

The Supply Determinants of Small Island Tourist Economies

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Abstract

■ For over two decades, the island economy literature has been dominated by the MIRAB model (Bertram & Watters, 1985) which argues that small islands subsist on remittances from off-island workers and aid from metropolitan patron countries. This study presents a MIRAB alternative, the small island tourist-driven economy or SITE, and teases out its characteristics employing three empirical analyses: (1) a means difference comparison between the more developed Caribbean and the less penetrated Pacific and Indian Ocean islands; (2) a Tourist Penetration Index analysis of 39 small islands less than three million in population; and (3) a regression analysis that identifies the contours of successful SITEs: political dependence, uncrowded ambience, ample tourism infrastructure, favorable geography, and relative affluence.

Key Words:

Islands, economy, tourism, MIRAB, PROFIT, SITE

Resumen

■ Durante más de 20 años, lo que se estudia sobre las economías isleñas ha sido dominado por el modelo MIRAB (Bertram y Watters, 1985), el cual sugiere que las islas pequeñas subsisten del dinero enviado del exterior por ciudadanos que residen en el extranjero y por las ayudas de países metropolitanos. El presente estudio ofrece una alternativa al modelo MIRAB: la economía de islas pequeñas impulsadas por el turismo, o SITE, y trata de explicar sus características empleando tres análisis empíricos: (1) la diferencia de las medias entre las islas caribeñas, generalmente más desarrolladas, y las islas del Pacífico y del Océano Índico, en general menos penetradas; (2) el análisis del índice de la penetración turística considerando 39 islas pequeñas de menos de 3 millones de población; y (3) el análisis estadístico de regresión que identifica las variables del éxito de las islas pequeñas impulsadas económicamente por el turismo (SITE): dependencia política, contornos turísticos no abarrotados, adecuada infraestructura turística, geografía favorable, y sociedad económicamente próspera.

Palabras clave:

Islas, economía, turismo, MIRAB, PROFIT, SITE

Introduction

■ In the post-war era, international tourism has grown at a sustained 4-5 percent annual pace such that cumulatively it has become one of the largest industries in the world economy. According to Satellite Account estimates of the World Travel and Tourism Council, in 2008 tourism accounted for roughly ten percent of global GDP, employment, exports and capital investment (WTTC, 2008). As a result, many small tropical islands across the Caribbean, Indian and Pacific basins have become popular tourist destinations (McElroy, 2006). Geographically, tourism's advance across the island

periphery has spread somewhat unevenly. The earliest thrust embraced the Caribbean partly as a result of the region's proximity to affluent origin markets in North America and Europe and partly as a result of its postwar restructuring away from traditional colonial staples like sugar and cotton toward tourism, offshore finance and light manufacturing (McElroy, 2003). Subsequent growth of origin markets and leisure preferences in Japan and Australia/New Zealand expanded tourism across several Pacific islands (Guam, Northern Marianas, French Polynesia), and more recently Indian Ocean des-

tinations like Maldives, Seychelles and Mauritius. Because of their development success, these tourism-driven tropical island economies have emerged as an interesting object of study particularly during the past decade (see

Apostolopoulos & Gayle, 2002; Baldacchino, 2007; Briguglio *et al.*, 1996; Conlin & Baum, 1995; Duval, 2004; Lockhart & Drakakis-Smith, 1997; Pearce, 2008).

The Island Economy Literature

■ Though island fascination has figured prominently in literature and the biosciences for over a century (Baldacchino, 2007), the examination of island economies is a recent post-war phenomenon. Whereas the early pioneers (Seers, 1964; Demas, 1965) focused on the importance of export propulsion and domestic policy flexibility, later scholars emphasized a litany of obstacles particularly for small territories: small market size (Knox, 1967), geographic remoteness (Selwyn, 1978), over-specialization, export market concentration and disaster proneness (Briguglio, 1995). Bertram and Watters (1985) developed the first island economy model based on Pacific experience, the so-called MIRAB formulation, which has dominated the literature for two decades. This theory postulates that islands export labor and diplomatic and other services (UN votes, military uses etc) in exchange for a standard of living deriving mainly from migrant remittances and foreign aid. The economic dynamic is located principally in public sector bureaucracy and the largesse of patron states.

