FLOSS Strategic thinking: a proposed framework to support strategic decision for commercial open source companies

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Abstract:

This research focuses on the Free / Libre and Open Source Software (FLOSS) as a productive activity, or in support of a productive activity. This study analyses the integration of Open Source movement in company strategy. In this article, the concept of commercial Open Source companies, is used as model covering all activity carried on a FLOSS software, or based on an open collaborative development model.

This study helps to answer the question of how to form and implement an effective strategy for the Open Source commercial companies? This paper follows FLOSS’ elements and implementation of reflection without lapse. It is therefore intended to propose a model of multi components reflection ensuring the right formulation of strategic intent and organizational configuration.

The proposed model incorporates the usual economic and legal components, and adds the socio-political, technological use and psycho-cognitive dynamics. This stems from rereading of the phenomenon and its literature. Preliminary results is based on a case study of French companies leaning on a FLOSS activity.
Résumé:

Cette recherche se focalise sur le Free/Libre and Open Source Software (FLOSS) comme activité productive ou comme support d’une activité productive. Il est ici question d’étudier son intégration à la stratégie des entreprises du secteur. Il est retenu dans ce travail, le concept d’Entreprises de l’Open Source commercial, recouvre l’ensemble des entreprises porteuses d’un logiciel FLOSS ou adossés, en tout ou partie, à un modèle de développement collaboratif ouvert.

Ce travail contribue à répondre à la question du comment se forme et s’implémente une stratégie efficace pour les entreprises de l’Open Source commercial ? Ce papier tend ainsi à exposer les éléments de compréhension du FLOSS et de mise en œuvre d’une réflexion sans omission. Elle vise dès lors à proposer un modèle de réflexion multi composantes assurant une formulation adéquate de l’intention stratégique et de la configuration organisationnelle.

Le modèle proposé intègre les composantes économique et juridique usuelles, et ajoute les dynamiques socio-politique, d’usage technologique et psycho-cognitive. Ce complément découle de relecture du phénomène et de sa littérature, ainsi que d’étude de cas d’entreprise française adossant leur activité au FLOSS.

FLOSS strategic thinking: a proposed framework supports the strategic decision

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1. Introduction:

This research focuses on FLOSS as productive activity, or in support of a productive activity. The issue here is to study its integration in a company strategy. The concept of commercial Open Source companies covers all company s with promising software FLOSS or backed to a collaborative open development model, as opposed to the concept of Open Source Pure-POSS-company s (Bonaccorsi, Giannangeli, & Rossi, 2006, p. 13). Based on this qualification, the research covers a broad spectrum of strategies and activities, from engineering to the Services Company (Société de Services en Logiciel Libre - SSLL¹). This work aims to provide development strategy models and guidelines to all FLOSS based companies and the ones intending to.

The literature on FLOSS phenomenon has paid little attention to its implementation into the global company strategic model. There is, so, non commercial activity creation and generation structure for existing FLOSS base companies and ones intending to follow this concept eventually. We know through Dahlander (2004) generic economic opportunities and models. Former study has highlighted brand or company image improvement following FLOSS in a French SSLL. This case gives the trend but may not permit to asses the process of integration activity. The implementation of collaborative open development into business model encompasses multiple dimensions. A separated analysis can lead to a list of proposals for a more comprehensive, coherent and strategic approach. This implementation must be economic, legal, technical, organizational and ethics compliant. A company must understand the virtues of FLOSS. It will enjoy substantial gains from development partly outsourced to a community. It also benefits from a potential

¹ This is the french denomination for the pure open source services firms.
improvement of the software support quality, arising from the heterogeneity of actors involved in programming. The freedoms of use, disclosure or modification of FLOSS will be fruitful to a company. However, it will be key to perfectly control these possibilities by a sharp and detailed process. If some former FLOSS studies have touched these aspects, none has described in details mechanisms of companies following FLOSS as one of their businesses. This is not necessarily the complete integration of FLOSS in the strategic model, but the integration of this phenomenon within the overall strategic thinking. In every business strategy definition and deployment, this new form of software production will bring opportunities and risks. The model proposed in this paper ensures companies to have a perfect view and command of all FLOSS aspects for their strategy definition.

