A Web Presence Analysis of Malaysian Government Agency Websites

Baharudin Osman[a], Azizi Abas[b], Mohd Rushdi Idrus[c] and Azizah Sarkowi[d]

Faculty of Information Technology
Universiti Utara Malaysia,06010 Sintok Kedah
Tel: 04-9284782, Fax : 04-9284753, E-mail : [a]bahaosman, [b]azizia, rushdi, [d]s83390@uum.edu.my.

ABSTRACT

The focus of this research is to identify the Malaysian government web presence stage, quality factors based on the last updated period and downloading time and the website updating problem from webmaster view. The study employed a multi-method approach such as inspection method on selected websites, URL analyse using web diagnostic tools and e-mail survey. An analysis of 74 government agencies website shows that the majority of Malaysian government website presence in Stage III to V. Many of the website did not achieves the expected quality with only 31 percent which has been updated less than once a month and 76 percent are poor in downloading times (more than 10 seconds).

Keywords

Government web present, web diagnostic, downloading times.

1.0 INTRODUCTION

The penetration of the internet and information and communication technologies (ICT) has caused government around the globe become aware of its potentials and consequently utilized them into electronic services. The utilisation of ICT in providing improved services and products to the internal and external stakeholders can broadly refer to as Electronic government (e-Government).

In Malaysia, e-Government was implemented as one of the Multimedia Super Corridor (MSC) flagship in 1998. Its implementation aims at reinventing how the government works as well as improving the quality of interactions with citizens and businesses through improved connectivity, better access to information and services, high quality services and better processing systems. As an initiatives, an e-government gateways for the public named as Malaysian Civil Service Link (MCSL) was developed. Through this gateway, many online databases were upgraded and hyperlinked to the MCSL for more comprehensive information access and facilitate internet-enabled service. With this regard, agencies were required to developed and link their websites to the MCSL. In order to ensure smooth and effective development of agency web sites, guideline on the design and implementation of web sites were issued by MAMPU in the year 2000 (MAMPU, 2000). With the government major initiatives, it is hoped that this website to be fully utilize by the Malaysian citizen, as the internet dial-up subscriptions was increased from 1,659 thousand to 3,439 thousand in year 2005 and the numbers of broadband subscriptions also increase from 19,302 in 2002 to 297,937 in 2005 (MCMC, 2005).

1.1 Problem Statement

Many government agencies worldwide recognised the advantage of the Internet and its surrounding opportunities. Electronic government was implemented to deliver public services to citizens through the Internet and World Wide Web. As this phenomenon grows, United Nations starts an evaluation program to check the e-government readiness among United Nations countries. E-government readiness is based on e-government readiness index which is formed by three specific indices, Web Measure Index (WMI), Telecommunication Infrastructure Index (TII) and Human Capital Index (HCI). Web Measure Index (WMI) is an important assessment to check the government willingness and ability to employ ICT for the provision of basic services.

In 2003, United Nation conducts an e-government survey worldwide. In their report, United Nations for the Global E-Government Survey 2003 (United Nations, 2003), Malaysia was ranked at level 35th among the 191 member states of the UN. Meanwhile, in the Web Assessment Measure Index, Malaysia was ranked at level 33rd. Another survey, which was carried out by the American Society for Public Administration (ASPA) and the United Nations Division for Public Economics and Public Administration (UNDPEPA), found that in terms of e-government web presence, Malaysia seems to spread between Stage II (enhanced Web presence) and Stage IV (transactional Web presence), not reaching the final stage – Stage V (full integrated Web presence) (UNDPEPA, 2002). Amazingly, UN Global E-government Readiness Report 2004 (UNPAN, 2004) listed Malaysia's web presence stage increasing from Stage III to V. The above mentioned study, focused on national government website among countries. There are not many research have been conducted to identify the web presence stage of the government agencies website within particular country, especially for Malaysia

government websites. This issue need to be studied to determine Malaysia government agencies website web presence stage.

