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**If not for money for what? Digging into the
OS/FS contributors' motivations**

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If not for money for what?

Digging into the OS/FS contributors' motivations*

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Abstract

This paper analyses the data collected by two of the most significant surveys on the Open Source Software (OSS) contributors' motivations with the aim of assessing if in the OSS products circulation we can recognise the characteristics of the modern way of giving, suggested by Godbout (2000). The analysis of the information collected seems to confirm that the intrinsic motivations (social/community and political) prevail over the extrinsic ones (monetary and signalling) when developers decide to join and stay in the OS community and that the feeling of reciprocity is shared by the majority of the community members. Therefore the OSS product circulation seems to fit into the characteristics of the gift circulation.

Keywords: open source software, reciprocity, gift economy

JEL Classification: L17, L23, L31

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Introduction

Software industry is a fast growing sector of the economy which is undergoing significant changes due not only to the growth of the “information economy” (Hall, 2007) but also to the presence of two distinct modes of production and distribution of the software products: proprietary and open source software.

Proprietary Software (PS) is realized by hired programmers working along hierarchical procedures defined by private firms. PS is protected by patent and distributed through commercial channels under the payment of a licence fee.

Free (Libre) or Open Source Software (F/L/OSS)¹, on the contrary, is the result of the joint work of a great number of contributors, usually unpaid, scattered throughout the Web, who share their results, i.e. the source code of the computer program, which is therefore publicly accessible. It can be copied, modified and even redistributed, under some kind of restriction to avoid the appropriation and sale by commercial firms. The diffusion of desktop computers and their connections through network applications via Internet has created, in the early 90s (Graham and Mowery, 2003), the right environment for the growth and diffusion of OSS. Apache, Linux, Mozilla are just few of the best known OSS.

A growing literature is now trying to assess the increasing role of OSS in the software market answering to questions such as why OSS are produced in a market where firms are driven by the profit incentive or how these products act as drivers of innovation on that market.

Instead, less research efforts have been devoted to investigate into the motivations of contributors who choose the open source mode of production. The most widely cited piece of economic analysis (Lerner and

¹ Free Software was the original term, while Open Source Software was coined later, in 1998. Members of the two communities may contribute to the same project but consider themselves to belong to different movements.

Tirole, 2002), on the motivations of OSS contributors try to give an answer to the startling question of why people should devote their time working at projects without pay. Lerner and Tirole suggest that there are many economic rationales which explain the decision to contribute freely to software programming. But the findings of developer surveys, suggest a more complex and rich motivational framework than that asserted by Lerner and Tirole.

The empirical studies, based on developer surveys suggest that individual motivations might be both intrinsic, i.e. the contribution has a value per se, and extrinsic, i.e. the contribution will bring external benefits. Contributors are usually driven by a combination of intrinsic and extrinsic motivations and for many of them the intrinsic motivations (to enjoy their personal creativity, to expand and share their knowledge, to feel the sense of community identification) tend to prevail over the extrinsic ones concerning future career and monetary rewards (Lakhani and Wolf, 2005). This brings us back to the role of altruism and reciprocity and suggests that further investigations on individual motivations are required.

This paper tries to extend the results already achieved by investigating the data collected by the two most significant surveys on the OSS contributors' motivations: FLOSS (Ghosh *et al.*, 2002) and FLOSS-US (David *et al.*, 2003). First of all, I shall try to answer the following questions:

- 1) How relevant are the motivations of contributors, to join and to stay within the OS community?
- 2) Are the intrinsic motivations more relevant than the extrinsic ones?
- 3) Do the contributors perceive the existence of indirect reciprocity and act accordingly?

Second, I shall analyse how two of the most famous members of the OS community interpret their contributions to the information society:

- 1) Do they think that the members of the OS community behave according to a “gift culture”?
- 2) What kind of gift culture they have in mind?
- 3) Will the gift culture expand and contrast the exchange culture now prevailing?

The paper will then conclude discussing the role that OSS, as a gift, may play within the market economy.