This work then answers to the question of how to shape and implement an effective strategy for commercial Open Source companies? Research tends to expose the elements of understanding of FLOSS and implementation of a reflection without lapse. It is therefore to propose a model of multiple components reflection ensuring a right formulation of the strategic intent and organizational configuration.

This work considers not appropriate to impose on companies, with the emergence of FLOSS, to separate the model of proprietary software (earnings from the sale of license) in favor of a open software publishing or additional services strategy. For the services companies, there is no requirement to develop a range of services around software and the Open Source movement. However, if it corresponds to its strategic intent, executive must be aware of the need to generate a specific model, both the characteristics and needs are different. This example shows a little more than a strategic thinking framework is needed on FLOSS. It is aimed at companies with heterogeneous profiles or resources, and distinct strategic projects. If the FLOSS is a solution, it is not the solution. Companies must take into account this development model as an alternative to consider in their strategic thinking. The FLOSS may be an opportunity for a reduction in development time cost and higher quality of final software through a larger number of developers and bug fixes on the most
diverse platforms. The company may then surpass the competition by providing a better overall product. However, Open source models are not efficient for all companies, all activities and all development. It can be very inefficient to apply these patterns in a company having not made a study of the balance of resources, business model and development model. The proposed model should thus provide the baseline for this reflection.

This framework can also contribute to monitor the competition. Companies in computer industry and component software, are concerned with the evolution of this very dynamic market, close to the hyper competition (d’Aveni, 2005). They have to watch over the activities of all stakeholders, not limited solely to business owners competing factual or potential. With FLOSS, software production is affected by a change of stakeholders. We find new companies surfing the FLOSS, but also communities whose projects may become substitutes to the commercial product. The proprietary form of competition is a common knowledge and taken into account in strategic thinking. The new form are not fully controlled and integrated into executive decisions. Indeed, to master this type of competition, including the outcome of the community, companies must integrate FLOSS in their process of business intelligence. It is then necessary to know the Open Source movement. We need a complete framework for comprehensive analysis of this phenomenon.

Thus, the FLOSS can be an opportunity or a threat to companies developing software or services, it is necessary for the company to acquire new skills, new competences to formulate its strategic intent and to implement organizational configuration. But on this issue, research is lacking. The literature on FLOSS is important but it does not address this kind of challenge.
2. An incomplete literature: a non operational strategic intent

Free/Libre and Open Source development is recognized as an important and attractive research area (Von KROGH & SPAETH, 2007). With the rebirth of collaborative software development, after the domination of personal computer and proprietary license, this emergent phenomenon questions a large spectrum of field. In strategy research, the literature is important and wide. We can find three principals axes of investigation.

![Figure 1: The development of the strategic intent around FLOSS: classical vision of the open development phenomenon](image-url)
The articles of economic approach seek to understand the incentives of market to the participation in a project FLOSS (LERNER & TIROLE, 2000; FORAY & ZIMMERMANN, 2001; CREMER & GAUDEUL, 2003; DAHLANDER, 2004). These authors expose contributor motivations and generic ways of return generation. These studies only describe facts, without a real analyze of procedural activities. Executives don’t know how apply this generic result. They need framework to shape business model. Economic approach has been completed by legal approach, which analyze scheme of FLOSS protection. Licenses give more freedom to users; companies are constrained to reinvent its activities.

This central search, focus on the legal characteristics, studies the framework of legal protection of the software (Patent, Copyright) or the characteristics and the role of the license in the development (diffusion) of the open projects (ZIMMERMANN, 1999; JULLIEN & ZIMMERMANN, 2002; MUSELLI; VÄLIMÄKI, 2003; POSNER, 2005; VARIAN, 2005). This field is very important. Legal aspects have interaction whit all others features of FLOSS phenomena. License allows emergence of community, influences contributor thinking or modifies economic equilibrium. Strategic thinking must integrate legal components, but it doesn’t operate a separate decision. Executive must combine legal aspects with it strategic intent. GPL license is a “good” license for diffusion and development outsourcing strategy. On the other hand, it isn’t the ideal license for generate returns for a licensor (LERNER & TIROLE, 2000).

