

Evaluating the Readiness of E-Commerce Websites

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Abstract—Many developing countries are formulating strategies intended to exploit the opportunities offered by e-commerce. One fundamental strategy which often seems to be ignored, or is unachievable by many small and medium-sized enterprises (SMEs) in developing countries is to ensure that they have a sophisticated e-commerce website. In this paper, the readiness of e-commerce websites in Barbados is determined by evaluating ninety-eight websites across eight service sectors using the CEC Website Evaluation Framework. The findings show that although these websites were easy to use and provided some product/service information they generally lack company information, innovation in services, transaction processing, and customer services. In addition, the banking sector had the highest ranking websites, followed by online shops, real estate, car rentals, tour operators, accommodation, restaurants and insurance. Based on these results, a set of recommendations have been proposed which are intended to promote the growth of e-commerce. A similar study should be conducted by any government, SME or stakeholder interested in evaluating the implementation phase of e-commerce in their country.

Keywords—Developing countries, e-commerce, sophistication of Barbados websites, website evaluation.

I. INTRODUCTION

MANY developing countries are formulating strategies intended to exploit the opportunities offered by e-commerce. One fundamental strategy which often seems to be ignored or is unachievable by many small and medium-sized enterprises (SMEs) in developing countries is the development of high quality e-commerce websites which: have secure transaction processing; provide company and product information; provide customer services; and, are easy to use.

In order to evaluate the implementation phase of e-commerce in a developing country, it is necessary to evaluate the e-commerce websites of businesses to determine their readiness. To this end, Elliot *et al.* [2] CEC Website Evaluation Framework was used to evaluate ninety-eight websites from eight service sectors in Barbados.

Only a few researchers have published studies on e-commerce in Barbados; these include Fraser *et al.* [12], Molla *et al.* [5] and McClean [13]. These studies have focused on users' online shopping habits [12]; the institutional actions

which have impacted the diffusion of e-commerce in Barbados, over a six year period [5]; and, the practices of e-commerce facilitators and practitioners [13]. However, no research has examined the quality of the existing websites in order to determine their e-commerce readiness.

Barbados is a good developing country to study because:

1. It has enacted two critical pieces of e-commerce legislation and has an additional one in draft form [1][6][11].
2. About 60 percent of the population is online [14].
3. Over 87,839 credit cards have been issued [15].
4. It has most of the limitations of developing countries including: high Internet access costs [5], a lack of willingness of consumers to use their credit cards to make purchases online [5][16]; and, banks are reluctant to issue merchant accounts [5].

These findings are of great importance, to the other islands in the Caribbean region and any developing country embarking on e-commerce, since it allows governments, SMEs and other stakeholders to evaluate the implementation phase of e-commerce in their country.

A. Overview

The remainder of this paper is organized as follows. In sections II and III, respectively, website evaluation frameworks are reviewed and an overview of e-commerce in Barbados is presented. In section IV, the study is described and the evaluation methodology outlined. The results are presented in section V and discussed in section VI. Finally, recommendations for the growth of e-commerce in Barbados are proposed in section VII.

II. WEBSITE EVALUATION FRAMEWORKS

Several website evaluation frameworks have been presented in the literature, however only a select few will be presented in this section.

Elliot *et al.* [2] described an evaluation framework called the Centre for Electronic Commerce (CEC) Website Evaluation Framework which consisted of six categories; these categories were: company information and function, product/service information and promotion, buy / sell – transactions, customer services, ease of use and innovation in services and technology. In each of these categories, five elements were defined. These elements are presented in Figure 1. A total of thirty (30) elements were used to evaluate a given website (six categories of five elements each). Each element

was awarded a score of 1 or 0 depending on whether the given feature (or features) was present or not. This framework was used to evaluate 100 Danish companies websites and it was reported that approximately 80% of these websites had a rating of 50% (and overall score of 15 out of 30) or less.

