

## Identifying the Affecting Factors for Adoption of Open Source Software in it Community

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**Abstract:** Open Source Software (OSS) can be regarded as one of the most recent trends in the information technology society. The attractive features of OSS are the reliability and performance, in addition to the free availability of the source code. Not only, the desktop environment of OSS is similar to that of proprietary software solutions but rather exceeds in many features. However, there have been limited assessments or empirical studies carried out concerning the adoption of OSS by the individuals for their personal needs as well as the influential factors affecting the decision making process. The objectives of the current study are to determine the main factors affecting the adoption of OSS in the desktop environment, investigate the status of awareness regarding OSS in addition to investigate the status of OSS application usage extents within the IT community. The research methodology made use of a surveying approach as an empirical means of investigation, targeting the IT community. More than 340 questionnaires were completed and analyzed and the results showed that compatibility, quality, support as well as usability are the key factors affecting the adoption of OSS. The findings indicate that the operating system and the office suite environments are mainly dominated by the proprietary software packages whereas the OSS usage is still limited among the community. On the contrary, OSS internet browsers utilization is quite popular among the users. Moreover, the results shown that awareness issue playing a role in OSS usage.

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**Key words:** Open source software, technology adoption, usability, compatibility, quality, support

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### INTRODUCTION

In recent years, Open Source Software (OSS) development has gained a noticeable importance in the construction of software products. Moreover, OSS has considered as one of the most discussed phenomenon in the software industry. As interests are becoming increasingly higher in the open source movement as a new paradigm for the software development, OSS offers cost reductions and quality breakthroughs for the offered programs. OSS has emerged as a potential alternative for commercial or Closed Source Software (CSS) products in many domains. The OSS proponents has confirmed its capacity to offer a free alternative against the proprietary software industry along with a higher quality regarding its features, reliability, security, large-scale productivity achievements and ever-increasing user satisfaction (Nichols and Twidale, 2002; Michlmayr *et al.*, 2005; Ajila and Wu, 2007; Choi and Yi, 2015; Dhir and Dhir, 2017). In the past few years, the OSS Model has

recognized itself as a workable alternative for the other developed models as well as growing into a sophisticated movement which has produced some of the most reliable software packages ever produced. Many popular products such as Apache, Linux and Samba have been created according to open source principles.

Past studies have confirmed that OSS has become available for free and it has high quality standards, efficiency in addition to a good performance. Nevertheless, it still contributes just a limited share to the market (Zhao and Elbaum, 2003; Al-Marzouq *et al.*, 2005; Colombo *et al.*, 2014). In fact, OSS reduces the costs in three methods. First, it is a free software requiring no license fees. Second, there are no upgrade fees included and third, it calls for lower hardware requirements (Mtsweni and Biermann, 2008; Pare *et al.*, 2009). In other words, consumers can gain a lot more from OSS free desktop softwares. Besides, its qualities are known to provide greater value for the users (Ayala *et al.*, 2011; Taibi, 2015).

A number of OSSs have achieved significant market success but they are mostly bound to server applications such as the Apache web server and the 'Sendmail' mail transport agent or the other components of the IT infrastructure. Literature and software market share has stated that OSS has not made a significant impact at desktop levels yet. Moreover, it is an undeniable fact that the utilization of the personal computers by the general public still indicates that the majority of the users has been utilizing the commercial or proprietary softwares (Farber, 2004; Comino and Manenti, 2005; Holck *et al.*, 2005; Andreasen *et al.*, 2006; Kelley *et al.*, 2006; Sohn and Mok, 2008; Heili and Assar, 2009; Przechlewski and Strzala, 2009). However, OSS adoption by the individuals at desktop levels is still not well understood and despite the broad impact of OSSs on the information technology and so on the economy, the empirical studies are rather limited in this area. This empirical study aims, first identifying the main factors affecting the adoption of OSS in the desktop environment. Second investigating the status of awareness regarding to OSS within the IT community. Third investigating the status of OSS application usage within the IT community.

**Literature review:** Although, a considerable attention has been given to the OSS in the organizational environments, the literature has indicated that a little attention has been given to the adopting of OSS at desktop levels. This study is considered important on two levels. The first level is the individuals and the second one is the companies at the same time. Johnston *et al.* (2013) and Mtsweni and Biermann (2008) concluded that the users resistance has become an obstacle for switching to OSS throughout the companies. As a result, the user attitude is a significant factor to adopt OSS in terms of companies. The researcher has recommended a survey to be carried out to find out the factors that would lead the users to accept or reject the OSS.

