

Comparative Analysis of Web Content Management Systems

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Abstract— *Web content management systems (WCMS) are playing an ever more important role in shaping of the Internet. They are software frameworks that facilitate the implementation of a website or an e-commerce site and are becoming increasingly popular due to their simplicity and ease of use. A Content Management System is a collection of programs used for the development and management of digital content. In this paper a comparative analysis is done between four CMSs, namely Wordpress, Joomla, Drupal and Sitecore mainly on the basis of content type, ease of use, system requirements, security, features, performance, support and management.*

Keywords— **Content Management System, Sitecore, Wordpress, Joomla, Drupal.**

I. INTRODUCTION

The purpose of a CMS is to manage and modify the content on a website, without the need for technological or management expertise. The content in the websites can include everything from plain text, pictures, audio, to videos and documents and so on. A website's visual design, structure, and configuration is dependent on templates and modules that can be easily and efficiently changed, as the web pages are completely based on templates. Thus the content is separated from the presentation, unlike conventional websites. Unlike in a hard-coded static HTML template, new functions and features can be introduced as the specifications change. Hence the CMS a dynamic program, primarily favored by those who want to quickly and easily modify material.[1]

The remainder of the paper has been organized as follows: section II offers a description of the four CMSs and their key characteristics. Section III offers an overview of why we chose to compare the chosen four CMSs from the list of available CMSs, section IV provides an evaluation of a full-scale ecommerce site based on each of the chosen CMSs. The last section provides a conclusion to the study.

A large number of CMSs are currently available on the market, based on features and platform. We describe and state

the main functionalities of four CMSs we have selected to compare in the section below.

II. CONTENT MANAGEMENT SYSTEMS

1. Wordpress

WordPress is an open-source, online website creation tool written in PHP which is mainly used for blogs, ecommerce sites and other online applications. It's probably the simplest and most efficient blogging and website content management system (or CMS). This can also be used for creating simple websites with efficiency. WordPress has powerful features that enables web developers to create client's sites efficiently; WordPress is suitable for simple websites, such as daily blogging and news pages. Wordpress is developed such that multiple websites can be easily managed. Creating changes in pages on WordPress is simple and the content editor can see updates in real time as changes are made to the website.

Benefits of WordPress[2]

- It comes with an out of the box plugin and template function which allows even non technical users to easily create pages.
- It very easy to use and requires minimal training.
- User-friendly and best for beginners and amateurs.
- It offers over forty-five thousand plugins which can be used for different functionalities.
- Each of the templates can be customized by the user to make custom themes.

2. Joomla

Joomla is a free, open-source content management system (CMS) for publishing web content. It's perfect for e-commerce or social networking websites but it needs a clear understanding of technical skills when it comes to CMS comparison. Joomla is designed to serve as a community

forum, with strong features of social networking. Joomla is in between Wordpress and Drupal in terms of complexity of use of CMS systems. Using Joomla content tracking can be achieved. In contrast with CMS, Joomla lets you create a site with more versatility in content and layout than WordPress does.

Joomla has the strength and versatility that Drupal has also incooperates the intuitive, user-friendly features that WordPress excels in, which makes it a great middle ground in the CMS marketplace. Joomla requires certain Plugins for certain scripts. Its Customization is limited. It is heavy as it takes up a lot of computing for simple and small websites.

Benefits of Joomla[3]

- Joomla is an open source framework and their license is available free of charge.
- Joomla can be used for many types of applications such as government and corporate web pages.
- It's Easy to Use even for new users.
- It is not very Technical, thus enabling more users to use it.
- There are over thousands of ready to use themes and templates which can be used for easy CMS development and deployment.
- The CMS development can be migrated to any server.

3. *Drupal*

Drupal is the toughest to use but also one of the most powerful. A basic understanding of HTML, CSS, and PHP is required to use this CMS. Drupal an exceptionally user friendly CMS as it comes with Clean code samples and powerful modules. Drupal is known for its strong taxonomy and labelling, categorizing, and organizing complex material amongst all other CMS systems.