The last approach, which we call « community approach », is a very attractive research topic, since it informs us about the open private/public innovation (RAYMOND, 2000; Von HIPPEL & Von KROGH, 2003; LEE & COLE, 2003; CORIS & Y. LUNG, 2005; DAHLANDER & WALLIN, 2006; MEYER & MONTAGNE, 2007). These studies explain relation between companies and communities, or existing rules inside a user/developer group. This field is very interesting. It demonstrates that FLOSS environment is structured and politicized. For a company, this regulated environment (FLOSS companies, associations
and communities) is a benefic characteristic of open development, although the companies for an optimal result must integrate these rules.

These papers investigate FLOSS phenomena and it different aspect. However, these studies do not generate a general Framework. Company executives can begin formulating its strategic intent, but they can’t make a complete thought. To develop the organizational setup, the manager must have a broader vision. Thus, this work proposes to generate a framework for strategic decision support integrating new components FLOSS

3. A broad strategic FLOSS thinking: a multi-dynamics framework to generate configuration

The company is not the single actor in the development of the product that it operates. The business environment is a given integrated longstanding by leadership and management researcher. We can cite the work of Porter on the five forces, taking into account the environment as disruptive. Other articles highlight the impact of environment on the company’s structure and strategy (Burns & Stalker 1966, Lawrence & Lorsch, 1967).

However, in this research, the characteristics of the Open Source give at the environment a particular role. The opening of the code and therefore the development of the software allow a certain number of actors to integrate the production process. If the community is considered an additional external asset by some authors (Dahlander & WALLIN, 2006), it remains a FLOSS actor in right and full power. Similarly, competitors, project stakeholders, society, customers impact the phenomenon and thus its production.

Therefore, it seems appropriate to consider the relationship to the FLOSS environment, including community. The company is no longer the only actor to manage the production process. Management of cooperation and openness is essential for development, as evidenced by the issues outlined in these following questions:
How to balance openness and sharing with the need of performance, reliability and security for a code that is not finalized?

In a proprietary development, the company has hand throughout the process, what do it happen in a FLOSS project?

How to ensure the performance of development, with a large audience to participate: no duplicity of action, relevance and quality of individual participation?

In large and virtual communities, each actor has no pressure of the eyes of others, how to ensure greater production to free riding?

Can the project environnement make rules, akin to social pressure, that erase the paradox of Olson stating that a group of individuals may never come to be productive?

These questions expose the need for environment reflection in companies. The relation to the community is present in numerous studies on the phenomenon Open Source and Free Software. We believe that it should be analyzed according to three axes, namely the management of substance, form and the meaning of this relationship to the environment FLOSS.

The proposed model included generic components (economic, legal) and 3 new outcomes of this FLOSS environment approach: socio-political, technological use and psycho-cognitive. Each component has respective dynamics that lead the company to manage substance (what?), form (how?) and meaning (why?).

Returning to the Figure 1 and by incorporating this change of a new approach of community and environment, this study provides a strategic configuration model with 5 dynamics (Figure 2 below). The concept of dynamic components of tactics shows that
strategic decision must integrate component specific question to a general issue. The components have their dynamics and their local problems. These issues must be combined when drawing the pattern leading to development of a core competency around FLOSS.

Figure 2: Generation of strategic intent and organizational configuration around FLOSS: a vision of broad strategic thinking
3.1. Legal dynamics: tension between protection and diffusion

Legal dynamics is a recurrent research component in FLOSS phenomena. The legal framework is important to understand the Open Source movement and its economical implications.

Initiator or follower: a legal leadership vested in the “Licensor”

The proposed distinction between initiator and follower is essential in this research on companies’ strategic thinking. The legal aspects have an important influence on a FLOSS project. It seems appropriate then to think that being master can be an advantage for a company wishing to lean on Open Source business development. A company opting for a strategy of Open Source business can control the legal characteristics of software if it is the initiator and thus “Licensor”. « Suppose that an entity, whom we will term the “Licensor,” is deciding whether to make some software available under an open source license and, if so, what type of license to employ. » (LERNER & TIROLE, The Scope of Open Source Licensing, 2005, p. 7)

Protection and diffusion: a coherent license scheme for commercial Open Source

The foundation of legal reflection is tension between protection and diffusion. Companies can profit FLOSS development when diffusion, openness and collaboration are rules. However, in a business based on FLOSS, diffusion and cooperation aspects must be encouraged. With this community interests, executives also have a logic of creation or guarantee their private interests. Thus, the issue of legal thinking about a project consists in designing an attractive and protective license. This legal scheme must allow for cooperation, diffusion into the FLOSS community and must ensure sustainability of the economic model. Legal dynamics and legal reflection must integrate the tension between
protection and diffusion. Companies search new ways for create value, but executives search also control.