All government agencies have to develop their website by the end of 2000, as stated in the Guideline of Malaysian Civil Service Link (MCSL) and Government Agency Website (MAMPU, 2000). Almost two years ago, when Datuk Seri Abdullah Ahmad Badawi was still Deputy Prime Minister, he issued a directive to all government departments and agencies to update their websites (Berita Harian, Jun 26, 2003). This is a never ending issue because on 29 Mac 2005, Datuk Seri Abdullah Ahmad Badawi, Prime Minister of Malaysia, once again brought up a similar issue when chairing National Information, Communication and Technology Cabinet (NITC) Committee meeting. He asked the entire government department to update their websites and urged the department to develop more interactive websites and not only for public information. He also emphasized on the websites ability to have two way communications and not only provide the department information and services (MOSTI, 2005). Since a website is the reflection of the government agencies reputation, many citizens expecting the information on the website is always latest and up-to-date and have an easy access.

The above scenario leads the issue of current scenario of government website in our country. This study aims to answer three research questions:

1. What is the Malaysian government agencies web presence stage?
2. What is the credibility of the government websites based on sites last updated and the total of downloading time?
3. What problems those government webmaster encounter in order to update the sites?

1.2. Research Objective

The general objective of this research is to investigate the implementation of government agency web sites in the implementation of e-government project. The specific objectives of this research are:

1. To identify the Malaysian government agencies web presence stage.
2. To identify the credibility of the government websites based on sites last updated and the total of downloading time.
3. To identify the problems that government webmaster faced in order to update the sites.

1.3. Scope

The Malaysian government machinery listed in the Malaysia government official portal, myGovernment (http://mawar.www.gov.my) are divided into four categorise by the different levels in line of government structure. The categories are: Executive-Cabinet line-up, Malaysian Parliament, Federal Government and State Government. The scope of this study is the websites listed under the Federal Government agencies only.

2.0 LITERATURE REVIEW

E-government is defined as a way for government to use the most innovative information and communication technologies, particularly web-based internet applications, to provide citizens and businesses with more convenient access to government information and services, to improve the quality of the services and to provide greater opportunities to participate in democratic institutions and processes (Fang, 2002).

As government websites are the gateways for the public to access information and services provided by the government in the information age, the government websites have to provide an easy access to all citizens. Stage model are often used to position and evaluate the current status of e-government development (Layne & Lee, 2001; Persson & Goldkuhl,2005). They are representative of the government's level of development based primarily on the content and deliverable services available through official websites (UNDPEPA, 2002).

United Nations (2003) has introduced Web Presence Measurement Model (WPMM) in the UN E-Government Survey 2003. The WPMM was used to identify the Web Measure Index (WMI), as an assessment towards United Nations member countries specifically for their capability in providing services electronically via the internet. The website being assess in this survey are limited to the official homepage of the government, the Ministries/Departments of Health, Education. Social Welfare, Labour and Finance. Being a purely quantitative five-stage model, WPMM shows 5 progressively ascending stages of presence that consists of Emerging Presence, Enhanced Presence, Interactive Presence, Transactional Presence and Networked Presence. Websites are scored on the basis of whether they provide specific products and services. The model, by design, does not attempt to measure the quality of those products or services provided by the government (United Nations, 2003).

One of the main quality criteria of a website is the currency by regularly updating the site's content. A site must have content that satisfies users' needs and it should be updated at least every month (Gonzalez & Palacios, 2004). On the other hand, the currency will also increase the credibility of web pages (Turns, Valeriano & Adams, 2003). Golubeva, Merkuryeva and Shulakov (2002) in their study analyzed functional performance, effectiveness and usability of St.

Petersburg government sites. Information currency and accuracy as one of the criteria in functionality performance analyzes whether the site content is relevant and up-to-date. This criterion is of primary importance to those users looking for proof of reliability.

According to Hiller and Bélanger (2001), the biggest challenge of e-Government agency website is to maintain the quality of information to ensure that the information is updated and accurate. Many sites fail to meet basic standards and are not well maintained - with many grammatical errors and infrequent updates of information (Stock, 2000). Similarly, Trkman and Lindic (2004) found that nowadays almost every company has its own web page and updates it more or less regularly.