Waring and Maddocks (2005) focused on the adoption of OSS in public institutions. The study reported eight different public sector organizations adopting OSS in the United Kingdom. They listed several factors such as reliability, scalability, cost savings and customization as the advantages of the adaptation of the OSS. They also stated some of the obstacles of adopting the OSS in the public sector which among them are the lack of IT skilled employees in the governmental institutions and the government's resistance to such changes.

Munoz-Cornejo (2007) made use of survey questionnaire and conducted semi-structured interviews with hospital IT managers aimed at exploring the extent of OSS adoption in hospitals as well as the factors

facilitating and inhibiting the adoption. the researcher discovered a very limited adoption of OSS in the hospitals. Also, the influential factors inhibiting the adoption of OSS were turned out to be lack of in house development, perceived lack of security, quality and accountability of the OSS products.

Andreasen *et al.* (2006) believes that OSS is regularly designed for and by power-users and the OSS programs have been criticized for having little attention or no importance for the usability. The study included two types of surveys; Questionnaire and series of interviews. The researcher interviewed OSS developers about both the usability and technical issues and found that the OSS contributors are mostly interested in the usability.

Ajila and Wu (2007) investigated three consistent economic factors including the cost, productivity and quality. The study was conducted through a series of interviews carried out with 18 senior project/quality managers and software developers. The results showed that there are significant coherent statistical correlations between the components of OSS reuse and the economic aspects of the software development.

The influential factors determining the acquisition of OSS by small and micro enterprises in South Africa have been resolved by Ellis and Belle (2009) through semi-structured interviews and questionnaires. They found that eventhough software cost and compatibility have a major effect on the adoption assessment of the small businesses but the lack of knowledge and exposure were fundamental to the slow of the process as well.

Through another study, Bhadauria *et al.* (2009) investigated the critical factors that influence the adoption of MySQL in organizations. Using a multi-sited case study research method, they found that TCO is a motivator in considering the adoption of MySQL but is not a key factor. The important factors influencing the adoption assessment are the technological factors, including high-availability, scalability and quality of technical supports.

Johnston *et al.* (2013) targeted at gaining visions into the factors that influencing or preventing OSS adoption within the Western Cape Schools Environment of South Africa. In-depth interviews were conducted with senior staff in the department of the premier and the department of education, in addition to users at school level. The Technology-Organisation-Environment (TOE) framework was employed to organize the data while thematic analysis was used to uncover themes and patterns in the data. Significant factors that appeared as positive effects on the adoption of OSS included cost, performance and positive attitudes. The negative influences that appeared included compatibility, lack of resources, time and lack of support.

The usability factor commonly cited in the literature as an obstacle to widespread OSS adoption. Usability is simply defined as the interaction of the user with a system. ISO 9241-11 has defined the usability as the degree to which a product can be used by the users to achieve pre-specified goals effectively and with satisfaction in a particular context of usage (Preece *et al.*, 2002). Numerous studies has addressed the usability issue of OSS and classified it as an obstacle for the widespread application of OSS (Taibi, 2015; Dhir and Dhir, 2017). Regarding to the usability items this study will focus on the items which has frequently been cited as the key items for adopt OSS. The items including, ease of use, learnability, instellabilty, user friendly and graphical user interface.

Quality defined according to ISO 8402-1986 as “The totality of features and characteristics of a product or service that bear on its ability to satisfy stated and implied needs” (Glass, 1998). However, quality is a broad concept, this study will discuss and investigate those aspects which cited in the literature regarding to OSS adoption, the aspects including functions, features and reliability. Some of the most commonly suggested barriers to adopt OSSs are the fewer features and capabilities of some OSS (Stafford, 2006; Ridling, 2007; Sarraf and Rehman, 2014; Taibi, 2015). The reliability aspect cited as a critical part to adopt OSS (Dedrick and West, 2003; Williams *et al.*, 2005).

Technical support is a fundamental concern of the OSS users and its shortage is cited as one of the major challenges that affect the OSS adoption (Mtsweni and Biermann, 2008; Bhadauria *et al.*, 2009, Johnston *et al.*, 2013; Choi and Yi, 2015; Dhir and Dhir, 2017). Technical support is a collection of services designed to help users of a given software on an as-needed basis. Technical support service usually refers to information about the software, documentations, updates as well as new versions.

