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Research Note

Small firms embracing technology and tourism development: evidence from two nations in Central America

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Abstract

This research note reports the findings of a study that explored the types of technology used within hospitality-related small-to-medium enterprises (SMEs) in Costa Rica and Nicaragua. The study investigated the perceptions of value and the levels of awareness of entrepreneurs and managers regarding various technologies commonly used in similar organizations in the United States. The results suggest that there are minimal technology applications in back-office and front-office processing activities in SMEs in Costa Rica and Nicaragua. The evidence further suggests that the levels of awareness of entrepreneurs and managers concerning these applications are practically non-existent.

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1. Introduction

This research note reports the findings of a study that examined the levels and types of technology used within tourism-related small-to-medium enterprises (SMEs) in Costa Rica and Nicaragua. Specifically, the authors sought to identify the electronic business tools used by SME firms on a daily basis. Further, the authors investigated the value perceptions and awareness levels of entrepreneurs and managers concerning various technologies that are commonly used in similar organizations in the United States. Finally, the article presents conclusions and

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implications that may help to identify those technology applications that will be sought by future tourism-related enterprises in lesser-developed countries (LDCs).

The explosive growth of computing technologies and telecommunications during the past decade has influenced the management of SMEs around the world (Montealegre, 1998). In developed nations, small firms in tourism-related businesses such as lodging, foodservice, recreation, travel, events and entertainment are known to use management information system networks to varying degrees (Tesone, 2003). More than 10 years ago, the Internet emerged as a global commercial transaction medium, which spawned numerous studies of technology adoption and evolution processes as they apply to organizational strategic directions (McKenney, 1994).

2. Tourism development in Costa Rica and Nicaragua

In recent years, both Costa Rica and Nicaragua have made commitments to the development of tourism-related enterprises (Reinhardt and Peres, 2000; Wayne and Croes, 2003). Table 1 depicts selected indicators of tourism in the two countries. Interestingly, the stage of tourism development is different in both countries in a number of respects, such as scope, scale and impact. These general factors may help explain some of the differences between the results of each country.

3. Descriptive profile of the firms

The survey provides an interesting preliminary assessment of the profile of the firms in Costa Rica and Nicaragua. Over 164 firms in the two countries responded to the survey. The study reports quantitative data including number of employees,

Table 1
Selected indicators of Costa Rica and Nicaragua, 2001

	Costa Rica	Nicaragua
Area (1000 km ²)	51	130
Population (1000)	3.8	4.9
GDP (US\$ million)	16.157	2536
Income per capita (US\$)	4039	489
International arrivals (US\$)	1.132 (26.5%)	483 (10.9%)
International receipts (US\$ million)	1.278 (40.6%)	109 (3.8%)
Income per arrival (US\$)	1129	226
Tourism spending per capita (US\$)	339	22
Effectiveness foreign exchange generation ^a	1.86	1.57
Rooms	29,497	3320
% Share Central American tourists	26.5	63.5

Source: World Tourism Organization, The Americas 2002.

^a Authors' own estimates based on elasticity calculations of arrivals and receipts.

annual revenues, and activities. In terms of the structure of the firms responding, the majority (57%) were in the accommodation sector, with a further 25% operating in food and beverage, and 23% in tours. The remaining business categories are identified in Table 2, which illustrates that a reasonable broad range of hospitality businesses responded to the survey. Only one firm in Costa Rica out of the entire sample reported to be active in ecological tourism, which is surprising given the country's substantial resources and growing international reputation in this area.

Most activities of the firms surveyed are limited. The majority of firms consist of less than 25 persons and had a turnover of less than US \$100,000 annually. Firms in Nicaragua used more workers in their operations than Costa Rica, which may suggest relatively lower levels of productivity. The majority of firms in Nicaragua had a turnover of less than US \$60,000 per year, whereas only 39% of firms in Costa Rica were below this amount. As depicted in Table 2, firms in Nicaragua are

Table 2
Profile of firms

	Costa Rica ^a	Nicaragua ^b
<i>Sectoral basis of firms</i>		
Lodging	16.13	40.6
Tours	16.13	6.77
Transportation	3.23	9.02
F&B	9.68	15.04
Recreation/sports	3.23	0.75
Consultancy	9.65	0
Others	0	4.51
<i>Annual gross revenues (×\$1000)</i>		
0–60	38.71	53.38 ^c
61–90	0	25.56
91–100	51.61	16.63
100+	9.68	0
<i>Number of employees</i>		
1–10	48.39	30.08
11–25	29.03	28.57
26–50	9.68	25.56
51–100	6.45	9.77
100+	6.45	6.02
<i>Age of firms</i>		
1–5	22.58	51.13
6–10	16.13	33.84
11–14	22.58	2.26
15+	22.6	5.41

^aThe oldest reported firm in the sample was established in 1955.