The most critical quality factor for any web site is accessibility by referring to the ability of user to access and navigate the web site. However, web users often face a long waiting time for downloading Web pages (Nah, 2004). In order to study significant of this factor, many research has been conducted to examine the effect of download delays on user performance. To analyze the performance of the web application, web application monitoring tools such as WebXact, LIFT and Bobby provide a considerable volume of information related to the time it takes for pages to download (Galbraith & Davison, 2005).

Nielsen (1996) reported that "if a web page takes longer than 10 seconds to download then user is likely to lose interest". . Selvidge, Chaparro and Bender (2000) used delays of 1 second, 30 seconds, and 60 seconds in their study. They found that longer delay (30 or 60 seconds) would increase frustration, and decrease task success and efficiency of the user. Another study conducted by Galbraith and Davison (2005) found that users begin to abandon websites rather than wait for the information if they have to wait more than 5 seconds for a page to download. The study shown that the web users frustration were rapidly rising after a wait of around a second. In the same way, Schaffer (2001) offers practical advice those acceptable downloading times can range from five to over 30 seconds

Study conducted by Bouch, Kuchinsky and Bhatti (2000) also attempted to identify how long users would wait for pages to load. Users were presented with Web pages that had predetermined delays ranging from 2 to 73 seconds. While performing the task, users rated the latency (delay) for each page they accessed as high, average or poor. Latency was defined as the delay between a request for a Web page, and totally receiving that page. They reported the following ratings: (1) High (good): Up to 5 seconds; (2) Average: From 6 to 10 seconds; (3) Low (poor): Over 10 seconds.

3.0 METHODOLOGY

This study was conducted in three phases from 17 July to 3 September 2005. First, an assessment was done on selected websites as a sample to determine the web presence stage. Second, the URL samples were entered in web diagnostic tools, WebXact to determine the last updated period based on days. Lastly, a question on the problems that the webmaster faced to update their website was e-mailed to them.

Websites in Malaysia government official portal, myGovernment (http://mawar.www.gov.my) was used as a unit analysis and population in this study (N=370). The listed websites in this portal is used as a sampling frame. A systematic sampling technique was done to get about 20% of the websites as a sample (n=74).

In the first phase, the five-stage Web Presence Measurement Model (WPMM) was employed to assess the current scenario of the government websites in Malaysia. WPMM shows 5 progressively ascending stages of presence that consists of Emerging Presence, Enhanced Presence, Interactive Presence, Transactional Presence and Networked Presence. Being a purely quantitative in nature, reviewers are required to assign a binary value to the indicator based on the presence/absence of specific electronic facilities/services available (UN, 2003; UNPAN, 2004). Two reviewers who are expert in web development and web management were assigning to survey the web site.

As an exploratory study, the model was manipulated for the purpose of website assessment based on MyGovernment portal. Table 1 shows a summary of related indicators used for the assessment of E-Government web presence. In the second column, similar indicators that are used in this study are also provided. The manipulation is used to measure the presence or absence of the electronic facilities or services available in selected samples.

Table 1: Original WPMM indicators and manipulated indicators for this study

Web Presence Measurement Model Indicators used as Web Measure Index in UN E-Government Survey 2003	Manipulated Indicators used for this study
STAGE I: Emerging Presence	
• Existence of an Official Website, National Portal or Official Homepage • Archived information • Head of State's Message • Link to Ministries	• Official Website, National Portal or Official Homepage • Archived information • Link to government ministries, regional/local government, non-executive branch of the government.
Stage II: Enhanced Presence	
• Provide current and archived information • Policies, budgets, regulations and downloadable databases • Search enabled • Site map • Menu provided • Help features	• Provide current and archived information • Search enabled • Site map • Help features
Stage III: Interactive Presence	
• Downloadable forms for printing and mailing • Audio and Video capability • E-mail, fax, telephone and physical address provided for ease of participation from citizen • Updated regularly*	• Downloadable forms for printing and mailing • Audio and Video capability • E-mail, fax, telephone and physical address provided for ease of participation from citizen
Stage IV: Transactional Presence	
• Instruction for the ease of interactions • Online application of identity cards, birth certificate and license renewal • Able to make online payments via credit, bank or debit cards • E-procurement facilities • Online bidding via secure links for public contracts	• Able to make fully online applications (excluding online payment).
Stage V: Networked Presence	
• Use of Web Comment forms • Other innovative dialog mechanism such as online polling mechanism, discussion forums and on-line consultation facilities	• Use of Web Comment forms • Other innovative dialog mechanism such as online polling mechanism, discussion forums and on-linc consultation facilities

** This indicator is tested in second phase using web diagnosict tools. WebXact*

We have decided to come up with a weight scoring method to gauge the presence of relevant indicators as getting to know the numerical data given by this analysis is important. Furthermore it is needed for quantifying the frequencies and percentages. The weighing scheme for each indicator in every stage appears in Table 2 below. There are 13 parameters were analysed in this study and every parameter is represented by one indicator.

Table 2: Scoring Method for Web Presence Stage

Indicators	Weights
Stage I: Emerging	3
• Existence of an Official Website, National Portal or Official Homepage • Archived information • Link to government ministries, regional/local government, non-executive branch of the government.	
Stage II: Enhanced	4
• Provide current and archived information • Search enabled • Site map • Help features	
Stage III: Interactive	3
• Downloadable forms for printing and mailing • Audio and Video capability • E-mail, fax, telephone and physical address provided for ease of participation from citizen	
Stage IV: Transactional	1
• Able to make fully online applications (excluding online payment).	
Stage V: Networked	2
• Use of Web Comment forms • Other innovative dialog mechanism such as online polling mechanism, discussion forums and on-line consultation facilities	

In the second phase, we used a special web diagnostic tool, WebXact (http://webxact.watchfire.com) that is widely used in order to gauge accessibility, quality and privacy. The software can report the quality issues including typical download times, information on metadata, last update, style sheets, server-side image maps and inline multimedia. This study is focussed on the issues of last update (measured in days), and downloading time (in second). The downloading time is measured as an amount of time to download all objects on the page, including text, images, style sheets and embedded multimedia objects over a 56.6 connection. Table 3 shows the measuring score of the last update and Table 4 shows the measuring score on

the downloading time based on studies by Bouch, Kuchinsky and Bhatti (2000).

Table 3: Scoring Method for Last Update

Indicator	Remarks
0 day	The web is update on the day analysis was conducted.
n days	n is the number of days displayed by the analysis.
n.a days	The date and time was not set on the web.

Table 4: Scoring Method for Downloading Time

Rating (Remarks)	Time (seconds)
High (good)	Up to 5 seconds
Average	From to 10 seconds
Low (poor)	Over 10 seconds

In the last phase of this data collection, we have e-mail one single question 'What are the problems that you faced while maintaining your agency official website' to identify the problems in updating the web. This question is important to gauge the reasons from the webmasters own word that reflect the real phenomenon why government websites was not frequently updated.

4.0 FINDINGS

A total of 74 government websites was sampled from 370 websites listed in Malaysian government official portal. Out of these samples, 16 (22%) websites are not presence due to the unavailable link from the portal. Based on that, only 58 websites were used in this analysis. Discussion on analysis of every indicator below will be based on Table 5.

Table 5: Existence of indicators in Malaysian Government websites (n=58)

Stage	Indicator	Number of existence indicators	Percentage (%)
Stage I Emerging	1. Existence of an Official Website, National Portal or Official Homepage	58	100
	2. Archived information	58	100
	3. Link to government ministries, regional/local government, non-executive branch of the government.	57	98
Stage II Enhanced	1. Provide current and archived information	52	90
	2. Search enabled	29	50
	3. Site map	20	50
	4. Help features	15	26
Stage III Interactive	1. Downloadable forms for printing and mailing	49	84
	2. Audio and Video capability	24	41
	3. E-mail, fax, telephone and physical address provided for ease of participation from citizen	47	81
Stage IV Transactional	1. Able to make fully online applications (excluding online payment).	36	62
Stage V Networked	1. Use of Web Comment forms	37	64
	2. Other innovative dialog mechanism such as online polling mechanism, discussion forums and on-line consultation facilities	19	33

In Stage I, majority of the government agencies have an official website and archived information of their organization, while another 2% have a missing link to other agencies. The finding shows that the majority of e-government websites has reached the basic implementation stage.

In Stage II, 90% of the websites have enhancing their web facilities by providing current information of their agencies. Half of the websites have provided a search facilities and site maps but only 26% of the websites provide help features to the users. The findings show that many government websites has overlooked in providing citizens a basic features (help features) for easy usage.

In Stage III, majority of the websites provides interactive options such as downloadable forms and contact mechanism (e-mail, fax and phone number, and physical address) to citizen. Another 41% provides audio and video capability in their website. This findings show that more than half of the agencies is ready to offer interactive features as an alternative to physical counter service to every citizen in this country.

In Stage IV, 62% of the government agencies have provided an online form for every citizen to make an online application. At this stage, government agencies have entered the paperless phase in processing customers' application excluding transaction involve with online payment.

In Stage V, 64% of the government websites provide a web comment forms as an alternative besides their service at physical counter. At this stage, 33% of the websites also provided an innovative dialog mechanism such as online polling, discussion forums and online consultation to their customers.

As an overall assessment, Table 6 shows the web presence stages of Malaysian government agencies website. A total of 58 websites was analysing to determine their web presence stage. In Stage I, 57 of the total websites have all indicators in this stage. Only one website have partial indicator while other 5 websites ended at this stage. This finding shows that, nearly 10% of the government website only offered their web features at this Emerging Stage.

payment). This shows a large dropping of 26% from the total websites in the previous stage. This finding shows that the majority of government websites in this study is not ready yet to offer online transactions via web to Malaysian citizens.

In Stage V (Networked Stage), 31 websites has entered this stage. Out of this, 16 websites shows the full indicators while 15 are incomplete. Near half of the total government websites in this study does not provide comment and feedback mechanism in their sites.

Based on the findings from this study. Malaysian government agencies websites shows the dramatic increase in providing a good websites. Although 31 websites have reach Stage V, Malaysian government should inprove their website because many indicators in Stage II, III and V is incomplete. This study found that the majority of Malaysian government agencies websites presence at Stage III and move forward to Stage V. This result has supported the Malaysian web presence stage in UN global e-government readiness report 2004 (UNPAN, 2004).

Table 6: Web Presence Stages of Malaysia Government Agencies Website (n=58)

Stages (Presence)	Website with all indicator in particular stage		Website with partial indicator in particular stage		Total website exist in particular stage		Website ended at particular stage	
	f	%	f	%	f	%	f	%
Stage I (Emerging)	57	98	1	2	58	100	5	9
Stage II (Enhanced)	8	15	45	85	53	100	2	3
Stage III (Interactive)	19	37	32	63	51	100	15	26
Stage IV (Transactional)	36	100	0	0	36	100	5	9
Stage V (Networked)	16	52	15	48	31	100	31	53

53 websites has entered Stage II (Enhanced Stage) and we found that; only 8 from the total websites have all the indicators for this stage. While another 45 websites have partial indicators and only 2 websites ended at this stage. This finding shows that although 53 websites was entered this stage, 85% from the total websites has not provided some important features such as search feature, help feature and site map. This may cause difficulty for citizen to use the sites efficiently.

In Stage III (Interactive Stage), 51 websites continue from Stage II. 19 websites fulfil all indicators in this stage, while 32 websites only shows partial achievements. The majority of the websites in this stage failed to provide audio and video capability as an important interactive feature. This factor may lead the answer of why 15 websites stopped at this stage. This finding shows that many government agencies have not yet ready to offer an interactive websites to citizen.

36 websites entered Stage IV (Transactional Stage) with fully online transactions (excluding online

Analysis on Last Update and Downloading Time

Table 9 shows the result of e-government websites analysis to determine the last updated period. In this study, 47% from the total websites was ranked as 'Not Available' on last updated period. This indicator remarks that the date and time was not set on that website. This finding may indicate the strategy to protect the website from being listed as 'a not up-to-date' government website by government monitoring agency. Besides that, 31% of the websites is considered as its best practise because the updated period is lest than 1 month. Other websites is considered in category of 'not in a good practise' because the updated days are more than 30 days. Some websites shows a very bad reputation for not update their website more than 7 months. All the websites was in the Stage I.