Company information and function

- (1) Ownership, company mission statement, financial performance
- (2) Operations and product/service areas
- (3) Image building
- (4) Contact details or list of distributors
- (5) Richer set of company relevant functions

Product/service information and promotion

- (6) General product/service groups
- (7) More detailed product/service specifications
- (8) Pricing
- (9) Promotions on special products/services
- (10) Details on new or future products/services

Buy / sell – transactions

- (11) Supports on-line purchasing
- (12) Security
- (13) Simplified processes
- (14) Online payment
- (15) Details of full transaction cost + order confirmation + delivery time /mode + trust assurance

Customer services

- (16) Sales assistance
- (17) Customer policies
- (18) After sales procedures
- (19) Customized services
- (20) Broader approach to customized services

Ease of use

- (21) Layout and design
- (22) Site map
- (23) Website found easily by a search engine
- (24) Site information easily assessable
- (25) Caters for a range of users

Innovation in services and technology

- (26) Enhanced customer service – orders
- (27) Enhanced customer service – feedback
- (28) Enhanced customer service – communities
- (29) Enhanced customer service – website customization
- (30) Novel and effective use of multimedia

Fig. 1 the five elements of each of the six categories comprising the CEC Website Evaluation Framework; these elements are labeled 1 to 30.

Doolin *et al.* [3] utilized the Extended Model of Internet Commerce Adoption (eMICA) to evaluate 26 New Zealand regional tourism organizations. In this model three stages were

defined; each stage contains one or more layers. In the first stage, which was called web-based promotion, there were two layers. The first of these layers comprised of basic information about the company while the second layer considered a richer set of information, for example email contacts. In the second stage, which was called web-based promotion, three layers were defined. Each of these layers was determined by their level of interactivity. The first layer was characterized by low interactivity, such as the interactivity provided by a basic product catalogue. The second layer was characterized by medium interactivity, for example customer support and the third layer or the high interactivity layer by a chat room. In the final stage, which was called provision of information and services and transaction processing, only one layer, characterized by secure online transactions and order status, was defined. It was reported that 97% (25) of these web sites where at the first and second stages.

Limayem *et al.* [4] evaluated 80 tourism operator websites in Hong Kong to determine their e-business readiness. Their evaluation framework utilized 22 criteria to determine the ease of use of the interface, the variety and content of the information on the website, the types and levels of e-business services and the organizational trust factors. The scoring mechanism used was similar to Elliot *et al.* (2000) in that each of the 22 criteria were awarded a 0 or 1 depending on the presence or absence of the given feature. The results of the evaluation revealed that only 46% of these websites had a rating of 50% or more (a score of 11 out of 22).

Sellitto *et al.* [9] described a framework which evaluates websites using features from four categories, namely authority and currency, accuracy, objectivity and privacy. Each category contained one or more features; for example the features in the authority and currency category were authorship, creation date, contact details and author reputation. Each of these features was assigned a weight, for example the highest weighted feature was reputation which was assigned a weight of 25%. These weights were based on the experience of one of the authors. Sellitto *et al.* used this framework to evaluate 58 health information documents on Australian websites. Of these websites 27 documents were taken from public hospitals, 16 documents from Government sponsored health sites and 15 documents from commercial health product suppliers. The resulting scores for each of the website types were public hospitals, 71.5%, Government sponsored health sites, 80.6% and commercial health product supplier, 41.0%. Only four websites were found to satisfy all of the criteria in the four quality categories.

Finally, Signore [10] defined a five-dimensional model which examined the correctness, presentation, content, navigation and interaction of websites.

III. E-COMMERCE IN BARBADOS

Barbados is a small developing country in the Caribbean, with a population of 266,731 (in 2006) over a land area of 430 Sq. Km. Although Barbados is in the early stages of e-

commerce diffusion [5], it has already enacted some important pieces of e-commerce legislation; has implemented some e-commerce awareness and education programs; has liberalized its telecommunication industry; and has begun offering online banking services.

The e-commerce legislation that has been enacted are the Electronic Transactions Act of 2000, which recognizes digital transactions as being equivalent to paper-based transactions; and the Computer Misuse Act of 2005, which enforces penalties for illegal computer access and child pornography. In draft form is the Data Protection Bill [6].