However, very recently two alternatives to the MIRAB orthodoxy have surfaced.

In the first case, Baldacchino (2006) argued that small often dependent and/or subnational island societies manipulate their amorphous jurisdictional status to obtain tax, finance, resource ownership, trade and other concessions from their metropolitan partners. This so-called PROFIT model based on North Atlantic islands' creative use of "the resource of jurisdiction" emphasizes domestic policy ingenuity and flexibility and a dynamic private sector.

In the second case, McElroy (2006) introduced the SITE formulation based primarily on Caribbean experiences to explain how many Small Island Tourist Economies

overcame their size disadvantage by restructuring toward tourism, the most sustained growth engine in the postwar global economy. He also demonstrated descriptively that SITEs were socio-economically and demographically superior to their MIRAB counterparts and argued that these differences were due in part to the tourism-conducive advantages of political affiliation. These include the same language, currency, customs etc. for metropolitan tourists who tend to dominate their visitor origin profiles.

This new research has spawned a series of efforts to descriptively define differences among the three island models. In a large follow-up study, Bertram and Poirine (2007) developed nine separate submodels including mixed genres underneath the three ideal types based on different strategies employed to fund imports. In a further extension, Baldacchino and Bertram (2009) categorized 65 islands into a six-fold taxonomy that included the three basic models plus three mixed genres (MIRAB/SITE etc.).

In related work, McElroy and Pearce (2006) demonstrated conclusively that small politically dependent islands were not only more affluent than their small sovereign counterparts, but also more socially and demographically mature. Oberst and McElroy (2007), arguing that SITE economies are a special species of the PROFIT genre, found these same statistically significant differences comparing comprehensive profiles of 58 islands stratified into PROFIT/SITE and MIRAB subgroups. These results were duplicated in a companion study (McElroy & McSorley, 2007) comparing 19 SITE with 17 MIRAB islands. Most recent work has explored the impact of various SITE characteristics on the volatility of tourist demand (Shareef *et al.*, 2008).

Scope and Method

■ To date no study has specifically addressed the determinants of SITE success. In other words, what factors explain the uneven spread of tourism across tropical islands? The purpose of the present study is to empirically isolate those determinants in order to uncover a preliminary model of SITE development. This will be achieved in three steps. First, a mean difference analysis will be employed to compare and contrast the more developed small Caribbean islands with

their Pacific and Indian Ocean counterparts. Second, a Tourism Penetration Index (TPI) analysis will be constructed to group the entire sample of small islands from highest to lowest levels of tourism development. This will allow sketching out in broad strokes descriptive profiles of the greater from the lesser penetrated destinations and drawing further inferences about SITE determinants. Third and most importantly, regression analysis will be used to more rigorously esta-

blish a provisional model of the determinants of the SITE economy.

Several of the key factors to examine can be gleaned from the literature. Certainly the costly negative impact on tourism of distance involving long-haul travel to the tropical periphery from visitor origin markets is paramount and has been emphasized for island destinations by both Prasad (2003) and Armstrong and Read (2006). Clearly dependent political status in islands with strong metropolitan ties may favorably affect tourism development (McElroy & Pearce, 2006) as well as offshore finance and light export manufacturing (Armstrong & Read, 2000). In addition, the presence of transport and communications infrastructure (Khadaroo & Seetanach, 2007) and hotel facilities (McElroy, 2003) should also positively affect visitation. Likewise, particularly for the mass sunlust market that tropical islands attract, the level of destination modernization is important to ensure adequate comfort and security (Page *et al.*, 2001). Similarly, successful tropical resorts would be expected to possess an abundance of environmental amenities (UNEP, 2007) and be characterized by the absence of crowding (Thomas *et al.*, 2005).