1. The contributors' motivations

The search for the motivations of the OSS contributors starts from the already famous question asked by Lerner and Tirole: “Why should thousands of top-notch programmers contribute freely to the provision of a public good?” That is: why is there a voluntary participation and why it is so large?² With a simple scheme of cost benefit analysis, the authors compare the opportunity cost of the contributor’s time with the sum of her immediate benefit, due to fixing a bug or customizing an OS program, and her delayed benefit in terms of future career and peer recognition. These two incentives go under the heading of “signalling incentive”, since the developers receive public credits for their contributions, and are considered by these authors the most relevant drivers in contributors’ motivations. Nevertheless, the motivational framework appears to be more complex and rich than that asserted by Lerner and Tirole.

Some empirical surveys have recently tried to collect information on the organisational patterns of OS projects and also to investigate the motivations of contributors, to join and to stay within the OS community.

² As recorded in February 2009, the projects and users registered on SourceForge.net are more than 230.000 and more than 2 million respectively, with an increase of 600% if compared with the data on projects (39.000) referred in Lerner and Tirole (2002). SourceForge.net is one of the largest Open Source Repositories together with Savannah, Freshmeat and the GNU repository.

The insights are quite interesting. In a previous paper on the features of the organisational structure (Marzi, 2008), I investigate the development of OSS in order to understand if and how it can drive the process of innovation and competition in the software market and whether its organisational procedure could be adopted by the commercial firms as well³. In this notes, I shall try to analyse the motives of the OSS developers looking at the results achieved by the two most extensive and recent surveys on the OS community⁴.

In looking at the results of the surveys, we have to keep in mind their limits. Firstly, the data are collected through questionnaires administered online, in such a way to reach the largest possible number of contributors and the respondents have selected themselves. This may bring about some bias due to self selection. But the validity tests applied suggest that the interpretation of the data is indeed valid for the sample of the respondents and can be extended to the universe of the developers with some caution, since the samples may not reflect some characteristics of the whole population.

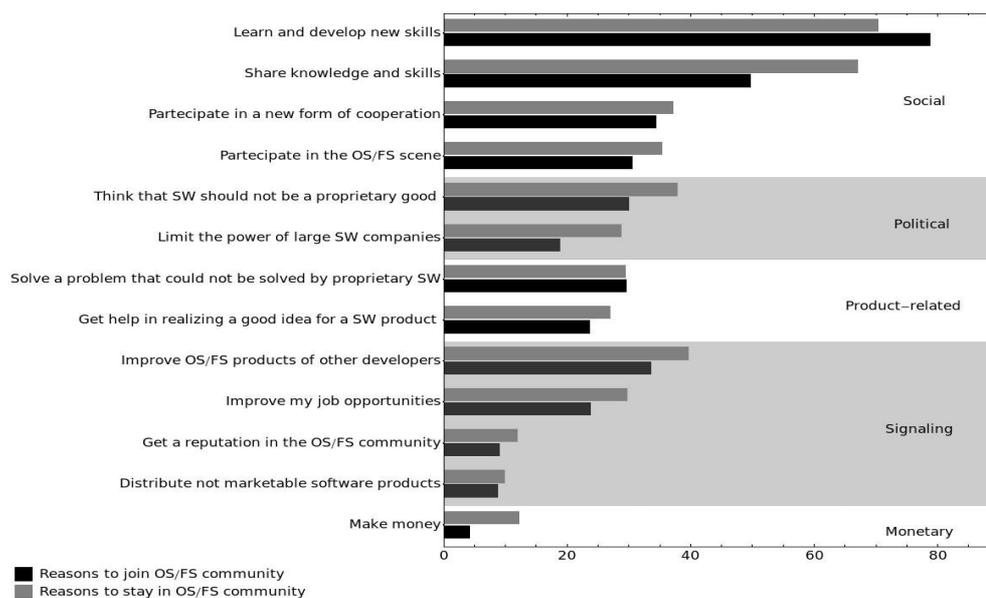
³ Although the number of developers and projects is very large and steadily increasing, the participation of each developer is usually limited to a small number of projects and only about 30% of the projects are developed by more than 5 contributors (Krishnamurthy 2002; Ghosh *et al.*, 2002). Within each of these, so called, large projects one of the contributors is recognised as the leader of the project by the others. Usually, is the programmer who has started the project and has been clever enough to leave some relevant problems still unsolved for gaining further contributors to the project. Her leadership lies entirely on the trust she is able to obtain from the contributors of her project who share her objectives, follow her suggestions and work on a pure voluntary basis, mostly for just few hours a week. A good leadership is essential for the success of the project and to reduce the risk of forking, i.e. the splitting of the project or its development into a variety of applications which may waste resources of the community (Lerner and Tirole, 2002). So the entire OSS development process looks much less loose than it is conventionally thought.

