

An Analysis and Comparison of Proprietary and Open-Source Software for Building E-commerce Website: A Case Study

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Abstract—Starting an e-commerce website has been one of the most successful business ideas in recent years. Managing an e-commerce website used to be challenging, but thanks to advances in technology, it is now feasible to successfully manage an e-commerce website by choosing the right e-commerce platform. Almost every company nowadays has a website, particularly those that cater to digital or internet-based clientele. Starting a modest online store is straightforward, but as the company expands, the expectations get more specialized, and they are not met. Unfortunately, “ready to go” solutions are typically resistive to acceptance, meaning that all individual changes are not warmly welcomed. This study analyzed and compared the two types of software used in building e-commerce websites in the Philippines’ popular websites and detected the current web technologies and conducted an online survey using qualitative approach with the participation of experts and familiar with e-commerce system. It also identified what are the things need to consider when choosing software. As results from the surveys on e-commerce software, the most significant variables to consider when choosing an e-commerce software, whether proprietary or open source, are security and performance, followed by time and budget when establishing an e-commerce website.

Keywords—e-commerce, proprietary software, open-source software

I. INTRODUCTION

A. Background of the Study

One of the most successful business ideas in recent years is to start an e-commerce website. Managing e-commerce used to be difficult, but as technology has advanced, it is now possible to manage an e-commerce website successfully by selecting the right e-commerce platform. Nowadays, almost every business has its own website, especially those that serve digital or internet-based customers. A website is a part of a business strategy for a company that provides services online or over the internet. Every customer wants their desired product right now, which implies becoming more demanding. Many small business owners enter the world of e-commerce without completely understanding all the benefits and drawbacks of

e-commerce. There are two types of software in the internet world: Open source and Proprietary. When creating an e-commerce website, the business owner, project manager, or programmer/developer must choose which software to use and consider saving money and time, security, performance, and scalability. When developing a website for the company, there are two options proprietary and open source. Businesses must be examining, planning, and understanding their business requirements and capacity before choosing a platform when building the e-commerce website.

An e-commerce website enables new and established businesses to engage in online marketing and access new customers. To thrive in today’s market, the company will need an e-commerce platform to meet current customers’ demands. Businesses that wish to stay competitive must deliver excellent shopping experiences in various environments and devices. It also needs to satisfy consumers and fulfill orders most quickly and cost-effectively feasible. Proprietary software is software owned by the person or firm who created and published it. Only the software developers have access to the source code, which means that only they know how it works and can make modifications to it and distribute it. Communities produce open-source software. This research thoroughly reviews and compares the popular and successful e-commerce websites today. The goal also is to examine the benefits and disadvantages through a web survey using a qualitative data collection approach for programmers and developers in an online community for which software they are preferred when building e-commerce. This research will also perform an inspection on the top-rank websites to determine the software.

B. Research Problem

Businesses had to construct their own platform in-house by their IT and development teams before even having a professional e-commerce website. But this was a time-consuming and expensive process. These custom-built systems were typically unscalable, challenging to manage, and unable to interact with the company’s existing software solutions [1]. Choosing an e-commerce platform ensures

that you will be involved with it for at least the next several years unless you suddenly decide to restart the firm or close your prior business site.

C. Significance

This research study will be significant to e-commerce website programmers and developers since it will show them the findings of a comparison of two e-commerce software types: the benefits and drawbacks of each software or platform. The study will also be significant to business owners who want to open an online store and know if they need a team to develop their online store or just host on a famous e-commerce builder where they don't need to know any coding. The proprietary software can easily set up the store and see a lot of tutorials and documentation provided by the vendors. It will also be significant to business/project managers assigned to research and build an e-commerce website, as they will assist in deciding which software to use based on their business needs. It will also give an idea when their development team brainstormed about analyzing the business and system requirements and what web technologies will be used to develop an e-commerce website. It will also help them reduce the time of searching and conducting each software and apply this in the system development life cycle to see what things are needed to consider before choosing and building an e-commerce website.

II. LITERATURE REVIEW

A. Open-Source Software in the Context

Open-source software has grown in popularity in libraries, with more libraries migrating from proprietary software to open-source software every year for two key reasons: cost and system functionality. However, it is critical for organizations to exercise caution when selecting and customizing a suitable open source software since it may meet unique business requirements related to organizational performance [2]. In this research shows the importance of business requirements when choosing an open source software because every business may have unique strategies and services or products for their business.

The primary motivation for using Free and Open-Source Software (FOSS) is to save money. This was noted by three out of five respondents as a reason in their decision to use FOSS. Other benefits of using FOSS include increased performance, security, and stability. The most essential reason is still the cost [3].