Benefits of Drupal[4]

- No specific coding language are required to be learnt while in Drupal as it already provides modules which can be used by all users.
- Drupal provides Thousands of free Modules which help create CMS pages faster.
- Drupal comes with Readymade Professional Themes which can be used even by novice users to create professional websites with extra features- both basic and advanced.
- It has a very neat code structure and is very efficient.
- It also has exceptionally potent modules that are preferred by many of the search engines.

4. *Sitecore*

Sitecore is an enterprise framework built on .NET platform, and is a much more of a niche platform than the others listed in this article. It is best known for its creative drive to the edge of what other CMS does, as it provides a range of marketing-specific functions as part of its "digital marketing suite". For market integration with site content in a CMS system, when it comes to customer experience it is the best tool available. Sitecore is much more than a simple CMS, it's a whole platform enabling you to build modular site components in one repository. Sitecore also offers a site owner the opportunity to be as search engine friendly as possible, with a emphasis on interaction.

Features and ease of use[5]

- Sitecore's interface mimics that of Windows, so for many users it will feel comfortable and familiar.
- It is built on Microsoft Net 2.0 technology, which is a prerequisite for using Sitecore.
- A highly customizable workflow engine, extra modules can be added as extensions. They can also be third party applications.
- It has very high scalability capacity.
- It provides multilingual functionality and is very adaptable for international users/clients as the content can be launched in different languages very easily.
- It has a windows 10 like end user interface.
- It can be deployed on the Azure cloud.
- Options are available for targeting customers, building end-to-end shopping experiences, optimizing for mobile, personalizing a marketing story which are all part of their digital marketing suite. It allows easy website tracking experience and user behaviour information collection to help drive conversions.

III. ANALYSIS

The preference for comparison of the four content management systems is explained here. Two independent polls indicate that WordPress dominates the CMS market by beating both Drupal and Joomla. 55 per cent of the 1 million most visited websites running on a content management system use WordPress according to W3Tech. This survey says 71 percent of websites use none of the content management systems while WordPress is used by 16 percent of all websites. Joomla is the second with a share of 2.8% and Drupal is the third with 1.8%.

Another Water & Stone survey shows open source CMSs continuing to lead in 2011 as of 2010. WordPress, it says, averages over 640,000 downloads a week. Joomla comes in second with over 86,000 per week after WordPress and Drupal is about 23,000 per week.[6]

Details about the number of downloads is not enough to draw a conclusion, because one does not install it necessarily. A Water and Stone installation survey found that 70 per cent of users used Wordpress, Joomla, and Drupal. In this segment, Sitecore is included as it provides powerful features such as marketing automation, analytics to help consumers with customized content. It also provides capabilities both multi-site and multi-lingual. According to a survey by W3Techs, Sitecore has also the potential to accommodate high traffic volumes.



Google PageRank is a mathematical formula that defines the importance of a network page. Many Relevant / Important pages have higher ranks and have higher chances of appearing on top of the search results. Google PageRank is constructed from backlinks. This provides some insight into the relative value of these CMSs by looking at their primary project sites on the page list.

TABLE I. PAGE RANKS OF THE CMSs

Content Management System	Page Rank
Joomla	8
Sitecore	9
Drupal	8
WordPress	10
Plone	9
Typo3	8
Concrete5	7
DotNetNuke	7
Alfresco	7

The results of table I are obtained from <http://www.checkpagerank.net/>.

It can be inferred from the above table that WordPress highest page number.

Brand familiarity is characterized as the number of direct or indirect brand-related interactions which the customer has accumulated. Therefore brand familiarity has been considered as one of the dimensions to use the seven CMSs explained in the section above.

There was a survey where three options were given to the participants: Very familiar, somewhat familiar and not familiar. Wordpress has been observed to have over 50 percent of the participants who have chosen very familiar as their response. Joomla and Drupal had more than 35 percent of the participants who chose their response as very familiar.

We selected the four CMSs namely Wordpress, Joomla, Drupal and Sitecore based on the findings of the aforementioned surveys and measurements.