To test the influence of these determinants on tourism development, several variables were selected based on data primarily from the *World Factbook* (CIA, 2007), and secondarily from the *World Bank Data Query* (2007). To measure the level of modernization, per capita income and electricity usage were employed. To measure infrastructure, three variables were used: (1) roads per land area (Km), (2) percent of roads paved, and (3) the number of airports with paved runways. Tourist facilities were measured by the number of hotel rooms per land area. Political status was measured dichotomously with zero representing dependence and one representing independence. Crowding was measured by population density, and distance was measured by three variables. These included: (1) distance (km) to the nearest conti-

nent, (2) the isolation index calculated as the sum of the square roots of the distance to the nearest island, islands group, and the nearest continent (UNEP 2007), and Great Circle Distance. This last was taken from Armstrong and Read (2006) and calculated as the distance, based on latitude and longitude, from each insular capital city to the nearest of the three major global origin markets: Europe (Brussels), The United States (Washington, D.C. or Los Angeles, whichever is nearer), and East Asia (Tokyo). To measure natural amenities, because most sunlust activity in these mass tourist tropical islands takes place at the beach, two proxy variables were used: (1) total shorelines (km) and (2) the coastal index calculated by dividing shoreline by land area.

Finally, the level of tourism development was measured three ways: (1) visitor spending per resident, (2) average daily visitor density calculated as total visitor days (hotel and cruise) divided by resident days per 1,000 population; and (3) The Tourism Penetration Index (TPI), a comprehensive measure of overall economic, social and environmental impact. The TPI was constructed in three steps according to McElroy and de Albuquerque (1998) from *Compendium of Tourism Statistics* (2007) data. First, the three variables were selected: per resident visitor spending, average daily visitor density, and hotel rooms per Km², a proxy measure for tourism's ecological footprint. Second, the three variables were normalized using a standard MAX-MIN formula. Third, the TPI scores and destination rankings were estimated by taking the unweighted average of the three impact indices. To operationalize the model 39 small islands were selected less than three million in population and for which adequate data were available. Of these, only three exceeded one million population: Jamaica, Mauritius, and Trinidad/Tobago. They included 19 in the Caribbean, 16 in the Pacific and four in the Indian Ocean (Comoros, Maldives, Mauritius and Seychelles). Table 1 identifies them along with their basic tourism data, and they are grouped into Caribbean and Pacific/Indian clusters.

Results

Means Difference Analysis

■ As a preliminary test of the level of tourism development, the two island subgroups were compared using means difference analysis across the 15 indicators identified above plus five measures of tourism activity as well as by their TPI scores. As expected results in Table 2 demonstrate the superior performance of the Caribbean, commonly considered the most tourism intensive region in the world (Celimene & Marques, 2008). There are significantly higher levels of cruise visitors, an indicator of destination maturity, and 3-4 times higher average levels of per resident visitor spending and daily visitor density than Pacific/Indian (P/I) islands. Likewise among these small islands, the Caribbean records high-

er levels of modernization with average per capita income over double the P/I figure (\$17,700 vs. \$7,095). In terms of infrastructure, the former islands demonstrate roughly double the level of rooms per Km² and triple the road area, although only the latter is statistically significant. Not surprisingly, the P/I destinations are considerably more geographically remote (more costly to visit) as suggested by their higher averages for great circle distance, distance to the nearest continent and the isolation index. On the other hand, the P/I group also demonstrates markedly higher levels of shoreline and coastal index, perhaps more indicators of their larger size as much as their abundance of tropical amenities,

