Open Source: What's the Dilemma?

Syaiful-Rizal Hamid
Faculty of Technology Management & Technopreneurship (FPTT)
University Technical Malaysia Melaka, Malaysia
www.utem.edu.my
E-mail: syaiful@utem.edu.my

Boon-Cheong Chew and Sarah Halim
Faculty of Technology Management & Technopreneurship (FPTT)
University Technical Malaysia Melaka, Malaysia
www.utem.edu.my
E-mail: bcchew@utem.edu.my

Abstract - This paper discusses about the dilemma of implementing open source in the selected Multi National Corporation (MNC) companies which based in Malaysia. In order to understand this current trend, the research focuses on two main stakeholders' issues namely as; (1) an overview of how the management and its policies formulated to support the progression and the development for open-source sharing, and (2) a discussion of how the firms get involved in free and open source software sharing and R&D which include joining existing open source communities, creating new ones, free riding off for existing open source projects, or deciding to adopt open source software. However, when it comes to ensuring the quality of software from a security standpoint, was there really any difference between open source and licensing software and the dilemma for the organization either to move into the progressing line of open source or remain in the business as usual.

***Keywords*- Open Source, licensing software**

I. INTRODUCTION

It is becoming clear that open source sharing with the copyleft is the latest trend in the ICT industry. In the spirit of free and open source software or source code sharing, the scientists and engineers are attempting to establish a community in which information will be freely exchanged, so that one may further brings the understanding of open source and its implications outside the realm of software development.

In order to better understand this current trend, the research will focus on two main stakeholders' issues:

- An overview of how the management and its policies formulated to support the progression and the development for open-source sharing.
- A discussion of how the firms get involved in free and open source software sharing and R&D which include joining existing open source communities, creating new ones, free riding off for existing open source projects, or deciding to adopt open source software.

In light with that, the authors wish to test and further develop the framework. See also [1-2]. This framework was developed in the UK depicts few of the companies which have materialised the open-source concepts that strengthen within the community of ICT. In terms of research methodology, this research is based on quantitative study for theory testing with the aims to examine the level of awareness of these companies, as well as to envision the next level of ICT evolution. It is expected that the findings from this study, such as new inputs and elements would provide new insight and enable to refine the existing body of knowledge.

The objective of this article is two-fold:

- Explain in simple terms what open sources means, its benefits, and impact in creating and managing open source innovation in the network context.
- Share the results of a case study conducted among Malaysian industries in understanding the further extend of existing open source model or framework.

Current research in the field Technology Management calls for more theoretically grounded research for open source appropriate for a given context. This study will demonstrate that the context within which open source is used is changing. The key questions are: "*Is Malaysian industry ready for the emerging context?* "*What are the gaps in our knowledge?"* and "*Which lines of enquiry do we need to pursue?"*

From proprietary to Open Source reflect that this transition is from the principle of closed source based on a profit motive to the principle of open source based on a non profit motive. The transition line is where the rights of ownership are waived and the public are allowed to share and given access [3-7].

One of the events occurring at present is 'Open Source Innovation', where the organisation invites outsiders to comment on their suggested design improvements. Ideally, in an open source context, this creates more opportunities for developing and exploring new innovative ideas. Thus,

the open source movement brings the ideas of participation, collaboration and creativity to our social structure. This waives the orthodox idea of proprietary and copyright and gives way to the new domain of copyleft[1].

According to review by [6] claims that the open source movement grew out of the principle of closed source (for example, the protection of intellectual rights and private investment was motivated by profit) - the latter is based on the commonly owned goods, as goods based on non-profit motives [6]. Contrary to the closed-source innovation model, the problem of non-contributors or free riding is not a concern for open source innovators, since their personal gains are considerably higher than those of free riders [7]. Free riders, it seems fair to assume, are unlikely either to acquire social recognition/status or experience any significant learning curve effect.