⁴ The FLOSS survey was completed by 2784 contributors, while the FLOSS-US by 1588 contributors. In both cases the surveys give also insights into the personal characteristics of contributors. On average, the contributor is usually a male, with an average age of 30 years, highly educated, living in North America or Western Europe.

Secondly, we know that different questions may be asked with the purpose of predicting some different behavioural models. In the FLOSS survey, the questions were designed to understand both the intrinsic and the extrinsic motivations of the contributors to join and to stay within the community. In the FLOSS-US survey, there were also questions on different topics like the role of contributors on OSS projects, the intensity of their work and the relation with the commercial firms supporting or working with OSS products.

In the following figures, the questions asked on motivations and the share reached in the two surveys are grouped into more broad headings, as suggested in the FLOSS survey, to overcome their somewhat different formulation.

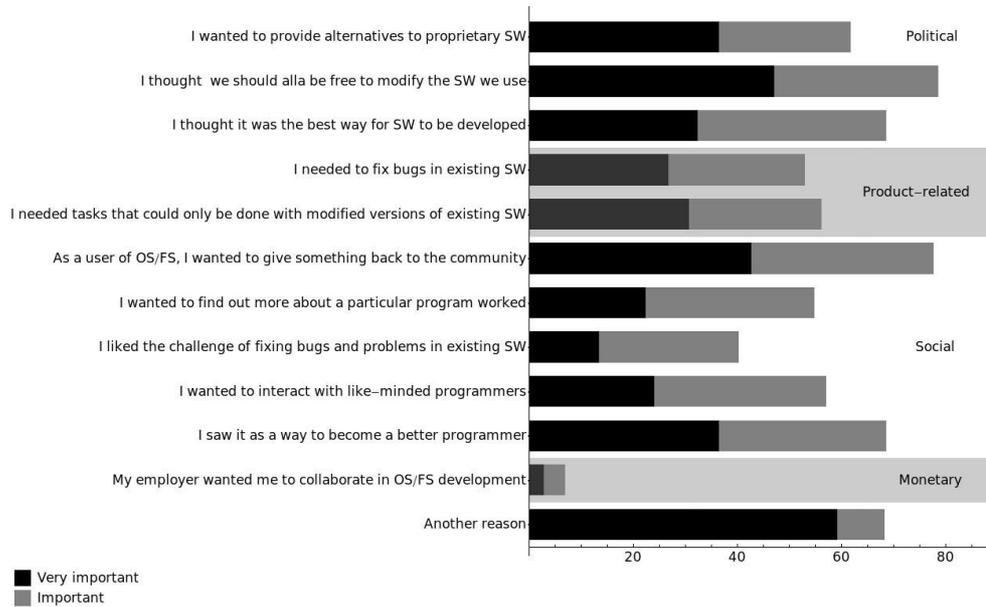
FIG.1 Reasons to join and to stay in the OS/FS community



Source:

Ghosh, R. A., Glott, R., Krieger, B., Robles, G. (2002), Survey of developers. Free/Libre and Open Source Software: Survey and Study, FLOSS Final Report. International Institute of Infonomics, Berlecom Research GmbH, p.45

FIG.2 Motivations to start developing OS/FS



Source:

David, P., Waterman, A., Arora, S. (2003), FLOSS-US, The Free/Libre/Open Source Software Survey for 2003, Stanford Institute for Economic Policy Research, Stanford University, p.19, question 4.