E-commerce public awareness and education is being promoted by the Government and the University of the West Indies. The Government has offered a number of seminars and public speeches on e-commerce. The university has offered seminars and workshops; an e-commerce course in the Diploma of Information Technology program; e-commerce courses in the Computer Science and Information Technology undergraduate degrees program; and at the postgraduate level an M.Sc. e-commerce degree program [1].

In 2001, the monopoly of the telecommunication industry which was held by Cable and Wireless (Barbados) ended and other providers entered the market. This has slowly been driving down the cost of telecommunication services.

Although more local banks are issuing credit cards, foreign exchange controls limit the amount a consumer can spend outside of Barbados using these credit cards. Some banks and credit unions are also now offering online banking services.

IV. THE STUDY

This study was completed in two parts. The first part was conducted in November 2006 [1] and the second in September 2007 [11].

In total ninety-eight websites across eight service sectors were evaluated; the evaluated sectors were accommodation, car rentals, restaurants, tour operators, real estate, online shops, banking and insurance. The accommodation, car rentals, restaurants and tour operator websites were evaluated in November 2006; while the real estate, online shops, banking and insurance websites were evaluated in September 2007.

The website selection strategy, evaluation criteria and research strategy are described in the following sections.

A. Website Selection

To determine the service industries to evaluate and the number of websites from each service industry to select, the author conducted a search for all Barbadian websites using local newspapers, magazines, online and offline directories, and search engines (e.g. Google).

The author then identified the service industries these websites belonged to and eliminated all service industries with less than five websites. This included books, music, supermarkets and beauty. From the remaining categories, ninety-eight websites were selected: accommodation (20), car rentals (20), restaurants (15), tour operators (15), real estates

(13), Online Shops (6), Banking (4), and Insurance (5).

It was estimated that 15 percent of the total number of accommodation websites were evaluated; 100 percent of the car rental websites; 80 percent of the restaurant websites; 40 percent of the tour operator websites; 54 percent of the real estate; 46 percent of online shops; 31 percent of banking; and, 50 percent of insurance websites. The evaluated websites were therefore a representative sample of Barbadian websites.

B. The Evaluation Criteria

The CEC Website Evaluation Framework was used to evaluate the websites. This allowed a comparison between all the services industries in Barbados that had an online presence at the time of the evaluation. No weighting of elements or categories were deemed necessary since an overall score was not desired.

It was recognized however that due to the nature of these websites that some information might not be available unless the user was logged in. This was found to be the case in the Buy / sell transaction category. This category was therefore not included in the results presented in Table I.

C. The Research Strategy

A single researcher trained in e-commerce was used to evaluate the websites and record the results.

V. RESULTS

The results of the evaluation of the eight service sectors are presented in Table I. This table contains the average scores (which range from 0 to 5, corresponding to the five elements in each category) and standard deviations (in brackets) for each category, comprising each service type. In addition, the overall average and standard deviation of each service type is presented.

The Buy / sell - transactions category was not included in this table since information for this category was not available for all the sectors; since user access was restricted.

The banking sector had the highest overall average rating (average 3.3, standard deviation 0.6); followed by online shops (average 2.8, standard deviation 1.1); real estate (average 2.1, standard deviation 0.8); car rentals (average 2.0, standard deviation 0.8); tour operators (average 2.0, standard deviation 0.9); accommodation (average 1.8, standard deviation 0.9); restaurants (average 1.6, standard deviation 0.7); and insurance (average 1.5, standard deviation 0.9).

Banking websites ranked highest in the following categories: company information and function (average 3.8, standard deviation 0.5); customer services (3.5, standard deviation 1.0); and, innovation (2.5, standard deviation 0.6).

Both Banking and Online Shops websites ranked highest in the ease of use category with scores of 3.8 (standard deviation 0.5) and 3.8 (standard deviation 0.4), respectively.

On the other hand, Insurance companies had the lowest average in the product / service information category (average 1.8, standard deviation 0.8); and the ease of use category (average 2.0, standard deviation 0.7).