IV. EXPERIMENT

The four selected CMSs would be compared based on the features listed in table II. This is done by dividing the features into six separate broad categories namely content, extension, repository, user community, ease of use, security, support, built-in features, performance and management. The experiment involved designing and evaluating a full-scale ecommerce website using the four CMSs, based on the features listed in the table. At the end a conclusion is made on which is the best CMS in each category. The results helps in deciding which is the best CMS for each of the broad feature categories.

TABLE II. COMPARISON OF FEATURES OF THE FOUR CMS

Category	Feature	Wordpress	Joomla	Drupal	Sitecore
Content	Main content type	Blogs, Ecommerce, Online applications	Websites, online applications	Blog	Ecommerce, Blogs, advanced personalisation
Extension	Extension availability	High	High	Medium	High
Repository	Extension repository	Distributed	Distributed	Centralised	Centralised
User Community	User Community	Highly active	Highly active	Limited	Highly active
Ease of use	Ease of use	Simple	Simple	Complex	Simple

Security	Captcha	No Plugin	No Plugin	No Plugin	Yes
	Content Approval	Yes	Yes	Yes	Yes
	Email Verification	Yes	Yes	Yes	Yes
	Login History	No Plugin	Yes	Yes	Yes
Support	Commercial support	Yes	Yes	Yes	Yes
	Developer community	Yes	Yes	Yes	Yes
	Plugin API	Yes	Yes	Yes	Yes
Built in features	Drag and drop content	Yes	Yes	No plugin	Yes
	Image resizing	Yes	Yes	No plugin	Yes
	Multiple upload	Yes	Yes	No plugin	Yes
	Spellchecker	Yes	No plugin	No plugin	Yes
	Subscriptions	No plugin	No plugin	No plugin	Yes
	Template language	No	Yes	Limited	Yes
	WYSIWYG editor	Limited	Yes	No plugin	Yes
	Personalisation	No	No	No	Yes
Performance	Caching	No plugin	Yes	Yes	Yes
	Multi-lingual content	No plugin	No plugin	Yes	Yes
	Multi-site deployment	Yes	No plugin	Yes	Yes
	Database replication	No plugin	Yes	Limited	Limited
Management	Advertising management	No	Yes	No plugin	Yes
	Content Scheduling	Limited	Yes	No plugin	Yes
	Workflow engine	No	No plugin	Limited	Yes

V. COMPARISON OF FEATURES OF CMSs

To define the most suitable CMS with respect to the context of use, a method of creating a list of required features and then testing the implementation of those features in the selected four CMSs has been followed.

The first step of the analysis is to pick seven CMSs according to parameters addressed in section III. Technical requirements of these CMSs have been described in Table III.

Table II compares the CMSs based on the different features available.

TABLE III. TECHNICAL REQUIREMENTS OF THE FOUR CONTENT MANAGEMENT SYSTEMS

System Requirements	Drupal	Joomla	WordPress	Sitecore
OS	Any	Any	Any	Windows Server 2016/ Windows 10 Professional(32/64bit)
Web Server	Apache	IIS	Apache	IIS, Microsoft Web Deploy 3.6, URL Rewriter
Programming language	PHP	PHP	PHP	C#
Database	MYS	MYSQ L	MYSQ L	SQL Server
Application Server	PHP	PHP	PHP	
License	GNU	GNU	GNU	Paid license

VI. CONCLUSION

On the basis of the comparison of features of different CMSs in table II, it can be concluded that Sitecore provides the most versatile framework specifications. Wordpress, Joomla, Drupal and Sitecore share the same position as regards to security. Sitecore provides the highest results and can be particularly useful for companies who need to handle large quantities of content efficiently. Sitecore also has the ability to manage huge amounts of traffic. Sitecore beats the rest in terms of built-in functionality by providing maximum number of built functionality. It also provides personalisation and marketing automation which the other CMSs doesn't not provide. Joomla offers best asset management and advertising while Wordpress provides the least amount of management tools.

Given the ease of use of the content management system, it was observed that all four CMSs provide a reasonable degree of user-friendliness while Sitecore provides users with its WYSIWYG rich text editor with maximum user-friendliness. In terms of performance, Sitecore is the best as it has even multi-lingual and multi-site capabilities along with caching and database replication.

VII. REFERENCES

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