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ABSTRACT

E-government refers to the use of information and communications technology to support the interaction between a government and its citizens, employees, businesses, and other government agencies. Today e-government projects are pervasive in both developed and developing nations worldwide. This study explores the e-government phenomenon in a developing region. Specifically, the objective of this study is to provide an exploratory analysis of the current state of e-government in the Caribbean. We used a website content analysis, with a theoretical base of Layne and Lee's (2001) e-government stage model. The significance of this study is two-fold. First it presents an empirical analysis of that state of e-government in the Caribbean region. Second, the study advances the current literature in the e-government domain and focuses on a region of the world that has been largely overlooked by existing e-government studies.

Keywords

E-government, development, Caribbean

INTRODUCTION

The United States, United Kingdom, Canada, Singapore, and Australia have distinguished themselves as the global leaders in the e-government domain (Lee et al., 2005, Hunter and Jupp, 2001). These countries have embraced the e-government phenomenon and embarked on extensive and comprehensive e-government projects. This paper focuses on the development of e-government, specifically in English speaking Caribbean countries. The subjects of this study are the member countries of the regional trading bloc called the Caribbean Community and Common Market (Caricom). Caricom includes the member states of Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, St Kitts and Nevis, St Lucia and the Grenadines, Suriname, and Trinidad and Tobago. These countries are characterized by a rich diversity in language, culture, ethnicity and political and economic systems the product of their insularity and turbulent colonial history. Part of the goals of Caricom is to foster economic growth and development in the region via the use of technology. The challenges of overcoming political, economic, and other disparities among these micro-states pose a particularly interesting research area. In this paper we examine the level of e-government maturity in the Caribbean through exploratory content analysis of data presented on the countries government websites.

FOUNDATIONS OF E-GOVERNMENT

The foundation of e-government can be defined along different developmental models. Layne and Lee (2001) indicate that e-government develops in four main stages: 1. catalogues, which are primarily static webpage; 2.transactions, which involve the two-way movement of information between the government and the user; 3.vertical integration, which involves the integration of lower to higher levels of government and 4.horizontal integration, which involves functions integrated across different units of government. Their model suggests that e-government development is an evolutionary process characterized by more advanced functions at each successive level of growth.

Anderson and Heriksen (2006) proposed an extension of the Layne and Lee model called the Public Sector Process Rebuilding (PPR) maturity model. The PPR model uses a two dimensional matrix and identifies four progressive phases: cultivation, extension, maturity, and revolution. While Layne and Lee's model focuses on the development of the technical feasibility of e-government, Andersen and Henriksen's model focuses on the development of end-user features.

A third e-government developmental model identifies four stages, moving from least sophisticated to most sophisticated e-government implementation, as follows: platform builders, steady achievers, visionary followers, and innovative leaders (Hunter and Jupp, 2001). This model identifies specific countries that were at each of the different stages. Brazil, Mexico, and Malaysia are described as platform builders while Spain, Portugal, and New Zealand are described as steady achievers. Australia, Netherlands, and United Kingdom are visionary followers with Canada, Singapore, and the United States described as innovative leaders. Initiation, infusion and customization are three sequential phases of a forth e-government developmental model (Ke and Wei, 2004). The Ke and Wei model was applied specifically in Singapore. One concern with the two above models is they both focus on specific countries and may not be directly transferable to countries outside of those specified domains.

The above models represent a sample of e-government developmental models. A common theme across developmental models shows maturity of an e-government project starting with an initial website to a comprehensive platform that delivers multiple products and services to end-users. At a minimum level, e-government projects begin with cataloguing of information and matures to include different levels of transactions for citizens, employees, businesses, and other government agencies (Reddick, 2004). However the citizen-focus is dominant in the existing literature (Reddick, 2005, Marche and McNiven, 2003, West, 2004, Wei and Zhao, 2005, Criado and Ramilo, 2003, Evans and Yen, 2006) since citizens are easily identified as the major government stakeholders.

In developing countries over 60% of e-government projects fail (Swartz, 2004). Project failure is attributed to a variety of factors including social, economic, and political dimensions. Failure can also result from a lack of clearly defined goals and objectives of the e-government project. A broader and more encompassing reason for failure can also be lack of e-government readiness. E-government readiness refers to the amount of infrastructure such as telephone lines, computers, and internet connections that exists to support the online delivery of government products and services (Swartz, 2004).

