AN EXPLORATORY ANALYSIS OF 200 MALAYSIAN ENTERPRISE WEBSITES BASED ON WEB PRESENCE MEASUREMENT MODEL (WPMM)

Mohd Zaidi Abd Rozan[*] and Dr. Yoshiki Mikami[**]
Nagaoka University of Technology
1603-1, Kamitomioka-Machi, Nagaoka-Shi,
Niigata-Ken, Japan.
940-2188

Abstract

E-Commerce has been the idiom of many enterprises since the last few decades. The efforts to provide commercial contents via the Web are revolutionizing, triggered by the increase of opportunity to grasp more customer in the cyber world. According to the Computer Industry Almanac as quoted in Clickz.com[1] website, currently there are 934 million online populations and Malaysia solely contributes to a 10.04 million potential online shoppers. With this promising number of prospects, it is vital to measure the fitness of enterprises in the Web. As most online customers seem to be more hugely demanding, it is often a "click" either closer or further away from retaining them in the cyber space. Web Presence Measurement Model (WPMM) was employed by the United Nations for the Global E-Government Survey 2003 as a purpose of measuring the generic aptitude of governments to employ e-government. However, this paper will manipulate WPMM in order to analyze Malaysian Enterprise websites based on its 5 stages of presence; Emerging, Enhanced, Interactive, Transactional and Networked. A sum of 21 parameters will be covered as the indicators for all the stages. The selected websites were the top 200 returned results generated by Google search engine using "E-Commerce" as the query and was intentionally made only for pages in Malaysia. The findings of the analysis are found to be indispensable and should be taken into account as it provides practical information regarding the abilities of Malaysian Enterprise websites in order to thrive in this unpredictably digital world.

Keywords: Website assessment; E-Commerce; E-Readiness; Web Presence Indicator.

1. Introduction

According to Malaysian E-Commerce Readiness Assessment (Mecra)[2], Internet users in Malaysia will double from about two million in 2000 to about four million in 2004 and related Internet devices are expected to grow from 1.2 million in 2000 to 3.2 million in 2004. The booming of Internet as a communication media will not be the matter that is obliterable from our mind. Due to its rapid development, even the speediest and most fanatic user would not get a grip on it. Looking at the utilization of Internet nowadays, getting businesses ready for it could be a tough attempt. Organizations are trying as hard as possible to create path that could lead to attention and interest from its spectators. In the galaxy for instance, the most distinguished flash comes from the presence of highly illuminated stars. Similar to the presence of organization in the cyber space called Internet, only those enterprises with strong web presence able to be distinguished by online spectators.

[*] Graduate School of Information Science and Control Engineering and also corresponding author. *E-mail address:* zaidi@mis.nagaokaut.ac.jp
[**] Professor, Management and Information System Science Department
[1] Accessed on 11/10/2004 (http://www.clickz.com/stats/sectors/geographics/article.php/5911_151151)
[2] Archived news accessed on 19/10/2004 (http://www.msc.com.my/today/html/emedia-020909-1.html)

Being business organizations, facing extra challenge due to the competitive nature of trading via the Internet is indisputable. As more online customers seem to be more hugely demanding, it is simply a "click" either closer or further away from retaining a customer in the cyber space. While attracting customers to a web site is an extremely important aspect of Electronic transaction, the longer the retention of customer to it is critical to the effectiveness of a web presence (Hoffman and Novak, 1996).

The exploratory nature of this study is triggered by a few points in mind. Initially, to grasp first hand experience of undertaking web presence assessment by using established model. Parallel to that are to develop understanding about the current scenario of Malaysian enterprises and the curiosity to know the coverage Google is providing. It is also intended to raise awareness of fellow readers regarding the importance of having marginally high web presence, as this would be the critical success factor for electronic business in Malaysia. Jonathon Robinson, director of business development at easily.co.uk, warns: "Companies without a web presence will miss out on a significant number of sales leads."[3]

Conclusively, the purpose of this paper is to manipulate a model called Web Presence Measurement Model (WPMM) that will be employed to assess the current scenario of organizations' website in Malaysia. We begin by explaining the indicators that are found in the WPMM and also the manipulation of the indicators to suit our exploratory study. Secondly, we discuss the retrieval of web addresses or URLs[4] that was generated by the Google[5] search engine. Thirdly, the categorization process of the retrieved URLs to better classify to its most suited group and also the scoring method based on the WPMM indicators. All these tasks took place from 16th October to 8th December 2004. Before coming to the discussion and conclusion of results, the findings of the analysis will also be presented.