Table 1: Selected Tourism Indicators for Small Islands, 2005^a

Island	Land Area (km ²)	Population	Tourists (000)	Cruise Passengers and Same Day (000)	Stay (Nights)	Rooms	Tourist Spending (US \$ Millions)
Caribbean							
1 Anguilla	102	13,677	62	81.0	8.1	746.0	86.0
2 Antigua & Barbuda	440	82,786	261	467.0	7.0 ^a	3185 ^a	327.0
3 Aruba	190	100,300	733	553.0	7.8	7,966	1,096.0
4 Bahamas	13,880	323,063	1608	3,428.0	4.88 ^a	14,800	2,069.0
5 Barbados	430	269,556	548	563.0	7.4	6,353	897.0
6 Bermuda	50	63,570	270	251.0	6.4	3,067	393.0 ^c
7 British Virgin Islands	153	23,552	337	483.0	9	2,722	437.0 ^c
8 Cayman Islands	260	45,000	168	1,799.0	6.8	2,954	353.0 ^c
9 Dominica	750	72,000	79	301.7	8.7	787	56.0
10 Grenada	340	106,500	99	281.0	7.4	1,470	71.0
11 Jamaica	10,990	2,654,500	1479	1,136.0	9.8	22,528	1,545.0
12 Montserrat	102	9,538	10	3.7	10.0 ^a	243 ^a	9.0
13 St. Kitts and Nevis	360	48,000	127	217.0	8.7 ^a	1825 ^a	107.0
14 St. Lucia	620	164,791	318	402.0	9.6 ^a	4,511	345.0
15 Sint Maarten / St. Martin	54	33,102	462	1,488.0	5.0 ^a	3532 ^a	619.0
16 St. Vincent and Grenadines	390	119,051	96	163.0	10.6 ^d	1,692	105.0
17 Trinidad/Tobago	5,128	1,056,608	463	67.0	14.3	5,929	453.0
18 Turks and Caicos	430	21,746	200	--	7 ^a	2210 ^d	311 ^d
19 U.S. Virgin Islands	350	108,708	575	2,030.0	4.3	4,762	1493.0 ^c
Caribbean Averages	1,843	279,792	416	762	8	4,804	567
Pacific/Indian Ocean							
1 American Samoa	200	58,300	25	6.1	7 ^a	243 ^a	31.0
2 Comoros	2,230	600,490	20	--	7	418	14.1 ^c
3 Cook Islands	237	21,750	88	--	10.2	1,408	92.0 ^c
4 Fiji	18,270	847,706	550	53 ^a	8.9	6,713	436.0
5 French Polynesia	4,000	256,603	208	--	13.4	2,963	550.0
6 Guam	550	169,635	1228	--	3.0 ^d	9,236	2041 ^d
7 Kiribati	730	99,000	3	59.4 ^a	7.0 ^a	162 ^a	3.2 ^{bc}
8 Maldives	300	329,198	395	4 ^a	8.5 ^d	8,992	287.0
9 Marshall Islands	180	63,266	9	--	4.5	328 ^a	4 ^{bc}
10 Mauritius	2,040	1,243,253	761	20.0	10.7	10,497	871.0
11 New Caledonia	18,580	234,479	101	81.0	16.8	2,244	253.0
12 Niue	260	1,492	3	--	7 ^a	58	1.2 ^c
13 Northern Marianas	477	80,300	498	9.0	3.6 ^d	4,122	563 ^a
14 Palau	460	20,100	86	--	7 ^a	959 ^a	97 ^{bc}
15 Samoa	2,840	184,984	102	--	7.6 ^d	939 ^a	77.0
16 Seychelles	460	84,494	129	6.0	9.7	2477 ^a	192.0
17 Solomon Islands	28,900	477,742	9	--	7 ^a	1238 ^d	2.0
18 Tonga	750	102,311	42	10 ^a	15.0 ^d	642 ^d	11.0
19 Tuvalu	26	11,992	1	--	7.6 ^d	59 ^d	1.3 ^d
20 Vanuatu	12,190	211,367	62	64.0	9.1 ^a	874 ^a	74.0
Pacific/Indian Ocean Averages	4,684	254,923	216	34	9	2,729	280
Source: Compendium of Tourism Statistics, 2007 ed. (WTO, 2007); The World Factbook (CIA, 2007); The World Bank Data Query (2007)							
Notes: * In place of missing data, the standard 7 days was used.							
a Indicates data was taken from the latest year available							
b Indicates in place of missing data, an average of data from islands in the same category was taken							
c Indicates figure includes passenger transport							
d Indicates data was taken from J. McElroy's (2006) "Small Island Tourist Economies Across the Life Cycle"							

and, given their characteristic remoteness, indirectly underlining the problem of P/I inaccessibility. According

to Table 2, the P/I group averages 2.5 times larger in area (4,684 vs. 1,843 Km²) than their Caribbean counterparts.