More broadly, e-readiness is defined as the "extent to which the country is prepared to integrate into the global information society/networked world/digital economy" (infoDev, 2005). E-government readiness in the Caribbean is part of the larger technological landscape in the region. Even though the definition of e-readiness is broad and subject to different interpretations, Caricom nations have undertaken different assessments to determine each country's e-readiness profile (infoDev, 2005). The e-readiness reports across the nations are quite different, both in the methods that were used, and the types of results that were produced. An examination of a specific technological area such as e-government can provide a tangible tool for assessment of one e-readiness component.

THEORETICAL FRAMEWORK

For the assessment and understanding of e-government projects, the government website or web portal can provide valuable information. Examination of a government's website has been used to understand different components of the e-government phenomenon including: e-government usability (Becker, 2005) and e-government service delivery (West, 2004, Shackleton et al., 2004). Similarly, we use the government website to examine the state of e-government development.

An exploratory content analysis methodology was used in this study. The roots of content analysis began with the analysis of newspaper articles to reveal dominant themes in journalism. Beyond newspaper articles, additional material such as speeches, advertisements and comic strips were analyzed to answer research questions (Krippendorff, 1980, Holsti, 1969). Content analysis uses material available via mass media and examines it to find answers to real world questions as well as make predictions. The method of content analysis involves examination of data within a particular context and utilization of the analyst knowledge to make inferences based on the data. Application of content analysis requires that the methods employed are replicable and that the analysis provides explanations and insights into the initial research question(s). Content analysis relies on modeling, statistical techniques and accepts the use of unstructured material (Krippendorff, 1980). One advantage associated with the use of content analysis is that it is an unobtrusive methodology and limits influences that can occur with the use of observations, questionnaires, interviews, or experiments.

METHODOLOGY

The search engine Google, was used to identify official e-government websites for the small sample of Caribbean countries selected. This limited the study to only sites with a ".gov" extension. If no ".gov" sites were found for the specific country the scope of the study was expanded to include verifiable sites with a ".org" extension. A site with a ".org" extension is considered verifiable if there is documentation on the page indicating that it is recognized by and affiliated with the respective country's government. Sites with a ".com" extension were excluded from this study because of their association with non-governmental and/or commercial enterprises. In some unique cases, a ".com" extension has been associated with official government sites (eg. myflorida.com) but for the purposes of this study all such sites were excluded. All links were examined until it led to an external page that was no longer part of the official government website. Data was collected from the navigation of the entire webpage.

As stated earlier, the Layne and Lee (2001) e-government maturity model consists of four stages: catalogues, transactions, vertical and horizontal integration. To test ideas described in Layne and Lee's model we decomposed the catalogue stage into two levels: existence and catalogue. For each stage a set of constructs were identified and used to determine if a specific e-government site had attained that specific level of development. The justification for this division is that before any cataloguing can occur, an e-government site must first exist. The next phase of the model is transactions. Transactions represent two-interactions between the e-government site and its users. Lastly, vertical integration and horizontal interaction are combined to form a single advance level. In summary, the following four categories were used in this study to conduct the content analysis: 1.existence, 2.catalogue, 3. transaction, and 4. horizontal and vertical integration. We use a set of questions to determine if the e-government site has attained a specific level of development as defined by Layne and Lee (2001).

Existence

The existence category refers to the presence of an initial web page and is a required prerequisite for cataloguing. If no relevant page was found for the specific country the content analysis was discontinued. Once a page was found existence also examined the presence of tabs and tab titles on the page. An examination of page tabs, gives an indication of the main categories of information available via the page. The page was also examined for the presence of privacy statements, accuracy statements, and last updated information. These variables are used as indicators for the level of development of the website. Existence also captured the degree of difficulty associated with page navigation. Table 1 shows the ten different items that were used to examine existence.

	Category	**Description**
1	Web Site (Y/N)	Indicates if a current website was found.
2	Language	Indicates number of different languages on a page.
3	Tabs (Y/N)	Indicates if tabs exist on the page.
4	Tab Titles(Y/N)	Indicates if there are labeled headers on page.
5	Privacy Statement (Y/N)	Presence of data privacy statement.
6	Summary of Privacy Statement(Y/N)	Description of how data is protected.
7	Accuracy Statement (Y/N)	Statement attesting to the accuracy of the information.
8	Summary of Accuracy Statement(Y/N)	Indication of party responsible for in data.
9	Multiple Levels of Gov (Y/N)	States levels of government evident on page.
10	Challenges Navigating Page(Y/N)	States if there are problems navigating page.