To become a better programmer (78.9%) and to share knowledge and skills (49.8%) are the reasons to join the community which show the highest share among the contributors in the FLOSS survey. The percentages are similar in the FLOSS-US survey, with 68.9% and 57.2% respectively. In addition, we notice that the knowledge sharing motivation is increasing over time, reaching 67.2%. We will come back to this data.

In FIG.1, we can see that the motivations that go under the “Social/Community” heading appear to be more relevant to developers compared to those under the headings of “political”, “product related” and “signalling” that show a share of 30-35%, while the “monetary” ones are less relevant. Signalling is really the most difficult motivation to interpret. In fact, within the Lerner-Tirole economic analysis, signalling is considered the most relevant driver of the developers’ motivations, because they

receive public credits for their contribution which may become very important for their future career. On the other hand, looking at the answers given in the survey on this topic, we can see that signalling is related to improve future job opportunities of developers but, at the same time, it is significantly aimed at the peer recognition or reputation within the community.

In FIG.2, we notice that political reasons are indeed important for this sample of contributors and may be explained by the different composition of the sample, in particular by a different nationality composition of the contributors compared to that of the other survey⁵. Unfortunately, the FLOSS-US survey did not include explicitly any questions under the “signalling” heading as those referred in FIG.1, but the question on “another reason” - which has a high share (68.4%) – includes motives such as having fun, give away software for others use, but also to get reputation, respect and being known⁶. This may suggest that the signalling motive is present in this sample but that further researches are needed to disentangle these different reasons.

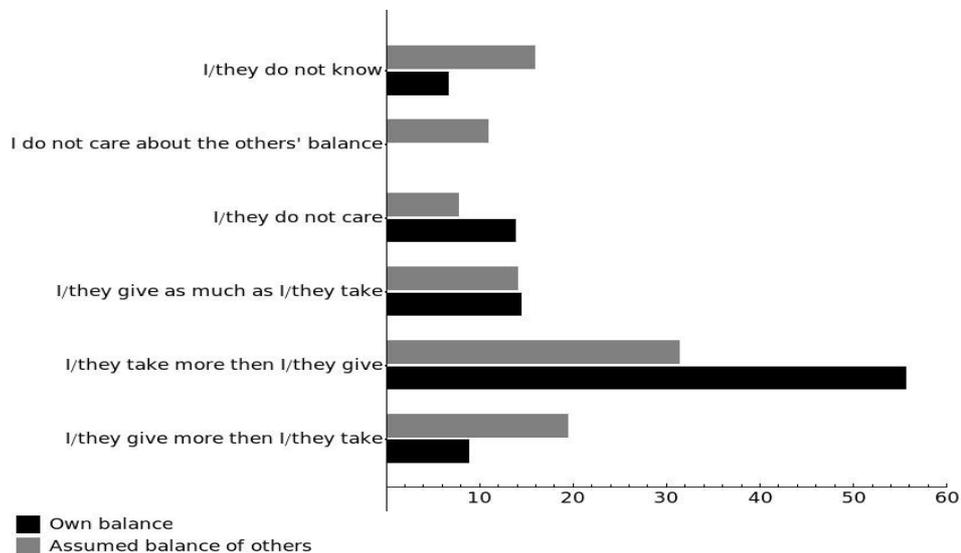
On the contrary, the FLOSS-US survey asks a question on “reciprocity” within the community, which is relevant to our concern. A share of 77.8% of developers think that it is “very important” or “important” to give back to the community. The FLOSS survey has not posed such a direct question but asked developers on a “balanced value flow”, in order to understand how they value their own contribution to the community and compare it with what they think to have obtained from the community in terms of help,

⁵ In the FLOSS-US survey the respondents were living in 65 countries: 52.7% in Western Europe and 27.1% in North America. In the FLOSS survey 71% of developers were from UE countries and 14% from North America.

