

M@n@gement

ISSN: 1286-4892

Editors:

Emmanuel Josserand, *HEC, Université de Genève (Editor in Chief)*

Jean-Luc Arrègle, *EDHEC (editor)*

Stewart Clegg, *University of Technology, Sydney (editor)*

Philippe Monin, *EM Lyon (Editor)*

José Pla-Barber, *Universitat de València (editor)*

Linda Rouleau, *HEC Montréal (editor)*

Michael Tushman, *Harvard Business School (editor)*

Olivier Germain, *EM Normandie (editor, book reviews)*

Karim Mignonac, *Université de Toulouse 1 (editor)*

Thibaut Bardon, *Université Paris-Dauphine, CREPA - HEC, Université de Genève (editorial assistant)*

Florence Villesèche, *HEC, Université de Genève (editorial assistant)*

Martin G. Evans, *University of Toronto (editor emeritus)*

Bernard Forgues, *EMLyon Business School (editor emeritus)*

Volume 13, No. 4. Special Issue:

Business Models as an Emerging Research Program in Strategy.

Guest Editors: Xavier Lecocq, Benoît Demil, & Juan Ventura

■ Valérie CHANAL

Marie-Laurence CARON-FASAN 2010

The Difficulties involved in Developing Business Models open to Innovation Communities: the Case of a Crowdsourcing Platform

M@n@gement, 13(4), 318 - 341.

M@n@gement est la revue officielle de l'AIMS



M@n@gement is the official journal of AIMS

Copies of this article can be made free of charge and without securing permission, for purposes of teaching, research, or library reserve. Consent to other kinds of copying, such as that for creating new works, or for resale, must be obtained from both the journal editor(s) and the author(s).

M@n@gement is a double-blind refereed journal where articles are published in their original language as soon as they have been accepted.

For a free subscription to M@n@gement, and more information:
<http://www.management-aims.com>

© 2010 M@n@gement and the author(s).

The Difficulties involved in Developing Business Models open to Innovation Communities: the Case of a Crowdsourcing Platform

Valérie CHANAL

Professeur des Universités, PACTE
Université de Grenoble
valerie.chanal@iep-grenoble.fr

Marie-Laurence CARON-FASAN

Maître de Conférences, CERAG
Université de Grenoble
Marie-laurence.caron@iae-grenoble.fr

ABSTRACT

Recent literature on open innovation suggests that firms can improve their performance by “opening” their business models, in other words, they can reduce their R&D costs by incorporating external knowledge. This implies that firms will be able to capture value through knowledge produced outside the organization. This, however, presents a number of difficulties notably where the knowledge produced is the result of collective creativity carried out by communities of peers. Here, tension can arise when some of the business actors involved take, or attempt to obtain, financial benefit from part of the value created by the online communities. The purpose of this article is to address the following research question: what are the main strategic difficulties encountered by firms whose business models rely on public web communities to create value? Our study used a collaborative research approach, and our empirical data is based on the longitudinal strategic analysis of a web start-up, CrowdSpirit, a collaborative web-based platform which enables communities to imagine and design innovative products. Our research highlights three main points that need to be addressed in further research on open business models. First, we highlight the fact that the ‘openness’ of the business model to online communities leads to the development of a multi-level incentive model adapted to the different profiles of the various contributors. Second, we suggest that crowdsourcing platforms act as intermediaries in multi-sided markets and, as such, are at the core of a knowledge-sharing and IP transfer process between multiple actors. Finally, we suggest that the business model design and development can be considered as an ongoing learning process.

Keywords: Crowdsourcing, open innovation, innovation communities, business model

INTRODUCTION

Recent literature on open innovation, developed by Henry Chesbrough and colleagues, suggests that firms can improve their performance by “opening” their business models. Chesbrough’s view on business models is based on the distinction between value creation and value capture: *“A business model defines a series of activities that will yield a new product or service in such a way that there is net value created throughout the various activities. Second it captures value from a portion of those activities for the firm developing the model”* (Chesbrough, 2006b).

One central idea behind the concept of open innovation is that firms can reduce their R&D costs by incorporating external knowledge (Chesbrough 2006b). From this perspective, it is accepted that firms will be able to capture value (in other words, “make money”) from knowledge produced outside. This is not easy to implement, however, as the knowledge generated is the result of collective creativity carried out within communities of peers who are external to the organization (Nambissan & Sawhney, 2007, Dahlander & Magnusson, 2008).

Indeed, the fact that some business actors (either firms or web intermediaries) seek to appropriate or obtain financial gain from part of the value created within web communities can potentially create tension (Bonaccorsi, *et al.* 2006; Chesbrough & Appleyard 2007). In our view this raises new issues linked to the relationship between value creation and value capture. This has been mentioned in previous work, but to our knowledge, has not been addressed as such through a case study of a real company facing these new issues. For example, in a recent book on Web 2.0 business models, Amy Shuen considers that “Web 2.0. takes a fundamentally different view of how businesses, customers and partners interact, and in doing so, it opens up a range of new business models” (Shuen, 2008: 1). Chesbrough and Appleyard also suggest that the opening up of companies to web communities constitutes a new challenge for strategy: “We believe that the concept of open source development and similarly inspired ideas such as open innovation, the intellectual commons, peer production, and earlier notions of collective invention represent phenomena that require a rethinking of strategy” (Chesbrough & Appleyard, 2007).

In this context, the purpose of the present article is to address the following research question: what are the main strategic difficulties encountered by firms whose business model relies on public web communities to create value?

Our empirical data is based on the longitudinal strategic analysis of the web start-up, CrowdSpirit, a collaborative web internet platform that enables communities to imagine and design innovative products. This in-depth case study gives us some theoretical and managerial insights into the tensions inherent in open business models based on external and anonymous knowledge production.

The article is structured as follows. Part 1 provides theoretical background to innovation communities, incentive models and innovation intermediaries’ business models. We characterize the type of innova-

tion community studied and the main sources of motivation needed to guarantee participants' contributions. This is particularly critical in situations where knowledge produced in common is not destined to be made freely available, as is the case of open source communities. We also present innovation intermediaries as being key actors required to articulate communities' contributions whilst ensuring their private interests are met, and we look at the type of business model they usually adopt.

The CrowdSpirit case and the research method are presented in part 2. We carried out collaborative research (Adler *et al.* 2003) based on a series of eight strategic workshops conducted by the authors with the company's managers between May 2007 and July 2008. This process allowed us to discover and work on the main strategic issues from the beginning through to the end of the study, rather than telling a success story and surmising the key success factors a posteriori, as is often the case in business model literature.