Table 1: Existence Component

Catalogue

Catalogues examine the content presented on the page. The two main types of information available were text and graphics. As part of the catalogue stage the page was also examined for the types of information available. More specifically, we looked for the presence of information on government agencies as well as any calendars relevant to important government events. The catalogue stage also looks for the presence of text and pdf files available to the end users. Further, we also looked at the number of levels of navigation required to obtain relevant information. Table 2 shows the eight different items that were used to examine e-government information presence. These components are proxies for e-government catalogue stage.

	Category	**Description**
1	Text Info (Y/N)	Text information on the main page.
2	Images (Y/N)	Pictures / graphics on the main page.
3	Important Dates (Y/N)	Calendars available on page.
4	Information on Gov Agencies(Y/N)	Information of government agencies.
5	Hierarchy on Page (Y/N)	Multiple levels on page.
6	Average # of levels of hierarchy	Numeric value eg. 3 - if you can drill down three levels.
7	Citizen downloads (Y/N)	Downloadable forms available to citizens.
8	Business downloads (Y/N)	Downloadable forms available to businesses.

Table 2: Catalogue

Transaction

This construct corresponds to the second stage of Layne and Lee (2001) e-government stage model. Transaction examines data-push and data-pull strategies on the webpage. Data-push refers to the phenomenon that data moves only in one direction, from the government to the end-user. Data-pull phenomenon is user driven and involves submitting user requests and receiving responses back from government. As a result data-pull involves a two-way movement of data and therefore interaction. For the transaction stage we examined the page content for e-mail access, form fill-in, message boards, and weblogs (also called blogs). The transaction stage also includes access to working databases and support for online transactions such as tax filing (Layne and Lee, 2001). Table 3 shows the seventeen different items that were used to examine the transaction stage.

	Category	**Description**
1	E-mail (Y/N)	Contact the government via e-mail.
2	Request info as a citizen (Y/N)	Citizen can request government forms.
3	Request info as an employee (Y/N)	An employee can you request forms of any type.
4	Request info as a business (Y/N)	A business can you request forms of any type.
5	Message Board (Y/N)	Presence of message boards on the website.
6	Blogs (Y/N)	Presence of weblogs or blogs on the website.
7	Search (Y/N)	Search feature available on the main page.
8	Financial Transactions(FT) (Y/N)	Presence of any financial transactions.
9	FT available to citizens (Y/N)	Presence of any FT available to citizens.
10	Citizens tax payment (Y/N)	Ability of citizen to pay taxes on line.
11	Property Registration (Y/N)	Citizen or business can register property online.
12	Permit Renewal (Y/N)	Citizen can renew driver's license online.
13	Ticket Payment (Y/N)	Citizen can pay a parking ticket online.

14	FT available to employees (Y/N)	Presence of FT for employees eg. payroll.
15	FT available to businesses (Y/N)	Presence of any FT available to businesses.
16	Businesses pay taxes (Y/N)	Businesses can pay taxes online.
17	Business funds/grants (Y/N)	Business can receive direct deposit funds.

Table 3: Transaction

Horizontal and Vertical Integration

Integration occurs in two forms, horizontal and vertical. Integration assumes that multiple levels of government exist. Horizontal integration refers to the linkage between different governments at the same level. For example, a country's department of education and department of housing sharing data via the e-government portal will be horizontal integration. In the case of vertical integration, there is a hierarchy in the government, and information is shared from a lower to a higher level. Data transfer between the local and state level of government is an example of vertical integration. To capture the presence of integration via the e-government website proxies for integration were used. Vertical and horizontal integration are advanced stages of e-government development and are not necessarily always visible to end-users on a website. As a result, we did not attempt to distinguish between the two types of integration for this exploratory study. We examined constructs that could represent the transfer of information across or between different levels of government. Some of the proxies for integration were the presence of electronic funds transfer (EFT), electronic data interchange (EDI), transactions for citizens and transactions for businesses. Table 4 shows the six different items that were used to examine horizontal and vertical integration.