Commercial software licenses can be purchased by the seat, server, desktop, concurrent user, or use basis. These charges may be one-time costs spent at the time of license acquisition or yearly costs incurred as a renewal license. Upgrade expenses are linked to licensing since they occur when software is upgraded to new versions and license fees must be paid [3].

B. Choosing a Proper Software

It is simple to start a small online shop, but as the firm grows, the demands get more individualized, and they are not provided. Unfortunately, "ready to go" solutions are

frequently adoption-resistant, implying that all individual adjustments are not well received [1]. Some popular e-commerce platforms allow for the development of extra features that may be added to the online store. These capabilities are known as extensions on specific systems. Sales and marketing, shipping and fulfillment, inventory and order management, customer service, accounting, and reporting and analytics are the most typical operations that may be added to an online store. All of these technologies help rationalize and automate human work and all the operations will be carried out automatically when an order is placed, eliminating the need for diligent order follow-up. These complex tools are not required at the start, but as the company grows, they will need to optimize their job. Therefore, selecting an e-commerce platform is so important [4].

III. METHODOLOGY

The two types of software, open source and proprietary, are analyzed and compared in this study utilizing whatcms.org and Wappalyzer tools and conducting a survey using Google Forms to the group of people who are experts and familiar with e-commerce system.

A. Website Inspection

The current software utilized on the leading and top e-commerce websites in the Philippines [5-7] and the Top five Best E-commerce Software [8] is identified using the two apps whatcms.org and Wappalyzer. Table I is the results of the websites software names, category, programming language and initial release.

TABLE I. TOP 5 BEST E-COMMERCE SOFTWARE [8]

Platform Name	Software Type	Category	Programming Language	Initial Release
Wix	Proprietary	CMS Website Builder	PHP+ JavaScript	2006
Woo Commerce	Open source	E-Commerce Plugin for WordPress	PHP+ JavaScript	2011
Shopify	Proprietary	Ecommerce Platform	Ruby	2006
Big Commerce	Proprietary	Ecommerce Platform	PHP+ JavaScript	2009
Weebly	Proprietary	Ecommerce Website Builder	PHP+ JavaScript	2006

What CMS Is This Site Using?

Currently detecting 1179 website powering technologies

https://shopee.ph/ Q Detect CMS

Figure 1. Website URL field from WhatCMS to detect CMS or software used.

Fig. 1 of Website URL Scan shows the first step in detecting the software used by entering the URL of the website you want to investigate and clicking the Detect Content Management System (CMS) button to begin the scanning and inspection process.

The example is Shopee PH website, the top one leading e-commerce websites in the Philippines [5]. After clicking the Detect CMS button, the results of what software and category were used will be displayed.

B. Identify Software Type

The last steps are by the getting the Web Framework has used from the results. Express or Express.js is the web framework has been used in this study. To get which type of software (open-source and proprietary) is by searching in Google and you will see the results on the right side of Google results page. Below are the example results of what software type of Express.js. Express is a Node.js web application framework that offers a comprehensive range of functionality for both online and mobile apps provided under the MIT License as free and open-source software [9].

C. Website URL Scan

Fig. 2a shows the first way to detect the web technologies has been used on the website, by going to Wappalyzer (a technology profiler that reveals the technologies used to create webpages) website and input the URL and then click the magnifying glass icon to proceed scan and the results will be displayed. The alternative option is to install the Wappalyzer extension on Google Chrome and then pin it to the extension tab, after pinned it, open the website you wanted to scan, and the tool will begin to scan and display the results as shown in Fig. 2b

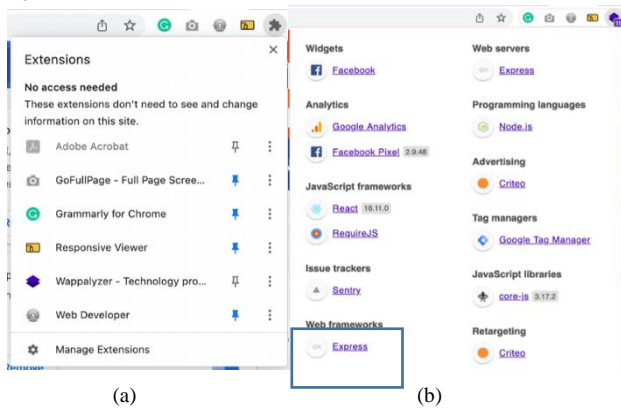


Figure 2. (a) Wappalyzer extension for Google chrome browser; (b) Wappalyzer results using browser extension.

D. Survey Conduct

This study also aims to know what software is common and preferred to use and things to consider when building an e-commerce website for both software types, proprietary and open source. This study conducted an online survey with 15 respondents. Respondents' profile are Business Owners, Project Managers, Programmers, and Developers who are experts and familiar with e-commerce systems. Questions asked in the survey are shown in Table II.

TABLE II. SURVEY QUESTIONS

Questions	Choices
1. In which group do you fall?	Business Owner, Business / Project Manager, Programmer / Developer

Questions	Choices
2. If you are the in charge on creating an e-commerce website for the company, which one do you use to build an e-commerce website?	Proprietary Software, Open-source Software
3. If you will build an e-commerce website using free or open-source software, which software you will choose? (Select 3 only)	Express.js, React.js, Ruby on Rails, Laravel, Microsoft ASP.NET, Angular.js, Umbraco, Magento, Nuxt.js, Vue.js, Next.js, WooCommerce (WordPress plugin), OpenCart, PrestoShop, Drupal, Joomla
4. If you will build or setup an e-commerce website using proprietary software which software, you will choose? (Select 3 only)	Wix, Shopify, BigCommerce, Weebly, Squarespace, Webflow, WordPress.com
5. Which are do you think you will consider first when you building an e-commerce website using proprietary software? (Select 3 only)	Time & Budget, System Security, Reliability, Reputation, Support, Compatibility, Performance/scalability
6. Which are do you think you will consider first when you building an e-commerce website using open-source software? (Select 3 only)	Time & Budget, System Security, Reliability, Reputation, Support, Documentation, Compatibility, Development model, Performance/scalability

IV. RESULTS AND DISCUSSIONS

Fig. 3 shows that 80% out of the 15 respondents prefer an open-source software vs a proprietary software when building an e-commerce website.

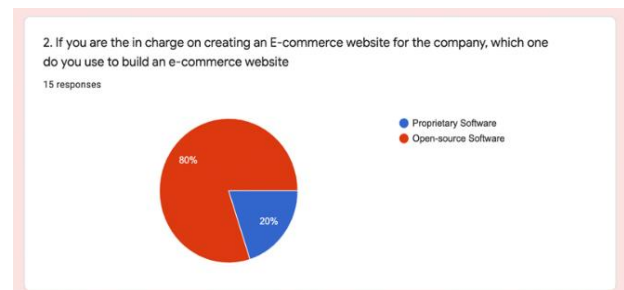


Figure 3. Pie chart of preferred software type to use when building e-commerce website.

The preferred open-source software for creating an e-commerce website is React.js, WooCommerce, and OpenCart, as shown in Fig. 4. React.js and WooCommerce are the most popular open-source software, with similar results on survey questionnaire selections, followed by

OpenCart. React is a JavaScript front-end library for building user interfaces with UI components. React makes designing interactive user interfaces a breeze. WooCommerce is a customizable WordPress-based open-source e-commerce platform designed for small to large-scale webshops [10]. WooCommerce is a plugin or extension in WordPress, is a Content Management System, and is open source to allow users to create a dynamic website. At the same time, OpenCart is an online store management system that can manage multiple stores from a single backend [11].

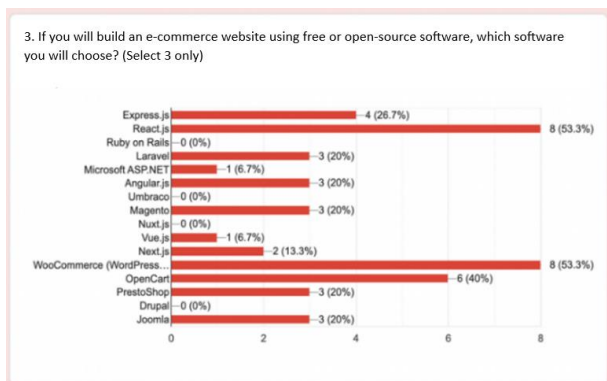


Figure 4. Preferred open-source commerce software.

Likewise, Fig. 5 demonstrates that WordPress.com is the most popular proprietary software, followed by Shopify and Wix. WordPress.com and WordPress.org are different. WordPress.com is a service that helps you build and maintain a website with the WordPress software, whereas WordPress.org is the program itself that you may use to create and manage your website [12]. Both are run by the same firm and use the same content management system, although they serve distinct objectives.

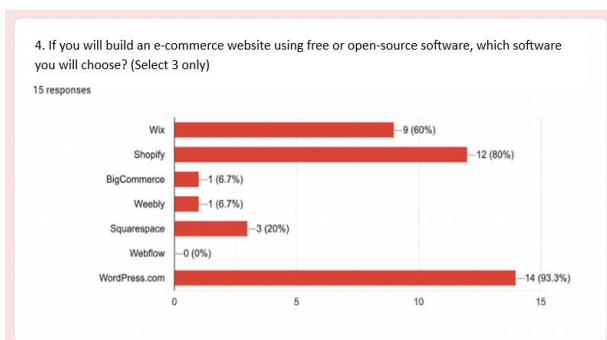


Figure 5. Preferred proprietary e-commerce software.