Part 3 presents the way CrowdSpirit's business model evolved over the course of the collaborative research process. The original business model was oriented towards product design and product sales via the web platform. We present the rationale behind this business model and interpret the main reasons for its failure. We then present the emergence of a second business model based on the valorization of IP generated by the community. To provide a full appraisal of the issues encountered by this startup, we present the case as a narrative, following the strategic workshops chronologically.

In the discussion (part 4), we suggest considering three main points: the necessity to define an incentive model to motivate the different categories of contributors, the specific position of platforms of this type in the knowledge-sharing process, and finally the idea that the development of the business model can be viewed as an ongoing learning process.

THEORETICAL BACKGROUND

Innovation communities

When addressing the issue of how to capture knowledge generated by communities, most authors assimilate innovation communities with open source communities (Chesbrough, 2006b; Chesbrough & Appleyard, 2007; Nambissan & Sawhney, 2007; Von Hippel, 2005; West & Gallagher 2006). However, Chesbrough (2006a) considers that open innovation and open source, while similar in their approach to innovation, are different in so far as: *"Open innovation explicitly incorporates the business model as the source of both value creation and value capture... While open source shares the focus on value creation throughout an industry value chain, its proponents usually deny or downplay the importance of value capture."*

Research work on innovation communities covers a range of different situations that can be summarized as follows:

- People sharing an interest or a passion in different domains who invent new products or new solutions together, also called “lead-users” (Von Hippel, 2005)
- Loyal customers who provide a company with suggestions for product improvement. The examples of Ducati or Staple customer communities described by Nambissan & Sawhney (2007) belong to this category.
- Anonymous people who are asked to contribute to a technical problem through a contest on an ad-hoc and individual basis. The often-cited Procter and Gamble case (Sakkab, 2002; Tapscott & Williams, 2007) describes how P&G publishes certain technical challenges on the web and thus obtains quick and relevant solutions.
- Anonymous people who are invited to contribute to a collective innovative project. The collaborative writing of the film “Swarm of Angels” by a web community is an example of this type of innovation community. Innovation communities can intervene at different stages of the innovation process, contributing to idea generation, technical problem solving or even product or service design. In this research we will focus on cases where firms appeal to anonymous communities not only to generate ideas or to respond to technical challenges, but also to contribute to new product design. In our view the anonymous character of the crowd and the level of involvement requested leads to specific issues as it becomes necessary to both identify and motivate these people to contribute to the business model of a private firm.

Incentives to contribute to innovation communities

The literature on online communities offers many contributions on what motivates people to work in communities for free: these include direct user motives (user needs for tailored solutions) (Lakhani & Von Hippel, 2003), professional and personal benefits such as learning and reputation (Lerner & Tirole, 2002, Raymond, 1999), and recognition from peers or from the company (Jeppesen & Frederiksen, 2006). This literature underlines intrinsic motivation factors such as enjoying creativity and improving abilities (Lakhani & Wolf, 2005). In many cases, the knowledge produced by this type of community is expected to be “freely revealed” (Von Hippel & Von Krogh, 2003). This is not the case in crowdsourcing platforms where the value of what is produced collectively will be captured by private actors. Can we expect the same types of reward in the case of the collective production of private goods?

Von Hippel & Von Krogh (2003, 2006) suggest a model on how private investment and the free revealing of goods can be compatible. They identify three key ways by which innovation efforts can be rewarded both in industry and society in general. In the private investment model, private investors¹ reward contributors individually for the knowledge they provide. Innovation intermediaries, such as Innocentive, are an illustration of this model: individual contributors are paid for the ideas or technical solutions they provide to the seekers. The second reward model, known as the “collective action model”, is based on revealing findings, discoveries and knowledge freely for the provision of public goods². The intermediate “private-collective” model combines the best

1. Intellectual propriety is transferred from individual contributors to private investors via patent or copyrights.

2. Public goods are defined by their non excludability and non rivalry. Epistemic communities in the world of science are the ideal type of collective action model (Von Hippel & Von Krogh (2006). However, even if the authors use the word “collective” here, we should not assimilate “collective” with “public goods” in all cases.

of both worlds as it assumes that private innovators may be interested in freely revealing knowledge or other assets they have developed during a project. The authors consider that certain initiatives in open source software development are representative of this private collective model: people or companies may invest time and money to contribute to software development and then decide to share the knowledge produced.

In the case of private firms that are open to innovation communities, there is a need to motivate individuals in order to ensure that they participate, as in the case of open source communities. However, the knowledge produced in common is not destined to be made available for free, but rather to be used for the benefit of a private firm. In this case, not addressed by Von Hippel and Von Krogh, we can expect to find a combination of motivation factors similar to those of online communities (learning, reputation, creativity) and financial motivation as in the private investment model.

Innovation intermediaries

Innovation intermediaries are new actors that can manage the relationship between innovative firms and innovation communities (or the crowd) (Chesbrough, 2006a). They are web platforms which function as marketplaces and appeal for individual contributions through open calls on behalf on their customers, the private firms. The hypothesis behind this practice is that the 'crowd' provides smarter and quicker solutions (Tapscott & Williams, 2007). However, a recent study on innovation intermediaries and marketplaces concluded that Internet marketplaces for technology transactions (such as InnoCentive, NineSigma or Yet2.com) have not yet met the expectations of either technology suppliers or seekers, and still generate a relatively small flow of transactions (Lichtenthaler & Ernst, 2008). The authors observe that marketplaces have recently made their business model evolve by offering additional services to facilitate technology exchanges. In addition, they note that there is a challenge involved in identifying high potential applications before actively commercializing technology not yet present in existing marketplaces.

The last three years have seen the development of new web platforms providing the necessary infrastructure for collective creation. Cambrian House, Kluster or CrowdSpirit are well-known examples of such platforms. The phenomenon is often designated by the concept of "crowdsourcing" (Howe, 2008). We will use this term to distinguish these platforms from marketplaces where contributions are made on an individual basis. In crowdsourcing platforms, there is a public sphere where people discuss innovative ideas and work together to develop solutions. This leads us to examine the business models of these innovation intermediaries in more detail as they have to manage both private interests and the anonymous collective work.

Crowdsourcing platforms require us to reconsider the three main dimensions of the traditional view of business models: value proposition, infrastructure and revenue model.

First, the value proposition dimension has to take into account the fact

that these companies act within multi-sided markets, as presented in the networks economy (Rochet & Tirole, 2004; Roson, 2005). In the case of innovation intermediaries, there are at least two sides to the market: innovation communities on the one hand and innovative firms on the other. Business models in multi-sided markets have to capture value from the various sides of their market, applying a pricing policy that enhances the positive cross-network effects (Shuen, 2008; Eisenmann *et al.* 2006).