	Category	**Description**
1	EFT (Y/N)	Evidence of Electronic Funds Transfer.
2	EDI (Y/N)	Evidence of Electronic Data Interchange availability.
3	Digital Signatures (Y/N)	Evidence of Electronic signature technology
4	Horizontal Integration (Y/N)	Any evidence of horizontal integration.
5	Vertical Integration (Y/N)	Any evidence of vertical integration.
6	Additional Transaction (Y/N)	Any evidence of transactional integration.

Table 4: Horizontal and Vertical Integration Component

RESULTS AND DATA ANALYSIS

Of the fifteen Caricom members, two countries, Haiti and Suriname, did not have an official e-government presence during the period of data collection (fall 2007). Haiti has the lowest gross domestic product (GDP) and literacy rates in the Caribbean while Suriname is the least densely populated Caricom nation. Further investigation will be needed to determine if any of these factors have affected the pace of e-government development in these two respective countries. Table 5 lists the websites that were examined for the data collection.

For each of the four categories examined for e-government development the results are indicated below. For yes and no responses, 1 = yes and 0 = no. All data is represented numerically in the tables. For each category we show the data for each country and then aggregate the data by finding the averages in each group. Since both Haiti and Suriname did not have an e-government portal, all the subsequent results reflect data collected from the remaining thirteen Caricom members.

Table 6 shows the results for the existence category. All countries had a website with at least one language and included tabs for user navigation. All countries scored a minimum of 5 indicating the presence of at least a functional government homepage with tabular navigation. The least popular component was a description of the privacy statement, which was only found on one country's website. For the existence component mean = 5.46, mode = 5 and median = 5.

Country	Website
Antigua and Barbuda	www.ab.gov.ag
The Bahamas	www.bahamas.gov.bs
Barbados	www.barbados.gov.bb
Belize	www.belize.gov.bz
Dominica	www.dominica.dm
Grenada	www.gov.gd
Guyana	www.gina.gov.gy
Haiti	N/A*
Jamaica	www.jis.gov.gm
Montserrat	www.gov.ms
St. Kitts and Nevis	www.gov.kn
St. Lucia	www.stlucia.gov.lc
St. Vincent & the Grenadines	www.gov.vc
Suriname	N/A*
Trinidad and Tobago	www.gov.tt
	* No .gov site identified for this country.

Table 5: E-government Websites for Caricom Members

Code	Ant/Bar	Bahamas	Barbados	Belize	Dominica	Grenada	Guyana	Jamaica	Montserrat	St Kitts/Nevis	St Lucia	St Vincent	T&T
1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1	1	1	1	1	1
5	0	0	0	0	1	0	0	0	0	0	1	0	0
6	0	0	0	0	1	0	0	0	0	0	0	0	0
7	0	1	0	0	1	0	0	0	0	0	0	0	0
8	0	1	0	0	1	0	0	0	0	0	0	0	0
9	1	1	1	1	0	1	1	1	1	1	1	1	1
10	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	5	7	5	5	8	5	5	5	5	5	6	5	5

Table 6: Results of Existence Component

Table 7 shows the results of the e-government catalogue component. All websites contained a combination of text and graphical material. Further all countries except Dominica provided information on the first page about government agencies. Each e-government site had a minimum of two levels of navigation before the user was re-directed to a non-government site. Many of the e-government pages eventually linked to other external sources such as international or private sector agencies. Only twenty percent (20%) of the e-government websites supported citizen downloads of forms for government services. Bahamas provided the highest level of cataloguing by including downloadable forms for both citizens and businesses.

Code	Ant/Bar	Bahamas	Barbados	Belize	Dominica	Grenada	Guyana	Jamaica	Montserrat	St Kitts/Nevis	St Lucia	St Vincent	T&T
1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	0	0	1	1	0	1	1	1
4	1	1	1	1	0	1	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1	1	1	1	1	1	1
6	2	3	2	3	3	2	3	3	3	3	3	3	3
7	0	1	0	0	0	0	0	1	0	0	0	0	1
8	0	1	0		1	0	0	0	0	0	0	0	0
Total	7	10	7	8	8	6	7	9	8	7	8	8	9

Table 7: Results of Catalogue Component

Table 8 shows the results of the transaction component. All countries except Grenada and Guyana had an option for e-mail on the e-government website. Twenty –three percent (23%) of the countries examined support citizen transactions. Interestingly, thirty percent (30%) of countries had a message board on their e-government pages. Tourism is a strong economic driver in the Caribbean and some of the message boards represented an opportunity for visitors to post travel comments. The only other transactional feature identified was the presence of a working search engine on twenty-three percent (23%) of e-government pages. Search engines provide a very useful tool for website visitors to navigate directly to required information.

