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**Community as a locus of innovation:
co-innovation with users in the creative industries**

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Abstract

The aim of the paper is to characterize innovation with user communities and to explore managerial implications for creative industries. Based on four case studies, we explore the interrelations between the firm and user communities. The digitalization and virtualization of interactions change the ways in which the boundaries between the firm and its user community are defined. User communities are actively developing new products, new services. Definitions of value differ for firms and users. Users are valuating the possibility to be creative, to transform individual creativity into products while firms are making money with innovation. Finally, innovation with user communities may modify the respective identities of firms and communities.

Keywords: innovation, community, lead user, innovation with communities, boundaries, identity

1. INTRODUCTION

The aim of the paper is to characterize innovation with user communities and to explore managerial implications for creative industries. Knowledge involved in innovation processes has become more and more complex, and ever-more widely distributed amongst different types of actors - firms, universities, public sector research organizations and individuals. Focusing on the biotechnology industry, Powell *et al.* (Powell *et al.*, 1996) reported on the unprecedented increase in collaboration, which has been identified as a new industrial organization pattern in which research is shared amongst different distributed partners. The locus of innovation is to be found in networks – and the biotech industry is the iconic case of ‘networks as a locus of innovation’ (Baum *et al.*, 2000; Powell *et al.*, 1996).

When innovation is based on close adaptation to user needs, proximity to markets is key. Following von Hippel and others (Urban *et al.*, 1988; Von Hippel, 2005) who emphasize the role of lead users in the development of new products, the paper focuses on user communities as the locus of innovation. Users are directly participating to the design and development of new products, a phenomena which has been reinforced with the digitalization of the creative industries - films, videogames, music, image or software - where proximity with users seems to be critical as the main source of innovation. Creative industries are those industries in which artistic creation may play a role. They combine technological innovations and artistic creation to create new products or services. In such industries, the bottleneck is not scientific but rather in the creativity of games, scenarios, worlds and devices, and firms rely on users to stimulate creativity, to generate ideas and to be directly involved in the creation. Users are increasingly involved in developing new and adapting existing products, in changing the ways products are used, and in transforming how organizations innovate. Indeed, different models of innovation are competing, integrating more or less levels of user ability in developing innovation, sharing more or less creativity and innovation with user communities. Innovating

with users - such as when amateurs or hardcore gamers work with firms to promote new scenarios, games or ways of using existing devices – are blurring the boundaries of the firm and, when designed and produced by the user community, the innovation process becomes partially externalized. Contribution to value creation is shared and new modalities for value appropriation have to be found, as value for the community and its user-members may differ from the value for the firm.

Based on four case studies, two original case studies (*Trackmania* and *Freebox*) - for which we collect and analyze data - and two indirect case studies (*Propellerhead* and *MySQL*) based on secondary data, we explore the interrelations between the firm and user communities. We chose three communities closely related to the firm and one community independent from the firm – in each case, we study their artistic creativity and technological innovations to understand their roles in innovation activities more fully.

The digitalization and virtualization of interactions change the ways in which the boundaries between the firm and its user community are defined. User communities are actively developing new products, new services. Definitions of value differ for firms and users. Users are valuating the possibility to be creative, to transform individual creativity into products while firms are making money with innovation. Finally, innovation with user communities may modify the respective identities of firms and communities.

The next section introduces the theoretical background, reviewing the literature about lead users and user community learning in the context of the digitalization of the creative industries and framing our focus on innovation with user communities at the micro-level, i.e., within firms. We then discuss our methodology, outline the cases and provide a detailed representation of our findings, before discussing the results in the light of existing theory and drawing implications for management practice and for the digital creative industries.

2. LITERATURE REVIEW

In periods of rapid technological development, research breakthroughs are broadly distributed and no single organization has all the internal capabilities to monitor the associated innovation. Powell et al. (1996) argue that when knowledge is broadly distributed and is a key source of competitive advantage, “*the locus of innovation is found in a network of interorganizational relationships*” (p119), and that organizations intensify their ability to collaborate, assimilate and exploitate additional ideas and information. In creative industries, artistic creativity is a key element of innovation, and is combined with technological developments. When close relationships with users are required, users need to collaborate in the innovation process, and this has taken three main forms: collaboration amongst entities, between two firms which are developing complementary knowledge; innovation through communities, mostly via the lead user approach where the firm connects with some user ‘spokesperson’ and innovation with communities where individual users involved in communities participate directly in the innovation process.

2.1 Innovation through collaboration

Knowledge and technological capabilities required to innovate are often highly distributed amongst actors involved in different communities and industries. Innovation takes place within firms which are exchanging information and technological innovations, or is based on the acquiring external technologies or co-developing them with other firms. Collaboration with other organizations (firms, Universities, research labs, etc.) makes it possible to gain access to unavailable information in order to increase a company's in-house knowledge via a collaborative learning process in an interconnected organizational network. As Duymedjian and Ruling (Duymedjian *et al.*, 2010) point out, technologies are adapted to local contexts through bricolage and minor transformations.

The main characteristics of the *lead user* is to identify needs before the others and benefit from the satisfaction of those needs through innovation (Franke *et al.*, 2004; Morrison *et al.*, 2004; Von Hippel, 1986). This approach (Urban *et al.*, 1988) mostly focuses on the relations between producers and clients in B2B and B2C (Von Hippel, 1986). Only few examples of B2C have been studied, in sports (Franke *et al.*, 2003), software (Hertel *et al.*, 2003) and video games (Jeppesen, 2005; Jeppesen *et al.*, 2006; Jeppesen *et al.*, 2003). Innovations are more commercially attractive when lead users are involved (Franke *et al.*, 2006; Von Hippel, 1994). The highly-motivated users with limited technical skill are in a more favorable position to develop and promote radical ideas than those of the company designer (Kristensson *et al.*, 2005). They are usually demonstrating more freedom and more ability to create out of the context of the firm. Gaining access to users' ideas enables engineers within the company to work to apply their technical knowledge to situations that they would have difficulty in imagining themselves. So establishing connections with users allows companies to renew their creativity, gain knowledge about how their products are used and be made aware of possibilities for radical innovations. In that context, innovation processes still take place within firms, even if users and other actors provide them with relevant and accurate information.

