

E-COMMERCE: A CASE STUDY OF BARBADOS' TOURISM AND HOSPITALITY INDUSTRY

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ABSTRACT

In this paper, a case study is conducted to analyze the effectiveness of web pages designed in Barbados for the tourism and hospitality industry. The assessment is made from two perspectives: to understand how the Barbados' tourism industry is using the web, and to identify the effect of information technology on economic issues. In return, this is used: (a) to provide interested parties with accurate information and marketing insight necessary for decision making for electronic commerce/e-commerce, and (b) to demonstrate pragmatic difficulties in searching and designing web pages.

I. INTRODUCTION

The underlying technologies of the Internet provide a suitable environment for the creation of electronic markets, digital economies, and new organizations within enterprises. Similar changes also take place in state services, health and education. Firms that cannot properly adopt and adapt technologies that enable electronic commerce, or in the other words, the above changes, could result in being increasingly excluded from the international economy. Indeed, the developing countries are the ones most at risk, because they have constraints in access to technological, financial and human resources. On one hand, increased market access, opportunities to create new economical values, reduced administrative costs and improvement of public services are as important to developing countries as they are to developed ones. On the other hand, lack of national IT policy, insufficient national communication infrastructure, shortage of skilled personnel, political, social and economical environments are the more obvious barriers to electronic commerce in developing countries. Therefore, we believe that the evolution of electronic commerce will follow a different path in the developing world from that seen in more technologically advanced nations. Not only that, the different socio-economical environments in different developing countries will result in different requirements for controlling the evolution of platforms for electronic commerce.

In light of these beliefs, the authors initiated a study to analyze the requirements of electronic commerce in Barbados, a developing country in the Caribbean region. Since the tourism and hospitality industry is the largest in Barbados [1], the authors chose to perform the web analysis for this sector. For enabling electronic commerce on the net, the authors believe that more efforts are necessary in the development and evaluation of Web measurement standards, surveys, research, and models for measuring consumer demand in this revolutionary new medium. Commercial web sites, shopping agents and search engines facilitate the process of developing electronic commerce on the web. Moreover, research on web analysis; design and search tools help to achieve performance measurements both for the buyers and sellers on the net. Therefore, the authors believe that by measuring the performance of web sites in Barbados' tourism sector, an example can be formed for the requirements and improvements that need to be performed in a developing country by this case study. The remainder of this paper is organized as follows. Section II introduces the different issues related to the web and electronic commerce proposed by this study. Section III presents the tests that are performed in the scope of this study. Results of these tests are given in section IV, and conclusions are drawn in section V.

II. EFFECTIVE WEB AND ELECTRONIC COMMERCE

It is a common misconception amongst the general public, and in some cases, the business arena, that all that is required for an increase in revenue from a site is simply to have a "web presence". This concept of a web presence is basically having a site up and running on the World Wide Web, where the main idea is to provide added exposure for current and new clients online. However, having an effective web is not actually that easy! The authors of this paper believe that having an effective web requires the fulfillment of the audience of the web site. In general, there are two different sets of audience. One of these is the targeted people, who are going to use the site for retrieving information or doing commerce, and the other is the search-engines, which are going to index the site to rank for other users. Thus, any company that wants to have an effective web for enabling electronic commerce and

improving its customer base needs to consider these two different sets of audience. Indeed, each of these sets of audience is going to have different requirements, hence a web site has to be designed and implemented according to those requirements. Typically, accessibility issues [4] guide a web site designer to fulfill the requirements for the first set of audience and search engines features [5] guide for the second set.

Moreover, there are several stages to creating effective web sites that will not only increase exposure of the company to the public online, but aid in increasing revenue, and ultimately have an “electronic commerce enabled” web site. The process of developing an effective web site for electronic commerce is divided into five stages by the authors.