^bThe oldest reported firm in the sample was established in 1978.

^c31.58% earns less than \$30,000.00 per year.

relatively younger than firms in Costa Rica, which suggests differences in stages of tourism development in both countries.

4. Business strategy and technology

Information technology is considered by many commentators as a vital business tool for many hospitality organizations at the end of last century (Stamboulis and Skayannis, 2003). Respondents were thus asked about the impact of technology on their business. Technology had a greater impact on business strategy in Costa Rica than in Nicaragua. Nine of 10 firms in Costa Rica reported that technology had an impact on their business strategy in significant ways compared to three out of four firms in Nicaragua. Pricing strategy for those businesses was the area where the greatest impact was felt, and this impact is evenly distributed among the firms in both countries. In all the remainder areas of business strategy, the experience of technology impact differed among the firms in both countries as shown in Table 3.

As Table 4 shows, the results from the survey are somewhat similar to businesses most commonly using computers to undertake correspondence and other back-office

Table 3
Impact of technology on business strategy of small firms

	Yes			No		
Costa Rica	90.32			6.45		
Nicaragua	74.44			25.56		
	Competition	Volume	Prices selling	Prices buying	Customer repeat	Customer new
Costa Rica	54.84	54.84	74.19	83.87	61.29	25.81
Nicaragua	33.08	84.96	74.44	81.20	60.90	78.20

Table 4
Degree of impact of technological areas

	None—low		Large	
	Costa Rica	Nicaragua	Costa Rica	Nicaragua
Web	16.36	40.59	48.38	40.60
Internet	22.59	27.83	41.93	40.60
Computer	19.36	12.78	41.93	62.41
Advertising	48.38	21.05	38.71	54.13
Networks	54.83	68.42	38.71	11.28
Cellular	35.49	12.78	29.03	70.67
Reservation	61.29	63.16	29.03	11.28
Accounting	61.29	47.43	22.58	18.79
Register	61.29	30.83	19.36	30.83

activities, such as reservations and accounting tasks. It is interesting to note that the impact of the use of computers in Nicaragua is perceived to be much more extensive than in Costa Rica, followed by a greater impact of advertising on the Internet. Cellular phones in Nicaragua also had the greatest impact in the business strategy of the firms. Nevertheless, the most notable feature is the low level of information technology use within the hospitality sector in both countries.

The results suggest that those businesses with computers are experiencing a major impact in the areas of Internet and Web activities. It is anticipated that the use of computers could generate a gap among firms because of the role of marketing and advertising of their products. The Internet is perceived to provide a greater opportunity for reaching a larger customer base.

5. The diffusion of technology in the firms

Firms in Costa Rica seem to embrace the use of computers to a higher degree than those in Nicaragua. Less than 1% of the firms surveyed in Nicaragua reported that all their employees use computers, compared to 29% in Costa Rica. On the other hand, 12% of the hospitality firms in Nicaragua reported that their employees do not use computers compared to nearly 10% in Costa Rica.

As seen in [Table 5](#), computers and emails are the most widely used technological devices by workers in the tourist industry in Costa Rica. The use of computer to provide information, to advertise, to sell or to buy goods was, however, the least popular usage. Diffusion of technology in firms in Nicaragua is even less conspicuous among employees than in Costa Rica. Only in the case of cellular phone usage is there a noticeable diffusion by the majority of firms. On the other hand, employees are least engaged in Internet-related services, such as email, internet, advertising, and web.

In terms of the availability of technology, a list of options were given to the respondents with the question of whether they felt that the cost was inhibiting the development of their business. As depicted in [Table 6](#), firms vary greatly in their perception of the cost effectiveness of technology in both countries. In Costa Rica, few businesses rated any factor likely to inhibit their business performance in terms of computers, Internet and the Web higher than 39%. This is in stark contrast with Nicaragua where this number is 71%, except for the Internet. On the other hand, less than 16% of the firms in Nicaragua consider cost as an obstacle to acquire a cell phone, whereas in Costa Rica this number is 52% of the firms.