Table 2: Comparison of Caribbean and Pacific/Indian Ocean Regions

Determinant	Caribbean Mean	Pacific/Indian Mean	P Value
Land area (km ²)	1843	4684	.177
Population (000)	280	255	.875
Tourists (000)	416	216	.115
Cruise Passengers (000)	722	15	.001***
Per capita visitor spending	6.254	2.12	.011**
Visitor density/1000	108.76	27.84	.002***
Rooms/km ²	4804	2729	.158
TPI Score	.2541	.1792	.332
Electricity Usage per population (kWh/person)	5.399	2.882	.164
Per Capita Income on Island (\$US)	17700	7095	.013**
Political Status	.5789	.7000	.444
Great Circle Distance (km)	2690	6421	0.00***
Distance to Nearest Continent (km)	545	2730	0.00***
Km of roads per land area	2.514	.673	0.00***
% of paved roads	.5848	.5787	.949
Airports with Paved Runways	3.842	5.05	.587
Isolation Index	41.58	80.55	0.00***
Shoreline	367	1059	.054*
Coastal Index	.4981	.8938	.127

Notes: *** Statistically significant at the 0.01 level

** Statistically significant at the 0.05 level

* Statistically significant at the 0.10 level

TPI Analysis

■ Table 3 presents results of the TPI analysis. The 39 small islands are loosely clustered into three levels of tourist penetration from high to low according to their combined index scores. The cutoff points are somewhat arbitrary given the highly aggregative nature of the data, but they are informed by a decade of small-island research (McElroy 2006, 2003; McElroy & de Albuquerque, 1998). The top half of the rankings is dominated principally by the popular resorts in the Caribbean and Northern Pacific that form the traditional 'Pleasure Periphery' (Turner & Ash, 1976), and the bottom half, with some exceptions, is populated mainly by the more remote emerging islands in the Pacific. The top dozen include the traditional Caribbean paradises that cater to mass tourism, two Japanese honeymoon/golf destinations (Guam, Northern Marianas) plus Palau -an international diving resort- and the Cook Islands just recently emerging from MIRAB status (Bertram & Poirine, 2007). These represent the most tourist-driven SITE islands with per resident visitor spending averaging \$7,500 and visitor density averaging roughly 150 daily visitors per 1,000 population. This is equivalent to a 15 percent

increase in the daily year-round population. In addition, these destinations average roughly 20 hotel rooms per Km² suggesting tourism's visible imprint on the landscape. According to the literature, these highly developed SITEs, for the most part, are characterized by large-scale transport and facility infrastructures, extensive cruise ship traffic, an abundance of man-made attractions (shopping, gambling, golf, conventions), and high levels of promotional spending. Many particularly in the Caribbean -Bermuda, Caymans, BVI and USVI- also function as lucrative offshore banking and insurance centers. They also are the islands identified in the literature as having experienced ecological degradation especially of their marine assets: reef damage, biodiversity and wetlands losses, coastal erosion, land and sea pollution and so on (Briguglio, 2008). Many in this most developed category are considered "sun and beach' destinations reaching lifecycle maturity" (Bardolet & Sheldon, 2008: 909) in Butler's (1980) familiar model of tourism area cycle of evolution. As a consequence, achieving sustainable tourism has become their key policy challenge (Dodds, 2008).