2.2 Innovation through communities

A user community is defined as a group of users of a product or service that are in contact to use the product or the service, exchange, share or spread information, knowledge or the material produced about or based on a product or service. Community members are linked to each other in different ways, not necessarily physically but through the web, newspapers or clubs and associations. In lead user approaches, ideas are crafted by users but the firm develops the innovations, even if it involves them copying what users have been experimenting with at the local level, while *User Community Innovation* is a concept that

describes how innovation is shaped by communities themselves. Franke explores how firm and user communities interact and proposes identifying innovations in these communities by mapping communities of enthusiasts and gaining information directly from their members (Franke *et al.*, 2003a). Following von Hippel, Franke, Shah and others see the existence of the community as a mean to identify lead users. Studies on users in sport equipment communities show that a large percentage (between 10% and 38%) are innovators (Franke *et al.*, 2003; Luthje *et al.*, 2005) and the majority of them have *lead user* profiles. They are even in certain cases the instigators of the user communities (Hienerth, 2006), where they reveal and discuss their innovation ideas with their peers (Franke *et al.*, 2003). But in their approach, lead users are taken as individuals while this is the whole community which is mobilized in the innovation through community case.

While innovation remains within the firm in lead user approach, the frontiers of the firm become fuzzy, and innovation is ‘performed’ by both users and firm engineers in user community approach. Both knowledge and involvement in the innovation process become more widely distributed, so it important to consider innovation via both lead user and user community ‘channels’.

2.3 Community as a locus of innovation

User community innovation requires firms to establish numerous relationships with the communities’ leaders and community innovators. The firm must not only have access to a collaborative network to design innovations, but must address a structured community which may hold different categories of users, be based in both physical and virtual spaces, and be led and managed by leaders. To understand how to innovate with community users, we must examine how companies establish relations with these communities: how do they share objectives and motivations, and contribute to community governance and leadership, and participate in recurring events and information circulation.. User community innovation may

require the company to open up its boundaries and involve users in its innovation processes - in this context, innovation does not take place outside the company but really in tandem with the company. Company employees contribute to user forums and provide the community with information, tools and ideas, and *lead users* are sometimes recruited by the company. When company boundaries become permeable in this way, the question of the community's identity vis-a-vis the company arises: is it completely independent, is it hosted by the company or do the two somehow possess common boundaries. Companies can originate from user communities, as for example MySQL (Dahlander *et al.*, 2008) or communities can be hosted by firms (Jeppesen *et al.*, 2006) – in these situations, the community takes part in the company's identity, or vice versa. We need to identify the connections and tools involved in open firm-community innovation so as to decipher how innovation in user communities are managed.

2.4. Understanding how do communities work

User communities connect firms directly with groups of users, not just to sell products or services but to involve community members in their innovation processes. While lead users interact with the innovative firm on an individual basis, the user community model supposes interactions between the firm and the community as a whole. What are their respective boundaries? How do they interact? While firm boundaries may remain clear, they remain unclear for communities, as the same individuals may simultaneously be firm employees and belong to (perhaps) many user communities, and be involved in innovation processes from either role. Firms need to understand firm/community boundaries, the identities of users and how to interact with communities if they are to co-innovate with them. It is thus key to understand how communities function.

User communities – whether on-line (Dahlander *et al.*, 2005b; Hertel *et al.*, 2003; Raymond, 1998) and off line - such as those which design new consumer goods in the sports sector

(Franke *et al.*, 2003a; Lakhani *et al.*, 2003; Lüthje, 2004; Luthje *et al.*, 2005) - are generally organized around three main pillars: objectives and individual motivations, governance and leaders, and finally circulation of information and recurring events.

Objectives and individual motivations

User communities are generally group of individuals who need to interact to be able to play games or perform their chosen activities, and thus value information exchange and sharing, which in some cases may be the only way their activities can be performed (e.g., on-line gaming). Their members are generally highly motivated by the prospect of improvements in their focal product or service. Jeppesen and Frederiksen (Jeppesen *et al.*, 2006) found that users freely reveal innovations to a firm's product platform (thus freely contributing to improving its position) because these new product features become available to all users via user-to-user sharing, or via product sales. They usually contribute from a 'hobbyist' standpoint, a perspective that (positively) affects their willingness to share their innovations, and respond to 'firm recognition', which we can define as a motivating factor for them joining the firm's domain and undertaking innovation around its products. Raymond (Raymond, 1998), Osterloh and Rota (Osterloh *et al.*, 2007) and Lerner (Lerner *et al.*) all note that, in *open source* communities, developers initially started by developing new software by and for themselves. The chance to gain reputation, to exchange with like-minded enthusiasts and to signal to potential employers beyond the community for career purposes are users' main motivations for being involved in the community, whose social norms elicit a strong sense of commitment towards other members (Wiertz *et al.*, 2007). Members try to gain high reputations in the eyes of their peers (Dahlander *et al.*, 2005b; Lerner *et al.*, 2002; Raymond, 1998), or or of the company (Jeppesen *et al.*, 2006) to build up their identity and perhaps improve their career prospects (Lerner *et al.*, 2002).

