Development of a Maturity Index for Open Source (OS) Content Management System (CMS): A Case Study of the DRUPAL platform- the Award Winning OS CMS

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Abstract: Web-based content management system (CMS) is a platform based on which commercial, community, and governmental web systems can be developed to facilitate communications among different parties with related interests. One interesting phenomenon associated CMS is that there are many open source (OS) CMSs such as Drupal, wordpress, Joomla, and Plone and their respective communities. Existing research has focused on how virtual teams in these open source communities emerge and evolve and how they could help grow these communities (Feller, Finnegan, Fitzgerald, and Hayes, 2008; Stewart and Gosain, 2006). While these studies help us understand the strength of a CMS community, I believe that a more comprehensive view of various technical and human factors that impact the growth and strength of an OS CMS needs to be developed. This research is to assess the growth potential and strength of an OS CMS by starting the process of developing a maturity index.

estimation of the stability, flexibility, usability, and sustainability of an OS CMS and its community - can be developed using a systematic method with empirical verification, it will help all potential users conveniently select the best fitted CMS platform with much less effort. Further, selection of the right OS CMS may also help significantly reduce total costs of ownership (including platform selecting cost, system developing costs, and maintenance costs). The goal of this research is to start the process of developing this type of maturity index by proposing a conceptual model of different technical and human factors that should be included in the maturity index calculation and identifying sources of data collection and data analytic methods to verify the maturity index in future research.

Keywords: OS, CMS, Human Factors

I. Introduction

Users of OS CMSs include both commercial organizations and not-for-profit organizations such as governmental agencies and community organizations. A powerful and sustainable development platform is critical for these organizations to survive and prosper continuously. It is easy to see that reasons for which a not-for-profit organization decides to use a particular OS CMS as a platform to develop its web system may be that the CMS has a large community of developers to provide free technical support and consultation and the platform itself is reliable with little demands for costly complicated maintenance after system implementation. For commercial organizations, a CMS platform's reliability, functionality, and flexibility can all be very attractive and further, the fact that there is no need to pay license fees makes it even more tempting. However, before businesses can benefit from a particular CMS, they are facing a challenge of selecting the right CMS from many candidates as their development platform. I believe that if a maturity index of OS CMS – defined as the summarized

II. Research Model and Hypotheses

Seven pairs of technical and human dimensions are proposed to be included in the research model (Figure 1) based on discussions of eco-system in Starik and Rands (1995) and King (1995). 1) Core modules are the fundamental basis of an OS CMS and the quality, reliability, flexibility, and architectural frameworks designed into these modules will decide the modularity, extensibility, and usability of a certain CMS. Core teams are responsible for designing the architecture and most core modules and they have the authority to make decisions on whether a contributed module can be added to core modules and whether a contributed module can be released or not. Core teams consist of founders and people who are key to the evolution of the OS CMS. From this discussion, it is proposed that characteristics of core modules and those of core teams will influence the maturity level of an OS CMS.2) Contributed modules are natural extensions of core modules and they represent the extended functionalities of an OS CMS. The number, growth rate, reliability, quality, configurability of contributed modules and their integration with core modules will impact the ultimate decisions made by many potential users. Developers of contributed modules should have solid understandings of the architecture of an OS CMS and master the supporting technologies and they are the key supporters and advisors for using a certain OS CMS. The number, the

degree of commitment, and the level of talents of these people are critical for the CMS to attract users and build its reputation. From this discussion, it is proposed that characteristics of contributed modules and those of their developers will influence the maturity level of an OS CMS.

3) Configurable theme templates represent themes that are ready to be used and customized. The number, quality and customizability of these templates will reduce the amount of tedious work of designing layouts and outlooks of a web system. While designing themes is not as technical as module development, it has the function of managing potential users' impression on a certain web system. In addition, it is natural to believe that site visitors (i.e., customers of users of a CMS)will also form their impressions of a web system based on the outlook and layout presented through a customized theme. From this discussion, it is proposed that characteristics of theme templates and those of themer community will influence the maturity level of an OS CMS.