Table 9: Websites Last Update (n=58)

Number of Days	Number of Websites	Percentage (%)
<30	18	31
31-60	4	7
61-90	0	0
91-120	0	0
121-150	2	3
151-180	2	3
181-210	1	2
>210	4	7
N/A	27	47
Total	58	100

Table 10 shows the downloading time of all objects on the government agencies website, including text, images, style sheets and embedded multimedia objects over a 56.6 connection. This study shows that 76% of the government websites have a poor downloading time with rating over than 10 seconds. Only 22% are rated good with downloading time below than 5 seconds. This study indicates that many of web developers for government websites have not considered waiting or idle time that user faced when the citizen surf the web. Webmaster in every government agencies should focus on this matter in order to create a quality web services to citizen.

Table 10: Government Agencies Website downloading time (n=58)

Rating		Number of websites	Percentage (%)
High (good)	Up to 5 seconds	13	22
Average	From 6 to 10 seconds	1	2
Low (poor)	Over 10 seconds	44	76

Reasons for Not Updating Website

A question 'What are the problems that you faced while maintaining your agency official website' was e-mailed to webmaster that responsible to maintained the website. After 2 weeks the survey was conducted, only 5 webmasters gave a feedback. A few reasons were given as stated in Table 11 below. The second reason seems to be a big problem to the webmasters especially in a government agency that have many units and departments. Besides that, skilful staffs are needed to maintain the website frequently. Lastly there is a need for expertise in content management system in order to delegate the maintenance job directly to person in charge based on specific information. All the reasons that have been given by this webmaster should be considered as a major problem in order to make sure the government agencies deliver a good service to Malaysian citizen.

Table 11: Webmaster Reasons for Not Updating Website

	Reasons	Frequencies
1.	No specific staff to maintained the sites	2
2.	Difficult to get information needed to update the website from other person / unit / department in charge.	3
3.	Lack of skills to develop and maintain a suitable website for the organization.	2
4.	No expert in content management system to ensure the website is updated regularly by person in charge.	1

5.0 CONTRIBUTION

This study indicates that many government websites are distributed from stage I to V. Although many of it have reach the Stage 5, many features ranging in Stage I to IV are missing from many websites. This finding could be used as a guideline to government monitoring agency (MAMPU) in order to upgrade the websites to the standard as shown in the Web Presence Measurement Model (WPMM). Based on this study, we suggest that MAMPU should monitor the last updated time from websites that link in the Malaysia government official portal every month. MAMPU as a monitoring agency should conduct a well training for government staff on web development tools such as content management system to strengthen the web development in every government agencies.

6.0 CONCLUSION

The primary purpose of our exploration is to assess the presence of stages in Malaysian government websites according to Web Presence Measurement Model (WPMM). The findings indicates the vast development of government websites in Malaysia from launching a basic official website in Stage I until conducting an innovative dialog mechanism to citizen at Stage V. Although many improvements need to carry out in many of the government website, it is a tremendous upgrading to be done by inserting various features in the website.

The second issues are the failure to update the government website is almost true and this reason shows that webmaster fail to update the sites periodically (at least once a month). Many of the government websites is not updated for a long time. Every time when the issues being rise by the minister, all government agencies start to update their agencies website. This phenomena need to be monitored regularly by MAMPU.

The issues on why webmasters did not update the web frequently were answered by a few webmaster through

e-mail. Reasons that brought by the webmaster is based on staffing, skills, cooperation and knowledge on developing and maintaining not only for a user-friendly web but also covers webmaster-friendly for ease updating. Meanwhile the downloading time is not the main concern. Many of the website that have problem with downloading time tend to provide a heavy image and multimedia features that are not so important to be displayed. This matter leads to the lacking of knowledge on users perspective. MAMPU should plan to allocate special staff on web development, and develop a periodically training programme on content management system.

Lastly, further study should be done to design a non-laborious way of assessment that could evaluate web contents over a designated period. This will assist to the development of a better assessment tools that could continuously evaluate the web stages presence and quality of government websites. By inventing right tools to skilled workers, the ideas of delivering a better service via website to all citizens will be achieved tremendously.

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