Second, the business infrastructure of innovation intermediaries is specific because users, as valuable knowledge creators, can also be considered as key strategic resources. But these resources cannot be fully 'managed' in that they have no contractual relationship with the platform as they would if they were employees or sub-contractors. In addition, how can they ensure that knowledge produced by anonymous external contributors can be capitalized, a condition deemed essential in providing a sustainable competitive edge in the knowledge economy?

Third, contrary to the common view that a business model should apply a unique revenue model, it appears that most business models on the web develop multiple and complementary sources of revenue (Shuen, 2008): subscription, usage fees, premium products or services, advertising, selling of databases, etc.

This review indicates that opening business models to anonymous communities for new product designs raises novel issues. How can anonymous members of communities of practice be motivated to contribute on innovation intermediaries' platforms? How can knowledge be managed as a strategic asset when it is outsourced and therefore not fully controlled from within the firm? How can a value proposition be developed to satisfy the different sides of the market?

We now turn to the empirical part of our research to gain greater insights into the strategic issues identified.

RESEARCH METHOD

Presentation of the case

CrowdSpirit is a startup launched in France (Grenoble) in September 2007. We worked with the company from its very beginnings in May 2007, five months before the platform's official launch. The startup appears to represent a highly original case of crowdsourcing as it offers a platform for a community of 'geeks' to manage an entire R&D process, from idea generation to the design of new electronic products. The case of CrowdSpirit is also particularly interesting in that its aim is to apply crowdsourcing to high tech product development, while most crowdsourcing experiences involve non tangible products or ideas (i.e. software applications, R&D challenges and cultural products).

In the initial CrowdSpirit business model, users submitted ideas for innovative electronic products that they would like to own, the community voted on the ideas, and the best ideas were worked on by a community of designers who developed and drafted the specifications. Following

this, investors provided financing, development partners made the prototypes and the manufacturing was done by ad-hoc subcontractors in China. The business model was based on the idea that CrowdSpirit would sell the products designed by the community on the CrowdSpirit website and in this way obtain sufficient revenue to finance the platform and share value with the contributors. It became clear, however, that the original model was not viable and CrowdSpirit abandoned it before the first product could be industrialized.

CrowdSpirit then turned to a more classical innovation intermediary model, whilst continuing with the concept of collective work done by a community. The following concept was adopted: the IP on collective created goods could be negotiated directly by the community leader with a corporate firm (without any transaction fees) and CrowdSpirit would earn revenue on additional services for firms such as the use of the platform for open innovation. For example, business organizations can now use the CrowdSpirit platform to organize contests for ideas, concept testing and other requirements in collaboration with the communities. We will look at the evolution of the company's business model in more detail later on in the results section of this paper.

Collaborative Management Research

The method is based on the principles of Collaborative Management Research (CMR). A CMR is viewed as: *"an emergent and systematic inquiry process, embedded in a true partnership between researchers and members of a living system for the purpose of generating actionable scientific knowledge"* (Adler *et al.*, 2003: 83). Among the different types of CMR identified by Adler *et al.*, we adopted the one called "Table Tennis Research" which is a hybrid method between Action Research, Intervention Research and Action Science. The purpose is to understand organizational phenomena through intense dialogue, action and reflection carried out by an interdisciplinary team of practitioners and researchers.

This type of research requires a high level of trust between the researchers and the company leader. We, the researchers, played different roles: experts (through the provision of theoretical data), facilitators (in the organization and facilitation of the strategic workshops), and sometimes consultants, though we did not want to provide ready-made solutions but preferred instead to help the leader to broaden his strategic reflection. After discussions with the leader of the company, he agreed to us publishing the results of this study under the real name of the company, considering that this could contribute to the 'buzz around his project without revealing too much confidential data.

Finally, the research process led to two types of knowledge:

- Actionable knowledge that could be directly appropriated by the manager to refine his business model and make it evolve according to the real results of the platform,
- Exploratory theoretical knowledge on the main issues encountered by new business models open to innovation communities.

Data collection

The collaborative research process described here covers a 15-month period between May 2007 and July 2008. Over this period, the research covered eight strategic workshops that included the two authors and the CEO of the company, Lionel, and, for some of the sessions, other researchers from the team and the CEO's colleagues. This period can be split into two main phases. Phase 1 focused on the elaboration of the first business model, the launch of the platform and the appraisal of the first results. After a few months of business activity with disappointing results, CrowdSpirit's management team decided to change the business model, giving it a somewhat different orientation. Phase 2 corresponds to the design and development of this new BM which required considerable modifications to the platform itself. The sequence of the research for these two phases is presented in **table 1**.

The data collected is as follows:

- The empirical material provided by the CEO: for some meetings, he prepared and brought in ideas or formal presentations to be tested on the group (for example the conceptualization of its revenue model).
- The theoretical material introduced by researchers: in each meeting, researchers prepared formal presentations and brought in new ideas to be tested by the CEO and to help him in his analysis.
- The minutes of the eight strategic workshops: for each workshop, one of the two researchers took extensive notes on the main issues discussed and how the CEO or other participants reacted to the theoretical material presented. Each workshop lasted between 3 and 4 hours, resulting in around 25 hours of meetings, completed by numerous informal discussions, mainly by phone or mail.
- After each session, we conducted a systematic analysis of the meeting minutes to identify the main issues and prepare the agenda for the following session.

The framework used to guide the strategic reflection is inspired by other business model research (Chesbrough & Rosenbloom, 2002; Chesbrough 2006a: 109; Osterwalder & Pigneur, 2005; Schweizer, 2005; Lecocq *et al.*, 2006; Warnier *et al.*, 2004). Our analysis focused on value creation and value capture, and more specifically examined the three following building blocks that characterize a business model: the value proposition (including the offer based on the technology, the choice of market segments and the customer interface process), the business model infrastructure (including the firm's resources, competencies and capabilities, the structure of the value chain and the positioning and relationships of the firm within the value network), and the revenue model (including both cost structure and revenue model).

Table 1: Research design

Workshops	Context and objectives	Empirical data	Theoretical data
Business model definition around the original concept of the platform			
N°1 May 2007	Test of the overall company BM	Presentation of the BM as imagined by the CEO	A guide to challenge the BM: value proposition, business infrastructure, revenue model
N°2 June 2007	Clearly explain the value proposition to the potential contributors Identify the main contributor profiles	Presentation of the contributors' profiles	Notion of value proposition
N°3 July 2007	Define more precise hypothesis of the value distribution model with respect to the different contributors	Presentation of the initial value distribution model	Notion of value chain
Commercial launch of the platform			
N°4 Nov. 2007	Observation of the real experiment and first results.	Development of a product: the digital wall calendar	Presentation of the open innovation and open source principles
N°5 Dec. 2007	Difficulty convincing investors based on the BM and the first results		Presentation of other platforms (benchmarking results) and the innovation intermediary model
Closure of the first version of the platform and search for a new business model			
N°6 February 2008	The platform is closed, preparation of a new version. Reflection and discussions about the new BM	Presentation of a new BM including an offer for private firms	Types of innovation intermediaries. Presentation of the open source incentives model
N°7 April 2008	Test of the intermediary model and discussion of the IP issues	Discussion with lawyers and potential industrial customers	
N°8 June 2008	Clarification and details of the value proposition	Reflection and discussions on the different targets and the value added for each	Multi-sided markets theory

RESULTS

The observations are presented along the lines of the two main phases of research, each phase corresponding to the development of a given business model for CrowdSpirit. The first is called “product oriented” in that the value creation is based essentially on the design work of innovation communities and the value capture through selling products via the web platform. The second business model is called “IP oriented” for while the value creation is still based on the design work of communities, the value capture is based on the transfer of the resulting intellectual property to private firms. In each case, the contributors are the same (communities) but the clients are different (end-users in the first case, innovative firms in the second). For each phase we present the key BM features, the collaborative research process followed throughout the study, and finally the main strategic issues for each described business model.

The first business model: selling products designed by a community to end-users

The starting point for the development of the CrowdSpirit business model

The first strategic workshop took place in May 2007, four months before the official launch of the web platform beta test, still under development at that time. At this stage, the CrowdSpirit team needed help in challenging its business model. In fact, Lionel, CrowdSpirit's CEO, found it difficult to explain his business model to potential investors and to convince them of its value creation potential. His vision was quite clear, however, and he had already defined the value-sharing model for the different contributors of the community. His initial concept was expressed as: *"Selling innovative consumer electronics products, under the CrowdSpirit brand, which perfectly fit end-user needs due to their involvement throughout the innovation process."*

- The CrowdSpirit concept

In May 2007, the crowdsourcing concept was not that well known. Lionel, who had already presented his project at a number of professional trade fairs, had formalized the concept but his explanations rapidly appeared inadequate. The term "end-user" appeared ambiguous, and the crowdsourcing community at the core of the concept was not referred to, nor was the value provided to contributors through the incentive model. After long discussions, we came up with the following concept statement: "To be the first platform and worldwide community allowing the design, industrialization and sales of electronic consumer products, and ensuring fair payment for all contributors." The CrowdSpirit team members were satisfied with the new formulation as it included each key word of their business: platform, community, fair payment for the contributors.

- Value proposition

CrowdSpirit had different target customers in mind, which presented a number of contradictions. People fond of new technologies, also called 'geeks', appeared to be the main CrowdSpirit target as the potential contributors to the innovation communities. We attempted to improve the definition of value potential for a community of 'geeks'. For Lionel, there would be intrinsic benefit in participating in a crowdsourcing enterprise: namely the satisfaction of participating in an economic revolution by rethinking the boundaries of the traditional firm. Nonetheless, and although he could be considered as a 'geek' himself, little was known of what might motivate 'geeks': would they have the same motivation as open source contributors for software development, would they be motivated by significant financial rewards, as for example in the case of innovation intermediary platforms? And also, how would the community members react if CrowdSpirit captured their contributions for the benefit of private companies? Is the model compatible with the community spirit that Lionel wanted to create? It thus appeared crucial to carry out a complementary study on contributors' profiles and values in order to answer these questions and better define the value creation model.

- Business infrastructure:

We then turned to the business infrastructure and firstly to the competencies needed to develop a BM covering all the R&D processes as well as the manufacturing and selling of products via the web. The main observation was that CrowdSpirit lacked both the marketing competencies and identified distribution channels for the end-customer. At

this stage, their intention was to build partnerships with well-referenced websites and e-business firms with some supply chain experience. During discussions on the subject, CrowdSpirit's managers identified this as a key issue, recognizing that building access to the mass market would require huge investments that the startup was unable to provide at that moment. The economic viability of the BM therefore appeared uncertain. On the one hand, value capture had to be ensured by the sales of the products designed, but the sales model was not yet stabilized. On the other hand, and on the basis of the open innovation paradigm, we identified other paths of value capture for the BM such as selling the knowledge generated by the community's work: ideas, testing of concepts, detailed specifications, and even patents. These by-products could generate revenue as long as CrowdSpirit could find the right business partners to promote them on the end-market.

At this stage, we decided that CrowdSpirit's initial concept could create and capture value through two types of BM: the original one based on the management of the entire innovation process from idea generation to the end market, and a second, more 'open' one which could generate revenue through the promotion of community-produced intangible assets.

We decided to keep these two scenarios in mind for the following phase of our study, and we then went back to the value proposition issue, identifying and defining the profiles of different types of contributor and their potential motivation in collaborating with the community.

Value proposition linked to the incentive model for different types of contributors

Defining a value creation model based on a crowdsourcing strategy requires a good understanding of how to motivate contributors in order to ensure that they actively participate in community work. The literature presented in part 1 provided us with some guidelines as to which incentive model CrowdSpirit should adopt. On the one hand, private investment appeared to be relevant, as the final developed products would not be in the public domain. It is therefore legitimate that individual contributors be paid for their activities. On the other hand, we might expect contributors in this type of community to have motivations other than purely financial ones, such as taking part in an economic revolution, obtaining products not found on the market, and even creating or enhancing their reputation. To answer these questions, we analyzed the profiles and motivations of the different contributor types. The objective of the second workshop was to define the value that CrowdSpirit could offer to the different contributors. This was vital to develop appropriate communication to convince them to take part and it had to be ready for the platform's launch, scheduled at the end of August 2007. We thus attempted to identify the different contributor profiles and define hypotheses concerning each ones' expected role(s) in the community, their motivation for participating and the competencies necessary for each type of contributor. We identified eight contributor profiles: the idea initiator, the design team member, the investor, the tester, the ambassador, the project leader, the reseller and the customer. Below is an example of the type of description we produced for each of the eight profiles identified (**table 2**).

Table 2: Description of a contributor’s profile

The idea initiator

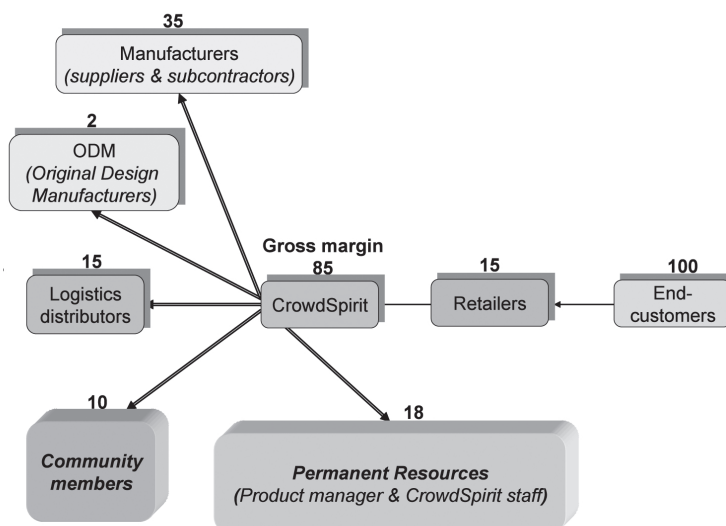
Role: He/she submits new ideas, concepts or problems

Motivation: He/she is motivated to share his/her ideas or act as a lead-user and bring the ideas into being with the community’s help

Competencies: He/she is interested in high tech products, has imagination and creativity. He/she is also able to describe his/her ideas in a pragmatic way.

We paid particular attention to the criteria of motivation and competencies so as to better understand the value the system could offer contributors. The description of the customer, which was identified as a key issue in the preceding workshop, also required specific work. We identified one segment of “ordinary customers”, those who buy MP3s or mobile phones through traditional distribution channels. A second segment is that of the ‘geeks’ who may play different roles as initiators, members of the design teams and also resellers or customers. The problem is that the initial CrowdSpirit BM was based on a volume strategy with relatively low price products (the target is under 150\$) sold to a mass market. With little investment in marketing and advertising, it is especially important to rely on a network of prescribers and create increasing adoption returns. The question then arises as to how to build the link with ‘ordinary customers’ who do not belong to a geek community. Would the Internet ‘buzz’, which had already started around the CrowdSpirit project, be sufficient to reach this segment? Following identification of the different types of contributors, we worked on the value distribution model for the community members. Lionel’s original model consisted of allocating points according to the level of contribution. An initiator would gain a certain number of points when submitting an idea, for example, which could then be converted into cash only if and when the product is commercialized and generates revenue. A percentage of the gross margin is a priori devoted to paying the community, as shown in **figure 1**. The rest of the gross margin is devoted to paying manufacturers, ODM, logistics distributors and permanent CrowdSpirit resources.

Figure 1: Value sharing model between the platform and the contributors



This model raises two problems. The first is that it doesn't take into account the other types of incentives previously presented. So far, for example, there is no formal model for the symbolic payment of talented contributors. The second problem is the fact that the incentive model is individually based. It could therefore introduce competition within the community and end up being counter-productive in terms of motivation. A second incentive model emerged from our analysis, this time based on paying the community engaged in the design of the product, which Lionel calls "the core-team." We also raised the issue of IP management. At this point, Lionel decided he would ask the community to transfer all IP generated by their teamwork to CrowdSpirit. This appeared particularly important as some members of the core-team could also be employees of dominant firms in the consumer electronics market. The principle of a relatively closed core-team dedicated to the design of the product, after the idea generation and idea selection phases, was therefore adopted. Only people with a sufficient number of points gained in the previous phases could belong to this core-team. The core-team would then be responsible for the innovation process up to commercialization. This of course would mean identifying a system of competencies so that all the talent needed (design, engineering, marketing, sales) would be represented in the team. Finally, this second workshop led us to identify the main elements of the value creation model within the community and to define the basis for the beta test: an open model for the idea generation and idea selection phases, and a more closed system for the following innovation process, with a core-team that would be more interested and motivated by the product's success on the market. At this stage, only a real experiment with a real product would help refine the economic and incentive models as the financial returns for the contributors would be proportional to the product's success. If the first products were successful, motivation for further contributions would be reinforced. However, we still lacked a clear view of the CrowdSpirit value capture model required to enable the company to become profitable and able to raise the funds necessary for its development. This was the purpose of the third strategic workshop that we decided should take place after the launch of the platform.

Main strategic issues faced by the platform business model

The third workshop took place in November 2007 after three months of real experimentation with the web platform. This experimentation provided us with concrete results and raised new strategic issues for the CrowdSpirit team. Two main issues were identified: how to obtain a larger audience for the platform and how to deal with the still uncertain revenue model.

An audience base still insufficient

The first important step in the company's life was the opening of a beta test of the web platform at the end of August 2007. This test provided feedback on how the community functioned and enabled the platform's technical aspects to be tested. The launch was performed on a limited basis with invited members who had just one day to register before the community formed was closed. This first experimentation phase pro-

duced positive results with over 500 people registered and more than 50 ideas generated. The second major event was the official launch of the web platform during the TechCrunch 40 Conference (a major Web 2.0 conference) in San Francisco on the 17th and 18th September 2007. CrowdSpirit was selected among 700 applications worldwide to present its website to potential investors. The number of visits to the website by October, however, was relatively disappointing as they had not increased since the beta test (**table 3**).

Table 3: Main results of the platform launch

- 6000 visitors since the launch of the platform,
 - 100 ideas proposed between August and November 2007
 - One product stood out with 70% of positive votes: the digital wall calendar (a wall-mounted device to coordinate the activities of family members)
 - A core group of 20 people had been formed to define the product specifications
 - In December, the product was ready for industrialization but CrowdSpirit decided to postpone this step due to uncertainty regarding the business model.
-

It appeared that despite the Internet ‘buzz’ around the launch of the innovative CrowdSpirit platform, there were not enough contributors of whatever profile. It was necessary to increase the traffic on the platform to ensure that the system would not become dependant on a core-team of just 20 individuals.

This result is in line with the observations by Dahlander & Magnusson (2008) on the use of open source communities by private firms. The authors observe that firms often have difficulty in building a sufficiently large community to create a virtuous development cycle. They note that just establishing a community does not mean that individuals will necessarily wish to become members, or that their interest will be sustained over time. Moreover, the benchmarking study on crowdsourcing platforms that we brought into workshop 3 provided us with additional hypotheses to explain these disappointing results. We suggested that the platform and tools for collaborative design were ill-adapted. In some cases they were too complicated and in others not sophisticated enough to support real collaborative work.

A still fragile revenue model

As stated previously, the initial BM of CrowdSpirit was based on a volume strategy. During the first three workshops it became clear that Lionel remained too focused on the communities and had difficulty in clearly identifying the end-customer. For example, we could not determine if the final customer would be a community contributor or an ordinary consumer. If CrowdSpirit’s end-products are designed for technology geeks, this would hold with the company’s overall philosophy (communities develop products they cannot find elsewhere for themselves), but there was considerable doubt as to whether the volume of transactions would be sufficient. In the second case, the market is potentially larger, but CrowdSpirit lacked the marketing and supply chain capacity to reach the mass-market. It appeared then that the “long tail strategy” that is viable for e-business when products are intangible because of marginal costs tending to zero (Anderson, 2006) is not relevant in the

case of tangible products such as electronic consumer products with high fixed costs and relatively low margins. The business model based on sales of products designed on the platform thus appeared fragile. Lionel therefore decided to explore the opportunity of finding additional partners, such as established firms in the consumer electronics industry that might be interested in the communities' knowledge creation capacity and would be able to promote it in their own markets.

Towards a business model based on the IP generation

In November 2007, we began to envisage the idea that the CrowdSpirit business model could evolve towards an innovation intermediary model in order to find other ways of generating revenue than simply direct selling of end-products. In line with the literature review presented in part 1, we suggested that the initial CrowdSpirit BM was based on both open innovation and open source principles: on the one hand it shared the characteristic that value creation is outsourced to the community via the open source models, and on the other, it shared the characteristic that some value capture should occur inside CrowdSpirit's BM with the open innovation paradigm. This confirmed the importance of the issue raised in the previous workshops, namely CrowdSpirit's capacity to capture enough value from the whole process to be profitable. We came to the conclusion that CrowdSpirit's business model should be positioned somewhere between a community model (the initial one) and an innovation intermediary model, as described in the literature (marketplaces combining individual innovators and business organizations).

The intermediary model thus appeared to be a viable strategic alternative for CrowdSpirit. Value creation would still rely on the work of a community, but value capture would be ensured by the valorization by established firms of what the community had developed. In this model, CrowdSpirit's clients would not be the end-users but rather companies willing to access crowdsourcing facilities to support their own open innovation strategy. As Lichenthaler and Enrst (2008) noted, one reason explaining the relative failure of innovation intermediaries is the fact that high potential applications need to be identified before actively commercializing them, despite the fact that they are based on technologies not yet present on existing markets. CrowdSpirit could therefore act as an intermediary between innovation communities and firms, not simply for technology or patent transfer, but rather to help firms invent new concepts, test them or identify application domains for given technologies they have in their portfolio. In other words the company could become a "market oriented" rather than solely "technology oriented" innovation intermediary. Adopting this type of model would be a major strategic shift for CrowdSpirit, which would then need to resolve the following issues:

- 1- Define the scope of its activity as an intermediary
- 2- Define the value proposition for these customers
- 3- Invent a new incentive model for the community
- 4- Manage the IP issues with the contributors and the customers according to the nature of the knowledge transferred.

Developing a new platform

Between December 2007 and February 2008, Lionel David started to redefine CrowdSpirit's web platform to fit the new strategic orientation. He decided to design a model combining the community model and the intermediary model. The main reason for this was that the CrowdSpirit (CS) community was considered as a strategic asset for the company for value creation, but could not ensure value capture for the company. In Lionel's view, the community model is based on two categories of contributors, the first made up of anonymous individuals from the "crowd" who provide ideas, challenges and solutions, and test out innovative ideas. The second category includes experts, members of the design "core-team" with the competencies to define user requirements and prepare the product for industrialization. The services offered by the platform are now based on both types of contribution. A client firm can use CrowdSpirit's open web platform to test concepts, find applications for their technology, or look for innovative solutions. It can also negotiate with a core-team to obtain the rights for ideas, concepts, scenarios, designs or detailed product specifications produced by the team. CrowdSpirit manages the communities of contributors and plays an intermediary role, offering firms access to the community members.

Main difficulties in the implementation of the intermediary model
Workshops 6, 7 and 8 were dedicated to a new round of reflections and discussions around this new intermediary business model. In effect, we found ourselves in a relatively novel situation: innovation intermediary business models as described by Chesbrough are quite simple in their principle. They are marketplaces that generate revenue through transactions between solution seekers and solution providers. But CrowdSpirit had invented a different model where the knowledge was created by communities rather than individuals. This point raises intellectual property issues. In addition, CrowdSpirit's market was now multi-sided with different contributor profiles on one side and private firms on the other. This involves a specific revenue model to take advantage of the cross-network effects. These issues were dealt with in the two last workshops.

Towards a value proposition integrating intellectual property issues

In the first "product-oriented" model, Lionel decided to ask the community to transfer all IP generated by the teamwork to CrowdSpirit. This was in line with the idea that the company would take on board both the industrialization and the selling of the product, and would then pay back the contributors according to the final income. As the new model involved business organizations, the transfer of intellectual property rights needed to be reconsidered. The April 2008 workshop was dedicated to this issue. In this session we organized a phone meeting with a potential customer, a large research laboratory ready to use the CrowdSpirit platform to test new technological concepts. The meeting involved the customer, CrowdSpirit and both parties' property rights lawyers. The resulting debate highlighted a number of different interpretations of property rights related to ideas published on the web. The laboratory's lawyer (customer) argued that it was not possible to take

out a patent on any idea already published on a website. This of course appeared a major weak point in the model as corporate customers would be interested in the platform in so far as they could obtain ownership of the property rights related to the inventions. CrowdSpirit's lawyer had another interpretation, however: he considered that an idea alone cannot be covered by a patent unless the technical principles of the solution are described in detail. This led CrowdSpirit to define two distinct offers for corporate customers. The first involves the possibility of publishing challenges or contests on an open basis in order to generate ideas that do not imply technical aspects (for example, to imagine possible applications for a technology that is already patented) or to test new concepts. The second involves the organization of private experiments on the platform (for example, restricted to the collaborators of a given company) in the case where 'confidential' technical aspects are involved. We later observed that this distinction between open space and private space for collaboration offered a satisfactory solution to businesses wishing to use the platform. For example, pilot experiments carried out for two important corporate customers included a private and a public phase. This represented an important step in the definition of value proposition for corporate customers.

A revenue model taking advantage of the cross-network effects

The June 2008 workshop was dedicated to the multi-sided market model. Lionel's strategic reflections had been stimulated by this approach and by reading the article by Eisenmann *et al.*(2006) on two-sided markets that we gave him for a summary of the theoretical approach. We provided him with a framework before the meeting, asking him to identify the different sides of his market and all the possible cross-network effects between them. After discussion we decided to focus on three sides of the market and to define a relevant value proposition for each. (**Table 4**)

Table 4: Value proposition for each side of the market

Sides of the market	Value proposition
1 – The crowd	To offer a platform where people can be informed of the newest innovations and be able to express their opinions
2 – Community participants	To offer a platform where people can belong to a network of innovators and where individual talent for innovation can be recognized and rewarded
3 – Corporate firms	To provide easy and fast access to new competencies in order to speed up and enhance the innovation process

We then tried to identify the network effects and came up with the following hypothesis:

- For the crowd, there will be a positive internal effect: the more ideas on the platform, the more interesting it is and the more chance of being selected to participate in a project as an active contributor,
- For the communities' contributors and the firms, there will be a cross-network positive effect: the more challenges proposed by firms, the more chance there is to play and to win something,

- For all sides, a possible negative effect: if there is too much content, the website could become confusing and the content difficult to read and understand.

These steps prepared the work for the pricing policy to be based on the positive network effects hypotheses. Lionel decided to apply the following pricing policy for the “money-side” of the market (the firms); it would be free to publish open challenges because if a large number of firms publish challenges or contests, it will increase the value of the whole system (positive cross-network effect). The platform will charge per use for private challenges, and this will become the platform’s main source of revenue.

DISCUSSION AND CONCLUSION

Crowdsourcing platforms are currently developing new ways of doing business by activating and leveraging the integration of heterogeneous outside knowledge resources. This paper provided insights into the difficulties facing these new economic actors in developing their business models. Indeed, “open business models” should pay considerably more attention to new phenomena such as peer production and collective invention within innovation communities. This study highlights three major points that, in our view, should be taken into account for further research on open business models. First, the openness of the business model to online communities leads to the development of multi-level incentive models adapted to the different contributor profiles. Second, crowdsourcing platforms act as intermediaries in multi-sided markets and, as such, are at the core of a knowledge sharing and IP transfer process between multiple actors. Finally, this longitudinal research, carried out in collaboration with a startup, shows that business model design and development can be considered as an ongoing learning process.

The incentive model: a central issue in the business model design

The incentive model appears to be central to the design of business models open to innovation communities. This type of business model has to take into account the level and profile of the various contributors who will have different expectations: people belonging to the ‘crowd’ with a low contribution level will be interested in the novelty and the possibility of playing and earning quite small amounts of money whereas bigger contributors will be amenable to a mix of symbolic rewards such as reputation (as in open source) and significant financial rewards (as in the case of traditional innovation intermediary platforms).

This implies that the underlying hypothesis of crowdsourcing, namely that the ‘crowd’ is smart, needs to be reconsidered. The Crowd, although a useful generic term used to designate a “community of anonymous potential contributors,” does not convey the multitude of different profiles, roles or motivations that exist within the community that need

to be considered. On the one hand, the idea of crowd power in innovation processes is based on the idea that “a huge amount of individual contributions build solid and structured sources of data” (Prieur et al. 2008). As in the case of Wikipedia, the idea is that the addition of small contributions will lead to a great masterpiece. On the other hand, the crowd’s activity is considered able to create conditions of serendipity (Ebner et al. 2008): individuals are asked to identify and vote for the best propositions. For both types of contribution, the problem remains how to motivate community participants over time once the excitement due to novelty has vanished. The hope of having one’s own idea selected is not sufficient to maintain a high level of contribution as we saw in the first phase of the project. Consequently, these platforms may have to abandon the myth of the smart crowd and focus rather on smaller groups of identified and qualified contributors. This is what CrowdSpirit tried to do at the end of the process by identifying a “core-team.” The challenge is then how to coordinate these communities and gain their loyalty to make them work for the benefit of the platform’s clients. This may turn into a more traditional work relationship with an outsourced workforce. Future research on the management of this new category of human resources should be undertaken to better understand the motivation of these people who voluntarily allocate part of their work time to this type of project.

It also appears that CrowdSpirit has tested another type of incentive model, not identified in the literature to date. The private-collective model of Von Hippel and Von Krogh (2003, 2006) describes how private investment can be freely revealed. On the other hand, CrowdSpirit’s empirical incentive model resembles a form that we could call “collective-private” where value creation is collective and value capture is private. Interestingly enough, CrowdSpirit manages this issue by separating the different phases of value creation. The first phase, idea generation and idea selection, could function as a collective action model, with quite low financial rewards, on condition that other forms of reward are developed, as discussed in the literature (such as reputation). The second phase, product specification and industrialization, will be carried out by a closed “core-team” with a more private investment model. This exploratory result is an invitation to complete the model developed by Von Hippel and Von Krogh by addressing the issues resulting from the new phenomenon of crowdsourcing and the management of online communities.

Crowdsourcing platforms as intermediaries in the knowledge sharing process

This research provides an example of the use of multi-sided markets theory via a concrete business case. This perspective considerably inspired the company’s CEO and helped him to think through the different aspects of his business model. In particular, our guidelines for the identification of the network effects could be used to design other multi-side markets business models. As a multi-sided market platform, CrowdSpirit lies at the interface of knowledge exchanges between con-

tributors, members of the community, and between the community itself and the customer firms. The knowledge produced by the community appears to be a major strategic asset for this type of business model. The idea of encouraging core-teams to form may provide a first answer to the knowledge capitalization issue. In effect, calling on the market to produce strategic knowledge can impede organizational learning. Stabilizing a core team, as occurred in many open source communities, can contribute to the creation of an alternative organization and give birth to a hybrid model, somewhere between market and hierarchy. In line with recent discussions (Bruce & Jordan 2007), we suggest that the analysis of hybrid business models should not be limited to the idea that they “contain characteristics of both polar-opposite governance mechanisms” (i.e. hierarchy and market or community and market). These emerging organizational forms could be considered as “configurations or clusters of arrangements to coordinate and control economic transactions.” In the second business model, economic transactions are based on the transfer of IP produced by the community. As in the open innovation model, knowledge produced by the community can have value for corporate firms and can be transferred as intellectual property. It appears however that the use of public web platforms to exchange innovative ideas introduces new issues related to IP rights management. Some categories of exchanges can be public (such as the evaluation of already patented technologies or ideas concerning potential usage) while others must remain private, notably where they potentially involve the description of ‘confidential’ technical principles. This result opens up a new perspective on the role of innovation intermediaries, which traditionally facilitate technological transactions with private exchanges. We could therefore expect them to progressively open their business models to public communities for other types of contribution.

Building a business model: a learning process

This exploratory study allows us to envisage the major challenges in building new types of business model, at the interface between open communities and traditional organizations in the knowledge economy. The novelty of this type of model led us to engage in collaborative research work with the company’s CEO, thus identifying new theoretical insights and highlighting concrete problems as they appeared. In this research setting, both the company and the researchers were engaged in a mutual learning process. This is an interesting point, not only from a methodological point of view (business models are mainly studied a posteriori), but also from a theoretical point of view. It appears that the business model is more of an ongoing learning process than a final result to be implemented through a business plan. This recalls Sarasvathy’s approach to entrepreneurship and her idea of “effectuation” (Sarasvathy, 2008). She opposes “effectual reasoning” with causal reasoning. For her, causal rationality begins with a pre-determined goal and a given set of means, and seeks to identify the optimal (fastest, cheapest, most efficient, etc.) alternative to achieve the given goal. Ef-

fectual reasoning, on the contrary does not begin with a specific goal. Instead, it begins with a given set of means and allows goals to emerge contingently over time from the diverse imagination and aspirations of the founders and the people they interact with. This concept of “effectuation” appears especially relevant to describe the business model of firms that are open to innovation communities. Indeed, the communities can be seen as an external strategic asset, whose activities and behavior can neither be fully predicted nor controlled. A pure causal strategic reasoning would be of no use whatsoever in this case.

Finally, Crowdsourcing platforms appear to be interesting organizational forms for further research studies. They combine community dynamics and market relationships, internal and external human resources, non-financial and financial rewards, contribution by both experts and laymen, etc. It may be that these organizations are the prototypes of major evolutions in ways of doing business in the near future.

Valérie Chanal is Professor of Management at Grenoble Institute of Political Studies, Grenoble University, France. Her research interests are in the field of innovation management, including open innovation, business model innovation and knowledge management.

Marie-Laurence Caron-Fasan is Associate Professor at the IAE Business School, Grenoble University, France. Her research interests relate to strategic scanning, anticipation, and business models related to Web 2.0. tools and environments.

Acknowledgements

The authors are grateful to the editors and anonymous reviewers for their useful comments, and to both Xavier Lecocq and Jean-Louis Ermine who discussed a previous version of this work at the research seminar on innovation management at the Ecole Polytechnique, Paris. We would also like to thank Lionel David for his support and his availability over the two years of research involved.

REFERENCES

- Adler, N., Shani, A. B., & Styhre, A. (2003). *Collaborative Research in Organizations: Foundations for Learning, Change and Theoretical Development*. London: Sage Publications.
- Anderson C., (2006). *The Long Tail: Why the future of business is selling less of more*. New York: Hyperion Books.
- Bonaccorsi A., Giannangeli S., & Rossi C. (2006). Entry Strategies Under Competing Standards: Hybrid Business Models in the Open Source Software Industry. *Management Science*, 52(7), 1085–1098.
- Bruce, K., & Jordan, J. (2007). Between Markets and Hierarchies: Towards a Better Taxonomy of Hybrid Organizational Forms? *Technology Analysis & Strategic Management*, 19(1), 7-16.
- Chesbrough, H. (2006a). *Open Business Model: How to thrive in the new innovation landscape*. Cambridge, MA: Harvard Business School Press.
- Chesbrough, H. (2006b). *Open Innovation: A New Paradigm for Understanding Industrial Innovation*. In H. Chesbrough, W. Vanhaverbeke, & J. West (Eds), *Open Innovation: Researching a New Paradigm* (pp.1-12). Oxford: Oxford University Press.
- Chesbrough, H., & Rosenbloom, R. (2002). The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change*, 11(3), 529-555.
- Chesbrough, H., & Appleyard, M. (2007). Open Innovation and Strategy. *California Management Review*, 50(1), 57-76.
- Dahlander, L. & Magnusson, M. (2008). How do Firms Make Use of Open Communities. *Long Range Planning*, 41, 629-649.
- Ebner W., Leimeister, M., Bretschneider, U., & Krcmar, H. (2008). *Leveraging the Wisdom of Crowds: Designing an IT-supported Ideas Competition for an ERP Software Company*. 41st International Conference on System Sciences.
- Eisenmann, T., Parker, G., & Van Alstyne, M. W. (2006). Strategies for two-sided Markets. *Harvard Business Review*, October, 92-101.
- Howe, C., (2008). *Crowdsourcing: How the Power of the Crowd is Driving the Future of Business*. New York: Random House Books.
- Jeppesen, L., & Frederiksen, L. (2006). Why do users contribute to firm-hosted user communities? The Case of Computer-Controlled Music Instruments. *Organization Science*, 17(1), 45-63.
- Lakhani, K. R., & Von Hippel, E. (2003). How open source software works: "free" user-to-user assistance. *Research policy*, 32, 923–943.
- Lichtenthaler, U., & Ernst, H. (2008). Innovation Intermediaries: Why Internet Marketplaces for Technology Have Not Yet Met the Expectations. *Creativity and Innovation Management*, 17(1), 14-25.
- Lecocq, X., Demil, B., & Warnier, V. (2006). Le business model, un outil d'analyse stratégique. *Expansion Management Review*, n°123, hiver.
- Lerner, J., & Tirol, J. (2002). Some simple economics on open source. *The journal of industrial economics*, L(2-June), 197-234.
- Nambissan, S., & Sawhney, (2007). *The Global Brain: Your Roadmap for Innovating Faster and Smarter in a Networked World*. Philadelphia, PA: Wharton School Publishing.
- Osterwalder, A., & Pigneur, Y. (2005). *Clarifying Business Model: origins, present and future of the concept*. Communication of AIS, 2006(16).
- Prieur C., Cardon, D., Beuscart, J. S., Pissard, N., & Pons, P. (2008). *The Strength of Weak cooperation: a Case Study on Flickr*. <http://fr.arxiv.org/abs/0802.2317v1>.
- Raymond, E. (1999). *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary*. Sebastopol, CA: O'Reilly.

- Roberts, J. A., Hann, I. H., & Slaughter, S. A., (2006). Understanding the Motivations, Participation and Performance of Open Source Software Developer: A Longitudinal Study of The Apache Projects. *Management Science*, 52(7), 984-89.
- Rochet, J. C., & Tirole, J. (2006). Two-Sided Market: A Progress Report. *The RAND Journal of Economics*, 35(3), 645-667.
- Roson, R. (2005). Two-Sided Markets: a Tentative Survey. *Review of Networks Economics*, 4(2), 142-160.
- Sakkab, N., (2002). Connect and Develop complement Research and Develop at P&G. *Research Technology Management*, March-April, 38-46.
- Sarasvathy, S. (2008). *Effectuation: Elements of Entrepreneurial Expertise*. Cheltenham: Edward Elgar Publishing
- Schweizer, L. (2005). Concept and evolution of business models. *Journal of General Management*, 31(2), 37-56.
- Shuen, A. (2008). *Web 2.0: A Strategy Guide*. Sebastopol, CA: O'Reilly Media.
- Tapscott, D., & Williams, A. D. (2007). *Wikinomics: How mass collaboration changes everything*, New York: Portfolio.
- Von Hippel, E. (2005). *Democratizing Innovation*. Cambridge, MA: MIT Press.
- Von Hippel, E., & Von Krogh, G. (2003). Open Source Software and the «Private-collective» model: Issues for Organization Science. *Organization Science*, 14(2), 209-223.
- Von Hippel, E., & Von Krogh, G. (2006). Free revealing and the private-collective model for innovation incentives. *R&D Management*, 36(3), 295-306.
- Warnier, V., Lecocq, X. & Demil, B. (2004). *Le Business Model: l'oublié de la stratégie*. Actes de la 13ième conférence AIMS, Le Havre.
- West, J., & Gallagher, S., (2006). Challenges of open innovation: the paradox of firm investment in open-source software. *R&D Management*, 36(3), 319-331.