Similarly, restaurants had the lowest average in the customer services category (average 0.3, standard deviation 0.6); and innovation (average 0.1, standard deviation 0.3).

TABLE I

EVALUATION RESULTS FOR SERVICE INDUSTRIES (SCORES RANGE FROM 0 TO 5 AND STANDARD DEVIATIONS ARE ENCLOSED IN BRACKETS)

	Company info. and function	Product / service information	Customer services	Ease of use	Innovation	Average Score
Banking	3.8 (0.5)	2.8 (0.5)	3.5 (1.0)	3.8 (0.5)	2.5 (0.6)	3.3 (0.6)
Online Shops	3.0 (0.6)	3.7 (1.2)	2.3 (1.9)	3.8 (0.4)	1.2 (1.5)	2.8 (1.1)
Real Estate	2.2 (0.6)	3.4 (0.9)	0.5 (1.0)	3.5 (0.7)	1.0 (0.6)	2.1 (0.8)
Car Rentals	2.0 (0.5)	2.8 (0.9)	1.5 (1.2)	2.6 (0.7)	1.0 (0.5)	2.0 (0.8)
Tour Operators	2.3 (0.8)	2.7 (1.2)	0.7 (0.6)	3.4 (0.7)	1.1 (1.2)	2.0 (0.9)
Accommodation	1.6 (0.6)	3.3 (0.7)	0.8 (1.2)	2.8 (1.0)	0.7 (0.8)	1.8 (0.9)
Restaurants	2.1 (0.9)	2.8 (0.9)	0.3 (0.6)	2.6 (0.8)	0.1 (0.3)	1.6 (0.7)
Insurance	2.0 (1.0)	1.8 (0.8)	1.0 (1.7)	2.0 (0.7)	0.6 (0.5)	1.5 (0.9)

Generally, the highest scores were found in the ease of use and product / service information categories; while, the lowest scoring category was innovation.

In Table II, the percentages of websites that satisfy each of the elements of the CEC Evaluation Framework are presented. These percentages have been provided for each of the eight service sectors.

From Table II, it can be seen that most, 99 percent, of the evaluated websites provided general product/service groups (Element 6), 93 percent provided contact details (Element 4), 92 percent had an easy to read layout and design (Element 21), 90 percent had easily assessable site information (Element 24), 84 percent had operations and product/service areas (Element 2) and 80 percent were easily found using a search engine (Element 23).

On the other hand, only a small percentage, 4 percent, of websites provided online payment (Element 14); 6 percent had enhanced customer service – orders (Element 26); 7 percent had details on new or future products / services (Element 10); 7 percent had website customization (Element 29); 9 percent

had details of full transaction cost + order confirmation + delivery time / mode + trust assurance (Element 15); and, 9 percent catered for a range of users (Element 25).

Only 11 elements had average percentage of websites values (the final column in Table II) equal to or greater than 50%; and only six elements had percentages over 75%.

Although many websites, 60 percent, provide online purchasing (Element 11), a significantly lower number, 4 percent, provide online payment (Element 14) and 27 percent secured transaction data, including personal information (Element 12).

TABLE II

THE PERCENTAGE OF WEBSITES SATISFYING EACH OF THE THIRTY ELEMENTS OF THE CEC WEBSITE EVALUATION FRAMEWORK (N/A MEANS THAT THE INFORMATION WAS NOT AVAILABLE)

