than city or beach hotels.

   We hypothesize that this effect is most associated with sub-factors PBE (particularly, PBE4, promote visitation, and PBE5, protect flora and fauna) and CR (CR12, provide cultural, historical, and environmental information about the area; and CR14, encourage customers to visit and protect protected areas). (See Table 12-1 for a more complete description of the sub-elements of each set of requirements.)

2. *Hotel quality*: We hypothesize that leisure travelers willing to pay higher prices for higher service levels are more likely to value the green certification. The proxies for this effect are number of stars (reflecting hotel service levels) and price for a standard double room.

(b) Supply-side factors:

1. *Economies of scale*: We hypothesize that larger hotels will achieve greater cost savings than smaller hotels; further, larger hotels are less likely to have capital constraints for making improvements and more likely to have the technical expertise to manage the improvements.

   Our proxy for scale is the number of hotel rooms. Unfortunately we do not have a measure for the scale of total hotel operations in Costa Rica, or a better proxy for access to financial capital (though stars may in fact be picking up some of that effect).
2. *Market niche/location*: We hypothesize that city hotels will have greater access to information, technical expertise, and the necessary inputs to implement the program.

   We hypothesize that the effect of greater access will be particularly salient for performance on sub-factor HF.

Determinants of ICT Prioritization of Hotels to Evaluate

ICT describes its process for selecting hotels for evaluation (after they have registered for the program) as first-come first-served, with adjustments for the geographical distribution of hotels to achieve transportation economies in scheduling inspections. We proxy this effect with a variable measuring enrollment order. In addition, the hotels located in urban areas (primarily San Jose, where ICT is located) are more accessible to ICT assessors. Finally, we want to test to see whether, controlling for enrollment order and location, ICT has a selection bias that favors hotels based on quality (as proxied by room price and number of stars) or size characteristics.

Sample and Descriptive Statistics

Characterizing the Sample

The basic hotel population in the analysis is the set of 347 hotels that are "declared" to ICT. To achieve ICT status, hotels must have 20 or more rooms (and lodges must have 10 or more rooms) and must demonstrate compliance with minimum legal, economic, and construction standards. We have data on characteristics for 100 percent of the ICT hotels. In addition, our sample in-

cludes 26 hotels enrolled in the CST program as of June 1999 that are not ICT-declared.

Given the sample, the analysis essentially will address the question of the determinants of participation and of CST performance within the population of ICT-registered hotels. The question arises as to the wider applicability of the results to the total pool of hotels likely to consider participation in CST.

ICT members tend to be larger hotels due both to explicit size-based eligibility requirements and to the scale economies in generating positive net benefits from participation.[7] Based on discussions with program officials, we believe that the hotels (and hotel rooms) participating in CST will be drawn substantially from the hotels and lodges meeting the size thresholds for ICT declarations. This group is estimated to represent only 31 percent of all hotels, but 70–80 percent of all hotel rooms.[8] The question then becomes, is the behavior of our sample of primarily ICT hotels also representative of the non-ICT hotels of the same size class? According to the Costa Rican Treasury Department estimates regarding the size distribution of the non-ICT portion of the population, about two-thirds of the eligible hotels join the ICT. We have in our sample 100 percent of the 347 ICT hotels and, 11 percent of the estimated 217 non-ICT hotels in the same size class.

Current enrollment rates diverge between the two groups at this point, at 26 percent for ICT hotels and 11 percent (24/217) inferred for non-ICT hotels meeting the ICT size threshold. The 0.2 percent (2/1234) participation rate inferred for smaller non-ICT hotels is very small, consistent with our operating hypothesis that the participation rate will be low in that group.

Differences in enrollment rates between the ICT and non-ICT larger hotels may be due in part to greater access to information about the ICT-run program among ICT hotels. This effect would tend to lessen as CST marketing becomes more broadly diffused. Another contributor to the difference could be different distributions of characteristics. Among the group of CST-enrolled hotels, the ICT subset on average had significantly higher room prices and numbers of rooms relative to the non-ICT subset. Both of these variables are positively associated with participation, as we see below. The two groups have similar patterns for tourist segments targeted by hotels, though the

7. Though ICT hotels represent only 19 percent of total hotels, as a result of the selectivity toward larger hotels, they represent 51 percent of estimated total hotel rooms. (Interviews with Treasury Department officials).