Table 3: Tourism Penetration Index for Small Islands, 2005^a

	Island	Spend/pop (US\$)	Density ^c /1000	Rooms/kr ²	Spending	Impact Indices ^b Density	Rooms	TPI Score ^c
1	Sint Maarten/St. Martin	18700	315	64.9	1.000	0.761	1.000	0.920
2	British Virgin Islands	18208	409	17.8	0.973	1.000	0.262	0.745
3	Guam	12032	59	16.8	1.000	0.527	0.560	0.696
4	Aruba	10927	171	41.9	0.575	0.393	0.640	0.536
5	Cook Islands	4230	113	5.9	0.352	1.000	0.198	0.516
6	Bermuda	6140	85	61.3	0.313	0.176	0.944	0.477
7	Northern Marianas	7011	61	8.6	0.583	0.545	0.288	0.472
8	Maldives	872	28	30.0	0.072	0.246	1.000	0.440
9	Turks and Caicos	14136	174	5.1	0.750	0.402	0.064	0.405
10	Palau	4826	82	2.1	0.401	0.728	0.069	0.399
11	U.S. Virgin Islands	13697	113	13.6	0.726	0.248	0.197	0.390
12	Cayman Islands	7844	179	11.4	0.406	0.415	0.161	0.327
13	Seychelles	2272	41	5.4	0.189	0.360	0.179	0.243
14	Anguilla	6288	117	7.3	0.321	0.256	0.098	0.225
15	Bahamas	6404	96	1.1	0.327	0.203	0.000	0.177
16	French Polynesia	2143	30	0.7	0.178	0.262	0.024	0.155
17	Barbados	3328	47	14.8	0.159	0.078	0.215	0.151
18	Antigua & Barbuda	3950	76	7.2	0.193	0.152	0.097	0.147
19	Niue	804	36	0.2	0.067	0.318	0.006	0.130
20	Mauritius	701	18	5.1	0.058	0.157	0.171	0.129
21	St. Kitts and Nevis	2229	75	5.1	0.099	0.150	0.063	0.104
22	St. Lucia	2094	57	7.3	0.091	0.104	0.097	0.098
23	New Caledonia	1079	21	0.1	0.090	0.182	0.003	0.092
24	Fiji	514	16	0.4	0.043	0.139	0.011	0.064
25	Tonga	108	17	0.9	0.009	0.149	0.028	0.062
26	Samoa	416	11	0.3	0.035	0.099	0.010	0.048
27	American Samoa	1	8	1.2	0.000	0.071	0.040	0.037
28	St. Vincent and Grenadines	882	27	4.3	0.025	0.028	0.051	0.035
29	Vanuatu	350	8	0.1	0.029	0.069	0.001	0.033
30	Tuvalu	108	2	2.3	0.009	0.014	0.075	0.032
31	Grenada	667	26	4.3	0.013	0.025	0.051	0.030
32	Montserrat	944	28	2.4	0.028	0.030	0.021	0.026
33	Marshall Islands	63	2	1.8	0.005	0.013	0.060	0.026
34	Dominica	778	38	1.0	0.019	0.055	0.000	0.025
35	Kiribati	32	2	0.2	0.003	0.016	0.006	0.009
36	Jamaica	582	16	2.0	0.008	0.000	0.016	0.008
37	Comoros	23	1	0.2	0.002	0.002	0.005	0.003
38	Trinidad/Tobago	429	17	1.2	0.000	0.003	0.002	0.002
39	Solomon Islands	4	0	0.0	0.000	0.000	0.000	0.000
Averages		3995	67	9.1	0.235	0.240	0.172	0.216

Source: *Compendium of Tourism Statistics, 2007 ed. (WTO, 2007); The World Factbook (CIA, 2007); The World Bank Data Query (2007)*

Notes: a. Calculated as: $((\text{Tourists} \times \text{Stay}) + \text{Day}) / ((\text{Population} \times 365) \times 1000)$.

b. Calculated as: $(\text{Indicator value} - \text{minimum}) / (\text{Maximum} - \text{minimum})$.

c. Unweighted average of the three impact indices.