Proposed model must assist initiators or followers to appreciate FLOSS legal dynamics and formulate strategic intent. Legal dynamics is exposed in first position because it is a common entry to analyze FLOSS phenomena. In our model, legal dynamics is a component in a global framework. It is not predominant in the reflection, it is just one element.

3.2. Economic dynamics: tension between opportunity and sustainability

Economic dynamics is an important field of research. The emergence of floss sets of theoretical tensions in economic activity. FLOSS is a model of freedoms for user. Commercial activity is a model of payment for customer. This finding highlights a tension between the market sphere and the community sphere. In FLOSS, software value is important, but commercial open source companies use services or bundle to capture it.

A potentially enhanced generation of value, but a difficult revenue generation

It has been demonstrated that the activity of community development leads to an increase in value through the integration of expectations and feedback from users (Raymond, 2000; Von Hippel & Franke, 2003; Lee & Cole, 2003; LIN, 2007). « Stallman’s tale illustrates the spirit of the OSS development process: users modify software to suit their needs, and creativity, innovation, efficiency, and interoperability are revered and appreciated.» (HICKS & PACHAMANOVA, 2007, p. 316). The software value is potentially important in FLOSS projects. The present generation of value here as potentially strengthened by open collaborative development precludes a difficulty of capturing the value of FLOSS software. In fact, the copyleft or open licenses follow more or less precisely the principles of FLOSS, and give the software the properties of non-rivalry and non-exclusion. In these conditions,
it is very difficult to generate revenues. Companies must tradeoff between an opportunity strategy and a sustainability strategy to capture the FLOSS value in long term.

*Opportunity and sustainability: a economic choice of reasource allocation*

In this dynamic, it must be chosen between a strategy of opportunity and a strategy for sustainability. Either it is a choice of an activity based on advantage of the phenomenon and its fashion, whether it is opting for a real involvement in FLOSS, which can be costly in the short term but benefit in long. Company must decide to allocate resources for rewarding efforts (brand or company image, reputation in the community or the environment) or valuable (direct sales). It is then to consider the target is what the client or user? Depending on the context, we must make a choice between product and project. Resources are allocated to project emancipation or to adequacy of supply to paying users (customers). In the same context of opportunity / sustainability, company must take place in the environment (cf. 3.3). The company can complete the work of community or compete with (replace) existing players. (This touches on the border with the socio-political, which reinforces the need for a comprehensive framework)

This research integrates FLOSS literature results in a global model. Economics choices are studied and well identified. The proposed model doesn’t expose new business models. It only exposes the influence of other dynamics on economic thinking. Resources allocation must assimilate effects on each cited dynamics to be efficient.

**3.3. Socio-political dynamics: tension between integration and diversification**

Socio-political dynamics highlight the importance of understanding the rules governing the practices of open collaborative development and the distribution of power among the stakeholders in FLOSS projects. Project environment appears to be politicized and regulated, in contrast with the approach of idealized productive anarchy, the Bazaar
(RAYMOND, 2000). The choice of the term socio-political for designate this dynamics is important. It unifies in a single dynamic impacts of the relations from development tasks in the project and the place of each actor in the same project. It seems useful to understand that the same task can be performed more or less optimal depending on the relationship between actors and their desire to master this relationship. Socio-political dynamics expose the link between integration and diversification of FLOSS environment.

**FLOSS environment, not LIMITED to the Community Project Only**

In this research, FLOSS isn’t limited at its community. We argue that a coherent FLOSS strategic model must integrate all project stakeholders and all movement stockholders.