Thus, in terms of psychological motives are based largely on the premise that intrinsic motivating factors exist which allows the participants to achieve a degree of personal satisfaction. If the concept 'the best idea to win' – meritocracy is within the networks (i.e. communities of practice), then people will be motivated more by peer recognition and community prestige (reputation). This means that the continuous improvement movement is placing a greater emphasis on community opinion. However, some contributors have looked for external rewards by stressing the importance of peer recognition (communities of practice) [9]. He argues that such rewards can later be exported to the outside and translated into traditional monetary rewards.

As such, learning opportunities have been proposed as another important driving force within this open source context [10] where learning by answering questions from users is a motivating factor for open source software developers. Continuous learning opportunities simultaneously provide a process of development for contributors and improvement for participators. Thereby, the future of open source movement will provide more learning opportunities for an individual in the team and the organisation. As a result, the staffs are given more space and freedom for their development. This also becomes the platform for the staff to increase and equip their knowledge.

The open source movement puts forward the view that customers should participate actively in the product and services development, and share their thoughts and reviews of the products - customers provide a wide variety of skills and motivation levels, which promote dialogue with producers/manufacturers and among consumers. This two-way communication is believed to increase transparency in the relationship between producers, suppliers and customers. In addition, this movement provides a platform for promoting new innovations and fostering new knowledge.

This reflects the situation where continuous customer engagement and re-engagement in the form of collaboration, innovation and learning with the customer as an integral part of the network. This view is in line with [11] who claims that customers are increasingly a source of competence. An informed and active customer base is emerging. Customers are willing to engage and co-create their personalised experiences [11].

Thus, this creates a learning process for the producers to learn from customers' feedback. In the meantime, it also provides opportunities for the producers and customers to increase their knowledge literacy. As a result, customers become well informed and demand higher and better quality products and services.

Furthermore by implementing open source, organizational policies is critical to ensure that employees do not use open source in a way that will bring undesirable consequences. Any use of open source should have a real determination by management that it would not conflict with the company's business model. The uncontrolled use of open source can force an organization to share proprietary source code or face an injunction from the sale of products. Other than that, companies need to look for opportunities to acquire and share their innovations with others [12]. In certain technologies, particularly by release as open source, it can be a good strategy to support the new innovation to be implemented. This requires a proper analysis of the value of each feature that lead to the product, so that the right features are from open source or stored in proprietary.

The advantage of this movement is that the quality of the product will be improved and amended faster through the pooling and development of ideas and solutions. Therefore, this is likely to increase the pace of change and the response from the producers and service providers. Occasionally, this may help to mitigate the issues arising from customer complaints, and reduce the time of response to solution.

Overall, it may be fair to say that producers will enjoy the benefit, as they gain the trust of their customers (as the customer becomes the contributor and participator in the web). There is also a need for more transparency in dealing with their relations with customers to fully benefit from this movement.

[1] This transition is from legal rights protection to the waiving of certain public rights. A particular example of Copyleft is the General Public License.

II. WHAT IS OPEN SOURCE? AND WHY COMPANIES INVOLVED?

In viewing report by [13], open source was defined in 1998, however, free software and sharing the source code is the long-established concept, especially in research and university environments. Today, more than 140,000 open source projects. In basic open-source projects, new companies were created and designed to make money on the success of open source technology. Many of these companies either distribute indoor and outdoor versions software, offer support and maintenance services based on open source software or provide consultation, training and system integration services around open source software.

In production and development, open source is a method that promotes pragmatic free redistribution and access to the design and implementation details of the final product. Before the phrase open source to be widely adopted, developers and producers used a variety of phrases to describe the concept such increased with the rise of open source internet, and the attendant need for massive retraining computing. Open source code allows the source code itself increase the diversity of production model, access communications, and interactive communities. Open source software movement was born to illustrate the issues surrounding the new copyright, licensing, domain, and users that are created [14].

Open source model, including the concept of simultaneous but different agenda and different approaches in the production, in contrast with more centralized models of development as commonly used in commercial software companies. One of the key principles and practices of open source software development is the production of peer exchanges and cooperation with the final product, source materials, and documentation are available at no cost to the public. This is increasingly being used in other fields of endeavour, such as biotechnology [15].

According to the review by [16], model of free and open source development has made contributions towards calculating, maintaining both research and commercial projects and facilitate the group of people, who may not know, and to help one another. While increased activity has a bright future, all this work is built on the license, legal documents often look good or difficult to understand. Businesses and individuals who are not always sure what is holding in their decision to participate, and make the license to be used for specific projects may project it. Also, open source software components and solutions means that source code is available, can be used, changed and distributed to other users of the agreed common rules [13].

Furthermore, literature also provides sources on the advantages and disadvantages of open source, which are summarized in Table 2.1

Table 2.1 Typical advantages and disadvantages of open source.

Advantages	Disadvantages
Control – lets to be control in business.	**Eliminates** - The value of a commercial license for the software.
Flexibility - it is licensed in such a way that can modify it.	**Crack** - Can be enhanced and redistributed by competitors, creating splinter versions of the original code.
Reliability - it is developed in such a way that it is typically more reliable.	**Loss** - Can lead to a loss of control over integrity of the code.
Cost - used with little to no upfront costs. Pay for the support and when need it.	**No support exists** – Once decide to use open source software it at on your own. There are many self-motivated forums that can help to install and run open source software; there is no qualified support available.
Longevity - simply contract with a consulting firm, individual programmers, or other third parties.	**No guarantee of updates** - Not paying for the open source software it is bound to give the regular updates. Users can get stuck with the same old version for years without ever getting an update.

Sources: [17]; [18]; [19].

Previous research by [18] identified several reasons that may cause an impact of open source. These reasons are categorised as follows:

- End Users - Impact on end users is positive and clear. They give the client software for free and at competitive prices because of the low threshold of entry for service providers.
- Service Provider - Service providers can download and install free in users hardware and it is possible to install software on just about any hardware that the service providers have. Also the distribution of open source creates a community of individuals and organizations that will continue to maintenance development should go out of existence, eliminating that risk to service providers.

- Consultants - Open sources software can be a real advantage to the consultant, especially if they choose to be of service suppliers. Because it is a web-based service, it is easy to distinguish from others through specialized websites and on the contrary, intellectual property or the organization that develops them.

- Software House - A software house specializing in getting the best out of a cluster calculation may develop a proprietary replacement for the term of daemon may do an excellent job optimizing workflow.

All of these put forward the arguments regarding the important of the open source in the daily life context. In order to see this study in the real life case, the researcher conducted some interviews with few staff to gauge the information regarding the implementation of the open source, respectively at the chosen companies. The illustration of the case can be found in the Section Three as follows.

III. CASE STUDY

On 15 November 2000, a partnership between Companies A, B, and C resulted in the birth of Company D, a company committed to offering the "Highest Customer Satisfaction in Malaysia". Since then, Company D has been a solid and aggressive player in the Malaysian automotive market. Each year, it progresses so rapidly that it set up a plant in Melaka. With this new plant, not only Company D optimistic of achieving high sales every year, it has further strengthened Company D reputation in Malaysia. Company D rides strongly on its slogan "The Power of Dreams". It signifies the ever changing and growing needs of the future with better technology, along with better value. Thus, through superior technology, Company D controlling their every computing system by storing each license software in large server and can be uploading to the client.

Each Operating System such as Windows and Microsoft Office using a valid license and be purchased through authorized supplier. It is also in accordance with the standards Japan through the head quarter, each Microsoft Office at this Company D should using MS Office 2010 for consistency between the branches in two countries. The same goes for email delivery system was previously using Microsoft Outlook but now changed to Lotus Notes because, there are some customers were unable to receive full information when using MS Outlook. Thus, Company A made the decision to replace MS Outlook to Lotus Notes where MS Outlook previously found often go wrong and facing a few problems and because of that, the e-mail system such Lotus Notes has been adopted in some factory as the UK, India, and Indonesia.

In additional, the format for the drawings for each model of vehicles mostly use CATIA aimed to drawing engine and body structure. Software like Auto CAD is also used for sketch purposes only. Both of this software also has its own license to get the full use of tools. Through the use of licensed software, Company A issued strict rules to not allow any free software. The use of open source software and download any external software is forbidden and blocked by a firewall.

This is caused by the restriction of virus issues and mitigating hackers. Users of this company can't download and install due to regulation by administration where the Fireball will be blocked and asking for administrator ID and password.

So that, previously company allows the social networks such as Facebook and YouTube, it gives impact to unlimited usage for user, and however this made high traffic. YouTube and Facebook rating is very high slower the network flow system. As much of the operation is involved transferring data between Company D with others company branches such Thailand and Japan and the network operation become slowly (i.e. using TV conference). But, once with the implementation of blockage and having the firewall, it is no more problem with the network speed. However, Company D still allows employees and customers to use a pen drive to transfer or collect data for their work only. But at Thailand, customers or suppliers are not allowed to bring any data storage into the field. If they want to use e-mail, customers must use a computer and email from the factory or branch only. Moreover, users are allowed to use a web browser such as Internet Explorer and Netscape Navigator only aims to control the information that being access.

The standardized functional process also as an example the auditor will check the manual of guidelines every year. Therefore, as conclusion, if users install any software that is not listed in the database of this company, the security system will send a warning including the user ID to the IT department. Thus the user's computer will be blocked to prevent unwanted data leaks. However, in fact freeware mostly welcomed when it suits the purpose and function and easy to use and does not interfere with database and system in Company D.

In this paper so far, the researchers have identified there are four critical points that affect the process of decision making either the organization wants to implement the open source or stick to old fashion style which is proprietary licensed software. One of the main reasons is based on policy system and earlier agreement that bind between the organizations with licensed provider (i.e. Microsoft). For example, if the headquarter give an instruction to the subsidiaries, the rest will follow the stated rules. As this restrict the options and also opportunities for the organization to experience and enjoy the benefit from this movement of open source itself. Secondly, what holding back the organization to jump into the open source is due to the fact that there is becoming more high activity of usage and traffic, which slowing down the operation – IF there is no element of control. So, the freedom to access in network is not really appropriate for the business, as the staff may tend to use and watching streaming media such as You Tube, on line TV, face books – all sorts of social networking sites – which increase the internet traffic and eventually slowing down the business operation and processes. For example, more time to spend to downloading and retrieving information. On one hand, there will be more works to do for the ICT department as they need to monitor any highly network activities in order to make sure that the staff are not downloading any application or watching the social media websites. On the other hand, the ICT department also need

to monitor and applying the firewall as all these put on an extra miles effort and costs.

As such, what worrying the organization to change is because of the compatibility factor, as the people in the organization perceived that the license software is much longer in the market and it is also very compatible in comparison to others open source product. Yet, it is easy to learn and relatively easy to apply - user friendly count in here. The final point is goes back to security issues as the selected organization feels that the open source software and its application is vulnerable to hackers and other harmful intruders such as virus, Trojan and malware as all of these things are associated to safety concern which need to be resolved.

All of these bring to the dilemma to the organization either to move into the progressing line of open source or remain in the comfort zone – business as usual concept.

IV. CONCLUSION

The aim of this research was to understand if open source can be realized in real life context by using case study to illustrate the issue. From empirical investigation, the dilemma that the open source are currently facing are based upon the premises that there are a few factors where open source is hardly been implemented in the organization, as it is regarding the issues of policy and license; daily operation (i.e. speed and performance of networks – the traffic); compatibility and security issue (i.e. data storage, data leakage, virus, Trojan, spam and hackers).

The findings of this study are limited in the sense that it is valid to those companies that underlined into open source contexts characteristics. However, the issue of generalizability and those findings followed the research methodology literature [20-21], which support the argument that, although the conclusions reached cannot be claimed universally applicable, it is likely that similar studies conducted in organisations similar to this research are likely to yield similar results.

Also, another dimension of the generalizability of findings is that by learning from this research and this kind of context and this kind of organisation, one could conduct a more competent research in similar cases with less effort in the future. In turn, throughout the research process, the researcher opted for three key data collection methods (mixed methods) using: (1) primary data from official company websites, (2) primary data from interview and (3) secondary data from documents (i.e. journal article and magazines).

In summary, the findings of this research provide a useful starting point to discuss the ability of theories developed in industries to be adapted into the open source context. Further work will investigate detailed aspects of each of the issues that be touched on in this paper.

ACKNOWLEDGMENT

The authors would like to thank to the FPTT's team for all the support and facilities and also for valuable comments and feedback while this research work was run. Also, the commitment stands as main interest to collaborate with this kind of research.

REFERENCES

[1] Hamid, S.R., *Putting Technology Management principles in the future context*, in *4th European Conference on Management of Technology (EUROMOT 2009)*. 2009: Glasgow, United Kingdom.

[2] Hamid, S.R., *Social Innovation and Business Trends in the Future* in *5th International Conference on Innovation Management (ICIM)* 2008: Maastricht, Netherlands

[3] Hamel, G., *The future of management*. 2007, Boston: Harvard Business School Press.

[4] Krogh, G.v., *Open-Source Software Development.* MIT Sloan Management Review, 2003. **44**(3): p. 14-19.

[5] Muir, S.P., *An introduction to the open source software issue.* Library Hi Tech, 2005. **23**(4): p. 465-468.

[6] Ulhøi, J.P., *Open source development: A hybrid in innovation and management theory.* Management Decision, 2004. **42**(9): p. 1095-1114.

[7] von Hippel, E. and G. von Krogh, *Open source software and the 'private-collective' innovation model: issues for organization science.* Organization Science, 2003. **14**(2): p. 209-223.

[8] de Laat, P.B., *Copyright or copyleft? An analysis of property regimes for software development.* Research Policy 2005. **34** p. 1511-1532.

[9] Johnson, J.P., *Economics of open source software: private provision of a public good.* Journal of Economics & Management Strategy, 2002. **11**(4): p. 637-662.

[10] Lakhani, K.R. and E. von Hippel, *How open source software works: 'free' user-to-user assistance.* Research Policy, Vol. 32, pp. 923-43., 2003. **32**: p. 923-943.

[11] Prahalad, C.K. and M.S. Krishnan, *The new age of innovation : driving cocreated value through global networks*. 2008, New York McGraw-Hill.

[12] Kemp, R., *Current developments in Open Source Software.* Computer Law & Security Review, 2009: p. p. 56 - 582.

[13] Brian Otis, K.F., *Realize the Benefits of Open Source.* . US - Boston: OPTAROS., 2007.

[14] Margit Osterloh, S.R., *Open source software development - Just another case of collective invention?* . Research Policy, 2007. **36**: p. 157–171.

[15] A. J. Buitenhuis and J. M. Pearce, *Open Source Development of Solar Photovoltaic Technology.* Energy for Sustainable Development, 2012. **16**: p. 379-388.

[16] Laurent, A.M., *Understanding Open Source and Free Software Licensing.* Gravenstein Highway North: O'Reilly Media, Inc., 2004.

[17] Portelli, B., *Why Open Source?* ECT News Network, 2010.

[18] Westhagen, A., 2005. . United State: *The Benefits of Open Source.* Software Architect, 2005.

[19] F, W., *From Using Open Source in Business Revolution Systems.* LLC, (2012, May 1).

[20] Stierand, M. and V. Dorfler, *(in review) Iterative Learning from Investigating Extraordinary Chefs: Generalizability in Idiographic Research* International Journal of Contemporary Hospitability Management 2010.

[21] Morse, J.M., *Editorial: Qualitative Generalizability.* Qualitative Health Research, 1999. **9**(1): p. 5-6.