By contrast, the least penetrated bottom grouping comprises mainly Pacific outposts and Comoros plus Dominica, a Caribbean ecotourism destination, and Montserrat where the tourism industry was severely damaged by a 1995 volcanic eruption that rendered roughly half of the island uninhabitable. The inclusion of Jamaica is an anomaly, a highly tourist-dependent island down-ranked by the TPI because of its large area and population. By and large, these destinations are typified by small-scale transport infrastructure and tourism plants and limited accessibility where tourism has a marginal footprint. For example, per resident visitor spending is only \$350, barely five percent of the most penetrated island average, and visitor density augments the local population by an average less than two percent. Likewise average hotel room density is a scant 1.5 rooms per square kilometer. With some exceptions these economies are relatively dependent on traditional pursuits (agriculture, fishing), have limited cruise traffic and man-made attractions, and experience high seasonality and a high ratio of short-staying low-spending business travelers. Their key tourism policy challenge is to achieve greater accessibility and international visibility.

The dozen intermediate destinations share substantial tourism experience. On average their tourism impact falls between the most and least penetrated groups. For example, average per resident visitor spending is \$2,200, and daily visitor density is 52 per 1,000 or roughly a five percent increase in the daily on-island population. In addition, there are approximately five rooms per Km². This average substantially understates the experience of the more developed Caribbean destinations among the intermediates like Anguilla, Antigua, Barbados and St. Lucia. Many are in transition to restructure their economies away from traditional staples: for example Seychelles (tuna), Polynesia (farming, pearl diving), Mauritius (sugar, textiles), and St. Kitts-Nevis and St. Lucia (bananas). They exhibit a diversity of tourism styles but common features like rising visitor densities, hotel scale and occupancy rates, cruise traffic, promotional spending and the ratio of holiday visitors. Their key policy challenge is controlling growth. According to McElroy (2006:68): Many experiencing growth pressures face resource-use conflicts and planning challenges as factors rapidly migrate from traditional activities to the modern and more lucrative tourism sector.

SITE Determinants

■ Both the means difference and TPI analyses have suggested certain internal or supply determinants of tourism success in small islands. They appear to include a high general level of development, proximity to the major visitor origin markets, the presence of tourism infrastructure and the influence of dependent political status. The TPI analysis indirectly suggested this last factor. For example, 10 of 12 of the most tourist penetrated destinations are politically affiliated islands while 12 of

15 of the least penetrated are sovereign islands. To more rigorously examine the influence of these factors plus the other determinants drawn from the literature (crowding, tropical amenities), a series of regression experiments were conducted. While several dependent variables to measure tourism development were used, the most consistent were average daily visitor density and per resident visitor spending.

Table 4: Regression Results

Equation	Dependent Variable	Independent Variable	Coefficient	t-value	R ² (adj.)	F-value
1.	Visitor Density	Rooms/km ²	2.717***	3.19	52.6%	9.42
		Per capita income	0.002*	1.93		
		Population Density	-0.131***	-2.97		
		Isolation Index	-0.897**	-2.29		
		Political Status	-47.95**	-2.15		
2.	Spending per population	Political Status	-4067***	-3.81	67.4%	16.69
		Rooms/km ²	131.48***	2.80		
		Great Circle Distance	-0.519**	-2.27		
		Electricity/population	323.3**	2.64		
		Population Density	-6.896***	-3.19		

Notes: *** Statistically significant at the 0.01 level
 ** Statistically significant at the 0.05 level
 * Statistically significant at the 0.10 level

Results are presented in Table 4. In the first case employing visitor density, over half of the variation in tourism penetration across the small-island world is “explained” by the interaction of primarily five independent variables. These include: (1) sufficiently built infrastructure and facilities as measured by rooms per square kilometer; (2) a favorable degree of economic modernization as measured by per capita income; (3) a reduced level of crowding as suggested by the negative effect of population density on tourism; (4) proximity to assumed origin markets as indicated by the negative sign of the isolation index; and (5) finally dependent political status (0= dependent, 1= independent) indicating the touristic advantages of metropolitan affiliation. Of all these internal supply determinants of tourism development, infrastructure, absence of crowding, and geography appear to be somewhat more important influences than development and political status in explaining varying degrees of average daily visitor density across the 39-island sample.