Element	Accommodation (%)	Car Rentals (%)	Restaurants (%)	Tour Operators (%)	Real Estate (%)	Online Shops (%)	Banking (%)	Insurance (%)	Average (%)
1	5	10	7	33	31	50	100	20	32
2	50	85	87	93	100	100	100	60	84
3	0	0	7	0	0	33	75	0	14
4	100	100	100	93	92	100	75	80	93
5	0	0	7	7	0	17	25	40	12
6	100	95	100	93	100	100	100	100	99
7	90	45	60	73	77	67	75	20	63
8	100	85	73	73	100	100	0	40	71
9	30	50	40	27	62	67	100	20	50
10	10	0	7	7	0	33	0	0	7
11	85	85	33	20	0	100	100	60	60
12	25	10	0	13	0	67	100	0	27
13	35	10	0	13	0	100	n/a	n/a	26
14	15	0	0	7	0	n/a	n/a	n/a	4
15	20	10	0	13	0	n/a	n/a	n/a	9
16	15	15	0	7	15	67	100	20	30
17	20	40	7	7	15	50	100	20	32
18	10	50	0	7	0	50	75	20	27
19	15	10	7	0	8	17	75	20	19
20	20	35	20	53	15	50	0	20	27
21	85	95	80	93	100	100	100	80	92
22	15	5	13	13	54	83	75	20	35
23	70	65	87	87	92	100	100	40	80
24	100	95	80	87	100	100	100	60	90
25	10	0	0	60	0	0	0	0	9
26	0	10	0	13	0	0	25	0	6
27	50	75	27	50	77	67	100	60	63
28	5	0	7	0	0	17	25	0	7
29	0	0	0	20	8	17	100	0	18
30	15	10	7	27	15	17	0	0	11

VI. DISCUSSION

Many of the findings of this study are significant, therefore

understanding and linking them to the underlying factors in Barbados are essential if hindrances and bottlenecks are to be identified and workarounds provided.

Most of the websites, except in the insurance sector, were easy to use; this is primarily due to the fact that many of these websites have been built by website design companies.

Most of the websites also provided above average product / service information. Unfortunately, this was not the case with insurance companies. It is expected that, at the very least, service-based companies will include complete and detailed product and services information on their websites.

Only banking and online shops provide above average company information. This will certainly reduce the trust consumers place in the websites of the other service sectors.

Customer service is poor for all of the sectors, except banking. Traditionally, good banks have been characterized by their level of service; it therefore appears that this has been transferred to their online services. Many of the other sectors will suffer loss of customers due to this poor customer service. This has serious implications especially for the tourism-based sectors, such as accommodation and tour operators. In fact, this may be jeopardizing the economy of the country as a whole since tourism is the main foreign exchange earner.

A lack of innovation in every sector, except banking, points to a lack of managers who are capable of integrating technology into their e-commerce initiatives. This highlights a desperate need for e-commerce training in companies, especially at the management level. Due to the nature of the services provided by the banking sector, innovation in services and technology is essential; for example, a high level of website customization.

An alarmingly high number of websites failed to secure transaction data. Out of the 60 percent of websites that provide online purchasing, only 27 percent secure their transaction data; that means that approximately 30 websites allow personal information to be disclosed. Insurance companies are the biggest offenders; none of the insurance websites evaluated secured personal information.

The findings for real estate websites were generally expected, since real estate is about selling a product (thus the high score in this category) and is best bought/sold using a combination of traditional and electronic commerce [8]. The buyer is able to search for properties and conduct virtual tours online before actually visiting the property. However, the actual sale must be completed offline, as per the Electronic Transaction Act 2000, Item 3.1.b [7]. This possibly explains why real estate websites had no transaction processing facilities.

VII. RECOMMENDATIONS

Based on these findings the following recommendations are proposed to further the growth of e-commerce in Barbados:

1. **Companies need to protect the personal data they accept from users.** This measure could improve the trust consumers have in these websites. In addition,

upcoming legislation, the Data Protection Act, will require companies to ensure the privacy of personal information that they collect from consumers.

2. **There is a great need for e-commerce security experts in Barbados.** Too many websites in Barbados simply do not secure personal information (including transaction data). This means that many websites are vulnerable to hackers, thus the need for security experts.
3. **Innovation in services and technology needs to be a priority for SMEs.** Consumers expect website innovations, such as customization which is lacking in most of the websites that were evaluated. If these features are not present it is likely that consumers will not use these websites.
4. **Training in the theory and practice of e-commerce needs to be a priority.** Both management and employees in businesses require e-commerce training. This may take the form of short courses, workshops or seminars. The topics should include: e-commerce strategies; security; online customer service; marketing your website; and information communication technology used in e-commerce – latest trends.
5. **There is a need for the documentation of successful e-commerce initiatives in Barbados.** Case studies of successful and unsuccessful e-commerce initiatives help to document best practices which can be used by any business that is interested in embarking on an e-commerce initiative.
6. **The Government, SMEs and other stakeholders need to begin investing in their web offerings.** Creating sophisticated e-commerce websites is costly, however is necessary especially in the tourism sector. From the lack of currency of the evaluated websites, it is clear that businesses view the creation of websites as a one-off investment. Clearly, this is a grave misconception. Investment is therefore needed to keep websites accurate, current and competitive.

