FLOSS-Induced Changes in the Software Business: Insights from the Pioneers

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Abstract. Companies that build their offerings with Free/Libre Open Source Software (FLOSS) communities have evoked fundamental changes in the operating environment of software firms. However, prior literature has not paid sufficient attention to how the managers of software firms perceive these changes and the impact of FLOSS activity on their business. This study investigates the perceptions of the entrepreneurs and senior managers in Finnish software firms regarding these issues. Based on narratives obtained from discussions with the managers, we group the findings into four categories that provide insight into the ongoing changes in the software industry.

1 Introduction

The Free/Libre Open Source Software (FLOSS) phenomenon has received increasing attention among IS-researchers as an important aspect of the information economy and an essential consideration for all software companies (Fitzgerald 2006). FLOSS collaboration has delivered high quality mainstream applications such as the Linux operating system and the Apache Web Server (Raymond, 1999; Mockus et al., 2002; Fitzgerald, 2006). In sum, FLOSS development represents an important phenomenon that deserves to be studied further (Feller 2001; Lerner and Tirole, 2001). Prior research on making commercial use of FLOSS has focused mainly on pointing out that managers must take care when adopting FLOSS (see, for example, Lerner and Tirole, 2001; Ven et al., 2008). In this paper, we focus on individual companies and pose the research question: *"How do software entrepreneurs perceive FLOSS-driven changes in their business?"* We address this question empirically through a qualitative inquiry and a narrative analysis.

2 Related Research

The benefits of open innovation are widely accepted in the software development community (e.g., Von Hippel and Von Krogh, 2003; Henkel, 2008). In its broadest sense, software innovation refers to research and development (R&D) activities that involve intellectual capital, physical products, and processes in software production

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(Vujovic and Ulhoi, 2008). Chesborough (2003) observes that strategic innovations have been regarded typically as a company's most valuable competitive assets, which also serve as barriers to entry by competitors. Service-dominant logic (Vargo and Lush, 2004) describes a significant transition in business in terms of the use of resources. It considers resources in the development and delivery of offerings as operand resources (those on which an operation or act is performed) and operant resources (those that act on other resources). FLOSS development depends to a great extent on resources that are external to the firm. In FLOSS businesses, resources are accessed through collaborative relationships (Dahlander and Magnusson, 2008).

Fitzgerald (2006) argues that the emergent forms of FLOSS have a strong commercial orientation in the product development, delivery, and support processes. Fitzgerald (2006) has labeled these forms as OSS 2.0. In many cases, voluntary cooperation-based collective action systems involve some form of public or semipublic good (Heckathorn, 1996; Monge et al., 1998). According to the definitions by Olson (1965) and Udéhn (1993), public goods offer participants in networks collective benefits that are (a) non-excludable, in that they are available to all network partners, and (b) jointly supplied, in that partners' uses of the goods are non-competing.

3 Methodology

A narrative approach is considered a feasible research strategy in this study, as it is well suited to investigate a phenomenon within its real-life context (White, 1981). There are several noteworthy examples that suggest how to use the narrative approach to research FLOSS (e.g., McDaniel, 2004; Szczepanska et al., 2005; Brown and Jones, 1998; Alvarez and Urla, 2002). The narrative approach coaches the members of a certain organization to frame their understanding of social reality and their place in it in a discursive manner (Phillips and Hardy, 1997).

Table 1. Cases

Case 1	Tripod (pseudonym) is a small Finnish FLOSS company that specializes in developing collaborative learning and knowledge management software, related training, and consultancy. Its revenue model is based largely on service contracts with public organizations.
Case 2	OurDB (pseudonym) is a large Finland-based international firm that specializes in relational database management systems and related services. The company's revenue model is based on dual licensing, which means it provides both FLOSS and proprietary versions of its software.
Case 3	Yoga (pseudonym) is a small Finnish entrepreneurial firm that focuses on consultation and FLOSS development. The firm specializes in combining relational databases and e-mail management tools.
Case 4	Nemesis (pseudonym) is a small Finnish company that specializes in FLOSS-based Web services, especially content management systems, related services, and online support.
Case 5	Tulip (pseudonym) is a small software development unit belonging to a branch of a large multinational corporation. It produces FLOSS software systems for interoperability testing of the concerns equipment of the main product lines. The unit is located in Netherlands and employs three persons.

We selected five FLOSS software companies to discover how the managers in these companies perceived and described the changes in their operating environment. The companies were selected on the basis that their product and service offerings were built on FLOSS. The method used for data collection was semi-structured interviews. Respondents were (senior) managers responsible for the company's strategic decision making. We conducted one to four interviews with each of the respondents from the selected firms over a 4-year period from 2004-2008. To gain a rich understanding about the organizations in their contexts, we interviewed the whole staff then employed by Tripod (3 people), Yoga (1 person), and Tulip (4 persons). Conversely, OurDB and Nemesis are larger companies, so we limited our discussions to the CEOs and CTOs of those companies. In total, we conducted such interviews for twelve respondents. The average duration of the interviews was about 2 hours, with durations ranging from 1.5 to 3 hours.

4 Discussion

The openness of innovation activity is a key theme in commercial FLOSS development. This is evident in the respondents' accounts of companies' innovation processes. The responses we received depict a fundamental difference between the open and closed innovation paradigms.

"I think the architecture of participation that is embedded in the open source philosophy is a superior innovation method. And it is not limited to software. Look at Wikipedia. It just so happens that software developers were the first ones to adopt it in the modern world. The simple fact that everything you create is open for scrutiny by anyone else is a strong incentive to produce good stuff from the start. And the meritocracy of open source leads to faster innovation and thereby better innovations. It is a Darwinian system where over time, the best solutions will emerge." (CEO, OurDB)

"It is possible to create this kind of a joint project only if you let people see that their response has some effect on the software. ---

There was a lot to do with our software before it was ready, but we opened in a very early stage. We were able to give plausible promise and thus received a lot of valuable feedback. This resulted in a quite different end product." (Respondent from Tripod)

"Our solutions are made for the customers, not for ourselves. We want to build a working solution, but we want the customers to sit down with us, so we can do it on the users' terms. --- We believe that it is not enough for us to provide open source software. In our opinion, customer should also have open access to the actual work process. --- Not only through external communication, but also in internal collaboration. We want to get the customers' messages heard." (CEO, Nemesis)

The open innovation form embodies working together with numerous partners and various members of the FLOSS community. Our narratives underscore that through FLOSS activity, firms open their innovation processes in order to benefit from the knowledge and the innovation capacity of diverse OSS communities. The theme that FLOSS offered increased customer involvement was raised several times.

"We would never have gained 5 million users to our database product without acting according to the principles of the open source software community. Since we first released our software under an open license, we have gathered feedback … development ideas, problem descriptions and solutions … and responded to all possible initiatives from the user community to develop the product with the skillful individuals using the product." (CEO, OurDB)

"At OurDB we love users who never pay us money. They are our evangelists. No marketing could do for us what a passionate user does when he tells his friends and colleagues about the software. Our success is based on having millions of evangelists around the world. Of course, they also help us develop the product and fix bugs." (CEO, OurDB)

We find that while the software providers that rely on the goods logic in a closed innovation paradigm (traditional mass-market oriented software firms) aim at software delivery though distant, transactional customer relationships and focus on the development of standardized, homogeneous services for multiple users, companies that focus on OS development strive to empower their customers to engage in software co-development.

The main advantage of FLOSS is the external contribution made by users and developers. Harnessing this innovation potential would allow the production of software and services that would be appreciated by users. The interviewees viewed that external competencies are becoming increasingly important.

"The vast community of [our OurDB product] users and developers is what drives our business." (CEO, OurDB)

"We have five million server installations in use worldwide. Around them there are small 'software ecosystems.' There are books and articles written, lectures held, courses taught, and applications developed around our products. This community of volunteers is our most important asset. Yet, it is difficult to define." (CEO, OurDB)

"Having a large user group, you get higher product quality because more people us software in different situations and provide feedback." (Project manager, Tulip)

To conclude, the ability to utilize external resources and capabilities is recognized as one of the key factors in remaining competitive in the software business. As public goods, FLOSS-based platforms, components, and applications shift the focus from development of proprietary innovations to use of the goods and knowledge that are publicly available.

A vital consideration in FLOSS activity is how it changes the means of value capture in software business. It is apparent that the interviewees saw the future of the software business as being in services rather than in commoditized products. The respondents agree that proprietary software cannot compete successfully for long in the same market as a similar FLOSS product:

"---the business will have a fierce price war, where profits disappear. ---

"We started by not focusing on profits at all. Instead, we focused on boosting the use of the software. --- The vast community of our users and developers is what drives our business. Then we sell our offerings to firms – those who need to scale and cannot afford to fail. The enterprise offering consists of certified binaries, updates and upgrades, automated DBA services, 7x24 error resolution, etc.

-You pay by service level and the number of servers. No nonsense, no special math.
-Enterprise software buyers are tired of complex pricing models (per core, per CPU, per power unit, per user, per whatever the vendor feels like that day)—models that are still in use by the incumbents." (CEO, OurDB)

The narratives provide reason to conclude that when software is distributed freely, the traditional revenue sources are waned, and firms are compelled to develop novel revenue models that may be based on services and bound only indirectly to the distribution of software licenses.

5 Conclusions

Table 2 summarizes the findings concerning the impact of FLOSS on software business through dimensions of: 1) the impact of FLOSS on the innovation process of software firms; 2) user involvement; 3) the use of external resources in software firms' operations; and 4) the revenue model as part of software firms' business models.

Table 2. Identified FLOSS-induced changes in the software business

Dimensions	Impact
Innovation process	FLOSS-based software development urges software innovators to open up their innovation processes.
User involvement	FLOSS activity emphasizes user involvement in software development and delivery.
External resources	FLOSS activity emphasizes access to external capabilities rather than the ownership of resources.
Revenue models	FLOSS-based public goods change the revenue models of software firms.

This work has some important implications. First, the findings highlight the ways FLOSS affects the software business. FLOSS-based software development forces software innovators to open up their innovation processes and it emphasizes user involvement in software development and delivery. FLOSS activity emphasizes access to external capabilities rather than internal resource ownership. finally FLOSS-based public goods change the focus of competition in the software business from product-dominant to service-dominant operations. It closes traditional sources of revenue, and compels firms to develop new revenue models based primarily on services. For scholars interested in the software industry, the findings provide interesting avenues for further research.

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