The first stage is simply having a web site on the Web, acting merely as a tool for providing information about the company to potential and existing customers. The pages are static with “fixed” content about the company, services offered, contact information and location. However, the site does not allow for online transactions or interaction. The second stage of creating effective web sites improves upon the first stage by introducing the use of forms, and online transaction options such as online booking and reservations, which makes the site more dynamic. The content of the pages are still static, with “form submission” being the only kind of interaction between the visitors to the site and the business and typically performed using email. It is also important to note in this stage that emails are sent via non-secure lines, as no form of encryption is employed for “form submission”. Stage Three, on the other hand, incorporates a secure payment option for online transactions, a distinction from the previous stage as forms are now submitted through secure methods. The form information is encrypted (typically through PGP) and sent via email to a central registration location. Stage Four includes the use of databases for storing information from the forms and generating dynamic site content, hence moving from a 2-tier architecture to a 3-tier architecture [6]. This effectively allows the possibilities for personalization of the site to specific visitors. Geographical information of visitors can also be determined and ad targeting can also be introduced. The level of encryption also increases at this stage. Finally, the fifth stage, which is considered to be the final stage of achieving an electronic commerce enabled site, introduces the ability of the site to determine browser compatibility, frame compatibility, device compatibility and mobile access issues. In this stage, alternative options would be in place for users, who do not wish to view sites with frames, or who use different browsers. Automatic detection of browser is also implemented on the site so that visitors see a design that is optimal for their type of browser, as certain site design elements are not viewable on all browsers or look different depending on the browser used. Moreover, such a design also will incorporate the consideration of users with mobile devices – i.e. PDA(s), cellular phones – to be able to access the site. That is to say, alternate pages – that do not have frames, images or image maps –, and site content – that is easy to read on small screens and is not time consuming to download – are available for the users.

III. ANALYSIS OF WEB SITES

In this study, various tests were carried out to analyze the web sites from the perspective of people, search engines and the level of web presence to enable electronic commerce in Barbados. Since, tourism is the major contributor to Barbados’ economy [1], the authors selected 160 web sites within the tourism and hospitality industry in Barbados [2] to perform these tests. Table-1 details the number of web sites and the corresponding percentages. For each web site, three different sets of tests were performed. These are: Accessibility tests, Search engines’ features tests, and Web presence tests.

Table 1: The web sites analyzed

Type	Number of Web Sites Studied	Percentage
Accommodations (ACMD)	99	62%
Travel Agencies (TA)	6	4%
Rental Agencies (RA)	17	11%
Cruise ship/Sailboat Agencies (CSA)	15	9%
Restaurants (REST)	10	6%
Duty Free Stores (DFS)	7	4%
Barbados Stores (BS)	6	4%
TOTAL	160	100%

Accessibility Tests

For each site, the Bobby 3.2 test [3] was carried out. This test analyzes a given site for accessibility issues and any problems that would affect ease of use by persons with disabilities. Bobby 3.2 identifies any significant accessibility barriers – based on a set of priorities, priority one to three – which would affect the site being universally designed. It is an evaluation tool that conforms to the Guidelines for Web Content Accessibility as established by the World Wide Web Consortium’s (W3C) Web Accessibility Initiative (WAI) [4].

For the Bobby 3.2 tests performed, errors of type Priority 1 were noted only. These errors were “problems that seriously affected the page’s usability by persons with disabilities” and conformed directly to the Priority One Checklist outlined by the WAI. In the tests, results returning a Bobby Approved rating were only possible for sites in which none of the pages have accessibility errors of type Priority 1. This shows that the site is accessible by every user, including the ones with minimum skill levels and abilities. These requirements included items such as: providing a text equivalent for every non-text item, organizing documents so they may be read without style sheets, providing client-side image maps instead of server-side image maps, identify row and column headers for data tables, titling each frame to facilitate frame identification and navigation, and ensuring that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported.

Table 2: Search engine features for several popular search engines [4]

Service	Altavista	Google	Excite	Yahoo	HotBot	Lycos
<u>Crawling</u>						
Deep Crawling	yes	Yes	no	yes	yes	yes
Frame Support	yes	Yes	no	yes	yes	no
Image Maps	yes	No	no	No data	no	no
Robots.txt	yes	Yes	yes	yes	yes	yes
Meta robots tag	yes	Yes	no	yes	yes	yes
Link popularity helps Deep Crawl	yes	Yes	yes	yes	yes	yes
Learns frequency	yes	No	no	N/A	yes	no
Paid inclusion	yes	No	no	no	yes	yes
URL status check	yes	Yes	no	yes	yes	yes
<u>Indexing</u>						
Full body text	yes	Yes	yes	yes	yes	yes
Stop words	yes	Yes	yes	No data	yes	no
Meta description	yes	No	yes	yes	yes	yes
Meta keywords	yes	No	no	No data	yes	no
ALT text	yes	Yes	no	No data	no	no
Comments	no	No	no	no	yes	no
<u>Ranking</u>						
Meta tags boost ranking	no	No	no	no	yes	no
Link popularity boosts ranking	yes	Yes	yes	yes	yes	yes
Direct hit boosts ranking	no	No	no	no	yes	no
<u>Spam</u>						
Meta Refresh	Yes	No	no	No data	no	no
Invisible text	Yes	No	no	No data	yes	no
Tiny text	Yes	Yes	no	No data	yes	no