4) Educational sites with video/voice/text tutorials and portal sites such as digg.com and professional blog sites such as techcrunch.com with many technical reviews and reports on a certain CMS will help educate businesses and various governmental agencies to use that CMS platform. The developers of these tutorial materials and writers of these technical reviews and reports have their influencing circles and they are able to send messages to potential users and transform them into real users of a certain CMS. From this discussion, it is proposed that characteristics of relevant educational and portal sites and those of associated educators, reporters, and bloggers will influence the maturity level of an OS CMS.

5) Sites developed with a certain CMS are excellent referrals potential users can easily check and examine. These sites are living examples potential users can learn and they are proofs of the quality, reliability, and flexibility claimed in a CMS's promotional materials. Owners of these sites are the people and organizations from which potential users can learn the first hand experiences of the development, operations, and maintenance of a web system developed with a certain CMS. Based on this discussion, it is proposed that characteristics of sites developed with a certain OS CMS and those of owners of these sites will influence the maturity level of an OS CMS.
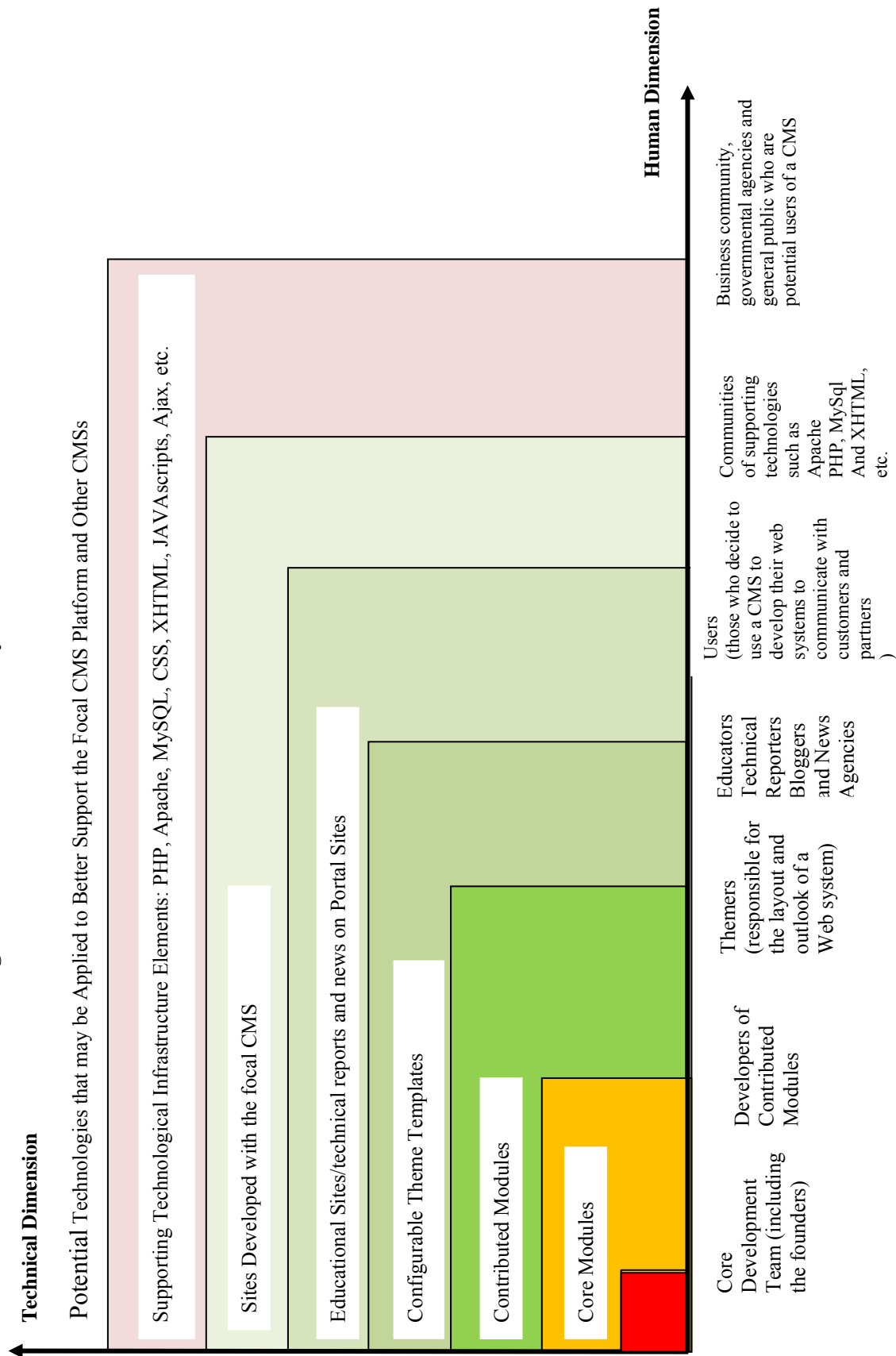
6) It is easy to see that the strength (such as quality, reliability, and flexibility) of supporting technical infrastructure elements such as PHP, MySql, Apache, XHTML, CSS, JAVAscripts, Ajax and etc. will influence the strength of a CMS itself. Characteristics of communities associated with these supporting technologies can decide the strength of these supporting technical infrastructure elements. Thus, the number, the level of commitment, the talents of these community members are factors that need to be taken

