

Good thesis on use of open source software in commercial and government environme...

[Technology](#), [Development](#)



INTRODUCTION

Open source refers to a model of licensing software such that the software's source-code is made available to the users of the software and they are required to pay no royalty. The terms of availability of open source software allows the users to redistribute, modify, and add elements to the software, however, with some degree of restriction (Business Software Alliance, 2007). Open source software is different from commercial software because in the latter, the developer does not disclose the source-code. The user of the commercial software is restricted from modifying the software or reproducing it to protect the commercial interests of the developer (Business Software Alliance, 2007). The current IT environment continues to experience innovation, and the software developers have focused on the emerging issues that affect the use of their software, for example, making their software more secure and reliable. Other emerging issues that the software developers focus on while improving their software include flexibility, accountability, support, cost, and auditability (Benefits of Open Source Software, 2015). It is important to understand how the innovations in software development have affected the choice and preference of the organizations on the types of software that they use.

Background Information

In the last decade of software development, the popularity of open source software has grown (Krishnamurthy, 2006). Consequently, the interest of the industry for software development has escalated towards the development of business models based on open-source software, increasing the

understanding of how to use the software, and learning about the methodologies of improving the efficiency of open-source software (Krishnamurthy, 2006). The focus of the software industry on improving open-source software due to its growing popularity has culminated in several benefits that have made both commercial and government institutions to move towards using open-source software at the expense of commercial software. Since the industry has also incorporated the business models that are suitable for their open-source software, there is a perceived improvement in user-interface because the government and commercial users can select the most suitable software with models that support their operations (Feller and Fitzgerald, 2002)

Aim and Objectives

The aim of this study shall be to determine the use of open-source software in commercial and government environments. The objectives of the research are to:

Identify the approaches and processes that the commercial organizations apply while introducing open-source software in their environments.

Identify the processes and approaches that government agencies apply in their use of open-source software.

Determine the experiences that the commercial and government institutions undergo while using open-source software. Such experiences are with regard to: Quality of open-source software, their reliability, cost of software provision, and the time taken for the organizations to acquire the software.

Determine the motivations behind the choice of the government and commercial institutions to use the open-source software.

LITERATURE REVIEW

The use Open-Source Software (OSS) in Commercial Environments

Commercial organizations participate in the development of open-source software for the benefit of their clients. According to Bonaccorsi (2007) study, the researcher established that in at least a third of the open-source software development projects, there was some form of commercial company participation. Bonaccorsi (2007) explains that the commercial companies participated in the development of the open-source software either as the coordinators of the projects, collaborators in the process of developing the codes, or as code-providers. An additional role that the private companies play during the development of the open-source software is integrating the components of the open-source software (Hauge, 2006). Rables (2007) considers the open-source community as the source of the open-source software and explains that the participation of the commercial companies in developing the open-source software in conjunction with the open-source communities has increased especially among the Small and Medium-size Enterprises (Rables, 2007). 75% of the commercial organizations that participate in the development of the open-source software have a symbiotic relationship with the source-communities for the OSS (Rables, 2007); and the commercial organizations participate in the process to ensure that the open-source software comply with their business

models. Such compliance offers a good interface that maximizes the benefits of the OSS to the commercial organizations (Rables, 2007).

Commercial Organizations and their Business Models through the use of OSS

Commercial organizations prefer the open source software for the strategic reasons that they are easy to access and they have minimal restrictions on their use. Open source software also allows the participation of the commercial companies in their development, a factor that enables them to incorporate their business models into the software. The reason that attracts the commercial organizations to participate in the development of the OSS is that apart from just participating in the development of the OSS, they can also develop customized software that is based on the OSS. The customized software takes into account the personal interests of the commercial organizations, for example, ensuring that the software is compliant with the business model. In a study by Hauge (2009), the researcher presents a case of a Norwegian Company that developed its business model around two open source software. Hauge (2009) concludes that commercial organizations prefer open-source software over commercial software for the reason that they can use OSS to develop hybrid software by retaining some level of control over the open-source software. Hauge (2009) explains that the commercial organizations' preference on using the OSS is based on the reality that they have more commercial benefits when they use OSS than commercial software.