6. Discussion of findings

The findings suggest that Moore's Law is not applicable to the business topology of tourism-related organizations in Costa Rica or Nicaragua. Evidence of usage indicates minimal technology applications in back-office, as well as front-office processing activities and network applications. This evidence corresponds to the

Table 5
Percentage of total employees' use of technology

		(1)	(2)	(3)	(4)	(5)	(6)
Computer	Costa Rica	9.68	25.81	9.68	6.45	6.45	29.03
	Nicaragua	12.03	42.11	21.8	8.27	6.77	0.75
Web	Costa Rica	16.13	25.81	9.68	12.90	9.68	12.9
	Nicaragua	36.84	17.29	9.02	5.26	4.51	0.75
Email	Costa Rica	9.68	22.58	16.13	9.68	9.68	22.58
	Nicaragua	27.07	18.80	11.28	8.27	6.02	6.77
Internet advertising	Costa Rica	29.03	29.03	6.45	6.45	16.13	12.9
	Nicaragua	43.61	16.54	7.52	0.75	6.02	1.50
Internet information	Costa Rica	19.35	35.48	12.90	12.90	6.45	12.90
	Nicaragua	25.56	29.32	9.77	5.26	6.77	3.76
Internet buying	Costa Rica	51.61	25.81	—	—	3.23	3.23
	Nicaragua	51.13	11.28	4.51	3.01	3.01	3.76
Internet selling	Costa Rica	41.94	22.58	3.23	16.13	6.45	9.68
	Nicaragua	53.38	7.52	2.26	5.26	6.02	3.01
Cellular	Costa Rica	9.68	16.13	12.90	19.35	16.13	12.90
	Nicaragua	1.50	35.34	27.82	14.29	6.77	4.51
Register	Costa Rica	22.58	41.94	9.68	—	—	3.23
	Nicaragua	20.30	39.85	9.77	5.26	3.01	0.75

(1) Not used; (2) less than 25%; (3) between 25% and 50%; (4) between 51% and 75%; (5) between 76% and 90%; and (6) all.

Table 6
Availability of technology based on cost

	Not-limited		Available		Don't know	
	Costa Rica	Nicaragua	Costa Rica	Nicaragua	Costa Rica	Nicaragua
Computers	16.13	44.37	61.29	29.32		9.02
Internet	16.13	30.82	61.29	54.29		4.51
Web	16.13	44.37	61.29	29.32		9.02
Cellular	25.81	3.01	48.38	84.46		0.75
Register	16.13	42.11	45.16	39.1	9.68	6.02
Accounting	45.16	42.86	45.16	19.15	9.68	24.06
Advertising	16.13	39.85	48.39	14.29	9.68	28.57
Reservation	12.91	39.10	48.38	10.53	9.68	34.84
Networks	19.36	37.59	45.16	11.28	6.45	38.35

findings of low usage of technology in Latin American countries in general ([International Telecommunications Union \(ITU\), 2000](#)).

There is evidence among practitioners in tourism-related firms, however, of the awareness and the intent to access global telecommunication networks in the course of doing business. This is consistent with the most recent wave of the technology evolution in organizations located in developed nations, but there is a key difference for the countries in the study. While developed nation firms are implementing automated digital network interfaces between the organizations and outside access points (CRS, GDS, and the Internet), firms represented in this study indicate a preference for person-to-person interfaces through low-tech means such as cell phones.

7. Implications

Perhaps there is a western-based flaw of assumption surrounding Moore's Law that invalidates it as a predictor of organizational technology infusion in countries such as Costa Rica and Nicaragua. It is probably true that technology doubles in power and its cost is halved every 18 months. The reduction in cost, however, is relative to what? Since the first two waves of technology evolution seem to have been based on automation, it is reasonable to assume that the relative comparison would be to the cost of human capital.

The evidence from this study suggests that the reduced costs of technology do not justify the replacement of human capital in certain LCDs, even when such costs decline at the exponential rate noted by Moore. It seems that labor-saving equipment is more expensive than the wage it saves because of higher costs of capital. Thus, Moore's Law is probably not a valid indicator of technology implementation in LCDs.

The findings of this study are consistent with Gilder's Law, which states that communications power doubles every 6 months—three times faster than the doubling of computing power ([Gilder, 2000](#)). Gilder's Law suggests that digital infrastructures of developed nations will become increasingly limited in their ability to process data that move through fiber optics at the speed of light (186,000 miles per second). The technical ramifications of Gilder's Law prescribe inverted networks (decentralized intelligence), bandwidth efficiency (high frequency, short wavelengths) and handheld processing devices (blending of cell phones and computers).

It seems likely that tourism-related organizations in developed nations will not be the first movers toward these technologies, as there is a digital infrastructure to safeguard. This is a result of previously allocated massive capital investments in modern hardware, software and telecommunications peripherals. This is not the case in lower developing countries, in which such an infrastructure is non-existent.

The authors suggest three core technology questions as barometers of telecommunication applications for future studies concerning LCD tourism-related organizations. First, is there a fiber optic connection between the continent of a specific country and the rest of the world? Second, are sufficient numbers of Low

Earth Orbit Satellites in place to facilitate transmission to existing fiber networks? Third, are there sufficient numbers of cell phones with minimal computing power available at reasonable prices? The authors suggest that when the answer to each of these questions is “yes,” tourism-related organizations in LDCs will be ready to embrace the fourth wave of technology evolution.

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