In the second case using per resident visitor spending as the tourism measure, the same five dimensions were associated with two-thirds of the variation in tourism development across the island sample. In addition to the superior level of prediction (67% vs. 53%) and overall statistical significance as measured by the F-value (16.7 vs. 9.4), there are three other differences between the

two models. First, the distance variable is measured by great circle distance and not the isolation index (see Equation 1), and the modernization variable is measured by per capita electricity consumption, a standard proxy for per capita income. Second, in this model the statistical significance of the independent variables are uniformly higher. This may in part be due to the fact that per resident visitor spending is a better measure of tourism impact than average daily visitor density. Third, political status appears among the strongest influences on tourism success. This last outcome should not be surprising given the increasingly favorable emphasis dependent political status is accorded in recent island political economy literature (Baldacchino & Milne, 2009).

In summary, the regression analysis basically confirms the literature and the two previous analyses that the determinants of small-island tourism development include a specific combination of economic, infrastructural, geographic and political factors. The most successful tropical SITES tend to be relatively affluent and uncrowded, relatively close to their tourist originating markets, amply supplied with hotel and assumed transport/communications infrastructure, and benefitting from the special tourism-conducive concessions associated with political affiliation.

Conclusion

■ This study has focused on a particular subset of small island economies less than three million in population to explain what factors are responsible for the uneven spread of tourism across the tropical periphery, that is, to uncover the special characteristics that define the most successful of these, the so-called SITES. While the traditional island literature emphasizes the MIRAB model and the role of off-island labor remittances and foreign aid in sustaining island livelihoods, the SITE formulation stresses the deliberate postwar policy of tourism diversification combined with aid-financed transport infrastructure and the lucrative advantages that come with political affiliation with an affluent (origin market) patron.

Three different and complementary analyses were employed in this provisional attempt to define the determinants of SITES. First, a means difference comparison between the more tourist developed Caribbean and the lesser penetrated Pacific/Indian islands suggested the importance of an adequate level of destination modernization and tourism infrastructure as well as proximity to primary tourist originating markets. Second, the TPI analysis re-emphasized the central role of distance (cost) in tropical island development but also stressed the favorable advantages of political affiliation for fostering tourism. For example, the TPI clustered the more devel-

oped, proximate, and politically dependent Caribbean and Pacific (Guam, Northern Marianas) islands at the top of the scale while the less penetrated and more remote sovereign Pacific outposts populated the bottom. In combination with earlier research, the TPI analysis also descriptively suggested a somewhat fuller profile of the most successful SITES. Their landscapes tend to be dominated by large-scale transport and facility infrastructure -common in mass tourism resort islands- and the visible daily presence of tourists. Such destinations present an abundance of man-made attractions, and are characterized by reduced seasonality partly as a result of their high levels of promotional spending, and partly as a result of their offshore finance activity.

Finally the regression analysis empirically identified the five destination characteristics consistent with SITE success. They included in order of statistical significance: political dependence, uncrowded ambience, ample tourism infrastructure, favorable geography, and relative affluence. Together these supply determinants accounted for two-thirds of the variation in tropical island tourism with the other explanatory third assumed to derive primarily from demand factors like different levels of origin market affluence, changing exchange rates and airline access, and so on. Unfortunately, natural amenities, as measured by shoreline, did not impact

tourism as hypothesized. This lack of relationship may be due to a couple of factors: (1) the sample selection of warm-water islands with similar sunlust amenities, and (2) the use of a poor proxy measure. On the other hand, one might also conjecture that the absence of crowding, as measured by population density, may have reflected some of the leisure ambience and casual pace of life that makes popular tropical destinations attractive. Further

research will be necessary to test and refine this SITE model with a larger sample of islands including warm and cold water destinations and using more discriminating amenity measures. What is clear from this provisional study is that the basic empirical contours of the small island tourist economy have been established, and SITE can take its place alongside MIRAB as a legitimate alternative for island development.

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