Electronic government: Evaluating status through content analysis of government websites in Papua New Guinea

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Abstract

Electronic government (e-government) involves government agencies using information and communications technology and the various Internet technologies to transform the way they provide their services. It includes aiding agencies to improve their processes in order to achieve internal operational efficiency and effective service delivery. This technology is being used to provide services online, but the development made so far in Papua New Guinea (PNG) is yet to be researched. Thus, this paper examines the status of e-government development in PNG and discusses the research context, an e-government model and content analysis methodology. By using content analysis and an e-government progress model, websites of government agencies are assessed to evaluate their level of development. The paper also discusses the instrument for the analysis and reports on the findings on current development. Finally, the paper provides an understanding that could aid further planning, development and evaluation of e-government progress.

Key words: connected services, content analysis, electronic government, egovernment, e-government services, emerging information services, enhanced information services, e-services, e-government model, information and communication technology, online service development, transactional services

Introduction

Government agencies aim to attain internal operational efficiency in their processes and thereby achieve effective service delivery (Huang, 2006). They seek to do this by leveraging the advances in information and communications technology (ICT) and the Internet technologies (Daniel, 2015), a phenomenon known as electronic government (e-government). By adopting e-government technology, agencies in Papua New Guinea (PNG) are striving for process efficiency and service delivery effectiveness (PNG Government, 2010), however, the progress made so far is yet to be adequately researched, a situation this paper seeks to address. Whilst need for services is usually high, there is some evidence indicating that their delivery and quality are unsatisfactory (Singh et al., 2011) due to various challenges in implementation (PNG Government, 2010).

This paper will examine the status of e-government progress (online service development) in PNG. An online service refers to information (e.g. contact details, services provided, plans and policies), transactional (e.g. e-passport) and connected service (e.g. e-polling and online feedbacks) which can be

provided through e-government websites (UN, 2014). The paper will discuss the research context, United Nations (UN) e-government model and content analysis methodology. By using content analysis (GAO, 1989) and the UN model (UN, 2014), the paper will describe how e-government websites were assessed to evaluate current development and also the instrument (coding categories) used for the analysis. The paper will provide an understanding of the progress made so far in order to guide further planning, development and evaluation. The research context will now be discussed.

Research context

Various plans have been formulated to guide development in PNG. Importantly, the Medium Term Development Strategy 2005-2010 provides ten guiding principles aimed at achieving economic and social advancement (PNG Government, 2004). These principles include improvements in the quality of life, integrating the three tiers of government, empowering citizens and improving their skills.

Moreover, the Medium Term Development Plan 2011 - 2015 sets out the PNG Development Strategic Plan goals, deliverables and strategies for building the foundations for national growth (PNG Government, 2010). The stated aims in the plan include increasing integral human development, developing human resources with advanced skills, providing equal opportunities for all citizens to participate in the power structure, political decision making and benefit from national development. The government also aims to achieve "high standards of performance and management in all levels and institutions" (p. 146), by providing quality education to all citizens, improving access to the Internet and communication services, improving and strengthening budgeting, financial management, and electoral process. The government also aims to provide "modern and affordable ICT that reaches all parts of the country" (p. 71), an integrated information system and access to e-government services such as epassport and various online applications. These goals could be accomplished with proper planning, implementation and use of e-government technologies which the government plans to fully adopt by 2030.

Furthermore, the Vision 2050 Directional and Enabling Statements provide the basis for socio-economic growth (PNG Government, 2009). These statements include improving access to basic infrastructure and services, utilising ICT in areas such as health and education, strengthening the three-tier government system and improving service delivery, implementing an effective service delivery model, establishing a communications satellite network and national information management system.

PNG government agencies are striving to achieve these goals and objectives through the implementation and use of e-government services (PNG Government, 2010). From the present literature review, there appears to be a lack of e-government research in PNG and so the current state of e-government development in unknown. In addressing this situation, this paper seeks to fill this gap and provide an understanding of the level of development. Evaluating

the extent of online service development usually requires the use of an egovernment model, a number of which are found in the literature.

Models of e-government development

Several models to guide and measure e-government development have been discussed (Bwalya, 2011; Chandler & Emanuels, 2002; Deloitte, 2001; Hiller & Belanger, 2001; Layne & Lee, 2001; Moon, 2002; UN, 2014; Wescott, 2001), which seek to divide the development into stages based on their degree of technological integration within government agencies (ministries, departments, provincial governments and statutory bodies) and perceived level of services. They proceed from basic forms to more sophisticated levels.