2. Web Presence Measurement Model (WPMM) and its use for this study

E-Government Readiness Index is formed by three specific indices, Web Measure Index (WMI), Telecommunication Infrastructure Index (TII) and Human Capital Index (HCI). As an assessment towards United Nations member countries specifically for their capability providing services electronically via the Internet, the WMI based upon Web Presence Measurement Model (WPMM) was introduced in the UN E-Government Survey 2003. (Guido Bertucci Eds., 2003).

Being a 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. WPMM quantification considers the development of sophistication or maturity of e-government presence on-line. It is intended to record the websites stage of fitness in the cyber space.

As an exploratory study, the five-stage WPMM is manipulated for the purpose of website assessment based on the top 200 URL retrieved by Google search engine. It is understood that, the assessment of Electronic Government (EG) is not exactly similar with the assessment for Electronic Commerce (EC). Due to that reason, indicators that present similar characteristics are derived accordingly. Table 1 shows the summary of related indicators used for the assessment of EG web presence. In the second column, similar indicators that are used

[3] Accessed on 10/12/2004 (Quoted from http://www.duport.co.uk/website-design/information/articles/dot-com.htm)
[4] Uniform Resource Locator or Internet Web Address
[5] Accessed on 11/10/2004. Google remains the top choice for anyone who wishes to start their web search quest. (http://searchenginewatch.com/awards/article.php/3309841)

n this study also provided[6]. The manipulated indicators are used to measure the presence or absence of specific electronic facilities or services available in an organization website.

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 Exploration 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	• Existence of an Enterprise Website or Portal • Archived information • Message from the CEO, President or owner • Link to Business, Industry or Technology partners
Stage II: Enhanced Presence	
• Provide current and archived information • Policies, budgets, regulations and downloadable databases • Search enabled • Site map • Menu provided • Help features	• Repositories of archived and up to date information. • Product, service details and downloadable catalogs or brochures • Search function provided • Site map for accessibility • Help features such as FAQ or knowledge data bases • Menu provided
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 to be mailed back, such as membership application form or quotation form • Audio and Video resources • Fax, telephone and physical address • Customer inquiries by clicking e-mail address or the use of *mailto* function • Updated regularly*
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	• Instruction or procedure to support transaction process • Online membership application • Able to close sales by providing online payment facilities • E-procurement feature provided • Online bidding via secure links for purchasing products
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	• Web comment such as online feedback form or improved web form with call back module • Chat or forum based module

******This indicator is a longitudinal variable and will not be covered in this study*

[6] Extracted from the UN Global E-government Survey 2003.
(http://unpan1.un.org/intradoc/groups/public/documents/un/unpan016066.pdf)

We 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 indexes to be used in our analysis. The weighing scheme for each indicator in every stage appears in Table 2 below. There are 21 parameters analyzed in this study and every parameter is represented by one indicator.

Table 2
Scoring Method

Indicators	Weights	Stages	Weights
Stage I: Emerging	**4**	**Stage III: Interactive**	**4**
o Official Website		o Downloadable forms	
o Archived Information		o Audio/Video	
o Message from CEO or President		o Address, Fax and phone number	
o Links to partner		o E-mail by mailto function	
Stage II: Enhanced	**6**	**Stage IV: Transactional**	**5**
o Current Information		o Transaction instruction	
o Downloadable product information		o Online application	
		o Online payment	
o Search enabled		o E-procurement	
o Site map provided		o Online bidding	
o Menu		**Stage V: Networked**	**2**
o Help features		o Web forms	
		o Chat or forum facility	

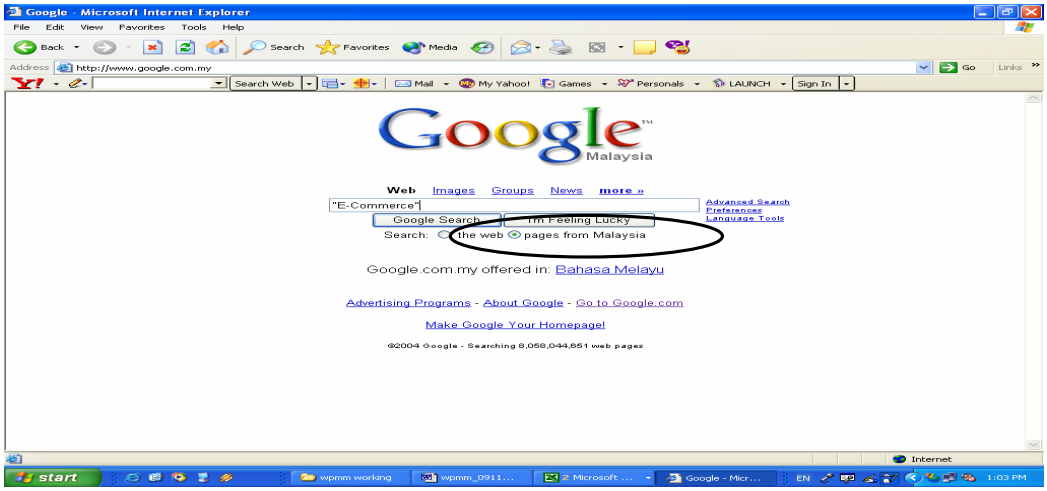
3. Retrieval by Google search engine

The word "E-Commerce" was used as an input for Google search engine query and is intended due the inquisitive nature of this study. Also to investigate the coverage made by Google for retrieving web pages specifically for pages in Malaysia only. Even if the queried word was exploratory, it seemed that the returned results were mostly in the category of online businesses and were highly related to our study. Further details on this matter will be discussed in the analysis and findings section.

Due to the frequent updating of indexes by the search engine crawler, it is mostly difficult to keep on updating the returned results. As for this, only a one time search would be possible and the time and date chosen for the search process was on 16th October 2004 at 1440hrs JST[7]. The returned URLs that were generated by Google at that point will be used for this study. At that moment a total of 29,100 webpage were indexed by Google. However only 709 webpage links were shown, the remainders are omitted by the search engine itself. Figure 1 below shows the Google Malaysia main website (http://www.google.com.my) as the initial input page for the queried word. As mentioned earlier in the previous paragraph, search "pages from Malaysia" (inside the oval sign) was selected since this option will limit its returned results only for pages from Malaysia as claimed.

[7] JST=Japan Standard Time

Figure 1
Google Malaysia main website



However, it was surprising to see few other URLs that do not belong from Malaysia were given as URL results. By opening up the links to view the organizations operating address, we found 6 websites that are not providing any information about its whereabouts mainly postal address. We decided to use DNS[8] application provided by www.dnsstuff.com[9] to trace the 6 links and found out that the 5 links are registered in the United States, 4 from Colorado and 1 from Seattle. And the remaining 1 is actually registered under a web hosting company in Petaling Jaya, Selangor, Malaysia.

One more concern regarding the top 200 given links is the organizational owner of those links. From our analysis, we found 137 owners from unique organization. These are 76 organizations with only one link each, 60 organizations with two links and one organization which have four repeated links summing to a total of 200 URLs. Up to this instance we currently have 137 organization website addresses that are not reoccurring and unique.

Table 3
Number of URL returns by organization

	Number of URL returns	Organization	URL for each Organization
	76	76	1
	120	60	2
	4	1	4
Total	**200**	**137**	

Table 3 above showing the details of the URL result based on the number of organizations who owns it. Out of this 137 URL lists, 7 of it are inaccessible due to Internet error. Due to its irrelevancy for this study, we decided to omit the 7 URLs from the lists without going to the very detail of it. However, we still list down the returned Internet error code generated by the Internet browser used; 401: unauthorized, 404: Not Found, 408: Request Timeout, 500: Internal Error and 503: Service Unavailable. Resulting to that, we decided to pursue the analysis with only 130 URLs representing 130 organizations website.

[8] DNS=Domain Name System
[9] Accessed on 06/12/2004.

4. Categorization process

One of the most important information retrieved from the search are the web addresses of the organizations. Since there are differences in business emphasis among these 130 organizations, a categorization process must take place to classify those enterprises to their most suited group. We tried using few online directories that are easily accessible from the Internet specifically Malaysian online directory. By comparing a minimum of five online directories available by picking random URLs from our list; we have found that www.mesra.net provides the most coverage for the organization's URL list. From the 130 listing URLs, there were 92 URLs (70.77%) obtained. This is a strong point and as of that, we strongly feel that using www.mesra.net as our classification tool will provide us with various benefit.

The balance 38 uncategorized URLs were analyzed by looking at the "About Us" page. "About us" page is intended to give understanding to visitors on exactly what the website is all about. After visiting those web sites and comparing it with the URLs obtained from www.mesra.net, we managed to comprehend the "About Us" contents to get full understanding of the best classification for the organizations. Anyhow, the naming conventions or the directory listings given by www.mesra.net will be applied as the classification code.

5. Analysis and findings

Table 4
Distribution of organization type according to category

Category	Number of organization (foreign)	Percentage
Business and Economies	44(4)	33.8
Education	19	14.6
Government Agencies	15(1)	11.5
Information Technology	18	13.8
News and Media	7	5.38
Others	12	9.23
Web Design & Hosting	15	11.5
Total	130*	

**Includes five non-Malaysian website*

Based on Table 4, it is clearly shown that Business and Economies is the highest number of the organizations analyzed. Business and Economies covers the type of enterprises which are offering numerous commercial products and services. This includes online advertising agencies, online banks and finance, E-commerce organization which provides B2B, B2C and/or C2C[10] activities, open source software and some business directories. Web Design & Hosting as its own category also provide online business and the classification is very clear for this type of organization. The Information Technology organizations deal mostly with IT solutions and software development. We also find that many businesses in this category also provide online services such as online payment service enabler and Internet security services. These three groups covered around 60% of the total website and this has shown that the keyword used for the query is appropriate with this study.

[10] B=Business, C=Consumers

Education category mainly refers to institutions like universities, colleges and training centers. This is the second biggest contributor to the sample size. Government owned educational institutions are also grouped under this category. However, the Government Agencies category only includes government owned organizations and mostly the generic Top-level domains[11] are ".gov" and also ".org' that are intended to serve the noncommercial community at large.

Table 5
Existence of Indicator in 130 organizations

	Indicator	Number of Existence in organizations' website	Percentage (%)
Stage I Emerging	1. Official website	127	97.7
	2. Archived information	128	98.5
	3. Message from CEO or President	29	22.3
	4. Links to partner	118	90.8
Stage II Enhanced	1. Current information	122	93.8
	2. Downloadable product information	84	64.6
	3. Search enabled	64	49.2
	4. Site map provided	43	33.1
	5. Menu provided	127	97.7
	6. Help features	43	33.1
Stage III Interactive	1. Downloadable forms	30	23.1
	2. Audio/Video capability	3	2.3
	3. Address, fax and phone number	106	83.1
	4. E-mail links by *mailto* function	108	83.1
Stage IV Transactional	1. Transactional instruction	106	81.5
	2. Online application	54	41.5
	3. Online payment	32	24.6
	4. E-procurement facilities	7	5.4
	5. Online bidding	2	1.5
Stage V Networked	1. Feedback forms	74	56.9
	2. Chat or forum facility	20	15.4

As an overall assessment, table 5 shows the existence of indicators in every stage of the total 130 organizations' website. Archived information is the highest presence (128) with only 2 websites that do not provide such information. The reason for it was the need for every organization to at least provide non current news to their visitors. This is one of the basic indicators required for organizations emerging presence. Although archived information is mostly needed as a basic for web presence, it should at least be updated once a month (Gonzalez M.F.J and Palacios B.T.M, 2004). Since this study does not cover the frequency of content update, we decided not to do any test on such longitudinal variable.

[11] Accessed on 01/12/2004. (http://www.iana.org/gtld/gtld.htm)

Table 6
Index of Indicators according to the category of organization (number of firms*)

	Indicator	Business and Economics (40)	Education (19)	Government Agencies (14)	Information Technology (18)	News and Media (7)	Web Design & Hosting (15)	Others (12)
Stage I	1. Official website	9.50	10.00	10.00	9.44	10.00	10.00	10.00
	2. Archived information	9.75	10.00	10.00	9.44	10.00	10.00	10.00
Emerging	3. Message from CEO or President	1.00	4.21	7.14	1.11	0.00	0.00	3.33
	4. Links to partner	8.75	9.47	10.00	8.89	10.00	8.00	9.17
Stage II	1. Current information	9.50	8.95	10.00	9.44	10.00	9.33	9.17
	2. Downloadable product information	5.75	4.74	8.57	6.67	7.14	6.67	8.33
Enhanced	3. Search enabled	5.75	4.74	7.86	3.33	4.29	0.00	6.67
	4. Site map provided	3.75	4.74	2.86	2.78	2.86	1.33	3.33
	5. Menu provided	9.75	10.00	10.00	9.44	10.00	10.00	10.00
	6. Help features	2.75	3.68	5.71	2.22	2.86	4.67	0.00
Stage III	1. Downloadable forms	1.75	0.53	9.29	0.56	4.29	1.33	1.67
	2. Audio/Video capability	0.00	0.00	1.43	0.00	0.00	0.00	0.83
Interactive	3. Address, fax and phone number	8.50	7.37	9.29	8.89	7.14	8.67	7.50
	4. E-mail links by *mailto* function	8.00	7.37	9.29	8.33	10.00	8.00	9.17
Stage IV	1. Transactional instruction	8.25	8.95	8.57	8.33	8.57	10.00	4.17
	2. Online application	5.50	2.63	1.43	4.44	5.71	6.67	0.83
Transactional	3. Online payment	3.00	0.00	0.71	2.22	4.29	6.00	0.00
	4. E-procurement facilities	0.50	0.00	1.43	0.56	0.00	0.00	0.00
	5. Online bidding	0.00	0.00	0.00	0.56	0.00	0.00	0.00
Stage V	1. Web forms	6.00	4.74	6.43	5.00	1.43	10.00	4.17
Networked	2. Chat or forum facility	1.00	2.11	1.43	1.11	0.00	4.67	0.83

**Only 125 firms are recorded in this table, 5 non-Malaysian websites were omitted.*
Note: Each index was measured on a 1-10 scale.

In Table 6, the index of indicator for every each category is shown. The index was derived from our weighted scoring in previous Table 2.

5.1 Analysis of indicators in Stage I: Emerging Presence

The lowest presence is for the Message from CEO or president. Only government agencies scored relatively higher marks because the need to convey their vision and aspiration to the public communities.

As for online transaction, some enterprise uses their website mainly for promotional purpose and do not even include transactional or purchasing functions for their visitors. These are enterprises that mainly exploiting their web presence as another channel specifically for promotional reason not only for their products and services but also providing links to its supplier or indirect promoter. This links referred to their business, industry or technology partners. Currently for instance, Levi Strauss uses its web presence to promote brand and to refer customers to retail partners, who excel at fulfilling buyers with product[12]. Our studies have shown that the relation between links to partner and online payment is negatively correlated. Hence, this is a point that is supporting the case.

5.2 Analysis of indicators in Stage II: Enhanced Presence

It raised questions to see the web design and hosting category are not providing search enabled function to find related queries for its web contents. Surfing www.apollohosting.com, the Best Ecommerce Hosting 2003 [13] Award winner also surprisingly does not provide such service. As this occur, it reveals that such function is not vital to that business. Nevertheless, the most vital module that acts as a search function is the domain name checking availability on the web. This module is mostly found in this category.

Majority of the website provides menu for ease of accessibility to visitors, however some menu have to be *mouse-overed* on icons in order to view its contents. We believe that this type of menu will created unpleasant surfing among visitors. Menus that are directly visible mostly will be ease of access to visitors.

5.3 Analysis of indicators in Stage III: Interactive Presence

Audio/video capability is the least existence for this stage. This is because of the necessity for low bandwidth information flow; consequently this will assist the spread of online wings that would be possible not only for broadband Internet users but also for dial up users.

E-mail links are considered as one basic channel for this stage. Most websites provide links that consist of email address that will automatically open up any default mail browser (e.g., Outlook Express, etc) when it is clicked by the visitor. This will eliminate the need for the visitor to launch an Email browser and to do *copy-pasting* or retyping of email address into the address field.

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[12] Accessed on 12/11/2004.
(http://www.varbusiness.com/sections/columns/columns.jhtml?articleId=18834578)
[13] Accessed on 10/12/2004. (http:www.100mostdynamic.com/2003/)

5.4 Analysis of indicators in Stage IV: Transactional Presence

The lowest contributor was Online bidding where only one organization provides such services. As most EC site works as a seller, it is understandable that the presence of such service will only be essential for such enterprise.

Most guidelines for doing transaction were given by nearly all organization. It provides instruction for online or non online application or transaction. Web design & hosting scored full for this parameter for the reason that they provide step by step instruction for their services.

5.5 Analysis of indicators in Stage V: Networked Presence

In this stage, enterprises were assessed by means of providing channels to welcome their customers' views and opinions. Employing functions like web comment forms and innovative online consultation mechanism, a two-way dialog can certainly be initiated. Innovative online consultation covers several style, some provide call back function once receiving customers' queries via the web, otherwise some enterprises provide online support through chat modules by keying in message and receiving real time response. Unfortunately, this method of communication always occurs during the call center operation hours, hence instant responds will not be available beyond operating hours. Web design & hosting achieved the highest points among all the categories for both indicators.

Contra to that, news and media showed the lowest index for these two indicators. This category mostly implements push information for its visitors, so the need to have web forms and chat function will not be that crucial. Most of the replies from online readers are sent via emails. As for advertising companies, they normally visit the news and media branch offices if they need to publish their ads.

6. Discussions and conclusions

The primary purpose of our exploration is to assess the presence of indicators in organization website based on the Web Presence Measurement Model (WPMM). As it was to suit the wide range of website returned by Google, we determined to manipulate the WPMM to properly assess these websites individually. Through this exploration, the effectiveness and suitability of WPMM can also be measured.

Since most assessments were based on subjective factors such as easy access, clear contents, colors, etc (Gonzalez M.F.J and Palacios B.T.M, 2004), our attributes are quantifiable. By having indicators in such a quantitative manner, our study is very much valuable to the assessment of the website returned by Google.

As this is an exploratory study, we decided not to group any organizations' website to any of the five stages. What we believe is to look at the existence of parameters that will be contributing to the retention of customers and hopefully gaining some implications for further development.

The point of our concern is the need to build and elevate the trust within our online community. Apart from having this exploration, we believe that putting laws for certain contents are essential. For example, Japanese Government through the enforcement of web rules under the Ministry of Economy Trade and Industry (METI). The Specific Commercial Transaction Act was introduced specifically for online vendors or retailers. It comes effective since 1st June 2001 and the main purpose is for the sake of customer protection. Few information are compulsory such as sales price of goods or service (including shipping fees, etc.), payment date and method time of delivery or time for completion of service, return policy, name, address and phone number of vendor. Also needed are the names of company representative, or individual in charge of company's e-commerce operation, if electronic advertising is used. As well as deadlines, if any, explanation of charges in addition to the sales price, explanation of vendor's responsibility for product defects, and explanation of limitations on quality or special sales conditions[14]. Also part of this Acts is the use of "*buy*" button. Visitors who click this button are considered as a person who accepts the terms and agreement and will be legally responsible to pay for the product. Apart from that, the display of "*cancel*" button must be clearly shown so customer can easily opt for it if needed.

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 the development of a better assessment tools and possibly will minimize human effort. Such tool is needed for continuous assessment and would be the best tool to gauge web presence in Malaysia.

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