WordPress.com is a paid proprietary software service that your website will be hosted on their web host server, which is included in their services. However, they offer a freemium option, whereas WordPress.org is open-source software that you can download, install, and customize on your web server for free. Shopify is an e-commerce platform and retail point-of-sale system that allows anybody to build an online store and sell their goods [13]. Wix is a comprehensive online business solution, not just a website builder. Wix takes bookings also for your services using the built-in e-commerce functionality [14].

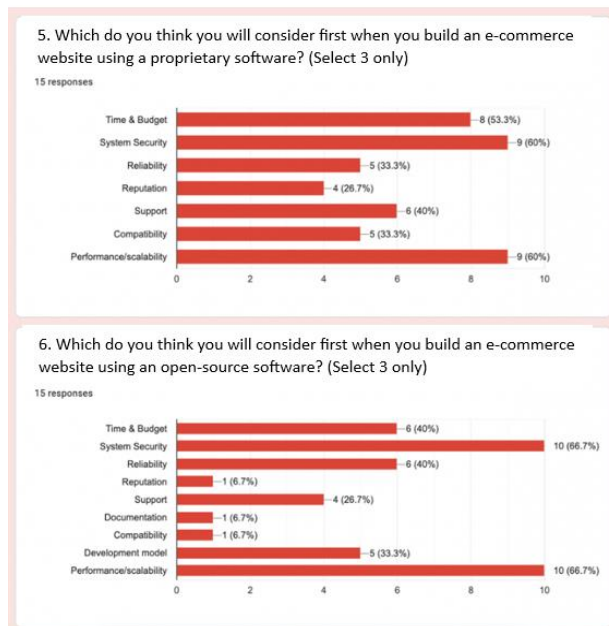


Figure 6. Important factors of e-commerce software.

Fig. 6 illustrates the top preferences for each software standard when choosing software. According to the survey results, Performance / Scalability and System Security are highly considered as a priority in both proprietary and open-source, followed by Time & Budget.

V. CONCLUSIONS AND RECOMMENDATIONS

Building a successful e-commerce business is more complex than it appears. There are a lot of things to think about and keep in mind. It is hard to declare which platform is the best without understanding your company's size, scope, and demands. One of the keys to e-commerce success is choosing the correct e-commerce software for the company. Choosing an e-commerce platform based on its popularity is not a good idea. The fact is that the most excellent e-commerce software is the one that helps you achieve the goals and objectives you have established for your business. In addition, the proper e-commerce platform should be compatible with your team's present technological knowledge. Choose open source only if your business requirements are unique, then you will need your development plan with different integrations.

In contrast, choose proprietary software only if your online store is straightforward or has no extensive features and functionalities. Both software types have features and possibilities that will appeal to a wide range of users. It is now up to you to learn about all the essential features these two popular platforms offer for your online store needs. The results of conducted surveys from experts on e-commerce software, security, and performance are the most important factors to consider when choosing e-commerce software, whether proprietary or open source, followed by time and budget when developing an e-commerce website and software reliability.

E-commerce security refers to the concepts that guide safe electronic transactions, allowing for the buying and selling goods and services over the Internet using protocols

designed to protect both the customer and the service provider. Safety, integrity, repudiation, authenticity, secrecy, privacy, and availability are all aspects of e-commerce security. A successful e-commerce website is based on the customer's belief that the website is secure. Consumers are willing to transact online primarily owing to security and privacy concerns [15]. Another research found that secured data transfers and storage determine an e-commerce operation's success or failure [16].

Although open source is free, the total cost of ownership might be much greater than that of proprietary software. The proprietary software is for you if you are a small business owner with few resources, few requirements, and no desire to deal with programmers. If you are an enterprise or large company with many special needs and have a budget, open source could be the way to go. However, make sure that the open-source modifications are no more than 30%; if you need to change more than 30% of the open-source e-commerce platform's codebase, you might want to consider constructing or building your software.

The qualitative technique allows the researcher to find expert preferences, and the data is insufficient to determine which software types are the best. This study also lacks testing data and evaluations to assess the quality of each e-commerce software, such as security, performance, and scalability. The recommendation is to undertake basic security and performance testing for the top rank of e-commerce software for proprietary and open-source and to gather evaluations from various respected sources.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Conceptualization & methodology: E.B., S.S.; writing, review and editing: S.S.; All authors have read and agreed to the published version of the manuscript.

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