Those countries which have embraced e-government may have used different models in their planning and implementation (Daniel, 2015), some using existing models whilst others using models adapted from those found in the literature. These models may not be applicable in all countries because of varying technological, cultural and socio-economic conditions (Daniel, 2015). A model that considers these conditions in PNG may be required to guide planning, development and evaluation of e-government services. We now discuss the UN model, which is used in this paper.

UN e-government model

The UN conducts a survey every two years to assess the extent of egovernment service development of member countries including PNG (UN, 2014). The last survey was conducted in 2014 using its four stage model (**Error! Reference source not found.**). This model is used to examine the progress in PNG.



Figure 1: The UN e-government model was used to examine e-government service development of the UN member countries (such as PNG) in 2014. Hence, it is used to examine e-government websites in PNG. Adopted from UN, 2014, p. 195.

In the first stage, basic information (simple one-way communication) such as public policy, governance, laws, regulations, relevant documentation and types of services offered are provided on government websites (UN, 2014) as well as

links are to ministries, departments, other branches of government, and archived information. In the next stage, enhanced one-way or simple two-way e-communication between the government and its citizens are provided, which includes downloadable forms for services and applications. Further, multilanguage and multi-media (audio and video) capabilities for relevant information are provided. In the transactional stage, advanced two-way communication including requesting and receiving inputs on government policies, programmes, and regulations, are provided. Financial transactions such as paying traffic fines and non-financial transactions such as applying for a passport online are offered. In the last stage, e-services and e-solutions that cut across departments and ministries in a seamless manner are provided. Such services are citizen-centric rather than government-centric, creating an environment that empowers citizens to be active in government activities and decision making. E-participation services are also provided to support and encourage citizen-engagement in the government decision-making process in areas such as public policies.

This model combines transactional and interactive stages of its previous fivestage model (emerging, enhanced, interactive, transactional and connected) (UN, 2008). Some stages from other models (e.g. integration and political participation) are merged into one (connected services) while others (e.g. information and interaction) are similar to emerging and enhanced. The model is used together with content analysis methodology in this paper; hence, we will now discuss the latter.

Content analysis methodology

Content analysis can be defined as "a research technique for the objective, systematic, and quantitative description of the manifest content of communication" (Kassarjian, 1977 as cited in Huang, 2006, p. 166). It is a method of quantifying qualitative data and considered as an effective way of evaluating e-government practice (Huang, 2006). It can be further described as:

a set of procedures for collecting and organising information in a standardised format that allows analysts to make inferences about the characteristics and meaning of written and other recorded material. One way to begin structuring written material so that it can be analysed is to summarise and list the major issues that are contained in it. Then the frequency with which these issues occur can be counted. Simple formats can be developed for summarising information or counting the frequency of statements. More complex formats can be created for analysing trends or detecting subtle differences in the intensity of statements (GAO, 1989, p. 6 – 7).

Content analysis comprises six steps (GAO, 1989): "decide to use content analysis, determine what material should be included, select units of analysis, develop coding categories, code the material, and analyse and interpret the results" (p. 8). These steps are further explained as follows.

After deciding to use content analysis to examine written communication (such as public documents, newspapers, survey responses and websites) (GAO, 1989), sampling is performed. Sampling determines what material should be included in the analysis if the body of material (universe) is too large, provided that they can be easily accessed and reanalysed for consistent results.

Selecting the units of analysis includes choosing recording and context units (GAO, 1989). "Context units set limits on the portion of written material that is to be examined for categories of words or statements. A recording unit is the specific segment of the context unit in the written material that is placed in a category. It may be a word, a group of words (such as those that identify a theme), a sentence, a paragraph, or an entire document" (p. 10).

Coding categories "provide the structure for grouping recording units" (GAO, 1989, p. 11) and should be clearly defined according to the problem and content to be analysed. They should be "exhaustive, mutually exclusive and independent so that all relevant items in the material being studied can be placed within a category, no item can be coded in more than one category and a recording unit's category assignment is not affected by the category assignment of other recording units" (p. 12).

Categories can be developed according to groupings, scales or matrices (GAO, 1989). Scales and groupings allow issues to be ordered or grouped. These formats could be combined into matrices to gain more insight than simply establishing the presence, absence or frequency of issues. Categories could be used to measure three levels of quantifying issues – space, frequency and intensity. Frequencies could be coded by counting the number of times issues appear in the material and intensity by counting the frequencies and adjusting them by applying a weight that measures relative intensity.