A study by Westenholtz (2006), however, analyzes the challenges that the commercial and government institutions face while using OSS to craft

software that serve their commercial interests through business models. The case study finds that the organizations are constantly changing their business strategies with the aim of making their operations more profitable. Consequently, they find the Open Software inadequate to address their emerging challenges, and they combine OSS with proprietary or commercial software to make their models more profitable. The commercial organizations may sometimes have business models that are too generic (Westenholtz, 2006). When the models are too generic, the commercial organizations must use incentives that are beyond the revenue generating incentives so that they can attract and retain software communities with highly specialized software.

Benefits and Motivations for using Open Source Software

There are benefits and motivations that attract government and commercial organizations to open source software. These benefits and motivations not only attract the users but also determine their approaches and processes of using the open-software. Reliability is one of the motivations to use OSS. Reliability concerns the presence or absence of bugs or defects that cause the difficult or incorrect operation of the OSS (Benefits of Open Source Software, 2015). OSS is more reliable than commercial software because the user can easily fix the software if it fails to perform. The reliability in this sense is strengthened by the fact that the user has access to the codes used in developing the software, giving the user greater control of the software. Severe defects on the software can be fixed in a matter of hours after their detection, and this means that OSS has high reliability. In addition, most of

the current versions of open source software are available for free as there is no payment of royalties for open source software. Westenholtz (2006) states that one of the defining factors that determines the choice of software for commercial and government institutions is cost. The business perspective of purchasing software considers the “ Total Cost of Ownership” as the issue that really. As a long TCO for software is low, which is the case with open source software, such software becomes the most desired by the users (Benefits of open source software, 2015). With open-source software in use, there is the possibility of zero-cost on the purchase price, there is the benefit of reduced administrative overhead and low risk of data loss because of low vulnerability to viruses and other security threats like hacking (Benefits of Open Source Software, 2015).

Open source software have become popular because of the current trend that the vendors have taken. Today, the vendors of open software package the software along their hardware. Some companies, for example, sell their computer hardware with the open source software packaged in ready-to-use form. Most software users, both government and commercial organizations, view such strategies as less laborious because they avoid the processes of buying the commercial software separately and installing them into the hardware. The fact that most hardware are currently sold with pre-installed open source software makes OSS popular, and it explains why most organizations use the open source software (Business Software Alliance, 2007).

Government Policy and the Use of Open Source Software

The main concern in most private concern in most private companies is the standardization of software (Hahn, 2010). Standardization of software is an emphasis that most private organizations with multiple branches make. An environment that lacks standardization of software experiences difficulty of the software-users sharing the documents and working jointly. In addition the private companies may value openness of their software, and they may find it relevant to customize their software to achieve a certain degree of standardization (Hahn, 2010). Hahn (2010) explains that a business may, for instance, find it necessary to customize Linux, an open source software, because it provides some degree of standardization. The other advantage of such software as Hahn (2010) states is that it enables the different departments within the organization to modify the software so that it can meet their specific needs (flexibility).

The regulations that the government forms can shape the choice of software in the government institutions. Hahn (2010) explains that the government can fund software and license it under GPL. When the government funds the development of software and registers it under GPL, “ All the other programs that incorporate or extend that software must also be registered under GPL,” (Hahn, 2010 p. 89). Hahn explains that due such licensure and the regulations surrounding it, the government funded software project cannot form the basis for commercial software, but it must remain under GPL instead. Also, the proprietary research that the government funds encourages the software to remain a secret, meaning that the source-code for such software must be protected. However, the government may license

its software under a less restrictive program, e. g. BSD, and such licensing encourages open sourcing of the software. Less restrictive licensing means that the software can be used both commercial and as open source software (Hahn, 2010).