⁶ See David, P., Waterman, A., Arora, S. (2003), FLOSS-US, Statistics, for the tabulation of answers to each question and, in particular, the lists of reasons for starting OS/FS, as given by the respondents at question 4.

learning and sharing knowledge and in general any kind of reward. Here the questions tend to focus more on the perception that developers have of their relationship with the community, on their own role and that of other contributors. In FIG.3, the answer to the question: “I take more than I give/ they take more than they give” has a share of 55.7% and 31.5%, respectively, while the question: “I give more than I take/ they give more than they take” has only 9% and 19.5% of share. About 14% of the developers of the sample think that what they and the other developers take and give to the community is balanced.

FIG.3 Balancing Give and Take



Source:

Ghosh, R. A., Glott, R., Krieger, B., Robles, G. (2002), Survey of developers. Free/Libre and Open Source Software: Survey and Study, FLOSS Final Report. International Institute of Infonomics, Berlecom Research GmbH, p.50.

These results suggest that more than half of the members of the community think that they obtain a net benefit from their relationship with the community. This conclusion may appear, in itself, somewhat ambiguous. It leaves room for questions such as: are the developers driven by the *homo*

œconomicus attitude of doing something if they get a net benefit? Having analysed the developers' motivations, we do not think that the answer suggested to this question is correct. On the contrary, the results previously illustrated suggest that developers give a positive valuation of the way the community works and look for recognition within the community. It is indeed the process of sharing freely knowledge and skills that brings about the perception of having obtained a net positive value, as the increase in time of the percentage of contributors motivated by the knowledge sharing reason, revealed by FLOSS, seems to suggest.

Going back to the questions I had in mind when I decided to dig into the OSS developers' motivations, I might conclude that a detailed analysis of the information collected in the two surveys seems to confirm that the intrinsic motivations (social/community and political) prevail over the extrinsic ones (monetary and signalling) when developers decide to join and stay in the OS community and that the feeling of reciprocity is shared by the majority of the community members.

2. The OSS community members' opinions

“Making Linux freely available was a *natural decision* within the community that I felt I wanted to be part of” “Putting back into a community as a sort of thanks for being able to take out” (Torvalds, 1998). “Because it is joyfull” (Torvalds and Diamond, 2001).

These assertions by Linus Torvalds, founder and responsible of Linux - the most widely known OSS project -, summarize his motivations to work for and within the community. He asserts that his first motivation was the joy of hacking, while fame and reputation came later and were indeed important to achieve his present economic status. But what is really relevant for our analysis is the desire expressed by Torvalds to belong to the

community and the feeling of indirect reciprocity due to the intention to “put back as a sort of thanks”.

Peer recognition, as a significant driver of the signalling contributors’ motivation, is crucial to understand the position of Eric Raymond, another famous member of the FS/OS community.

According to Raymond (1999) it is by means of peer recognition that developers obtain reputation, which is the only measure of success, among peers, of the quality of a complex product which requires time, effort, creativity and knowledge. However he does not think that reputation is the most relevant driver of developers’ motivations. The “joy of hacking”, that is the pleasure to write a program or some lines of a code, is one of the most relevant motives for developers, but it is the reputation game that shapes their behaviour (Bergquist and Ljunberg, 2001).

Reputation is considered a reward for giving OSS freely and a means to gain status. Raymond thinks that reputation is based on the principle of indirect reciprocity which takes place when the donor does not expect to be rewarded by the recipient but by someone else who has received a gift from other donors, and that indirect reciprocity finds its justification within a gift economy. Therefore, Raymond considers the open source culture or hacker culture⁷ as a gift culture which may lead to a gift economy. The gift economy that Raymond has in mind is an adaptation to abundance and not to scarcity and therefore the open source community having abundance of “survival necessities”, like computing power and disk space, can be considered a gift economy where social status is related to “what you give away” and not to “what is under your control”.

⁷ Raymond speaks of hacker culture, giving to hacker the original meaning of “someone who loves to program and enjoy being clever about it” (Stallman, 1999). To be recognised as *hacker* is a sign of honour within the community. This meaning is quite different from that commonly used to identify someone who tries to obtain valuable information in an unlawful way and that should, instead, be called *cracker* (See also Raymond, 1996).

Although such definition of gift economy based on the concept of abundance can be criticized, since it is too evocative of an archaic society and also because the concept of abundance is referred to necessities which may not be considered “survival necessities” in a open source community, such as time and creativity of the developers, some characteristics of the open source culture referred by Raymond, like indirect reciprocity, can indeed be expression of a modern way to look at the gift culture (Weber, 2004).

3. The OSS as a gift

Looking now at the opinions expressed by the open source community as a whole, we notice that within that community the feeling of reciprocity is shared by the majority of its components and that two of its most influent members consider the open source culture as a gift culture based on indirect reciprocity.

Is this enough to assess that the OSS is a gift? If we move into the realm of the intrinsic motivations, as we do, anthropologists and sociologists seem more at ease than economists. As an economist I might decide to adopt Mauss (1925) paradigm, which explains gift circulation with the sequence: to give, to receive and to repay, in order to see if the OSS products circulation can be described in that way. But I can't use the value category, inherent to the commodity exchange in the market, to explain why a gift received has to be repaid. This is a task for anthropologists, sociologists and psychologists.

OSS products circulation seems to follow the Mauss sequence. In the creative process of writing programs, developers give the product of their work to the community, some members receive and use it. The recipients may, in time, become donors to other members of the community.

In the OSS products circulation we can recognise the characteristics of the modern way of giving, suggested by Godbout (2000). A gift is something given to a stranger and is based on an indirect and generalized reciprocity, spanning over an indefinite time interval. Therefore, giving to strangers is a characteristic of the gift in modern societies to be added to the other characteristics already attributed to gift by Mauss in his studies on the gift in ancient societies: freedom and obligation, self-interest and altruism.

OSS developers are free to join the community, to give the product of their ingenuity and to share their knowledge with other members, although these are strangers to them. But, when they receive some contributions to their work from some member of the community, they feel that they have to give something back.

Developers are driven by self-interest since they look for peer recognition and receive public credits for their contributions. But, at the same time, they give something to someone else, which, in his turn, may feel the obligation to repay what he has received from other members of the community.

At this point, looking back at the answers given by developers, I shall suggest an interpretation which may be correct for, at least, the majority of developers. They give, receive and repay because they want to create relations to keep themselves within the OSS community.

Conclusions

The OSS product circulation seems to fit into the characteristics of the gift circulation. I agree with Godbout (2000), when he says that gift circulation is a different way of circulating goods and services which is not to be considered an ancestral way of exchange existing before the appearance of the market and the state, as Mauss seems to suggest, but something which is “fully active, at the heart of the modern societies” (Godbout, 2000, p.31).

The gift circulation should, therefore, be considered as a complement to the market and the state.

Gift exchange has, in the OSS case, some relevant implication for the software market. The statement: “on the Net, the same piece of information could exist both as a commodity and a gift” (Barbrook, 2005) drives the attention on the reality of the coexistence of the gift circulation and the market circulation. New strategies and new business models are emerging as a consequence of OSS presence. OSS is changing the industry organisation, because commercial firms are adopting new business models. OSS is also shaping the market through the emergence of new subjects such as the OIN⁸ and the Foundations⁹. OSS has induced profit seeking firms to rethink both their mode to produce intellectual products and how to protect them. Patents commons and creative commons experiments witness the need of a deep change in the patent system.

To conclude, looking at the OSS and the way it is integrating into the market activities, I would suggest that the two paradigms tend to integrate more than compete. In the meantime, OSS will go on fuelling the debate among scholars, because it challenges some relevant pieces of economic theory such as the theory of economic incentives, of labour organization and that of the private provision of a public good.

⁸ The Open Invention Network (OIN) is a company established in 2005 with the mission to create an environment to promote, improve and protect Linux. The OIN is financed by firms such as IBM, Novell, Philips, Red Hat, Sony and Google and has adopted an intellectual property model where the patents contributed are available, at no licence fee, to any person or firm or institution which agrees not to use its own patents against Linux.

⁹ The Foundations, such as the Apache Foundation and the Linux Foundation, are non-profit consortium which provide support and protection to the community of users and developers of their respective OS products.

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