Coding could be performed manually or using computer software depending on the availability of resources and format of the material (GAO, 1989). Specific instructions may need to be provided on how to code the material including "definition of recording units and procedures for identifying them, descriptions of the variables and categories, outline of the cognitive procedures used in placing data in categories and instructions for using and administering data sheets" (p. 18).

Pretesting may need to be performed (several times) before actual coding begins, to test the categories and instructions (GAO, 1989). Part of the material is analysed to ensure that categories are defined properly and meet the requirements (discussed above), coding instructions are clearly specified and coders are well suited for the coding process. Coding begins when assured that it can be performed with reliability.

Once the data is coded, it can be analysed by "summarizing, discovering patterns and relationships within the data, testing hypotheses about the patterns and relationships, and relating the results to data obtained from other methods or situations or assessing the validity of the analysis" (GAO, 1989, p. 20).

"The most common means of summarising data is by looking at frequencies among them. Absolute frequency might be the number of times issues are found in the sample; a relative frequency might be represented by a percentage of the sample size (GAO, 1989, p. 21).

Now let us review how content analysis and the UN model were used in published studies to understand how it is applied in this paper.

Content analysis in research

Several studies have used content analysis to examine the adoption of egovernment (Huang, 2006). This methodology was used to examine the websites of local governments in the United States by assessing their services, functions and features. The instrument used to perform the analysis was developed based on a four-stage model (information, communication, transaction and democracy) and extensive literature review. The model was used to examine the provision of informational and transactional services and compare e-government practices of local governments. The study found that egovernment adoption was at the elementary level but provision of communicational and transactional services was possible.

Furthermore, the methodology was used to examine the websites of Nepal governmental ministries for the availability of features that promote citizen-togovernment interaction (Parajuli, 2007). The study used an instrument, which was developed based on the Web content evaluation metrics to assess the transparency, interactivity, accessibility and usability of websites. Features that promote transparency of government, communicating with government, citizen participation and satisfaction, and meeting the expectations of citizens were either absent or infrequent. The availability of such features was used to understand the overall progress of e-government.

Moreover, the methodology was used to establish the status of e-government in three African countries – Kenya, Tanzania and Uganda (Kaaya, 2004). The study used an instrument based on attributes related to establishment year, visibility and usability, which were compared against a four-stage model (website creation, initial two-way interaction, online transactions and comprehensive government portals). These stages start from simple to sophisticated features. It was concluded that e-government websites were found to be operating at the two initial stages of e-government.

Content analysis has been successfully used in published studies (discussed above). Thus, it is used in this paper to assess PNG government websites, which now leads to the discussion of how this methodology was used in this paper.

Methodology

The content analysis steps (discussed above) were followed to analyse the content of e-government websites and compare against the UN model to assess the level of development. There are more than 130 listed government agencies (ministries, departments, provincial administrations and statutory bodies) (PNG Directories, 2016). Statutory bodies include authorities (e.g. Immigration & Citizenship Service Authority), commissions (e.g. Internal Revenue Commission) and corporations (e.g. National Housing Corporation).

Only 37% of all these agencies had posted websites and these formed the body of material (population) of the study. A random sample of 31 agencies' websites was selected for analysis and accessed through links provided on other easily accessible sites. Where there were no links provided, search engines such as Google were used to locate sites based on the name of the agencies with names being accessed from the PNG telephone directory (PNG Directories, 2016). The webpages and features of interest (e.g. government documents) contained therein were selected as the units of analysis.

Four categories (emerging, enhanced, transactional and connected) for coding Four categories (emerging, enhanced, transactional and connected) for coding data were developed based on the stages of the UN model (**Error! Reference source not found.**). The elements from each stage were defined as items of measure for each corresponding category. These categories and items were then used to determine the availability of services on the websites so that progress could be gauged.

Stages/categories	Features/items of measure
	Vision and mission statement
Emerging information services	Organisational structure
	News and events
	Contact details
	Frequently asked questions
	Links to other government agencies
	Government documents
	Services provided
	Employment opportunities
Enhanced information services	Search facility
	Contact form
	Help and support
	Sitemap
	Downloadable forms
	Multimedia support
	Multi-language support
Transactional services	Financial transactions
	Non-financial transactions
Connected services	Feedback mechanism
	Use of social media
	Discussion forum
	Polling mechanism
	Chat facility

Table 1: Categories and items of measure were established based on the UN model. The stages formed the coding categories while the elements in these stages were defined as the items of measure for the corresponding categories.