REFERENCES

- [1] P. A. Walcott, "An Evaluation of E-Commerce Websites in a Developing Country," in *Proc. of the 2007 International Conference on Internet Computing (ICOMP 2007)*, Las Vegas, Nevada, USA, 2007, pp. 176-182.
- [2] S. Elliot, A. Mørup-Petersen, N. Bjørn-Andersen, Niels, "Towards a framework for evaluation of commercial web sites, Electronic Commerce: The End of the Beginning," in *Proc. of the 13th International Bled Electronic Commerce Conference*, Bled, Slovenia, 2000, pp. 69-86.
- [3] B. Doolin, L. Burgess, J. Cooper, "Evaluating the use of the Web for tourism marketing: a case study from New Zealand," *Tourism Management*, vol. 23, 2002, pp. 557-561.
- [4] A. Limayem, D. Vogel, "Sophistication of Online Tourism Websites in Hong Kong: An Exploratory Study," in *Proc. American Conference on Information Systems*, Tampa, USA, 2003, pp. 1-10.
- [5] A. Molla, R. Taylor, P. S. Licker, "E-Commerce Diffusion In Small Island Countries: The Influence of Institutions in Barbados," *The Electronic Journal on Information Systems in Developing Countries*, vol. 28, no.2, pp. 1-15, 2006.

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- [6] Ministry of Commerce Consumer Affairs and Business Development (2005, March), *Electronic Commerce in Barbados. Commerce Today* [Online]. 1(2). pp. 1-2. Available: <http://www.commerce.gov.bb/Downloads/CommerceTodayV1.2%202005.pdf>.
- [7] Ministry of Commerce Consumer Affairs and Business Development. Electronic Transactions Act [CAP 308B] [Online]. Available: <http://www.commerce.gov.bb/Legislation/Documents/CAP%20308B.PDF>.
- [8] G. Schneider, *Electronic Commerce*, Thomson Course Technology, Seventh Edition, 2007, ch. 1.
- [9] C. Sellitto, S. Burgess, "Towards a weighted average framework for evaluating the quality of a Web-located health information," *Journal of Information Science (JIS)*, vol. 31, no. 4, pp. 260-272, 2005.
- [10] O. Signore, "Towards a model for web sites," in *Proc. CMG Poland Annual Conference*, Warsaw, 2005, pp. 1-8.
- [11] P. A. Walcott, "Evaluating the Sophistication of E-Commerce Websites in Barbados," in *Proc. of the 6th WSEAS Int. Conference on Data Networks, Communications, Computers*, Trinidad and Tobago, 2007, pp. 418-423.
- [12] S. Fraser, L. Henry, "An Exploratory Study of Residential Internet Shopping in Barbados," *Journal of Eastern Caribbean Studies*, vol. 32, no. 1, pp. 1-20, 2007.
- [13] S. McClean, *Electronic Commerce Trends and Practices in Barbados*, Centre for International Services, The University of the West Indies, Cave Hill, Barbados, 2004.
- [14] Barbados Internet Usage and Telecommunications Reports. Available: <http://www.internetworldstats.com/car/bb.htm>.
- [15] W. R. Moore, "Trends in the Barbadian Credit Card Market," *Central Bank of Barbados Economic Review*, vol. 33, no.2, pp. 25-32, 2006.
- [16] D. Walker, J. Gwilliam, M. Baker, "E-commerce — The world's consumers have their say," *Interactive Marketing*, Henry Stewart Publications, vol. 3, no. 4, pp. 337-349, 2002.