Search Engines’ Features Tests

Search engines are one of the primary ways that Internet users find a web site. A web site with a good listing or ranking in a search engine listing will see an increase in traffic as compared to sites with lower rankings. Many web sites are low in the ranking or do not appear in the engine listings at all because the site designers have failed to consider how search engines work. Submitting sites to search engines is only half the battle. It is also important to “optimize” the site for the search engines, which simply means ensuring that the pages are easily accessible to the various search engines (i.e. soft robots), and that the design is focused in such a way that it helps improve the chances that the pages will be found. Table 2 shows the various search engine features for some of the available

search engines. Based on these features, the presence of frames, meta-tags (including those for generator and charset), titles (for sites with more than one page), image maps, and alternative text for images are searched on the sites for this study.

The Web Presence Tests

Tests were also carried out to determine the stage of web presence for electronic commerce based on the criteria detailed in section-2. In order to achieve this, the sites were analyzed for whether their content was static or dynamic, whether the forms were available or not, if they had the ability to carry out online transactions including ordering and secure payments, and whether their architecture was 2-tier or 3-tier.

IV. RESULTS

The analysis of test results shows that the majority of sites that completely passed the accessibility tests were found in the accommodations category, with the remaining categories containing the number of Bobby Approved sites being limited to only one or two. Table 3 shows a summary of the results obtained from the Bobby 3.2 tests, carried out. As it is seen in these results, duty free stores' sites have the highest number of pages per site; however they also have the highest number of Priority 1 (P1) errors with none of the sites being approved by Bobby. On the other hand, accommodation sites, which have the second highest number of pages per site and Priority 1 errors, actually have the highest number of sites approved by Bobby.

Table 3: Summary of highest and lowest number of pages and Priority 1 errors, and Bobby Approved sites

Type of Site	Highest #Pages/Site	Lowest #Pages/Site	Highest #P1 Err/Site	Lowest #P1 Err/Site	# Approved Sites	Percentage of Approved Sites
ACMD	70	1	1401	0	17	17.2%
TA	21	2	171	2	0	0%
RA	13	1	101	2	0	0%
CSA	17	1	130	0	1	6.7%
REST	11	1	43	0	2	20%
DFS	83	4	2015	2	0	0%
BS	35	2	381	0	1	16.7%

Moreover, tests were performed to determine how easy it is for various search engines to access the site and consequently, how the site will potentially be ranked by the search engines. It was found that for the elements tested on the accommodation sites, less than 50% satisfied the tests carried out for frames, image maps and alternative text, while just over 60% exhibited conforming page titles, and approximately 85% had Meta tags on the pages. For the travel, rental and cruise ship agencies, less than 40% exhibited frames, image maps and alternative text, with 42% having titles conforming to the page content. 75% of the sites exhibited Meta tags. Comparatively, the tests carried out on the restaurants, duty free stores and Barbados stores had higher percentages for conforming titles, frames and alternative text, but only 60% of the sites exhibited Meta tags. It needs to be noted that none of these sites had image maps. Table 4 shows the number of sites within each type that contains the elements tested for. However, these results show that most sites only meet the basic needs for the search engines' features, table 5.

Table 4: Search Engines' Criteria Testing Results (by # sites)

Type of Site	Frames	Image Maps	Conforming Titles	ALT Text	Meta Tags
ACMD	6	3	63	48	84
TA	0	1	5	2	6
RA	2	2	4	0	13
CSA	5	0	8	4	11
REST	2	0	5	3	6
DFS	2	1	3	2	5
BS	0	1	3	1	4

Table 5: Search Engines' Criteria Testing Results (by % sites)

Type of Site	Frames	Image Maps	Conforming Titles	ALT Text	Meta Tags
ACMD	6.1%	3.0%	63.6%	48.5%	84.8%
TA	0.0%	16.7%	83.3%	33.3%	100%
RA	11.8%	11.8%	23.5%	0.0%	76.5%
CSA	33.3%	0.0%	53.3%	26.7%	73.3%
REST	20.0%	0.0%	50.0%	30.0%	60.0%
DFS	33.3%	14.3%	42.9%	28.6%	71.4%
BS	0.0%	16.7%	50.0%	16.7%	66.7%