into consideration in developing the maturity index of an OS CMS. Based on this discussion, it is proposed that characteristics of supporting technologies and those of their associated communities will influence the maturity level of an OS CMS.

7) Potential technologies that may support additional functionalities or enhance the efficiency and flexibility of existing functions of an OS CMS will influence the future growth and sustainability of the focal CMS. The application of these potential technologies may be stimulated by business and governmental agencies' needs for additional functions and improved efficiency and flexibility. Further, competing CMSs can provide opportunities for mutual learning and inter-exchange, which may help all CMSs become more viable, reliable, flexible, and sustainable as a field. From this discussion, it is proposed that characteristics of potential technologies, business communities, and competing OS CMSs will influence the maturity level of an OS CMS.

In summary, to develop a maturity index for OS CMSs, seven pairs of technical and human factors are proposed to be incorporated. Core modules and teams are responsible for the architecture of the platform and the organization of the community. Contributed modules are extending core modules within the architecture and developers of contributed modules are extending the organization of core teams. They are interacting with each other continuously through web forums, emails, formal on-line documentation, test codes and sites, and many others to cultivate a vital eco-system. Other factors described above have similar relationships which will be elaborated in future research. I believe that the proposed model has a high potential to lead to a fruitful investigation, which may very well simultaneously help both CMS communities to be more sustainable and CMS users to significantly reduce their total costs of ownership of business web systems.

Figure 1: Elements of the Eco-system of an OS CMS

Technical Dimension

Potential Technologies that may be Applied to Better Support the Focal CMS Platform and Other CMSs

Supporting Technological Infrastructure Elements: PHP, Apache, MySQL, CSS, XHTML, JAVAscripts, Ajax, etc.

Sites Developed with the focal CMS

Educational Sites/technical reports and news on Portal Sites

Configurable Theme Templates

Contributed Modules

Core Modules

Human Dimension

Business community, governmental agencies and general public who are potential users of a CMS

Communities of supporting technologies such as Apache PHP, MySql And XHTML, etc.

Users (those who decide to use a CMS to develop their web systems to communicate with customers and partners)

Educators Technical Reporters Bloggers and News Agencies

Themers (responsible for the layout and outlook of a Web system)

Developers of Contributed Modules

Core Development Team (including the founders)

III. Research Methods

In terms of research methods, qualitative data of all the elements in the conceptual model will be gathered by using the DRUPAL community web site (http://www.drupal.org) and associated educational and portal sites. Survey of DRUPAL community members may be conducted. In addition, sites developed with DRUPAL will also be investigated and summarized. Some other sites that are helpful for comparison purpose are CMS communities such as http://www.joomla.org/ and http://plone.org/. Professional technology review blogs such as http://techcrunch.com/ and the portal site such as http://www.digg.com, and others will also be used to collect relevant data. The collected case data will be analyzed using the established method in Yin (1994) to verify factors incorporated and the proposed maturity index.

IV. Conclusion

As the first step, this paper proposed a conceptual model for developing the maturity index of OS CMS in order to help enterprises select the best fitted CMS platform with limited efforts. This paper also identified potential sources of data collection and indicated the approach that should be taken to verify the model. Future research is needed to advance the study by refining the proposed model and physically collecting and analyzing collected data to validate the model.

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