Without a specific retailer, the users are concerned about who to refer to for help when things go wrong. On the contrary for proprietary software, technical support is usually included as part of the purchased package. Compatibility cited in the literature as an important factor to adopt OSS, in the IT area compatibility been assessed for example by the integration of IT with existing systems such as hardware and software compatibility (Ayala *et al.*, 2011; Adams *et al.*, 2016; Dhir and Dhir, 2017).

Determining whether to adopt the open source programs appears to be significantly influenced by the compatibility of the new technology with the previous

ones (Stafford, 2006; Huysmans *et al.*, 2008; Ellis and Belle, 2009; Johnston *et al.*, 2013). An OSS incompatibility issue with the current proprietary software products impedes the whole implementation of OSS (Goode, 2005; Jashari and Stojanovski, 2006; Michler, 2007; Mtsweni and Biermann, 2008).

Previous studies mentioned that lack of awareness hinders the use of OSS (Comino and Manenti, 2005; Choi and Yi, 2015). A number of authors have argued the uninformed users about the existence and the characteristics its limited usage.

Awareness about OSSs it can divided into two parts; First, knowing about the existence of OSS and second, knowing about the characteristics of OSS, specifically its free of charge availability (Jashari and Stojanovski, 2006; Pare *et al.*, 2009). The users may be unaware of the quality of the OSS alternatives for the commercial software packages.

The adoption of OSS by individuals for their personal computers has remained a poorly understood phenomenon. There is a lack of empirical research on the key factors influencing OSS adoption. In this regard, empirical studies are to develop a better understanding as well as to shed light on the key factors affecting the adoption of OSS in the desktop environment.

## **MATERIALS AND METHODS**

**Theoretical model:** The framework of the study consists of four stages. The first stage is to perform a literature review to determine the factors that have been the obstacles of or influential on the adoption of OSS which are founded in various studies. In the second stage, those factors are tested empirically through survey questionnaire. The third stage is to perform a data analysis by using SPSS to determine the key factors and finally the fourth stage provides the conclusion and recommendations to increase the OSS usage.

The framework of open source software adoption was developed from the literature the research hypotheses were formulated using existing literature on factors leading towards OSS adoption which are usability, quality technical support and finally compatibility. More specifically it looked at a user choice to adopt or not to adopt OSS (the dependent variable). A number of factors (independent variables) likely to effect the of OSS were identified in the literature review. Figure 1 shows the framework of the initial proposed factors influencing an OSS adoption strategy which was used in this study. The study hypothesis can be summarized as follows:

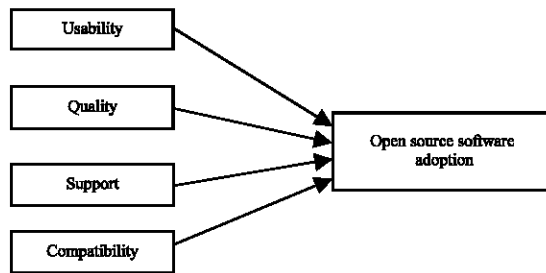


Fig. 1: Model for OSS adoption

- $H_1$ : the usability factor positively influences the OSS usage
- $H_2$ : the quality factor positively influences the OSS usage
- $H_3$ : the support factor positively influences the OSS usage
- $H_4$ : the compatibility factor positively influences the OSS usage

**Questionnaire design:** Questionnaire mainly consists of close-type questions where the respondents were compelled to choose between the alternatives. Most of the questions used in the questionnaire already have had pre-defined choices (answers). After the factors have been identified, a number of previous surveys have been collected. The included surveys are those which had studied the OSS adoption in addition to the ones that had examined the various aspects of the software in different areas. The research survey was carried out in four steps. In the first step, the questions were gathered. Afterward, in the second step, they were sorted and classified. In the third step, the most appropriate questions for the study were selected and in the last step, the questions were adjusted in order to fit the current study.

The questionnaire contains three main parts as well as a cover page providing a brief explanation about the topic, the objective of the research, the targeted sample as well as the open and closed source software definitions along with given examples of both types. The ethical concerns and the privacy related to the questionnaire and the contact information of the researcher had also been taken into account. Also, directions on how to fill out the questionnaire had been presented following the cover page.