Pretesting was conducted against three websites to ensure that categories and items were well defined so that results were reliable and valid, and that the instrument could be used later to achieved consistent results. Each site was then examined for the availability of items in each category with the presence and absence of an item being coded using 1 and 0 respectively. Appropriate statistical methods such as counting of frequencies were used to analyse the coded data leading to the findings to be discussed in the next section.

Results

Percentages of e-government websites that provided basic information (simple one-way communication) (Figure 2) show a significant proportion provided contact details (such as address, phone and fax numbers) (Figure 3), types of services offered and various government documents (such as plans, policies and legislations).





Figure 2: Percentages of websites that provided basic information, which could enable basic decision making and interaction with public officers or make particular decisions.

P.O.Box 1906	
Port Moresby	
National Capital District	
Papua New Guinea	
Phone: + (675) 321 3511 Fascimile: + (675) 321 5711	
Email: info@mra.gov.pg	
Website: www.mra.gov.pg	

Figure 3: These are contact details provided on an agency's website including an email address. Source: <u>http://www.mra.gov.pg</u>

About two thirds of the sites provided news and events, links to other agencies' sites and mission/vision statements. By contrast, fewer sites provided answers to frequently asked questions (FAQs) and employment opportunities (e.g. position vacancies and job application forms).

As one of the major employers, it would be useful for the agencies to provide information about employment opportunities, career prospects and pathways for graduates entering the workforce. Providing answers to FAQs could prevent citizens from having to go to physical public office locations, posting mails and waiting for responses, a process which is usually slow. Users (citizens and noncitizens living and working in the country) could need such information to interactive effectively with public officers or make particular decisions such as when applying for a licence. Percentages of websites that provided enhanced one-way and simple two-way communication (Figure 4) reveal that a fairly substantial proportion provided downloadable forms (to be completed and submitted manually), search facility (to be used for locating information such as archives) and contact/enquiry forms (to be completed electronically) (Figure 5).



Figure 4: Percentage of websites that provided improved one-way and simple two-way communication and information exchange, allowing enhanced interaction and decision making.

Name *	
Email ID *	
Address *	
Phone No. *	
Fax No.	
Subject	General Enquiry ▼
Message	
Captcha *	Invalid site key. Please see the FAQ.
	Reset Form Submit Form

Figure 5: This is a form provided on an agency's website that could be used to contact officials or send requests for further information and services provided inquiries. Source: <u>http://www.customs.gov.pg</u>

About a quarter (25%) only provided a sitemap, which could be useful for easy navigation to different parts of the site. It could also be used by search engines such as Google to locate such websites. By contrast, fewer sites provided help and support, and multimedia (video and audio to relevant information) capabilities for relevant information. These capabilities could be helpful and improve the usability of the site. It would be beneficial to all users to have access to such services, which could be needed to perform certain activities or execute particular decisions.

None of the sites provided support for multiple languages, which means that no translation facility was provided in any of the sites. It would be useful to provide support for multiple languages, especially for non-English speaking users, living and working in the country. Communicating such information in different languages allows to all users with different backgrounds would improve usability, accessibility and quality of the sites.

Percentages of sites that provided transactional services (financial such as applying for a licence and non-financial such as applying for a job online) (Figure 6) indicate that a fifth of the sites provided non-financial while a tenth provided financial services. These are insignificant percentages and imply that a large proportion is yet to provide such services. It would be beneficial to provide these services so that users can conduct secure transactions online rather than having to go to physical office locations, for example, which could take longer than expected for the services to be provided. It would also reduce the amount of time and cost involved in accessing such services.



Figure 6: Percentages of websites that provided services which allow users to perform financial and non-financial transactions with the government agencies.

Percentages of sites that provided connected services (Figure 7) show that about one-third provided links to social media pages (such as Facebook and Twitter) so that users could participate and interact with officials. About a sixth provided feedback mechanisms to allow users to send comments and opinions electronically. Few (about 3%) provided discussion forums (to allow asynchronous interaction) and polling mechanism (such as online survey). By contrast, none of the sites provided a chat facility for synchronous interaction with users.



Figure 7: Percentages of websites that provided services which allow citizen engagement and participation in government activities and democratic processes.