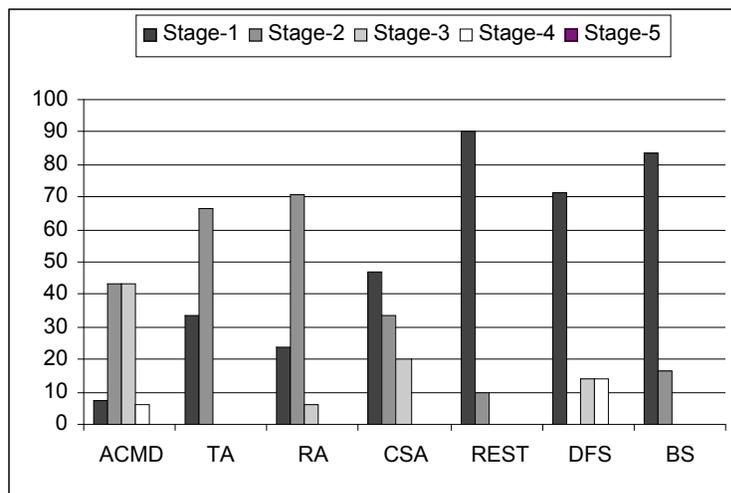
On the other hand, the highest percentage of sites with online booking and online payment capabilities were found to be in the section containing the accommodation sites. The restaurants and Barbados stores were consistently the worst (percentage-wise) for the tests performed for presence of databases, forms and online booking. Table 6 summarizes the results for the percentages of sites within each category containing the elements as listed. As seen in the table, only two types of sites implemented databases in some way – accommodations and duty free stores – and even those types of sites had very few sites with database implementation. Except the sites of restaurants, travel agencies and Barbados stores, online payment options were provided in at least 7% of the sites in the other categories/types. Although accommodations had the highest percentage of sites offering online booking options, rental agencies were the highest percentage of sites containing forms on the pages, with sites for the restaurants having the least percentage.

Table 6: Percentages of sites within each type of site containing specific elements

Types of Sites	Static Pages	Forms	Online Booking	Online Payment	Databases
ACMD	89%	57%	93%	47%	6%
TA	100%	67%	67%	0%	0%
RA	71%	93%	86%	7%	0%
CSA	100%	53%	53%	20%	0%
REST	80%	10%	10%	0%	0%
DFS	86%	71%	29%	14%	14%
BS	100%	29%	17%	0%	0%

Figure-1: Percentage of sites based on each stage

There is no site at Stage-5; ACMD denotes Accommodations, TA Travel Agencies, RA Rental Agencies, CSA Cruise Ship Agencies, REST Restaurants, DFS Duty Free Stores and BS Barbados Stores



In summary, it was seen that for those arenas of the tourism and hospitality industry that were studied (agencies, accommodations, restaurants, stores), those that did have a web site, indeed satisfied the criteria for being at the first stage. Overall, approximately 50% of the sites tested were at stage two as outlined, and about 4% being at stage three. Only about 3% of the total number of sites was at stage four, and none of the sites tested satisfied completely the criteria for stage five. However, about 50% of the sites that did have frames, offered an alternative for those browsers that were not frame compatible. Figure 1 summarizes the data based on the stages described in section two for each category/type of sites. Table 7 presents the overall ranking of sites in different tests.

Table 7: Ranking (in descending order) of sites for all the tests performed for this study

Ranking	Accessibility	Search Engines	E-Commerce	Overall
1 st	REST	TA	ACMD	ACMD
2 nd	ACMD	ACMD	RA	TA
3 rd	BS	CSA	TA	CSA
4 th	CSA	REST	CSA	REST
5 th	DFS, TA, RA	DFS	DFS	RA
6 th		RA, BS	BS	DFS
7 th			REST	BS

V. CONCLUSION

In conclusion, the authors of this paper believe that different stages of “web presence” on the net are very much related with the different stages of electronic commerce, hence the test are being continued for other indicators as well. By following the steps described in this paper for the various stages of being “electronic commerce enabled”, each web site can ensure that they satisfy the criteria for each of the five stages as they apply them to their company, and as such, move progressively further towards ensuring that their site is completely “electronic commerce enabled”. The majority of the sites will actually have a number of criteria to satisfy, and have elements to implement in order to ensure that they reach Stage-5, hence make their sites ultimately accessible by all users of the Internet. The results of this study show that most of the sites in Barbados are at stage-2, which arguably needs less technology and less high-qualified designers. Moreover, this observation is also supported by the accessibility and search engines’ features tests, where overall Bobby approves only 13% of the sites. In other words, only 13% are accessible by all users. Furthermore, only 38% satisfy the basic features of search engines. It shows the level at which the business is and what they need to do for the future. Obviously, these criteria are very much related with the infrastructure, the number of trained/educated people and the market position of a country, however, it is a good indicator, especially for a developing country to determine its priorities and targets for the future of electronic commerce in that country.

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