To understand the dynamics of interaction between the environment and the FLOSS company, it is necessary to clarify the concept of project environment. This notion covers a broader range of actors other than the company. Economic, legal and policy studies generally lead to opposition from the business world and his vision of commercial development, at the community ethics and freedoms. However, the phenomenon of FLOSS is not limited only to these two entities. Speaking of FLOSS community is sometimes a too strong simplification.

FLOSS project environment consists therefore of the project community, project initiator or follower company, but also communities of complementary or similar open software. FLOSS environment is not limited solely to the consideration of related communities. It seems necessary to incorporate open source or commercial companies. These companies offer software that is in competition with the project or benefit him by making improvements or new opportunities. Project environment cannot exclude from its field of vision software components (building blocks or entire programs). Always in complementarily, the environment of the project includes companies providing services on the software or related products. These companies may be the mediators between the project and inexperienced users (or naive). Finally, the above-mentioned actors fit into
society and interact with government policies. These particular actors may have an influence on the project for their vision, their expectations or their aspirations. For example, political power can these decisions via legislation influence the evolution of a FLOSS project. This rapid survey shows that project environment is not only the project community. Commercial Open Source companies must analyze all stakeholders before formulate strategy. All cited actors influence project and movement. They also can influence companies’ business models.

Integration and diversification: companies’ environment objectives

This dynamics shows the dilemma between integration and differentiation of environment. Company referee to become involved in project environment or only use (parasite) FLOSS development. This dilemma leads to a second dimension (management thinking). It is about creating the conditions for collaboration to ensure consistency, quality work environment project (integration), which groups players sensitivities, skills, behaviors distinct (differentiation). The second meaning of the dilemma stems from the first choice to parasitize or integrate. In a freerider role, it is more difficult affect the dynamics of the environment to ensure the integration within the meaning of Lawrence & Lorsch. The environment must ensure divide the development (programming, support for three spaces) and to unite around a common goal (project management: quality, usability, performance of the code ...). This is essential, but cannot be done without thinking about the couple rules / authority.

Proposed model integrate socio-political dynamics to allow environment’s comprehension of executives. Business or management framework incorporate model influenced by environment forces (Porter). In FLOSS, the actors’ vision is incomplete. With the definition of FLOSS environment, this paper highlights the heterogeneity in FLOSS movement and the respective role of all stakeholders.
3.4. Psycho-cognitive dynamics: tension between motivate and mobilize

Psycho-cognitive dynamics highlights the role of emotion and reason on FLOSS phenomenon. These notions explain motivations and incentives of contributors. Companies must influence emotion and reason to motivate and mobilize user around FLOSS projects.

Between psychology and cognition: an essential component in the collaboration of the heterogeneous users

Psychological dimension covers the emotional aspects of mental construct of individuals. In addition, the cognitive dimension reveals the existence of rational construction mechanisms of representations. It therefore seems useful to call this component of cognitive psychology, to integrate these two dimensions emotion / cognition. The actions of each actor FLOSS (firm, community, individual ...) provide information about the direction that everyone gives to his involvement in the project but also impacting the performances of others.

Motivate and mobilize: manage seduction and reluctance of FLOSS actors

This dynamic must manage the effects of seduction (emotion, aspiration) and reason (cognition) of all stakeholders. Arbitration is more here to choose between one and another. This is determined by the stakeholders what levers are used to act on their intentions and their feelings. It is necessary to manage the need for closeness or affinity despite the distance of collaboration (working distributed, heterogeneous skills). It is managing the position of all contributors (employees, users, customers ...) to ensure consistency of development. It is necessary to motivate (to encourage participation) and to mobilize, sensitize the usefulness of all and appoint the best user developer to development tasks (arbitration psychology / competence). It is then to maintain an effect of seduction to attract contributors and collaboration while ensuring rational (the best in each task) without creating resistance.
The proposed model argues that psycho-cognitive dynamics is important to insure good process and acceptance by users, developers and personnel of the company’s strategy. Companies must anticipate their commercial and community actions. All the actors are their representations of the environment through attention to the actions of other actors. With distributed cognition concept, we argue that companies actions must be manipulate to influence emotion and reason of all stakeholders.

3.5. Technological use dynamics: tension between innovation and regulation

Technological use dynamic is a important contribution for explanation of FLOSS phenomena and commercial strategy. Technology is invariant, but usage and practice can transform ICT on management tools.