Code	Ant/Bar	Bahamas	Barbados	Belize	Dominica	Grenada	Guyana	Jamaica	Montserrat	St Kitts/Nevis	St Lucia	St Vincent	T&T
1	1	1	1	1	1	0	0	1	1	1	1	1	1
2	0	1	0	0	0	0	0	1	0	0	1	0	0
3	0	1	0	0	0	0	0	0	0	0	0	0	0
4	0	1	0	0	1	0	0	0	0	0	0	0	0
5	1	0	0	0	1	0	1	1	0	0	0	0	0
6	0	0	0	0	1	0	0	0	0	0	0	1	0
7	0	1	0	0	1	0	0	1	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

14	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	5	1	1	5	0	1	4	1	1	2	2	1

Table 8: Results of Transaction Component

Table 9 shows the results of the horizontal and vertical integration component. The Bahamas e-government site was the only place where vertical integration was identified. All other countries excluded all vertical and horizontal integration. Vertical and horizontal integration are advanced functions that can be implemented via an e-government project. Further, the structure of government for some smaller countries may not have as many levels as that of larger developed nation, and thus does not see a need to transfer internal government functions to an online environment.

	Ant/Bar	Bahamas	Barbados	Belize	Dominica	Grenada	Guyana	Jamaica	Montserrat	St Kitts/Nevis	St Lucia	St Vincent	T&T
1	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	1	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	0	0	0	0	0	0	0	0	0

Table 9: Results of Horizontal and Vertical Interaction Component

Based on the combined results of the content analysis, e-government in the Caricom region of the Caribbean is at best at the early stages of the transaction level as defined by Layne and Lee (2001). This stage of development can be explained by different factors, including the rate of Internet penetration in the Caribbean region as well as the amount government spending that occurs in the area of technology. Further analysis into the specific factors that affect this outcome can be fodder for a larger study about the dynamics of e-government development in the region.

IMPLICATIONS, LIMITATIONS, AND FUTURE PROJECTS

The e-government phenomenon has universal appeal and impact. This study is an important one for the following three reasons: 1. it provides important insights into the development of e-government in the Caribbean; 2: it analyzes the current state of e-government development in Caricom nations; and 3. provides a methodological template for the examination of e-government development.

The development of e-government projects in the Caribbean can also be a tangible driver for the reduction of the digital divide in the region. For the Caribbean and Latin America an increase in a country's GDP can result in a significant reduction of its digital divide (Bagchi, 2005) . Development of the e-government platform in the Caribbean can also provide an important starting point for other government and business led initiatives such as electronic markets and electronic supply chain management.

However, one primary short-coming of this study is the limited sample size. The small sample size can limit extending the results of this study to other Caribbean countries, or other developing regions of the world. One strategy to address the sample size limitation is to include a broader subset of Caribbean countries. Secondly, in addition to just looking at a single site for each country, analysis can also include sites for specific branches of government, and thus effectively increasing the

number of websites examined for each country. A second limitation of this study is the focus on only English speaking countries. This is an inherent bias due to language limitations of the researchers.

The future directions for this research can include a longitudinal analysis. This will require a follow-up analysis for each country and compare the results to determine if any additional developments are visible via the e-government portal. Secondly, this study can provide a basis for comparison of the e-government platforms of similar developing regions in the world.

CONCLUSION

This study entails a content analysis of government websites to examine the state of e-government development in the Caribbean. The theoretical framework is based on the Layne and Lee (2001) developmental model. This study examined a region of the world that has received little or no attention in the current e-government research; thus, while exploratory in nature, it is an important expansion of e-government research into a historically important developing region of the world. The findings of this study indicate that e-government as a global phenomenon is not limited to more developed regions of the world. Further, the study indicates that Caribbean countries, specifically Caricom nations, have undertaken important initiatives to develop their e-government infrastructure. This study also extends the literature as it relates to empirical analysis of e-government development.

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