**Part one awareness issue:** As an objective for the current study, the related awareness was estimated, considering the importance of the subject as explained before. So, in order to determine the extent of awareness regarding OSS in the IT community, two questions were designed. The first question was whether the respondents had already

known the concept of open source and closed source which is a simple and clear question in order to measure their awareness about the existence of OSS. In order to measure the respondents awareness about the free availability of OSS, the second question was to identified whether they knew about any software program that can be used for free (e.g., operating systems, office applications and internet browsers).

**Part two OSS usage:** It was targeted investigate the status of OSS usage (desktop programs) and the OSS names that have been used in the IT community. The questions were adapted from those used by Mtsweni and Biermann (2008). The first question asked about the operating systems which had been installed on the respondent's personal computers by providing the popular operating system names as well as an 'Others' choice in case the operating system of the respondent was not included among the choices. The second question and the third one asked about the office suite and the browser type.

**Part three factors questions:** In the third part, in order to measure each factor listed in the proposed model, the respondents were asked to offer their level of agreement with each statement. The OSS desktop environments were targeted in the survey. The respondents were first asked whether they were using or knew any OSS that is used in the desktop environment from what mentioned previously (e.g., Linux, Mozilla Firefox, open office and so on). The respondents were asked to answer each of the questions and then provide their level of agreement with each one. If they respondents had not ever used or known any OSS that is used in the desktop environment, they were asked to skip to the demographic section of the questionnaire. This part of the questionnaire consists of 5 sections with 26 questions which had been chosen to examine the proposed model. The measurement scale that was used to investigate the proposed model is a 5-point Likert scale that quantifies the respondent's level of agreement with the questioned features. The scale range is from 1-5, respectively indicating 'strongly disagree', 'disagree', 'neutral', 'agree' and 'strongly agree'.

**Questionnaire pre-test:** The questionnaire was pre-tested on a small group of some 30 respondents to assess the comprehensibility of the questions as well as identifying the confusing or misleading questions. The overall results of the pre-test were encouraging. The respondents specified the confusing parts regarding the phrasing of a few questions. Consequently, the phrasing of the identified questions was adjusted to elevate the users

understanding without changing the configuration of the measures or removing any leading content being tested. Moreover, the participants were enthusiastic.

**Distributing the survey:** The study was principally aimed to empirically investigate the key factors by adopting a survey questionnaire method. The questionnaires were distributed among the respondents in the form of hardcopy. Among them were lecturers, students and technicians of the IT faculties selected from 5 universities including Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM), Universiti Malaya (UM), Multimedia University (MMU) and International Islamic University Malaysia (IIUM). Out of nearly 500 copies distributed, almost 430 responses were received, of them, 347 were complete and valid for the study. A responding rate of 69.4% is considered as an excellent rate. Actually, there are two factors influencing the responding rate. The first one is to select a right sample for surveying, the one which is qualified as well as interested and the second one is the simplicity, fluency and ease of answering of the questionnaire which makes the respondents willing to answer all the quotations within 5-10 min which was observed during the survey.

**Study reliability:** Normally, the study reliability refers to testing an instrument that provides trustworthy measures in comparable situations. Reliability is concerned whether a particular research instrument, applied repeatedly to the same goal, generates the same results (Buckingham and Saunders 2004). When using Likert-type scales, it is imperative to and report the Cronbach's alpha for internal consistency reliability. Cronbach's alpha is most commonly used to measure the reliability which was originally derived by Kuder and Richardson (1937) for dichotomous scored data (0 or 1) and later on was generalized by Cronbach (1951) to account for any scoring method. A high value of Cronbach's alpha implies high reliability. In this regard, an alpha value of more than 0.6 is recommended. The of the current study confirmed that the research model has a Cronbach score of 0.89 which is considered good enough.