Governance and leaders

O'Mahony and Ferraro (O'Mahony *et al.*, 2007) examine how a social group designed a shared basis of authority and thus, a governance system, detailing the governance of community, how it introduced formal authority, and leadership within the community. Although technical proficiency is an important criterion for leadership in open source communities, skill in building the organization becomes increasingly important over time. User communities also exhibit coat-tailing mechanisms for coordination and cooperation which align individual actions and collective activities (Hemetsberger *et al.*, 2009). Assessing a large online community of software developers, Stewart (Stewart, 2005) shows that in considering status, community members tend to evaluate actors' reputations according to publicly available social references. Community governance mechanisms may be based on implicit or more explicit hierarchies (Raymond, 1998). In many ways, although their boundaries remain fuzzy, community governance bears on similar mechanisms to those operating in firms. Community leaders play a central role, motivating members to participate, and become heroes to whom community members may identify to. The roles of such leaders are based more on animation than on hierarchical control: status is key, as skill recognition is central.

Circulation of information and recurring events

The life of the community is based on leaders, who manage them communities and animate them by setting new challenges. The circulation of information is a key for community functioning, to create a community feeling, to share news and technical information, and to promote status of community members. Events are organized to keep the community lively – for virtual communities these are usually on-line events, but some physical meetings also taking place among on-line community members, such as the Nadeo worldwide competition. These events structure the life of the community, giving members the opportunity to meet

leaders personally and to be recognized as a community member, to validate their status and to benefit from recognition of the others.

To study the management of innovation with user communities i.e. articulation between how community works and user community innovation, we analyse the innovation processes within four couples (Firm/user community).

3. METHODOLOGY

3.1. Research design

The paper aims at describing the user community innovation process to understand how firms manage, and benefit from, innovating with user communities. It focuses on digital creative industries to understand the interplay between user community and the firm. We used a multiple cases research design (Eisenhardt, 1989) to examine the interactions between firms and their user communities via four case studies: two direct cases studies (*Trackmania* and *Freebox*) and two indirect (*Propellerhead* et *MySQL*). Our research uses two units of analysis: process of innovation and organization (firm and user community). Case study selection was based on theoretic criteria - the way in which the firm established connections with its user community, and the size of that community. We select cases addressing two distinct types of community hosted by the firm web: three communities partially hosted by the firm and one outside the company. The relational mechanisms between the companies and the communities took different forms: forums and toolkits supplemented the content creation for *Trackmania*; forums and open source development tools for *MySQL*; forum and partial toolkits for *Propellerhead*; forum, setting and open-source software tools for *Freebox*. We also selected firms with four distinct sector of activity. Three firms were in the software sector (video games, music and data base) and one (*Freebox*) in the telecommunications sector. All of them are providing support for creators to design new games, to create music or to disseminate

creative products. Table 1 summarizes the characteristics of the cases in sample.

3.2. Data collection

Our data collection strategy focuses on tracking the activities of co-creation between the firm and user community. We defined a co-creation activity as an activity in which the user directly or indirectly contributes to the innovation process. Co-creation activities range from debate in a forum with users about idea of product improvement from the direct development by users of products. For TrackMania and Freebox, we carried out 24 semi-directive interviews with community entrepreneurs: for the *Trackmania* community, we focus on the most active individuals in the general forum, managers of the most well-known sites, developers and the director of Nadeo; For the *Freebox* community, we interviewed developers and the managers of the most recognized sites. These interviews were supplemented by documentary research on the community sites and specialist press. The data was collected over a period of three years with a historical restitution for the pre-data collection period. For the indirect case studies, we used as a basis the research articles describing these cases, 2 articles in the case of MySQL (Dahlander *et al.*) and Dahlander (Dahlander *et al.*, 2008) and an article about Propellerhead by Jeppesen and Frederikson (Jeppesen *et al.*, 2006). We supplemented this data from documentary research on blogs and websites (videos, interviews, articles), the company websites and on the community forums. Using these data, we wrote chronological cases histories for each firm, and identified the co-creation activities with community.

3.3 Analysis

For TrackMania and Freebox, we used a coding method with a theoretical objective (Strauss *et al.*, 1998) to analyse data, supported by Atlas.ti software. All the facts and arguments identified during the data collection were triangulated via analyses of the forums. The

theoretical objective coding method involved operations to categorize and interpret the qualitative data. Our first analysis categories were based on our theoretic framework. We coded the links between firms and community (forum activities, meetings inside and outside the firm), users' contributions to the innovation process (creation of contents, of new functionality, of new tools, idea generation, appearance of new uses, beta test, bug descriptions, evolution of product and services) and the life of community (creation of websites, events, appearance of leaders, clashes and disputes). After this coding, we compiled this information in chronological case studies focused on the activities of co-creation in innovation process. Our framework considered the innovation process as being structured in three phases: design (identification of problem, idea generation, idea selection, development of new concepts), production (R&D, development of product and service, creation of contents), post-production (product and service diffusion and improvement of). In creative industry, these phases are not always linear. When a user creates content in a product diffused by internet, the product/service may be in post-production, but the user is still participating in producing it. Next, we analysed chronological cases to find theoretical constructs, relationships and patterns within each cases. We identified interactions among co-creation activities and found emerged patterns. Then, we sought patterns in other cases to develop more robust theoretical concepts. Finally, we looked for similarities and differences between the cases in each innovation process category to discover processus and activities which facilitated innovation in user communities. The following section illustrates the history of the four case communities and the involvement of users in innovation processes.

4. THE CASE STUDIES

4.1 Trackmania

Nadeo is a small video games producer which develops and edits the *Trackmania* on-line

series of car races, and was acquired by the video games editor Ubisoft in 2009. The game includes a toolkit which enables players to create content - circuits, cars, video, mini web sites – as well as activities: races within a network, local forums and instant messages. The *Trackmania* forums registered 34,000 members in 2009 who exchanged 450,000 messages, and players have created more than 150,000 circuits in 3 years, launched dozens of competitions, and produced thousands of videos. They are over in the The *Trackmania* sites directory lists over 400 sites for players, of which some - *TM Exchange*, *Car Park* and *TM Liges* - have become very popular. The players group together in teams to participate in competitions, sharing out tasks between the creators, the managers and the competitors to manage the race servers, create their own types of cars, and plan training sessions. The CEO of Trackmania and his collaborators regularly participate in the general forum. The company supports the players' competitions and has encouraged a large new large web site by financing its hosting, supplying technical support, and maintaining direct links with the managers of the community's most-visited sites. Nadeo has progressively reintegrated innovations originating from the community into its different versions of the game, including automatic management of graphic resources, exchange of circuits, and access to the players' mini sites. By observing the players' creations and behavior, Nadeo has encouraged the game's evolution by including news about the community and regional player rankings, and offering more diversified graphical worlds. The community is now an inseparable part of the company's identity. In 2009 Nadeo's web site brought the sites managed by the players to the forefront, and arranged for direct access for players to the community's different forums. The players see Nadeo not as a commercial enterprise but as an enthusiastic game creator, and the company reinforces this impression by regularly producing free 'add-ons' for games already on the market and by distributing several complete versions of the games for free, practices which Nadeo has continued since it was bought out by Ubisoft in 2009.

4.2 Freebox

In 2002, Iliad was the first operator to market a broadband internet access tripleplay¹ based on the innovative *Freebox* modem. The *Freebox* set up enables users to configure specific services, set up their machines in a network, produce original multimedia configurations, edit telesites², and broadcast their videos on TVperso. The *Freebox* community is made up of about a hundred web sites directly managed by the internet users, across which community members exchange technical information and different ideas and advice. As soon as its services were launched, Iliad established numerous connections with the community and its employees and directors made themselves available to chat with fans of the brand in community newsgroups. The operator Free systematically made contact with the managers of the sites that were developing the most quickly. Today, Iliad organizes regular meetings between the managers of the largest sites in the community and its CEO. Iliad gave financial aid to *Freenews*³ (55,000 registered members, 600,000 forum messages) and hosted its servers for free, as well as those of the ADUF (74,000 members, 600,000 messages) and *Freeplayer* (40,000 members, 57,600 messages) and provided technical and administrative aid to *UniversFreebox.com* (12,000 registered members, 70,000 messages), an association that contacted foreign television channels to attract them to become part of Freebox's TV package. The community also produces service ideas via its forum discussions or during the regular meetings with the site managers, and has inspired some of the innovations that have been progressively integrated into the successive *Freebox* versions: Wi-fi, TNT tuner, multicast video, digital video recorder, TV perso and *Freeplayer*. The community's identity is also part of the image of the *Freebox* services. The main sites began with the radical *free*, by showing a

¹ A package of services with internet, the telephone and the television being operated from the same box.

² Telesites are internet pages which can be consulted directly on television through *Freebox*

³ Web site figures cited in the article are for 2008.

Freebox on their first page. Within the wider community, Iliad is considered the most innovative service provider, marketing the best offer in terms of quality/price. Iliad has held the price for the *Freebox* price the same for 6 years, and its CEO regularly defend the interests of the '*Freenautes*' against those of the shareholders, which has strengthened this community members loyalties, even though Iliad's own web sites do not promote its communities' sites.

4.3 Propellerhead

Propellerhead is a computer-assisted music software editing package which offers a virtual recording studio including a range of tools: recorder, mixer, sampler, synthesizer and sound effects. In 2007, it marketed *Rebirth BB-338*, a synthesizer for creating Acid and Techno music, and is currently marketing the virtual studio, *Reason* for users to compose using a sound library, *Record* for recording and mixing inputs from musical instruments, and *Recycle* for creating sound loops. After its *Rebirth* application was hacked by its users, Propellerhead opened up part of the code and supplied tools for modifying the sound bank and interfaces. Its musician users have subsequently made hundreds of modifications (called *Refills*) which together constitutes an original music creation system which associates a sound bank with graphic resources. Propellerhead regularly makes bundle offers available on community-created *Refills* sites (a hundred had been released by the end of 2010), and also gives its seal of approval to *Refills* supplied by professional musicians for sale. The community comprises some fifty user-managed sites - as well as the company's own community sites (which handled 77,000 messages in 2010) -where users discuss and exchange ideas and content, and give each other advice (via text or video) on how to use the software, propose ideas for its further evolution and organize creation competitions. Propellerhead employees regularly interact with the community about software evolution and development problems via its forums, which give the most experienced users the chance to propose ideas and solutions to the developers, and meet members face to face during Propellerhead Tours, a cross between

software demos and music group performances. Propellerhead has integrated the most innovative of users' ideas into its new software versions, including responding to wide calls for the introduction of sequencers, and offering a mouse wheel as an easier tool to manage music creation than a keyboard. The identities of Propellerhead and its community have become interlinked: the company provides clear links from its website to those of its community sites, and has even created a 'museum' site dedicated to Rebirth, which it ceased marketing in 2010⁴.

4.4 MySQL

MySQL created proprietary software for managing relational data bases, and the software – together with its associated programming language PHP, was used by the majority of web servers (more than 10 million in 2008). MySQL AB was bought out by Sun in 2008, which was in turn bought up by Oracle in 2009. The software is distributed with a double license, depending on the use that is made of it: the GPL license (for non-commercial applications) is free, and there is a proprietary license for commercial applications. MySQL's was created by three of the collaborators who had contributed most actively to the software's development development, and its community is made up of many developers (estimated at 6 million in 2010), grouped together on the official site, and about a hundred peripheral sites. The official site hosts a very active forum (230,000 messages in 2010), a bug base, documentation, blogs, and a space for collecting and following up developments. At a community level, MySQL appealed above all to users with development skills, and those who were active in writing code, contributing to forums and conferences, and sending instant messages every year were designated as 'Guides' and their names were posted on the official site. These developers proposed and wrote new functions for MySQL, depending on their needs, and those which

⁴ This software was reedited in 2011 for the Ipad tablet

emerged during the community discussions, with MySQL controlling and certifying the code developed by the community. Company employees were strongly involved in forum discussions, and organized regular training sessions and demo tours to meet developers and promote MySQL applications. The community was an integral part of the identity of MySQL and its site used the same graphic codes as the firm's web site. Sun retained the GPL license after buying the company in 2008, but the company's founders and main developers left the firm.

5. RESULTS

The four cases highlight an original way of co-creation along the three phases of innovation development (design production and post-production): User community Innovation. To manage user community innovation processes, firms not only . Innovation with user communities appears to be supposes a different structure of managing innovation than in collaboration or lead user patterns, with a firm managing not just its own innovation processes, but also its relation with its communities, its degree of monitoring of the global innovation process (beyond its boundaries), the co-creation process and the respective contributions of firm and community, and finally the identities of the two entities.

Data analysis identified a long list of items related to management of innovation when user communities are involved. The analysis is organized around three core elements: opening the firm boundaries, opening product and service and reducing property rights, and reshaping identity boundaries. Firms open their boundaries to involve users in innovation process. They open their product and service boundaries to develop the creative abilities of users and integrate the contributions of users directly into it. They open their identity boundaries to build common identity with the community around the product and service and develop a community company friendly. Theses processes allow the company to benefit from the contributions of users throughout the innovation process.

5.1 Opening the firm boundaries

Opening boundaries consists of opening up ‘crossover’ points in company boundaries to establish direct links with users so as to involve them in the innovation process. Our data indicate that firms use three activities to opening their boundaries: conversing with users, sharing knowledge and sharing tasks. Table 2 summarizes our data on opening the firm boundaries.

A company’s boundaries may be both physical (offices and production process) and virtual (web site and social network), and it will need to set up boundary objects (or ‘doors’) - such as discussion areas - for exchanging opinions and ideas and for giving advice on the products or services, which commonly take the form of internet forums where users and employees can discuss the product and services, community events, and the problems users encounter. These tutorials and pieces of advice are exchanged between the users, contributing to the firm's after-sales service. Analyzing these forums – which are most often situated on the company web site (Trackmania, MySQL, Propellerhead), or on the community sites (Freebox) - enables a company to identify new needs, new uses and new ideas at the design phase. Regular face-to-face meetings with community leaders are also occasions to present forthcoming products, to discuss ideas for improvements and innovations (Freebox, Trackmania). This is an important phase, when a company reshapes and adapts its product design, although such interactions are not completely original and replicate the way the company sources knowledge and ideas in its internal environment.

Opening boundaries in this way also involves opening production, by making development follow-ups (MySQL), beta version tests (Propellerhead, Trackmania) or information on bugs (Freebox) available to platforms users. Community leaders and developers within the firm are interacting. The integration of community leaders into the firm innovation processes facilitates exchanges between the two types of organization, and companies (e.g.,

Trackmania) may recruit some leaders to moderate the company/community exchanges. Leaders appear as gatekeepers while the boundaries between the community and the firm are maintained – indeed, in some cases (e.g., MySQL) it was the leaders themselves who set up the firms. However, when the firm is recruiting community members, the existing boundaries may be too strong, and objectives too different, so that the firm loses contact with the community. Alternatively, in user community innovation, the permeability of firm boundaries is high, so firms have to manage direct contributions from users who are not part of the firm, opening the innovation process and integrating heterogeneous contributions. At this stage, the firm is mainly interacting with community leaders who are the ones who propose innovation. Sharing communication platforms between the firm and its community is a way to address community members and to animate the community through the organization of recurring events, beta testing products and prototypes.

5.2. Opening product and service boundaries, sharing ownership

Managing co-creation involves ‘opening the product or service boundaries so as to encourage the creation of new content and new functionalities, controlling user community contributions to guarantee product and service quality, and enhancing the status of the most active contributors to maintain their motivation and involvement. It means that products, softwares or services can be transformed by users and sold by the firm. Our data indicate that firms use three activities to opening their product and service boundaries: supporting users creation, taking new usages into account and supporting community. Table 3 summarizes our data on opening the product and service boundaries.

The firm may open its products just to user communities or to outside contributors in general. Such ‘opening-up’ may be via an open source license, or interactions with the community may be organized via toolkits which allow users to create content and events within or around the product and service. Such toolkits allow community members to involve themselves in the

creative process and the development of innovations, and firms use them for innovation (Von Hippel, 2001; Von Hippel *et al.*, 2002); to organize competitions of ideas (Ebner *et al.*, 2009; Piller *et al.*, 2006); to design new products in collaboration with users (Fuller *et al.*, 2007); to obtain content directly created by the users (Jeppesen *et al.*, 2006); or to adapt products to meet particular client needs (Berger *et al.*, 2003; Piller *et al.*, 2006). Innovation in a user community extends this logic to allow the community to participate directly in the design and development of the product or service. When the firm provides the user community with tools for community animation, the firm is paying a tribute to the community to benefit from its expertise and creativity. The difference of objectives between the firm and the community are clear. When the community modifies the products directly or is involved in the development process, benefits must be shared according to the respective objectives of the firms (turnover and profits) and of the community (products or services better adapted).

Firms are opening their products to user communities during the development process. Users can also be involved in the production and post-production processes, by contributing innovative content (Trackmania, Proppelerhead), and by developing the functionalities of the product (MySQL, Freebox), and analyzing users' creations can help a company identify new modes of use and introduce new functions into upcoming versions to facilitate them. (Trackmania and Porppelerhead). The creative dimension in creative industries is twofold: technological creation (adapting existing products or games) and artistic creation (proposing new scenarios, new environments, new ways to play the game).

Firms and community are interacting mostly on the community animation side. Community animation is based on organizing community events connected with the product or service such as international competitions, (Trackmania), demonstration tours (Proppelerhead), or training (MySQL) - to attract new members, to stimulate and recognize members' status and encourage them to create new content). Event organizing tools can also be integrated into the

same toolkit users employ for creating innovations (e.g., Trackmania). The quality of members' contributions can be directly and automatically verified by the toolkit (Nadeo), or the contents can be validated once they are uploaded onto the company developer's site. (MySQL and Propellerhead). Users' status can be recognized and increased through such designations as 'best contributors' (MySQL), or by company developers acting as forum moderators (Trackmania, Propellerhead, MySQL), or by being identified as community leaders (Freebox). Trackmania has instituted a virtual money unit - a 'copper' to reward participation in competitions and content creation, and users can spend this currency on buying content created by other players in the game itself. Firm and community are sharing part of the ownership of the product but the rewards are different: mostly monetary for the firm, mostly symbolic for the community (recognition, premium access, etc.).

5.3 Identity convergence on product or services, not on firms and community

The community and the firm are two separate entities – although they are organized around the same focus they have different objectives. While the firm aims to create and appropriate rents by making the best offer to the market, the community aims to organize matters so that users to benefit from the focal game or software, and to propose or realize improvements to increase that benefit. Our data indicate that firms use three activities to opening manage identity and to organize identity convergence around products or services while the respective identity remains separated: sharing identifying elements, building common values and sharing values. Table 4 summarizes our data on opening the identity boundaries.

User communities and firms have separated identities based on rituals, events, and image while a project on which the two are collaborating will also have its specific identity, expressed in graphics, logos and graphic identity which is shared by the firm and the project even if their identity remains separated. The firm website is used to support virtual communities (Propellerhead, Trackmania and MySQL). Names in domains shared between

communities and companies have common roots, 'tm' for Trackmania and 'Free' for Freebox, and a company can give a domain name to the community, e.g., 'freeplayer.org' for the Freebox community site. The most active community internet sites can also be linked directly to the company web sites (Propellerhead, Trackmania), or can even be provided directly within the product, as in the Trackmania game's 'Manialink' function. The Freebox community is not integrated into its company's identity, but Iliad plays on its image in their advertising material, which systematically feature a geek who is more astute than others.

Company members confirming their common values in fora or interviews on community sites also contributes to the emergence of a common identity, whose values are reinforced when members belonging to both companies and communities, when companies are created from a pre-existing community (MySQL) or when a company recruits community leaders to manage relations between the two (Trackmania).

A community interprets company activity according to its own values –from its viewpoint, the company's products and services are parts of its identity. Trackmania, MySQL and Propellerhead are not considered as purely commercial firms: the passions for games, music and development are shared between employees and community members, and company founders and the employees are considered to be real user community members. For the communities, the task of the company is to provide the best possible games; the most useful music software or the most efficient database system, at the lowest possible cost. For the community, its specific objectives are the ability to play and to share with the others. The respect of the community objectives is important to maintain the community interest to collaborate.

The common identity is stronger in the Trackmania and MySQL case, and these firms have adopted economic models that are partially cost free to conserve and strengthen it. Trackmania regularly offers free ad-ons and game versions, while MySQL's double license

system means the software is free to individual users anyway. When the commercial model supplants the free model, the respective identities of the firm and the community becomes hazy and competition. The acquisition of MySQL by Sun, and then by Oracle, has provoked the departure of the founders, and led the community to persistent questioning of Oracle's intentions. Iliad's attempt to implement high charges for changing the Freebox box led to strong community protests, forcing the CEO to backtrack and propose a much lower tariff. Firms and communities act as balancing centers of power, and manage specific and separate firm and community identities while they are converging in their focus on the identity of product.

6. DISCUSSION

While networks are the locus of innovation for science based industries, user communities are becoming the locus of innovation in digital creative industries where artistic creativity is the bottleneck of the innovation process. We have examined such settings, moving from innovation through collaboration, to innovation *via* communities to co-innovation *with* communities, where firms have a dual role in simultaneously opening up the firm and managing the co-innovation on the one hand and monitoring and orchestrating user communities on the other.

6.1. Managing the innovation process within firm

Managing the innovation process involves both managing the internal process and opening the firm to users. The first decision by the firm is to open the development process: co-innovation with a user community involves opening company boundaries, its products and services, and its identity throughout the innovation process. Opening its innovation process risks the firm losing control of it, so decisions have to be made about the appropriate degree of openness. Dahlander (Dahlander *et al.*, 2010) argues that the more open the firms are in

revealing its processes, the greater the community's contribution can be - but the opening always remains partial, and how the link are managed differs according to the companies

The second decision is to identify which elements are to be opened and which remain purely internal. For example, the source code of software is open, and the product is completely customizable; the source code is closed, but the product is open to user contributions, or the code source is closed, but there is a canal of communication with the product to create new services. Nadeo has only opened up a part of its software - the content; the game code remains its property, while the Trackmania toolkit ensures that connections between the company and the community are partly automated. Propellerhead has only partially opened up the content element; proposed Refills have to be authorized by the firm before they are posted on the firm's site. MySQL has opened up all its codes, but community-created code has to be authorized by the company before being included in new software versions. Iliad has opened up very little; just a few settings are accessible to the developers. All these firms have limited the amount of opening (to different extents) so as to keep control of the innovation process, and in certain cases, to conserve their intellectual property control over their innovations. But opening the product alone is not enough – it must be accompanied by opening the innovation process, and the company's boundaries and identity.

The last decision is how to appropriate and share the rents. Firms and user communities are not looking after the same objectives: definitions of value will differ, and the firm must understand what is specifically valuable to user communities: symbolic reward, tools to manage the community, etc.

6.2. Orchestrating the community

Innovation with user communities requires the firm to balance opening up its development process and giving up full control of the innovation process – and maybe even of returns - against the potential value created through the involvement of user communities. The

temptation for companies is high to try to combine monitoring and value creation by directly controlling community activities, but such actions can provoke conflicts with the community members (Dahlander *et al.*, 2005a). Controlling means effectively integrating the community within the firm, but (Danneels, 2003) has shown the development of too strong ties with existing clients slows down the development of new products, and can lead to the sterilization of the community in the medium run as it reduces diversity and external sources of innovation. So companies more frequently adopt the role of an orchestrating community activity, which avoids this problem and respects the specificities identity of each player, and tries to ensure they play together, each contributing their own expertise. To maintain the freedom of action of both parties, the firm has to manage a combination of strong and weak ties. When a company adopts an identity that is partially shared with the community, the firm reduces its degree of freedom as it has to negotiate with the community each evolution of its strategy. Managing this kind of 'common' identity involves the firm in partially adopting the community model, discussing all the product and service evolutions it envisages with the community, explaining and justifying to them the choices it makes.

In the long-term, firm/community relationships have a tendency to become institutionalized: reoccurring events and meetings, the common identity is locked and its possibilities to develop are reduced. In three of our cases (Trackmania, Propellerhead and MySQL), it is the fact that the community is partly hosted by the firm that leads to the institutionalization of these connections within the community. In the case of Freebox, the relationship is more distant and the connections remain more sporadic—meetings with users are at regular events and demo tours and those with community leaders are held within the company. The community does not envisage that new versions will be launched without its advice, and will involve discussions on their evolution in community forums and the community having access to privileged company information and its members testing new versions' beta codes .

So the company loses part of its strategic freedom as it cannot make decisions without consulting the community. Once the product is completely finalized, the company might be tempted to limit the connections with the community, risking conflict with frustrated members, a situation that may also arise when (as in the case of MySQL) the company is bought out by an international group.

In the case of Trackmania, this pattern of continuous co-innovation in collaboration with a user community seems to have had a direct effect on the product life cycle, the product is constantly evolving, and it remained as a beta version for a long time. Thus there were 7 versions of Trackmania over 8 years, but without the game reaching its final phase, while Freebox functionalities evolved continuously over 10 years, ensuring it remains one of the most innovative and cheapest set-top boxes on the telecom market. In the same way, the MySQL database software is being constantly enhanced with new functions: involving an active community in the innovation process has allowed the firm to continuously permanently renew its product/service offer and maintain its innovativeness over a long period. A similar logic has been involved in the production of series of console games, where product versions follow on from one another, with the same basic structure, but including new functionalities as the design progresses, and sometimes extending their targeted market.

7. CONCLUSION

We have argued that on creative industries, the locus of innovation is located within a community of users. Firms involved in this style of co-innovation must develop specific and strong ties with user community to capture the innovative contribution. Co-innovation with communities processes requires the company to open up its boundaries, its products and services, and its company identity through the innovation process, so that it must successfully manage the boundaries between companies and communities; manage users' contributions and manage the respective identities of both firm and community. Our results also show that, to

increase the capacity for innovation, the collaboration must be established with all types of organizations: firm and community, and across all functions and type of innovation: technological innovation, innovative uses and content. This requires firms to develop new knowledge and skills, not only to develop experience at managing R&D but also in managing boundary and identity issues depending on the types of organization with which it connects. Involving whole user communities in the innovation process also calls into question the 'lead user' concept, as defined by von Hippel, which proves difficult to use in companies. Methods for detecting isolated lead users are expensive, and they may only be sporadically involved in innovation. (Von Hippel *et al.*, 1999). When the lead user belongs to a user community, a company does not need to identify him. The lead user can input directly into the innovation process via the different forms of openings set up by the company, as can other community members. von Hippel's users' toolkit for creating innovations gives users tools for creating content and functionalities enable him to create innovations that answer their needs, and which are therefore more operational for the company. Finally, innovating with user communities may change what the firm considers as a product or service. When users are involved, when user communities innovate and are able to change the product, the firm must accept to market on-going products or services that can be adapted changed or specified by users. Innovating with users implies that firms loss control on the product / service development, and at the same time better know users as they are connected to user communities. Moving from control to orchestration is one of the conditions to benefit from user community creativity.

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Table 1 – Characteristics of cases and cases Data

	Trackmania	Propellerhead	MySQL	Freebox
Activity of firm	Video game	Music software	Database software	Internet box
Size community	Forum in web site of the publisher and hundreds of web sites of players for discussion and exchange of content. 34 000 registered in official forum in 2008.	Web site of the publisher and a hundred site user discussion and exchange of content. 3850 members (see Jeppesen and Frederiksen, 2006)	Web site of the publisher and hundreds of sites and forums dedicated to MYSQL. 230 000 posts in official forum in 2010. We estimate the registered at 23000.	A dozen web site users. In 2008, the top 5 sites, 200 000 registered in the forums.
Device	Forums, user toolkit, site to sharing of content	Forums, user toolkit, site to sharing of content	Forums, open source language, code-sharing site.	Forums, open source software, news site, TV channel managed by users
Leaders	Administrators of the most visited sites in the community, and moderators of the official forum	Administrators of the most visited sites in the community, and moderators of the official forum	Mysql creator of language, administrators of forums and developers "Guide" of the community.	Administrators of sites and forums the most visited in the communities
Internal sources	16 interviews – 134 pages 34 000 posts 14 interviews on blogs and information websites	One research paper 77 000 pots. Storing contribution to Rebith software on the dedicated web site, rebirthmuseum	Two research papers 230 000 posts Ten interviews in websites.	8 interviews – 115 pages 200 000 posts Ten interviews in websites.
External sources	2 videos			
Informants: interviews and papers	General manager Developer Gamer Active member of community	General manager Manager Developer Users	General manager Manager Developer	Leaders of community General manager Manager Developer

Table 2

Opening the firm boundaries

Activities	Conversing with users	Sharing tasks	Sharing knowledge	Results
Definition	Conversing with users on internet, in small groups in the company, or during community events.	Calling for contributions from the users to participate in the development of a new version of the product Spontaneous development by the users.	Sharing knowledge of the product between the company and the users, and sharing knowledge on the product's uses among the users.	Involvement of users in the innovation process
Outcomes	Identification of needs, new uses, ideas of new functions and products.	Externalization of the development: codes, functions and identification of bugs.	Collective training on the use of the product Identification and problem solving.	
Plan of action Phase	Design Discussion forum and face to face meetings	Production Development platform. Free access to code source	Post-production Mutual aid forum	
Trackmania	Propositions by the players for improving the game (scores, circuit exchanges, types of game) and tests with players for developing the game. Regular meeting at Nadeo.	Debugging of all the beta versions of the different versions of Trackmania. Development of tools for downloading and sharing circuits.	Writing tutorials. Collective answers to questions on the use of Trackmania and the creation of content	Integration of user ideas into the new versions of the game
MySQL	Propositions of new language functions by the users in the forums	Development for the users of the new Mysql functions. Debugging by users	Collective answers to questions on the development of new functions and on the use of Mysql language	A part of the development is carried out by the users after identifying new needs
Propellerhead	Propositions of new software functions by the users (sequencer) and test with users of the software development project	Debugging of all the beta versions of the application. Development of an interface to connect Reason to videos	Writing tutorials. Collective answers to questions on the use of software and creation tools.	Integration of user ideas into the new versions of the software.
Freebox	Collecting ideas for improvements and new functions. Presentation of development projects during the regular meetings with community leaders	Development by the users of Freeplayer software mods Debugging by the users	Collective answers to questions on the use of Freebox. Installation problem solving	Transformation of the Freebox into a multimedia platform Community development. After-sales service provided by users

Table 3

Opening the product/service for co-creation

Activities or systems	Taking new usages into account	Supporting users creation	Supporting community	Results
Definition	Design of new functions by observing product usages and tools creation	Making tools available for creation and for evaluating user creations directly connected with the product	Organisation of events for the community and a status attributed to the largest users	Development of a community's creative content and events Integrating user contributions directly into the product and service
Outcomes	Identification of new needs Ideas of new functions	Product enhancement (features, circuits, codes, interface, music etc...). Personalizing the product.	Community events Development of community	
Plan of Action Phase	Design	Production	Post-production	
	Discussion Forum User tool box for innovating	User tool box for innovating Development management platform	Forum, demo tour, competitions, contests	
Trackmania	Decision to add listings and tools for direct sharing of the game circuits	Toolkit in the game to create content and organize activities : cars and circuits	Organisation of events: World Cup video game, LAN party. Toolkit in the game to organize activities. Designation of a moderator	Community Development More than 150,000 game circuits. After-sales service provided by users
MySQL	Does not use this type of system	A development management interface made available for developers	Training, demo tour, development contests Designation of a moderator	Creation of hundreds of features by the users
Propellerhead	Decision to add new functions : creation tools, sequencer etc.	Tool box made available to create interfaces and sounds	Demo tour, Creation contest Designation of a moderator Designation of a champion	Community development. Creation of hundreds of mods by the users.
Freebox	Is not used	Canal TV made available to circulate video creations of users A mini player for circulating user's mini sites on the web	Financial support of the associations and community internet sites	Creation of thousands of videos and hundreds of mini sites circulated by Freebox

Table 4

Identity convergence around product and service

Activities or systems	Sharing identifying elements	Building common values	Sharing the value	Results
Definition	Sharing elements of identification between the community and the company : history, visual, name and internet address	Exchange of common values between the community and the company embedded in product or service identity.	Users have free use of part of the product and service, or a low price is maintained over a long period	Development of a community company friendly
Outcomes	Common identity	Justification of the contribution of users	Attractiveness of the product	
Plan of action Phase	All phases	All phases	All phases	
	Company history. Logos. Name of the domain, Language elements	Post for the forum. Interviews with company managers. Meetings with the community leaders	Open source, limited version free	
Trackmania	Circulation of colours and the Trackmania logo on the community sites. Use of the TM root in the domain name by all the community sites	Creation of a TM spirit, shared values between the company and the community. Involvement of company members in the discussions on community values in the forums	Free add-on edition and entirely free versions of the game (Trackmania Nations and Trackmania Nations Forever)	Development of a community that is very favourable to the company
MySQL	Circulation of colours and the Mysql logo on the community sites	Founding of the company by the community leaders	Double licence : free for individuals, a charge for companies for business use	Development of a community that is very favourable to the company, except since the takeover by Sun, then Oracle
Propellerhead	Circulation of colours and the Propellerhead product logos on the community sites	Company Creators and users share their passion for music	Does not use this type of system	Development of a community that is very favourable to the company
Freebox	Circulation of colours and the free logo on the community sites. Loan of a domain name	Discussions during the meetings with community leaders	A single low price maintained for 10 years. A small amount of content and services are created by players	Development of a community that is only slightly favourable for the company