Use of the Open source software in Commercial environment

The commercial environment is different from the government environment in that the commercial environment belongs to private companies that are interested in making profits through their use of software. Lindman (2008) investigates how open source software is used within companies. Private companies restrict the supply of their software to surrounding community, meaning that even if they use open-source software, they have the tendency of modifying the software and safeguarding its source codes. However, the company handles the software as an open source project within its commercial environment. The unit of the organization that is responsible for development of the product performs the role of owning it and distributing it to the other units. The units that receive the product are allowed to use it or modify it to suit their needs. However, how the units modify the project remain a protected secret within the company because it uses software modification as a competitive strategy. The restriction of the source codes within the commercial environment is purely based on commercial interests but in the government environment, it depends on the program under which the software project is licensed. Lindman (2008) presents a case study in which the researcher investigates how Nokia uses the method of internal open source development. The commercial company holds a portal called

Nokia iSource where it hosts its software projects. The case study shows that Nokia's portal became a popular portal for hosting heterogeneous projects that involved many companies coming together to develop software. Such projects included Agile, SCM, distributed, and inter-company collaboration projects. The results of Lindman's study showed that open source software, within the commercial environment, enables companies to innovate their products.

Another finding is that within the commercial environment, companies use open source software as part of their component based software engineering. As this paper mentioned before, open-source software has the elements of flexibility and openness as the user of the software has the access codes. These elements give the user great control over the software; Lindman (2008) analyzes the third party components of Nokia's open source software. Nokia applies innovation to its open source software so that it can include the desirable features of software that arise from the frequently changing market. Lindman (2008) finds that OSS is appropriate for commercial environments such as Nokia's business environment because such environments require flexible and highly personalized software yet commercial software lack these elements. Also, Lindman (2008) finds that there is the tendency of commercialization of open source software in the commercial environments. The companies use the open source software as the basis for developing their commercial software whose source codes they protect for commercial reasons.

RESEARCH METHODOLOGY

This research uses the design of systematic review of the studies that have been conducted on the use of open source software in commercial and government environments.

Research Questions in Hypothetical format

If commercial organizations chose open-source software, they must develop the approaches and processes for introducing the software within their environments. It is necessary to understand these approaches and processes.

Like Commercial organizations, government organizations too must use certain approaches and processes when introducing the open-source software in the environment.

There must be certain experiential benefits the government and commercial institutions are entitled to while using the open-source software.

The motivations behind the selection of open-source software by government and commercial institutions exist. The motivations affect the growing popularity of open-source software in these organizations.

It is important to note that the objective of the study is not to give quantitative data that is based on numbers regarding how open source software is used in commercial and government environment. Open source software usage is a mature field where many researchers have conducted studies to find out the use of open source software in commercial and government environments. Consequently, there are findings that exist on the two aspects of commercial and government environments. However, the

problem is that the studies have been conducted separately, making it difficult to understand, in a precise manner, how the commercial environment is different from the government environment in terms of the use of open source software. Through the method of reviewing different studies on the use of open source software, therefore, this study shall make precise findings on how the use of open source software varies between the two environments. It would be an interesting venture to synthesize the empirical studies as such an effort shall give findings on the use of open source software in the two environments.

Search Methodology

In addition to using the two databases to identify the research articles for data analysis, the student shall also apply the method of manual identification of articles. In this method, the student shall identify the research articles in the conferences for software development and use. An example of such conferences is the International Conference on Open Source Systems. It is a conference that was held for a period of five years between 2005 and 2009, and all articles that were presented during the conference are available online in their full-text versions. The researcher shall select the articles on the basis of the research questions (above), ensuring that only the articles that provide answers to the research questions are included in the sample for analysis.

The student shall use three classes for categorizing the research articles.

Class 1 of articles shall comprise of the studies that were conducted by following the normal procedures for empirical research methods in software

engineering. This class of articles shall include those studies that show and use the empirical methods. Class 2 of articles shall include those articles that do not use the methodologies of software engineering but involve findings that are relevant to the research topic. Such articles may include surveys and case study analyses of how commercial and government environments use open source software. Class 3 articles shall include the articles that do not have any evidence of research having been done but they address the topic of the study.

The implication of resolving the problem of the study is that it will add to the body of knowledge in software engineering by distinguishing between the use of open source software in commercial and government environments. The research shall promote a clear understanding of how government agencies use open source software differently or similarly with commercial environment.

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