## RESULTS AND DISCUSSION

**OSS usage:** Data were compiled and analyzed using SPSS. Regarding the operation system Fig. 2 depicts the types that have been used by the sample. The results showed that the OSS operating systems not widely used (22.5%) when compared to the proprietary ones and most predominantly the Microsoft Windows (98%). Even those using OSS do not employ it alone but rather using along

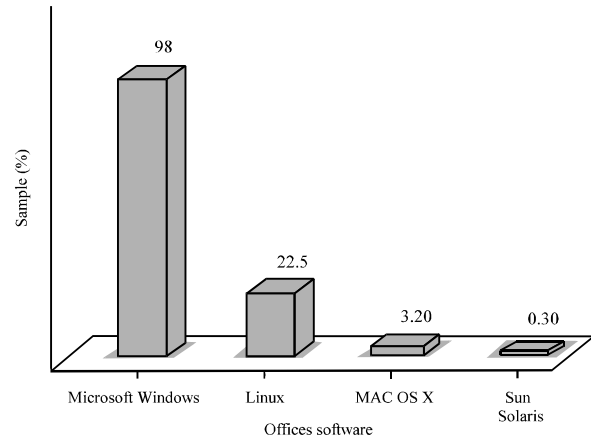


Fig. 2: Operating systems used within sample

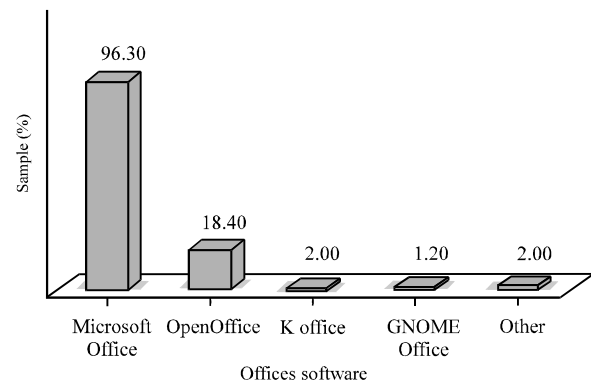


Fig. 3: Office software used within sample

time. Just few users make use of the OSS operation system alone. As a matter of fact, the majority of the users just utilize the proprietary operation systems (Fig. 2).

Figure 3 represents the office suites that have been used by the sample. The results showed that there are a limited number of users who use the OSS Office suite (18.4%) and this vacancy is mainly dominated by the proprietary software program; Microsoft Office (96.3%). Even those who take advantage of the OSS office suite do not use it by itself but rather using the proprietary office suite at the same time. Only there are a very few users who use the OSS Office suite alone and in return, the majority of them just use commercial proprietary suite.

As illustrated by Fig. 4, the results showed that the web browsing has been dominated extensively by the OSS ones which implies a different outcome compared to that of the survey over the operating system and the office suite utilizations. The results showed that even though, the proprietary internet browser is still used and has a good percentage of usage (77.2%) but the OSS internet browsers owned a well high percentage of

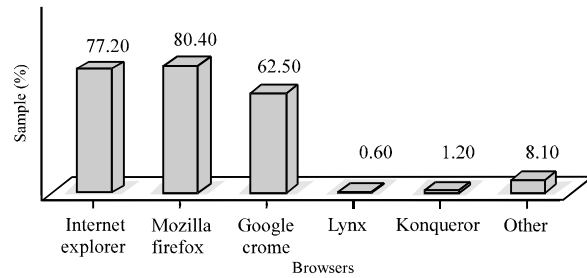


Fig. 4: Internet browsers used within sample

practice. The results showed that there are two different types of OSS internet browsers having been used successfully in the field which are Mozilla Firefox (80.4%) and Google Chrome (62.5%).

Study discovered that on the desktop side, OSSs is limited use on the other hand proprietary software is still widely used but the study results regarding to OSSs usage considered high compare to the statistics for OSSs usage around the world. The usage percentage for Linux is 22.5% in contrast <1% usage around the world. Usage percentage for OpenOffice within study sample is 18.4% compare to 10.6% around the world. Internet browsers usage for Firefox is 31% around the world compare to 80.4% usage in the study result as well as Google Chrome usage is 62.5% compare to 12.2% usage around the world.

**Status of OSS awareness:** To getting a better understanding, this study has investigated the current status of awareness. Figure 5 presents the respondents knowledge about the existence of OSS. The results showed that the respondents have a good knowledge about OSS. The respondents were familiar with such a new trend in OSS and the majority of them had known about the existence of OSS (84.4%). In fact, the mainstream of the respondents were aware of the existence of free software (98%). The result for OSS percentage use within the study sample considered high, when compared to market share statistics for OSS Usage around the world as mentioned previously, this attributed to a knowledgeable user about OSS. Previous studies have mentioned that lack of awareness hinders the use of OSS. So, it can be seen from the result that awareness issue playing a role in OSS uses.

Figure 6 shows the respondents knowledge about the existence of any software that can be used for free. OSS community might be has less incentive and fewer resources to advertise their software, than proprietary software vendors, since, the former make no direct profit from it. Some have argued that the existence and features of OSS are unknown to a large fraction of the potential users. Therefore, the majority users may be uninformed of

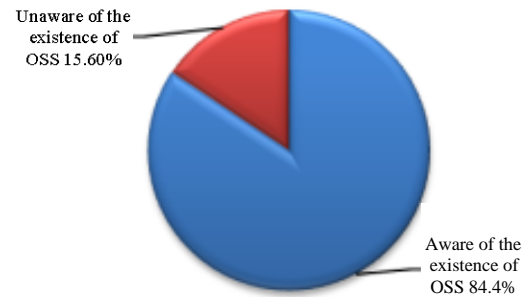


Fig. 5: The knowledge about the existence of OSS

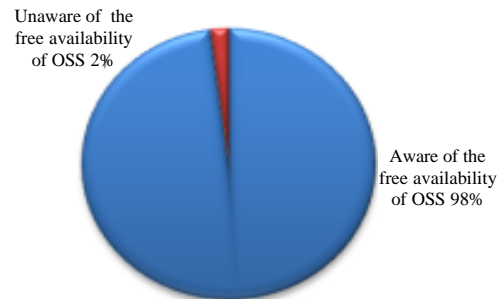


Fig. 6: Respondents awareness about the existence of free software solution

the existence or freely of OSS as an alternative to proprietary software. Accordingly, the presence of uninformed users leads to usage inefficiencies.

### Study hypothesis

**Hypothesis 1:** In order to test the research hypothesis, the bivariate correlations analysis was employed. A correlation means the direction and the strength of relationship between two variables. Correlation is a mathematical relationship. It can never prove a casual connection. It does however support an explanation based on logic. In fact, the bivariate analysis helps to compare and control two or more correlated variables in situations where the quality depends on the combined effect of such variables. This technique is most useful when two different variables work together to affect the acceptability of a process or part thereof.

As shown in Table 1 that all factors having significant correlations with the adoption of OSS. The usability factor is positively affected on adopt OSS. The results support this hypothesis ( $R = 0.43$ ,  $p < 0.05$ ). Previous studies have been mentioned that the usability is the influential reason of the limited application of OSS. Some of the researchers argued that usability issues are not fully consider during development and test phase of OSSs as well as a few usability experts participating in open source development processes. While in proprietary

**Table 1: Correlations**

Factors	Adoption open source software
<b>Usability</b>	
Pearson correlation	0.430(**)
Sig.(2-tailed)	00.000
N	328
<b>Quality</b>	
Pearson correlation	0.375(**)
Sig.(2-tailed)	0.000
N	336
<b>Compatibility</b>	
Pearson correlation	0.392(**)
Sig.(2-tailed)	0.000
N	339
<b>Support</b>	
Pearson correlation	0.479(**)
Sig.(2-tailed)	0.000
N	337

\*\*Correlation is significant at the 0.01 level (2-tailed)

software the usability is one of the main considerations in the design of software, due to it is related to users ability for work effectively, efficiently and satisfaction with this software.

Previous studies stated that professional usability support and defined user interface design processes are still rare in OSSs. Rough interface can be take the OSSs away from common user while good, simple and interactive interface make the program more understandable, usable and preferable for common user. Usability is still not the first priority of OSS developers, thus defining and integrating a suitable usability methodology into open source processes should be the first priority. As a conclusion, enhancing the usability of OSS does not necessarily mean that such software programs should replace the proprietary software ones within the desktop environment since there are several other factors involved. Nevertheless, enhanced usability is a necessary condition for the OSS widespread utilization.

**Hypothesis 2:** The quality factor is positively affected on adopt OSS. The results in Table 1 support this hypothesis ( $R = 0.375$ ,  $p < 0.05$ ). The result stated that functions, features and reliability considered critical aspects to adopt OSS. One of the frequent criticisms cited in the previous studies that OSSs are lower functionality compared to their closed source counterparts. Previous studies mention that some of the features in OSSs are not as advanced as their equivalents in proprietary software. OSS community must put more effort into deliver features and functions that required by regular users.

**Hypothesis 3:** The support factor is positively affected on adopt OSS. The results strongly support this hypothesis

( $R = 0.479$ ,  $p < 0.05$ ). Many references consider OSS to be unsupported software and technical support is a potential open-source user's primary concern. A large percentage of OSS application products do not come with technical support service availability such as information about the software, documentation as well as new versions. Dialogue with the software development team is often impossible while there tends to be significant documentation available on the internet. When there is a problem with the OSS product, a dedicated support team may not be readily available, if one exists at all. Therefore, user may be required to research available documentation and resolve problem without assistance.

The changing from proprietary software to OSS may be problematic for user perceives that there are fewer support options for OSS. While users touched that it was safer to stick with Microsoft Softwares with the product in a market leadership position, support vendors would always be available. In areas such as device driver's support, OSS does have a tendency to be released more slowly. The new software must be upgradable to provide additional capabilities. So, as a conclusion must but more effort to improving support, the support service be supposed to be as good as support for proprietary software from vendors like Microsoft.

**Hypothesis 4:** The compatibility factor is positively affected on adopt OSS. The results support this hypothesis ( $R = 0.392$ ,  $p < 0.05$ ). Numerous researchers have cited compatibility factor as an important factor to adopt OSS, the compatibility of OSS with existing infrastructure technologies including compatibility with current softwares and hardwares, the survey investigates both of sides. The decision to adopt open source platforms appears to be significantly influenced by the compatibility of the new technology with current technologies.

Although, a large portion of OSS is compatible with other OS platforms such as Microsoft Windows and MAC OSX, there are some applications which only operate within a Linux environment. Thus, it can be a challenge to find suitable OSS applications that can conform to user software needs. Also, researchers mention that the files or programs designed for the proprietary software can be used by the OSS while files or programs designed for the OSS are not usable by the proprietary software. It is clear that users fear of compatibility problems, in the case of OSS non-compatibility is seen as a key barrier to the adoption of OSS. So, the softwares, to be considered for adoption

it needs to be compatible with the user existing technology infrastructure. As a conclusion to increase adopting OSSs, there is a need to be compatible with a wide range of softwares and hardwares.

Mozilla firefox web browser is seen as a good example for commonly use OSS. Mozilla Firefox has a large user community and is considered to be among the best web browsers available. The observers point out that the Firefox web browsing software application has become popular and has captured a significant portion of the market. The broadly using of Mozilla Firefox attributed to its characteristics regarding to the first is usability, Firefox won UK Usability Professional's Association's 2005 award for "Best software application", simply Firefox designed for common or ordinary user. The second is compatibility of Firefox, Firefox is compatible with wide range of operating systems including various versions of Microsoft Windows, Linux, Mac OS X as well as Solaris. Combatable with most basic web standards including HTML, XML, XHTML and others as a result Firefox considered combatable with a wide range of softwares and hardwares.

The third is strongly support service, support service for Firefox includes references, documentation, tutorials and troubleshooting guides for users. The fifth is quality, Firefox is deliver a quality software regarding to advanced functionality, additional features of Mozilla Firefox those distinguish it from other web browsers such as Internet Explorer is the high reliability represented by run for a long time without errors, problems, crashes and service interruptions. Taken into considerations the awareness issue, Mozilla Firefox foundation increase awareness of Firefox and its characteristics among the user through a wide advertising campaign.

## CONCLUSION

OSS is still limitedly used despite its benefits which making OSS one of the most exciting phenomena in the Information Technology world. The main purpose of this study was to identify the factors that have a significantly effect on the OSS adoption, to increase the OSSs adoption should concentrate on support, usability, compatibility, quality in addition to increase the awareness users about OSSs solutions. This can be achieved OSS community including provision information through advertising campaigns to inform those users who have ignored the existence and the characteristics of OSS.

## RECOMMENDATIONS

Furthermore, governments could push the OSS adoption by intervention to diffusion OSS, this intervention including, mandate adoption of OSS in public administrations and at schools and universities. Offering tax breaks to companies that use the OSS instead of proprietary software such as Singapore government. Hardware discounts on PC with pre-installed Linux such as Germany government. Finally, support OSS through promotional campaigns such as what happens in US, many public education consortiums are promoting OSS.

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