_A source code generator of software and cooperation_

The source code is an ambivalent character. It is both output and (carrier of) process. Indeed, we can defined this code as the key element of the final software. The compilation generates the product, it is used as the final stage of “packaging”. This reminder of the importance of source code in the software should not overshadow another characteristic of the latter. Indeed, source code is the final goods but also a management tool. This source code is involved, by its design and its development, the regulation of collective activity. According to Paul A. David, the source code can be carrier structure.

_The modularity routing skills:_

The modular nature is extremely important in the software world and more particularly that of FLOSS. By splitting the software project into multiple parts, it allows a division of labor. This division of tasks is easy in companies. The knowledge management skills of employees, it optimizes the allocation of parts of the program to ensure the right person at
the right place. In the case of an open source project, there may be a group leader, but these people don't know all the participants and have no real power over the distribution of roles (he may have an influence if the contributor consults and listens –cf. 3.4). It therefore seems appropriate to consider the role that could take the source code through its modularity in this division of tasks in FLOSS.

The modularity directs skills, ICT allows coordination, the source code is structuring and tools enhance productivity. So it seems that the uses are community technology project success factors (coordination, dissemination, software quality) to find a equilibrium between regulation and innovation.

_Innovation or regulation: the ICT as tools for structuring_

In technological use dynamics, it must make a tradeoff between innovation and regulation. The technology is no different from proprietary development, but its use can provide part of the regulation absent in FLOSS. The tacit hierarchy of contributors / contributions should exploit ICT used as an intermediate in the relationship development programming (mediator) and as a rules vectors to transmit practices. This arbitration innovation/ regulation also requires investigating the form to give the source code. The programming module logic can direct the work, skills and thus have a structuring effect. However, source code must keep a simple guarantee of performance, readability and attractiveness of the project. It appears that the choice of tools affects the dilemma. The generic tools ensure maximum openness and therefore potentially greater innovation linked to increased contributions and heterogeneity. However, the tools developed specifically for a project can provide a tighter framing of development and benefit the project organization.

Proposed model highlights that the technological use is an important field of reflection. If the technology is identical on proprietary development, the ICT are tools for structuring FLOSS project and movement. Commercial Open Source companies must integrate ICT in
their strategy to influence the governance in the project environment (cf.3.3) and contributors’ motivations (cf. 3.4)

4. Case studies: research samples, methods and empirical result

This research on FLOSS strategy is based on French companies. We choose few representative cases to explore commercial open source environment. With one startup editing GPL software and its associated services, the sample includes little project case and inherent strategy. Large open source companies are represented by two cases. The first is a FLOSS pure player. Totally based on open source software, this medium company generates a profitable activity around services and software editing. The second case is a large company with international components. This corporation isn’t a pure player. FLOSS has only a little share of company’s activity, which is oriented to technology consulting. The FLOSS environment is also composed by public or private organization that support actors and by association. To incorporate such actors, we have analyzed, with lower detail, a FLOSS association that regroup regional actors and a company that escort emerging business projects.

Analyze use a qualitative methods and a series of interviews in each companies or organizations. First interviews have given first indications that are integrated at other converges with actors. The proposed model results from a mix of theory and empirical.

The most important result is the confirmation of a need for a global framework. All interviewed actors confirm that FLOSS is a complex phenomenon. None seems aware of the important of socio-political, technological use and psycho-cognitive dynamics. Executives and actors don’t integrate this last dynamics. Motivations or incentives are considered, but the actors think about that only for users or developers. The structuring role of ICT is also not integrated to actor’s strategy thinking.
5. Discussion:

This paper exposes preliminary results of generation FLOSS strategy model. This research argue that FLOSS can be analyze with five dynamics. With generic legal and economic dynamic, we add socio-political, technological use and psycho-cognitive dynamics. Actors ignore the structuring effects of ITC and source code. They don't think that their actions influence other actor’s representation and action. Moreover, the FLOSS environment is not limited to the community and incorporates important rules and power plays. Strategic intent and configuration implementation (HAMEL & PRAHALAD, Strategic Intent, 1989) can't be efficient without a broader strategic FLOSS thinking. The proposed model aims to assist actors in this objective.

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References:


