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Exam Capita Selecta Business Informatics (CSBI)
14/08/2008, 8:45-11:30

Instructions (please read carefully):
- This is a closed book exam. It is not allowed to consult other materials than this exam. Switch off mobile phones and store them in a closed bag.
- **Write the answers on this document.** Use the textbox after each question for your answer. It is not allowed to write outside the box.
- It is very important that we can read your handwriting.
- **State on every sheet your name and student number**
- The language for answers is English or Dutch.
- The grade for this exam is the sum of the scored points divided by 10.
- The grade for the course CSBI = 0.3*presentation + 0.3*paper + 0.4*exam
- We publish the mark for the course CSBI in total. (so not the individual result for this exam)
- This exam contains 9 pages

Additionally:
- All rules for writing papers (as discussed during the CSBI lectures) apply also to the answers on exam questions.
- For the review question, it is strongly advised to make already notes of comments while reading the paper.

Success!

This exam contains one question about your own paper (40 points), and one review assignment of a paper (60 points).

Question 1 (40 points)
    a. Concisely state the claim of your paper? (10 points)

    b. Criticize your own claim, by explaining how your claim can be improved? (15 points)

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c. Provide **two distinct** arguments that refute your reasoning for your claim (and hence refute your claim). (15 points)

1. ...

2. ...

Question 2 (total 60 points)
Review the attached article by using the attached review form.

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Long term economic benefits of participating in Open Source Software

Abstract
This paper contributes to the literature on Open Source Software by collecting the reasons for large profit seeking corporations such as IBM participate in the development of Open Source Software. We will define and analyse the differences between a commercial development process and an Open Source Software development model. The differences in the resulting products of the two development strategies are discussed. In this paper we show how companies can develop long term profitable business strategies by participating in Open Source Software projects.

1. Introduction

The reasons for companies to contribute to Open Source Software (which we will abbreviate to OSS henceforth) development seem counter intuitive from a classical economic perspective: the resulting products of OSS projects are distributed freely; therefore firms cannot gain direct revenues from their efforts (Wichmann, 2002). Furthermore, competing companies also have access to the source code that is used to develop a software product. Under the assumption that profitseeking companies are rational agents, trying to maximize their gain, there must be deeper economic motives that drive these software companies into participation in OSS projects (Hawkins, 2004). This paper contributes to the literature on OSS by identifying these economic motives and show how participation in OSS development can offer new business opportunities.

To better understand why and how profit seeking companies adopt the OSS development model, we first define what OSS is and analyse the differences between a commercial development process and an OSS development model. Second, we identify the differences in the resulting products of the two development strategies. Last, we show how companies participating in OSS projects can develop long term profitable business strategies.

2. Definition of Open Source Software

To give our discussion a solid foundation, we first clarify our definition of Open Source Software. For the purpose of this paper, we use a division in two categories proposed by Hawkins (Hawkins, 2004). This categorization makes a distinction between public licenses and viral licenses.

Public licenses are not really open source in the literal sense, because this license does not demand that source code of derived software is publicly available. The Berkeley Software Distribution (BSD) license is the canonical example of a public license: the only restriction on the software is that the original copyright must always be redistributed with any work based on the original product. Public licenses thus allow software to be redistributed in binary format. Moreover, companies are allowed to sell products that are based on work released under a public license without having to release the source code of this new product.

Viral licenses, like General Public License (GPL) from the Free Software Foundation, are open source licenses in the literal sense (Free Software Foundation, 1991). GPL and other viral licenses are more restrictive than public licenses. Any viral license contains sections that ensure that the source code of products based on the original is freely available. Besides the restriction on the redistribution of products based on a product licensed under a viral license, all libraries and other software that are needed to install and run the programare also subject to the same licensing terms (Lerner & Tirole, 1999).

3. Characteristics of OSS development

The development process is the most distinctive characteristic of OSS projects. Rossi and Bonaccorsi (Rossi & Bonaccorsi, 2003) use the term process innovation, to emphasize that the real innovation comes from the use of a new development process and not by the software products and their licenses as such.

In most software companies, development and coding of software is done by a group of programmers who are selected and paid. The management of software is organized according to strict time schedules and budgets. Furthermore, tasks and responsibilities within the development team are clearly defined. In contrast, designers, programmers and companies choose to participate in OSS projects without any direct financial reward (Hawkins, 2004). In an OSS context, this group is referred to as a community. Development in a community is done in a highly decentralized fashion, developers and other contributors in OSS projects are free to pick tasks they feel best suit their interests and skills.

Because the OSS development process is decentralized, tasks are not coordinated as tightly as in commercial software development projects and therefore the exact timeframe of projects and functionality provided by subsequent releases are hard to predict. Furthermore, little is done to eliminate duplicate effort. Additionally, OSS project are subject to the risk of forking (Lerner & Tirole, 1999). Forking happens when developers have different incompatible ideas about the future of a certain OSS product. OpenBSD is an example of a project that has forked from its' parent, the NetBSD project (OpenBSD, 2006).

4. Development advantages with OSS

Although the decentralized development process cannot be managed and coordinated as efficiently as the commercial development process, developing OSS software in a community has several important advantages. Software companies can lower the development cost of software products by participating in OSS projects. Cost reduction is realised by the distribution of development tasks among the developers and other contributors in the community (Hawkins, 2004), and by the feedback and contributions of participants in the ongoing maintenance of the software product (Lerner & Tirole, 1999) (Hawkins, 2004). These advantages are a direct consequence of the fact that the source code is freely accessible to all potential contributors of the OSS project. Exception to this rule is software that is considered part of the operating system of a computer, such as the kernel or compiler.

Another advantage for companies participating in OSS projects is the access to additional intellectual capital. Participation in OSS projects allows a company to access expertise that is not present within the company itself (Lerner & Tirole, 1999).

As a consequence of the decentralized and informal manner in which OSS development is managed, the costs and risks of starting and abandoning a project can be lowered. Contributors in OSS are not bounded by contracts, and are therefore free to come and go as they wish. In OSS development, companies can balance their investments in the project over time, depending on the actual received benefits. Companies must also include factors like forking and continuity in the assessment os the costs and benefits of participating in an OSS project. In the case that these risks are considered acceptable, the total costs for a company during participation in an OSS project are lower because the workload is distributed among the community (Rossi & Bonaccorsi, 2003).

5. Reduced dependence of commercial vendors
There are also motives for software companies to enter the OSS field that are concerned with the strategic positioning of a company in relation to other companies. Participation in OSS can reduce the dependency of the major software suppliers (Lerner & Tirole, 1999), and preventing vendor lockin. Lockin happens when companies are becoming increasingly dependent of supplying firms, for support or technology (Rossi & Bonaccorsi, 2003).

Another reason for software companies to reduce dependency of the major players in the industry is that companies want to influence the development of supporting products. For instance, IBM may wish to influence the development of the operating system that is needed to use many IBM software products. Aspects that can be of influence on a decision to reduce dependence of other software firms include the pricing and licensing of software and supported hardware platforms. The degree to which companies are able to influence the development process, is proportional to time and money invested in OSS development

6. New business opportunities
Participation in OSS development can also offer new business opportunities for software companies. By using OSS technology in new products, companies can focus on their unique value proposition. Companies can 'outsource' commodity parts of a system, which do not add value (Hawkins, 2004). Effectively, companies can shorten development of innovative products (Wichmann, 2002). TomTom, a Dutch manufacturer of personal navigation products, employs this strategy by adopting and modifying OSS technologies for commodity components such operating system and hardware drivers (TomTom, 2006).

Companies that participate in OSS projects are in a good position to develop and ultimately sell products that are complementary to the OSS product. Experience and status in a community can help companies to develop a strong position in the market for complementary software (Lerner & Tirole, 1999). Likewise, companies can develop services based on their expertise and experience developed from contributing in OSS development (Wichmann, 2002). Examples of such services include consultancy, support and training.

7. Conclusion

In OSS development, participants develop software in a community supported by Internet. Developing in such a widespread community brings disadvantages, the exact timeframe of projects and functionality provided by subsequent releases of products are hard to predict because tasks are not coordinated as tightly as in commercial software development projects.

Another disadvantage rises when developers have different incompatible ideas about the future of an OSS project. Different incompatible ideas bring the risk of forking.

Although the decentralized development process cannot be managed as efficiently as the commercial development process, developing OSS in a community has several important advantages. Cost reduction is realised by the distribution of development among the developers and other contributors in the community. The dependency of a company can be reduced, by developing alternative software. Participating in OSS projects can create new business opportunities, like selling complementary software and related services.

Companies are able to reduce costs, increase their dependency and create opportunities. Those advantages drown out the disadvantages of the unpredictable timeframe and the possibility of forking. From these observations we draw the conclusion that software companies participate in OSS projects because of longterm economic benefits.

8. References

Free Software Foundation (1991) "GNU General Public License" http://www.gnu.org/copyleft/gpl.html

Hawkins, R.E. (2004) "The economics of open source software for a competitive firm: Why give it away for free?" Kluwer Academic Publishers, the Netherlands

Lerner, J., Tirole, J., (1999). "The simple economics of Open Source". NBER Working Series. Working Paper 7600. NBER,Cambridge, MA.

OpenBSD (2006)
http://www.openbsd.org

Rossi C., Bonaccorsi A., (2003) " Why Open Source software can succeed". Research Policy, 32(7), 12431258.

TomTom GPL publications (2006)
http://www.tomtom.com/gpl

Wichmann T. (2002) "Firms' Open Source activities: motivations and policy implications." Free/Libre and Open Source Software: Survey and Study, FLOSS Final Report available online at http://www.infonomics.nl/FLOSS/report85

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Paper 1

Review 1

Title of Manuscript: Long term economic benefits of participating in Open Source Software

Which category describes this manuscript?

- ❏ Practice/Application/Case
- ❏ Study/Experience Report
- ❏ Research/Technology
- ❏ Survey/Tutorial/How-To
- ❏ Other (please specify): ……………..

Are the title, the abstract and the introduction appropriate? Please comment.

Title		Abstract		Introduction
❏ Yes	❏	Yes	❏	Yes
❏ No	❏	No	❏	No

Explain:………………………………………………………………………………………………………
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Discuss the contribution made by the manuscript:

Explain:………………………………………………………………………………………………………
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Rate the paper in each of the following areas (1 = low ; 4 = high):

	1	2	3	4	Explain
Technical content	❏	❏	❏	❏	……………………………

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| Business content | ❏ | ❏ | ❏ | ❏ | …………………………… |

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	1	2	3	4	Explain
Originality of claim	❏	❏	❏	❏	....

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Statements are exaggerated   YES / NO   ....

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Clarity and Organisation	❏	❏	❏	❏	....

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| Writing style/Grammar | ❏ | ❏ | ❏ | ❏ | .... |

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COMMENTS ON SCIENTIFIC REASONING

Rate the paper in each of the following areas (1 = low ; 4 = high):

Claim:

	1	2	3	4	Explain
Well-formulated	❏	❏	❏	❏	....
All concepts are explained	❏	❏	❏	❏	....
Generic (1) vs. concrete (4)	❏	❏	❏	❏	....

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Reasoning:

	1	2	3	4	Explain
Well-structured	❏	❏	❏	❏	....

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Shallow (1) vs. profound	❏	❏	❏	❏	....

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	1	2	3	4	Explain
Enough sound examples	❏	❏	❏	❏	....

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	1	2	3	4	Explain
Generic (1) vs. concrete (4)	❏	❏	❏	❏	....

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Conclusion:

	1	2	3	4	Explain
Based on logical reasoning	❏	❏	❏	❏	....

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	1	2	3	4	Explain
Contains new elements (1=yes, 4=no)	❏	❏	❏	❏	....

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Does the manuscript contain sufficient and appropriate references? Please comment.

	NO			YES	Explain
Sufficient references	❏	❏	❏	❏	....
References in conference style	❏	❏	❏	❏	....
References where appropriate	❏	❏	❏	❏	....

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Suggestions for improvement to the paper:

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