8. Treasury Department records (based on the requirement that all hotels must pay a 3 percent sales tax on room revenues) indicate that the overall universe of hotels in Costa Rica is 1798 hotels. Best estimates from Treasury officials are that approximately 15 percent of the 1,451 non-ICT hotels (or 217 hotels) meet those thresholds, and that the combined set of hotels meeting these size thresholds represents 70–80 percent of all rooms.

non-ICT hotel pattern was more positively associated with participation.[9] Interestingly, CST performance was not statistically significant between the ICT and non-ICT group, for any performance measure.[10]

Descriptive Statistics

Of the total sample of 373 hotels, 115 have enrolled in the program as of June 1999. Among the 115 enrolled hotels, we have hotel performance data for the sub-set of enrollees that ICT has evaluated to date ($N=49$). Table 12-4 presents variable definitions. With Table 12-5, we can examine the differences in the total sample by current enrollment status, and in the sub-sample of enrollees, by current evaluation status. Comparing those enrolled in CST (column 3) to those not enrolled in CST (column 2), we see that CST hotels tend to have more stars, more rooms, and higher prices. Also, they tend to target customers visiting natural areas, relative to hotels that have chosen not to enroll as of June 1999.

Within the set of enrolled hotels, the differences between those that have been evaluated (column 5) and those that have not been evaluated (column 4) do not appear to be substantial. Three major exceptions are that (1) ICT-declared hotels are much more likely to have been evaluated: 49 percent (44/89) of the ICT hotels have been evaluated, relative to 19 percent (5/26) of the non-ICT ones; (2) hotels that enrolled earlier are more likely to have been evaluated; and (3) city hotels are more likely to have been evaluated than beach or natural area hotels.

Table 12-6 reports descriptive statistics on the ratings variables for the 49 evaluated hotels. The variable BAND indicates the number of green leaves the hotel was awarded. For the first round of evaluation, 8 percent of evaluated hotels received an overall rating of 0 green leaves, 45 percent received 1 leaf, 37 percent received 2 green leaves, and 10 percent received 3 green leaves (panel 6A). All were offered the opportunity to make improvements and to be reevaluated within a 90-day period. Twenty-three hotels initially indicated they were interested in being reevaluated; in the end, 17 hotels requested that ICT conduct a reevaluation. Of the four individual areas, performance is best for the socioeconomic environment requirements (SEE), with a 69 percent average compliance rate, and worst for the Hotel Facilities area (HF), with a 53 percent

9. For both groups, the share of hotels targeting tourists visiting natural areas is close to 50 percent; otherwise, ICT hotels in the CST program are somewhat more likely to target city clienteles, and less likely to target beach clienteles than the non-ICT hotels in CST. As we see below, targeting city is more negatively associated with participation than targeting beach clienteles relative to the nature-oriented clienteles.

10. A table summarizing the data from this discussion is available from the authors.

Table 12-4. Variable Definitions for Data Analysis

Variable name	*Description*
PBE, PBE-R	Weighted-percent compliance for Physical-Biological Environment factors; initial and revised ([-R], where the hotel has requested a second evaluation–see section 3.3.2)
HF, HF-R	Weighted-percent compliance for Hotel Facilities factors, initial and revised [-R]
CR, CR-R	Weighted-percent compliance for Customer Relations factors, initial and revised [-R]
SEE, SEE-R	Weighted-percent compliance for Socio-Economic Environment factors, initial and revised [-R]
BAND-PBE(-R), BAND-HF(-R), BAND-CR(-R), BAND-SEE(-R)	BAND versions of the weighted percent compliance variables (initial and revised [-R]) are calculated as follows: (0–19% = 0; 20–39% = 1, 40–59% = 2; 60–79% = 3; 80–94% = 4; 95% + = 5)
BAND, BAND-R	Overall rating, in 0–5 green leaves, initial and revised [-R] = minimum value of BAND-PBE, BAND-HF, BAND-CR, BAND-SEE (initial and revised)
ENROLLED	= 1 if hotel enrolled in CST; = 0 else
EVALUATED	= 1 if hotel has received CST evaluation; = 0 else
BEACH	= 1 if Beach hotel; = 0 else
CITY	= 1 if City hotel; = 0 else
NATURE	= 1 if Natural area hotel; = 0 else (excluded categ.)
STARC	Stars (continuous)
MISSSTAR	= 1 if "Stars" is missing; = 0 else (all non-ICT hotels plus ICT hotels undergoing re-evaluation)
STAR01	= 1 if Hotel with 0 or 1 Stars; = 0 else
STAR3	= 1 if Hotel with 3 Stars; = 0 else excluded categ.)
STAR45	= 1 if Hotel with 4 or 5 Stars; = 0 else
PRICENOPK	Price- double room (not a package); continuous, except = 0 when missing
PRICECPK	Price of package (only used when no regular room price is available); continuous, except = 0 when have data for PRICENOPK
PRICE25	= 1 if PRICENOPK ≤ $25; = 0 else
PRICE50	= 1 if $25 < PRICENOPK ≤ $50; = 0 else
PRICEGT75	= 1 if PRICENOPK > 75; = 0 else
MISSPRICE	= 1 if PRICENOPK is missing; = 0 else
ROOMS	No. of Rooms (continuous)
ROOMS15	= 1 if ROOMS ≤ 15; = 0 else
ROOMS25	= 1 if 15 < ROOMS ≤ 25; = 0 else
ROOMS50	= 1 if 25 < ROOMS ≤ 50; = 0 else (excluded categ.)
ROOMSGT50	= 1 if ROOMS > 50; = 0 else
ENROLLORD	Order of enrollment in CST program, continuous from 1–115

average compliance rate (panel 6C). These statistics are based on the final versions of the ratings, revised after some of the hotels were reevaluated. As predicted above, the poorest performance among the sub-categories within the areas was registered for environmental monitoring systems (HF6, PBE1) and employee training (HF11). However, contrary to predictions, we do not observe better-than-average performance on the environmental management objectives pertaining to water, energy, and solid waste management (HF7, 8,

Table 12-5. Hotel Characteristics by CST Status

	1	*2*	*3*	*4*	*5*
		Total Sample (N = 373)		*In CST (N = 115)*	
Variable	*Total sample*	*Not in CST*	*In CST*	*Not evaluated*	*Evaluated*
N	373	258	115	66	49
%	100%	69%	31%	57%	43%
ICT status					
ICT	93%	69%	24%	51%	49%
Not-ICT	7%	0%	7%	81%	19%
Stars—ICT hotels only					
mean (sd)	2.5 (1.8)	2.4(2.0)	2.9 (1.1)	2.7 (1.3)	3.1 (0.9)
N	347	258	89	45	44
0 Star	10.7%	13.2%	3.4%	6.7%	0%
1 Star	17.9%	21.7%	6.7%	8.9%	4.5%
2 Star	20.7%	20.9%	20.2%	20%	20.5%
3 Star	32.6%	29.8%	40.4%	40%	40.9%
4 Star	11.8%	7.8%	23.6%	17.8%	29.5%
5 Star	2.6%	1.6%	5.6%	6.7%	4.5%
Missing—ICT hotels	3.7%	5%	0%	0%	0%
Total	100%	100%	100%	100%	100%
prob		0.00		0.28	
Rooms					
mean (sd)	38.4 (51.2)	34.1 (43.8)	47.9 (64.2)	44.4 (68.8)	52.7 (58.0)
N	373	258	115	66	49
prob		0.016		0.49	
Price ($)—not package					
mean (sd)	59.5 (36.9)	56.2 (37.3)	67.5 (34.8)	61.3 (34.8)	75.3 (34.8)
N	348	246	102	57	45
prob		0.0096		0.043	
Price ($)—package					
mean (sd)	170 (217)	245 (298)	108.4 (94.5)	130.3 (103.6)	50 (6.2)
N	20	9	11	8	3
prob		0.17		0.23	
Tourist segment					
City	32.3%	37.2%	20.9%	13.6%	30.6%
Beach	33%	33.7%	31.3%	34.8%	26.5%
Natural Areas	34.9%	29.1%	47.8%	51.5%	42.9%
Total	100%	100%	100%	100%	100%
N	373	258	115	66	49
prob		0.00058		0.086	
Order of enrollment					
mean (sd)			58 (33.3)	72.9 (30.5)	37.9 (25.8)
N			115	66	49
prob				0.000	

Note: prob are for X^2 tests that the data in the two columns are drawn from the same population.

Table 12-6. CST Performance Measures

A. Initial Evaluations

Weighted percent compliance measures:	*Mean*	*Standard Deviation*
Physical-Biological Environment (PBE)	57.1%	15.1
Hotel Facilities (HF)	49.0%	15.9
Customer Relations (CR)	50.6%	20.9
Socio-Economic Environment (SEE)	65.6%	18.0

Band ratings (Number of green leaves):

	Frequency distribution						
	0	*1*	*2*	*3*	*4*	*5*	*Mean*
BAND	8.2%	44.9%	36.7%	10.2%			1.5
BAND-PBE		14.3%	40.8%	34.7%	10.2%		2.4
BAND-HF		34.7%	42.9%	16.3%	6.1%		1.9
BAND-CR	6.1%	22.4%	38.8%	22.4%	6.1%	4.1%	2.1
BAND-SEE	2.0%	2.0%	34.7%	38.8%	20.4%	2.0%	2.8

B. Revised (Final) Evaluations (Reevaluated: N = 17, 35%)

Band ratings (Number of green leaves):

	0	*1*	*2*	*Mean*
No. Bands Increased for Reevaluated Hotels (N,%)	4, 2%	10, 6%	3, 2%	0.4

	Frequency distribution, by rating levels						
	0	*1*	*2*	*3*	*4*	*5*	*Mean*
BAND-R	2.0%	40.8%	32.7%	20.4%	4.1%	0.0%	1.8
BAND-PBE-R	10.2%	30.6%	42.9%	14.3%	2.0%	0.0%	2.7
BAND-HF-R	0.0%	28.6%	34.7%	26.5%	10.2%	0.0%	2.2
BAND-CR-R	2.0%	22.4%	32.7%	24.5%	12.2%	6.1%	2.4
BAND-SEE-R	0.0%	4.1%	28.6%	34.7%	28.6%	4.1%	3.0

and 10, respectively). It is possible that increased compliance due to anticipated cost savings on these elements will occur with a lag. The best performance in the hotel facilities category was for complying with the general supplies purchasing requirements (61 percent), which we had predicted would pose a problem due to availability constraints.

The highest compliance rates were for the following elements: protecting flora and fauna (PBE5), providing local labor market benefits (SEE16), promoting local activities (SEE17 and CR12) and contributing to local public health (SEE19). (See Table 12-1 for a more complete description of the categories.) Among these elements, we had predicted that the activities providing information (SEE17 and CR12) would be low-cost and therefore would have high compliance rates.

Table 12-6. Continued

C. Final Evaluations, by Detailed CST Category

	Weighted percent compliance measures	*Mean*	*Standard deviation*
PBE	**Physical-Biological Environment**	**61.18%**	**16.28**
PBE1	Policies and programs	41.4%	0.31
PBE2	Emission and wastes	56.3%	0.18
PBE3	Landscaping	52.9%	0.25
PBE4	Natural areas	52.1%	0.29
PBE5	Protection of flora and fauna	86.6%	0.20
HF	**Hotel Facilities (2)**	**52.78%**	**17.86**
HF6	Environmental management policies	25.3%	0.40
HF7	Water consumption	47.7%	0.25
HF8	Energy consumption	55.7%	0.20
HF9	Purchasing practices	61.3%	0.18
HF10	Solid waste management	52.8%	0.31
HF11	Employee training	25.0%	0.35
CR	**Customer Relations (3)**	**56.60%**	**22.33**
CR12	Communication and involvement	69.5%	0.26
CR13	Facilitating customer involvement	44.5%	0.35
CR14	Respect for community nature	50.3%	0.26
CR15	Customer feedback measurement	0.0%	*
SEE	**Socio-Economic Environment (4)**	**69.25%**	**17.99**
SEE16	Benefits to local labor markets	86.5%	0.19
SEE17	Benefits to local community activities	76.4%	0.18
SEE18	Contributions to local cultural development	59.1%	0.27
SEE19	Contributions to public health	70.7%	0.31
SEE20	Infrastructure and Security	50.8%	0.23

*This section did not apply to 92.3% of the evaluated

Results

Tables 12-7 and 12-8 present estimates of the full statistical model, which is outlined in the appendix. Table 12-7 reports the bivariate probit sample selection model of the determinants of (a) enrollment in CST and (b) CST evaluation, conditional upon enrollment. Employing a sample selection correction derived from the analysis in Table 12-7, Table 12-8 reports the determinants of CST performance, conditional upon enrollment and evaluation.

Table 12-7. *Bivariate Probit Model Estimating Determinants of Hotel Enrollment and ICT Evaluation*

Full information maximum likelihood estimates

	Enrolled	*Variable mean*	*Evaluated*	*Variable mean*
CONSTANT	−0.046		1.95	
	(0.20)		(0.83)	
ENROLLORD			−0.0303	58.00
			(0.0073)	
BEACH	−0.38	0.33	0.34	0.31
	(0.19)		(0.43)	
CITY	−0.84	0.32	1.07	0.21
	(0.21)		(0.62)	
STAR01	−1.18	0.30		
	(0.23)			
STAR2	−0.31	0.19		
	(0.22)			
STAR45	0.46	0.13		
	(0.24)			
MISSSTAR	1.36	0.10		
	(0.39)			
PRICECPK			−.0096	10.36
			(.014)	
PRIC25			−0.91	0.17
			(0.82)	
PRIC50			−0.98	0.27
			(0.51)	
PRICGT75			−0.36	0.22
			(0.45)	
MISSPRIC			−0.82	0.017
			(3.71)	
ROOMS15	−0.25	0.30	−0.86	0.21
	(0.24)		(0.61)	
ROOMS25	0.17	0.27	−0.035	0.29
	(0.22)		(0.41)	
ROOMSGT50	0.26	0.16	−0.54	0.22
	(0.27)		(0.54)	
N			373	
Iterations completed			32	
Log L			−227.55	
ρ_{12} [Disturbance correlation], (s.e.)			0.082 (0.54)	

Note: Standard deviations of the parameter estimates are reported in parentheses below the parameter estimates in the table.

Table 12-8. *Model Estimating Determinants of CST Performance, with Correction for Sample Selection*

2 stage least squares (2SLS) estimates

	PBE-R	*HF-R*	*CR-R*	*SEE-R*	*BAND-R*	*Variable mean*
CONSTANT	46.40	36.23	42.95	54.17	1.07	1
	(7.91)	(8.08)	(12.30)	(9.16)	(0.48)	
ENROLLORD	−0.29	−0.35	−0.40-	0.080	−0.017	37.94
	(0.17)	(0.17)	(0.26)	(0.19)	(0.010)	
BEACH	−11.29	−9.23	−11.99	−5.15	−0.36	0.27
	(5.57)	(5.70)	(8.67)	(6.46)	(0.34)	
CITY	4.13	17.33	5.30	15.12	0.85	0.31
	(6.48)	(6.63)	(10.09)	(7.51)	(0.39)	
PRICENOPK	0.22	0.18	0.14	0.22	0.0066	69.16
	(0.070)	(0.072)	(0.11)	(0.081)	(0.0042)	
PRICECPK	0.15	0.087	0.23	0.55	0.0086	3.06
	(0.23)	(0.23)	(0.36)	(0.27)	(0.014)	
ROOMS	−0.048	0.017	0.045	−0.051	0.00035	52.69
	(0.048)	(0.049)	(0.074)	(0.055)	(0.0029)	
LAMBDA-A	24.68	14.19	13.72	5.24	0.79	
	(10.33)	(10.56)	(16.07)	(11.97)	(0.62)	
LAMBDA-B	0.50	5.43	10.94	−2.44	0.30	
	(6.03)	(6.16)	(9.38)	(6.99)	(0.36)	
N	49	49	49	49	49	
R^2	0.40	0.48	0.23	0.34	0.32	
Adjusted R^2	0.28	0.38	0.079	0.22	0.19	
Prob.	0.0048	0.00045	0.18	0.021	0.034	

Note: Standard deviations of the parameter estimates are reported in parentheses below the parameter estimates in the table.

Determinants of Hotel Enrollment in CST, and CST Evaluations

Table 12-7 reports estimates of the determinants of hotel choice to enroll in the CST program, modeled as the first stage of a joint selection process.[11] A key finding is that, among the market niche/location factors, hotels close to natural areas (the excluded category) were most likely and city hotels were least likely to sign up, with beach hotels intermediate. Further, higher quality hotels were more likely to sign up as well. Three groupings of hotels are revealed in which enrollment probabilities appear similar: hotels with 0–1 stars,

11. This specification was chosen as the best among four different specifications tried in a simple probit modeling framework. We found that the price and stars variables were fairly highly correlated and so we entered one or the other; also we tested both continuous and dummy versions of the number of rooms, room price, and number of stars. The results were generally consistent across the different versions of the model.

2–3 stars and 4–5 stars. The scale proxy, number of rooms, was positively associated with enrollment, but the estimates were imprecise with this specification of the model; in the preliminary runs the relationship was significantly positive in specifications with price as the proxy for quality.

Table 12-7 reports the estimates of the determinants of ICT having completed an evaluation by June 1999 for the sample of the 115 enrolled hotels, modeled as the second stage of a joint selection process. A variable capturing enrollment order was added to the set of explanatory variables for this dependent variable (for the first hotel to enroll, ENROLLORD = 1). The two variables that are consistently significant across specifications are enrollment order and location in a city. The results are consistent with the stated policy of evaluating enrolled hotels on a first-come first-serve basis. Also the city effect is no doubt attributable to the fact that most city hotels are in San Jose and therefore are easily accessible to ICT. Regarding the hypothesized scale effect, the results suggest an inverted-U relationship, in which small hotels with 15 or fewer rooms are less likely to have been evaluated than hotels with 16–50 rooms, and the evaluation rate appears to decline again for hotels larger than 50 rooms. These relationships are not estimated with precision consistently across specifications. There also is a suggestion of a positive relationship with quality—though the results are not necessarily significant at the .05 or .10 levels.

Finally we note that the parameter estimates for the two selection equations barely change when we employ the bivariate probit formulation presented in Table 12-7, relative to independent estimation of the two equations. We do however observe a slight increase in the imprecision of the estimates for some of the variables. This result is not surprising once we see that the errors in the two selection models are not highly correlated ($\rho_{12} = .08$, with a standard error of .54).

Determinants of Performance

Table 12-8 reports the two-stage least squares estimates of the determinants of CST performance for the sample of 49 evaluated hotels, incorporating the correction for potential sample selection bias. We report results for five measures of performance—the revised percentage performance measure for each of the four groups of requirements, plus revised measures of the final summary measure, (BAND-R), the number of green leaves awarded the hotel. The greatest explanatory power occurs in explaining the second set of requirements, Hotel Facilities (HF-R). The only performance variable for which the regression does not provide significant explanatory power is for the Customer Relations set of requirements (CR-R).

In terms of the market niches/location factors, the city hotels are fairly

consistently performing best. The superior performance overall of city hotels, all else equal, may occur because city is a proxy for lower costs due to readier access to input markets and greater management sophistication. However, the natural area hotels perform best on the elements most closely associated with protecting natural areas and promoting their use by customers. Performance tends to be increasing in hotel quality as measured by the price proxy variable, but the relationship is not significant at the .10 level for Customer Relations or for BAND-R. Performance is not significantly related to the proxy for scale, the number of rooms. This result suggests that, among hotels that are members of ICT at this stage of the program, the small hotels represented in the sample are not significantly associated with lower compliance rates relative to the larger hotels. This finding appears to be contrary to the results in much of the literature reviewed above. However, the divergence may be attributable to sample restriction (for the most part) to ICT hotels or lodges, which must meet a size threshold of 10 or more rooms compliance rates. (As discussed above, we do not anticipate these small hotels will enroll in the program in substantial numbers.)

Finally, we note that, for the set of 373 hotels in the sample, our results are weakly consistent with the hypothesis that the hotels with the best performance are those that have chosen to enroll first. This selection effect is manifest in the performance equations through the selection equation variable, LAMBDA-1, which captures the effect of being in this first set of enrollees, and through ENROLLORD, which captures the effect of the order of enrollment within this first set of enrollees. LAMBDA-2 records the effect of ICT's prioritization of hotels for evaluation that has resulted in complete evaluation data (as of the time of the data collection) for only 49 of the 115 hotels in this first set of enrollees.[12]

We observe that hotels that signed up earlier (i.e., with lower enrollment order) have better performance on average, though the effect is imprecisely estimated for Social and Economic Environment and is only significant at approximately the .10 level for Customer Relations and for BAND-R. The parameter estimates for LAMBDA-1 (enrollment) are always positive and those for LAMBDA-2 (evaluation) are positive except in one case (SEE-R), signaling a positive correlation between the errors in the performance equation and in the respective selection equations. However, the LAMBDA-1 parameters are esti-

12. We have also estimated the performance equations without ENROLLORD, in order to calculate the predicted values for the performance measures for the remainder of the sample. The parameter estimates do not change substantially, except for LAMBDA-1 and LAMBDA-2. Except for the socioeconomic environment (SEE) performance measure, the predicted values of the performance variables are lower for hotels enrolled but not evaluated, and are lower yet for hotels not enrolled.

mated with precision only for the Physical and Biological requirements and, to a lesser extent, for the Hotel Facilities requirements; the LAMBDA-2 parameters are never estimated with precision. It is not surprising, therefore, that the parameter estimates in the performance equations are not substantially different from those estimated in OLS models without sample correction.

In summary, though the results are weakly consistent with better performing hotels signing up earlier, the sample selection bias does not appear to be strong. The implication is that, controlling for differences in observable characteristics (location, quality, scale), the pool of nonparticipating ICT hotels contains many hotels performing at levels comparable to the early adopters.

Conclusion and Implications

In this chapter, we reported on data analysis of the early adopters of the CST program, those who enrolled before the program was presented to the public. The basic population in our unique data set is the set of 347 hotels that are registered with ICT.

In this sample, enrollment is consistently associated positively with location near a nature area and negatively with a city location. Enrollment is also positively associated with higher-quality hotels, as measured by star ratings or by price, and with number of rooms in the hotel, though the latter effect is imprecisely estimated. These preliminary results suggest hotel owners believe that natural and cultural tourism, and higher-value tourist products, are more sensitive to the preservation of the resource base than mass "sun and sand" and city-based tourism.

Having identified the strongest patterns of participation, it is important to emphasize that enrollments are occurring across a broad spectrum of this population of hotels. Enrollment is 20 percent among city hotels, 29 percent among beach hotels, and 42 percent among natural area hotels, with the ICT population of hotels fairly evenly divided among the three. Enrollment is 9 percent among 0–1 star hotels, 29 percent among 2–3 star hotels (representing about half of all ICT hotels), and 52 percent among 4–5 star hotels.

Performance has been toughly graded: on a rating scale from 1–5 green leaves, 41 percent of evaluated hotels received a rating of 1, 33 percent of 2, 20 percent of 3, and just 4 percent ($N=2$) of 4. The pattern of performance across the different set of requirements was generally consistent with expectations. A notable exception was our prediction that firms would perform better than average on water, energy, and solid waste management criteria, due to anticipated cost savings; it is possible that this effect will occur with a lag.

Better performance is associated with higher-priced hotels and hotels located in a city. Interestingly the scale of hotels (within the range of the sample) is not associated with performance one way or the other. Finally, the results are consistent with better-performing hotels signing up earlier, but the effect does not appear to be a strong one, suggesting that the pool of nonparticipating ICT hotels contains many hotels performing at levels comparable to the early adopters.

This empirical analysis only represents a snapshot of hotel participation and performance behavior during the period before the public inauguration of the program and the receipt of any market feedback from tourists. As the CST program opens its first season in the field, various questions arise. First, how will customers respond to the program? How will they differentiate between hotels with high ratings, low ratings, and no ratings? In which market segment will hotel customers be most responsive? Second, will these responses provide incentives for participating hotels to improve their performance and for additional hotels to participate?

We have already observed over 25 percent of the hotels (or 13 of a total of 49 hotels) upgraded their performance when offered the opportunity during the 90-day period following their initial evaluation, and 1/4 of those jumped two green leaves. If hotels with ratings of 3 and 4 green leaves garner substantially greater consumer response than those with 1 or 2 green leaves, will the lower-rated hotels decide to invest further to increase performance ratings, or will they drop out of the program? Currently nature-oriented hotels are more likely to enroll, but city hotels currently have the highest level of performance. Will positive feedback induce more city hotels to enroll? Will we observe more geographic clustering of participation in subsequent years, if nonparticipating hotels observe successful results for their direct competitors who were "early adopters"?

The empirical results suggest opportunities exist for expanding enrollments within and beyond the set of natural area hotels and 4–5-star hotels among the 347 ICT hotels, the primary population in our data set representing approximately 13,500 rooms. Additional research that tracks Costa Rica's experience with this certification program will provide important lessons for other Central American countries.

Building a customer base and hotel participation are both critical to program development. Further, they must adapt the organizational structure to privatize the certification process and establish user fees for the system, while at the same time affirming the independent accreditation process, based on broad participation by civil society. Whereas ICT has been conducting assessments at no charge for the early adopters, the goal is a self-sustaining certification program that covers the assessment and administrative costs of certification and accreditation and makes a contribution to the marketing of the

program. At this stage, a crucial challenge is to expand the program in order to achieve the necessary economies of scale in certification to keep the user fees down. Our financial simulation analysis indicates that a key strategy under development is to regionalize the program within Central America, which could generate demand-side spillovers as well as efficiencies in the certification costs.

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Appendix: Statistical Model

The statistical model is a three-equation model, where Y_1 is the measure of sustainable performance under the CST program, and I_1^* and I_2^* refer to the two selection processes for having CST performance data about hotels as of June 1999—hotel choice to enroll in the program and ICT completion of its evaluation of the hotel. Higher performance hotels are predicted to have a greater likelihood of enrollment.

We write the model as follows:

$$Y_1 = X_1\beta_1 + u_1 \tag{1}$$

$$I_1^* = Z_1\gamma_1 - \epsilon_1 \tag{2}$$

$$I_2^* = Z_2\gamma_2 - \epsilon_2 \tag{3}$$

We define the indicator variables, I_1 and I_2, such that:

$$I_1 = 1 \textit{ iff } I_1^* > 0$$

$$0 \text{ otherwise} \tag{4}$$

$$I_2 = 1 \textit{ iff } I_2^* > 0$$

$$0 \text{ otherwise} \tag{5}$$

For our population of hotels, we observe separately whether a hotel has enrolled in the program as of June 1999 ($I_2 = 1$), and whether ICT has evaluated the hotel as of that time ($I_1 = 1$). Both processes are of interest in their own right. They are also important because we only observe Y_1 if both ($I_1 = 1$ and $I_2 = 1$). We assume that the processes are correlated, and that ϵ_1 and ϵ_2 are distributed bivariate probit where $cov\ (\epsilon_1, \epsilon_2) = \rho_{12}$.

The maximum likelihood estimates of (γ_1 , γ_2 , ρ_{12}) are obtained by maximizing the log likelihood function:

$$\log L = \sum_{I_2=1,I_1=1} \log\Phi_2[\gamma_1' Z_1, \gamma_2' Z_2, \rho_{12}] + \sum_{I_2=1,I_1=0} \log\Phi_2[-\gamma_1' Z_1, \gamma_2' Z_2, -\rho_{12}]$$
$$+ \sum_{I_2=0} \log\Phi[\gamma_2' Z_2] \tag{6}$$

where Φ_2 refers to the bivariate standard normal cumulative distribution function (CDF) and Φ refers to the univariate normal CDF. In order to define the likelihood function for Y_1, we define $\lambda_{1j} = \text{Cov}\ (u_1, \epsilon_j)$ where $(j = 1,2)$. We hypothesize that covariance between the error in performance u_1 and the error in enrollment ϵ_2 is positive. Evaluation following a first-come first-served algorithm could also yield a positive covariance of errors (u_1, ϵ_j), further reinforcing the selection bias. If u_1 is correlated with both errors terms ϵ_j and ϵ_2, we can write the expression for the expected value of u_1 as follows:

$$E = (u_1 | I_1 = 1 \text{ and } I_2 = 1) = \lambda_{11} M_{12} + \lambda_{12} M_{21} \tag{7}$$

where

$$M_{ij} = (1 - \rho_{12}^2)^{-1}(P_i - \rho_{12} P_j) \text{ and } P_j = \frac{\int_{-\infty}^{Z_1\gamma_1} \int_{-\infty}^{Z_2\gamma_2} \epsilon_j f(\epsilon_1, \epsilon_2) d\epsilon_2 d\epsilon_1}{F(Z_1, \gamma_1, Z_2\gamma_2)}$$