Users would like to participate in the government activities and political decision making. Providing these services would allow users to engage well with agencies in such activities and decision making in areas such as public policies. These services allow users to hold agencies responsible, become more transparent and improve the responsiveness of officials (UN, 2014). Users would like their 'voices to be heard'. These avenues could allow agencies to be receptive to the voices of the users.

Providing links to social media pages could further promote citizen engagement, allowing users to show their 'likes' and 'dislikes' about the provided information, services and interactions with officials. Feedback and polling mechanisms, discussion forums and chat rooms allow users to participate and provide recommendations on how to improve public services delivery. Chat facility would be essential for instant communication and real-time interactions between officials and citizens, allowing users to be assisted in a personalised manner (UN, 2014).

Discussion

Percentages of services available on the agencies' websites (Figure 8) indicate that a significant proportion (about 65%) of basic information was provided. This could suggest that a reasonably significant proportion of the sites operated at the basic level of service development.





One third (about 34%) of the services provided were improved one-way (e.g. forms for manual completion) and simple two-way communication (e.g. contact forms and search facilities), which are vital for users to be well-informed so that they are able to conduct their activities with the agencies effectively.

By contrast, only a small percentage (about 14%) of transactional services were offered, which means that a substantial proportion of sites did not provide financial and non-financial services. This shows that a considerable amount of such services were yet to be provided, making it inconvenient for users. Providing these services would greatly increase the capabilities of the websites and enabling users to performance financial and service transactions, without having to spend unnecessary costs and time normally involved the process.

Similarly, a very small proportion (about 10%) of connected services (such as feedback, polls and discussion forums) was provided. This suggests that a significant number of sites did not provide services that could allow users to engage well with agencies. It would be valuable to provide such services to

enable users to effectively participate in political and democratic processes in the country, leading to a transparent and responsible government.

Websites usually start from simple forms such as posting public information to sophisticated levels of services (Huang, 2006) such as making payments online, which usually require resources to be implemented. It was evident that most e-government sites were functioning at the basic level of service delivery (from citizen perspective) as was also found in Huang's study (2006). Most websites provided information services only; however, a few websites started providing transactional and connected services, which are more sophisticated from a technological perspective. On the whole, a fairly substantial amount (about 61%) of all services was yet to be provided. However, there is a great potential for further development of e-government and that provisions of more online services is possible.

E-government services development could be affected by various challenges faced by agencies (PNG Government, 2010) including resource availability, political support, appropriate policies and strategies, legal issues, inadequate funding and financing of planned projects, lack of staff development and skills-based training, employment of suitable graduates, lack of efficient cooperation agreements and inability to be receptive to change. It would be necessary to carefully address these challenges to facilitate further development of services so that agencies can progress from basic to more advanced service levels, and achieve the goals and objectives stated in the PNG development plans. Moreover, making ICT and Internet services accessible and affordable to all users would enable convenient access to services. When the websites are well established, it would be necessary to provide awareness so that users can use the sites effectively. This leads us to the conclusion of this paper.

Conclusion

Evaluating the websites of agencies "can effectively help us to understand the status of adoption of e-government" (Huang, 2006, p. 166). Thus, the paper examined the status of e-government progress by analysing the content of 31 egovernment websites. It discussed the research context, the steps involved in performing content analysis of written communication, the four stages of the UN model, how they were applied in published studies, and how they were used in the paper. By using content analysis and the UN model, it discussed how e-government websites were assessed to evaluate the status of egovernment progress in PNG, including the instrument used for the analysis. Moreover, the paper provided an understanding to guide further planning, development and evaluation. The paper demonstrated that most websites are functioning only at an elementary level, providing only one-way and simple two-way information services. Fewer sites are providing financial and nonfinancial transactional and connected services, however, it is believed that there is great potential for advancement to more sophisticated levels of services provided that resources are economically managed and challenges are carefully addressed.

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Glossary

Electronic government - use of ICT and Internet
technologies to provide unified, client-centric information
and deliver services online
Information and communications technology, which
includes networking and telecommunications, hardware and
software, databases and applications, standardisation and
interoperability, privacy and security, access networks, and
policies and regulations on the use of technology.
Medium Term Development Plan (MTDP) that sets out the
PNG Development Strategic Plan (PNGDSP) goals,
deliverables and strategies for building the foundations for
national growth
Online services refer to information (e.g. services provided),
transactional (e.g. e-passport) and connected services (e.g.
e-polling) provided to users (especially citizens).
Long-term development plan for PNG with the aim of
becoming one of the top 50 countries in the UN Human
Development Index

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