



Orchestrating innovation with user communities in the creative industries[☆]



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ABSTRACT

The digital creative industries exemplify innovation processes in which user communities are highly involved in product and service development, bringing new ideas, and developing tools for new product uses and environments. We explore the role of user communities in such co-innovation processes via four case studies of interrelations between firms and their communities. The digitization and virtualization of firm/community interactions are changing how boundaries are defined and how co-innovation is managed. The transformation of innovation management is characterized by three elements: opening and redefining firm boundaries; opening of products and services to community input and reducing property rights; and reshaping organization and product identities. Innovation in collaboration with user communities requires firms to orchestrate their communities and their inter-relationships to encourage the creativity and motivation of users, and develop the community's innovatory capacity.

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1. Introduction

The digital creative industries exemplify innovation processes where users bring new ideas, develop tools to play, create new game environments, and innovate directly. The digital creative industries are creative industries based on digital content. These creative firms engage with user communities [1] – whether amateurs or hardcore video gamers – to promote new scenarios, games or ways of using existing devices [2], and the two converge to share in developing new products, even if they value them for different reasons (users for the pleasure of playing and the chance of using their individual creativity to improve the product, and firms for the chance that such innovations offer for increased turnover and profits). It is

common to say that gamers can simultaneously be both users and developers, but what is new is that the blurring of firm frontiers in digitized industries allows for fluid interactions between user communities and firms [3,4].

Users participate in online user communities, which support and stimulate the diffusion of on-line products. The digitization of content and virtualization of interactions between firms and their user communities changes the definition of boundaries between the two, and may even modify their respective identities. Firms not only interact with individual users, they also have relationships with organized communities [5]. The goals, values and organization of firms and user communities differ, even though they collaborate actively in creating new products and services, and in order to manage innovations, firms orchestrate their relationships with online user communities who co-develop innovations and thus achieve on-going product transformation [6]. Lead user approach [7] mostly reports interactions between the organization and individuals. Digitalization and the subsequent virtualization of interactions change the nature of the relation. Users are forming communities, leading to a new model of innovation; and the online user

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community innovation model emphasizes the central role of community which blurs the boundaries of organization, and requires additional understanding of what communities are, how they work and how they interact with firms.

Based on four case studies to maximize the variety of contexts we examine two original case studies (Trackmania and Freebox), for which we collect and analyze data, and two indirect case studies based on secondary data (Propellerhead and MySQL) for which we explore the interrelations between firms and their online user communities to co-innovate on-going product development. We examine the activities of three communities which are closely related to the firms involved and one that is independent – in each case, we study interactions between communities and firms, and the ways in which creativity and innovations are stimulated or restrained. The paper characterizes the co-innovation process with user communities.

The next section introduces the theoretical background, highlighting gaps in the knowledge about user communities in the digitized creative industries, and considers the need to manage interactions between firms and on-line user communities at the micro (i.e. firm) level. 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. The paper contributes to existing theory in three ways: first digitization of firms' interactions with online communities increases fluidity of their interactions and allows co-innovation process [3,4,8]; second it underlines the blurring of the boundary between existing and on-going product, since the community of users contributes to changing the product on a continuous basis (Web 2.0 spirit). Third, it emphasizes the blurring of boundaries between firm and communities. As digitization progresses, user communities become the new loci of innovation in the creative industries, blurring the boundaries between firms and their communities, as well as the differentiation between production and post-production. Users are involved in developing products which are only stable only for short periods. The identities of user community and firm become merged in 'product communities' shared by both parties. Orchestrating their user communities becomes a central firm concern, as the continuum between creation, production and post-production allows communities and firm to retain their own identity but at the same time to collaborate in the on-going development of the usage and utility of products.

2. Background and knowledge gaps

Since von Hippel's seminal work [9], the 'lead user' approach has been seen as the major avenue via which firms involve users or their representatives in their product or service development processes. These are users with advanced requirements who involve themselves with the firm to satisfy those requirements – but the development effort remains essentially located within the firm. The collaboration of on-line communities with digital creative industries exemplifies a new model where users are directly involved in the co-development of products, blurring the frontiers of the firm and the identities of users and developers.

2.1. Innovation with digital on line communities

The lead user approach developed by von Hippel describes how firms source new knowledge from users who have themselves experimented intensively with the product and who are expecting benefits from the improvements to which they contribute. Although it underlines the role of distributed knowledge in the innovation process, the lead user approach maintains a clear distinction between users and firms. In concrete terms, the company identifies lead users and invites them to participate in workshops within the company in order to help design new products [10,11] but while lead users bring new ideas and knowledge, the company remains the undisputed owner of any resultant new product concepts: the innovation process remains internal, the boundaries are clearly defined and the firm orchestrates its relationships with individual lead users [6].

Mahr and Lievens [12] examine the creation of innovation by lead users in virtual communities, describing their traits and analyzing how such features contribute to the innovation process. They find that lead users in virtual communities tend to propose solution-focused contributions which provide greater value to the firms than problem-focused solutions, and have valuable expertise along design and usability dimensions. Lead users in virtual communities are more likely than regular lead users to make contributions on their own initiative, and more likely to codify their contributions, so providing the firm with more valuable innovations. Pitta and Fowler emphasize the role of communities of interests, and identify community leaders, those who are highly involved in such forums [13], and find that they can play a key role as coordinators of such communities. Burger-Helmchen and Cohendet [2] extend this approach from lead users to online communities; focusing on the game industry, they produce a categorization of user communities: developers, testers, hardcore players and average users. The communities of users who interact with different firms and communities to produce new video games tend to involve the first three first types. Dahlander and Magnusson [1] define "harnessing a community" as "accessing a community to extend [a firm's] knowledge base, aligning [its] strategy with that of the community and assimilating the work developed within the community in order to integrate and share results". Burger-Helmchen and Cohendet analyze the practical interactions between firms and communities, emphasizing the alignment of interests between the two. On-line communities, with their lack of structural mechanisms, open generative spaces in which new organizational mechanisms of collaboration can be explored and replace traditional ones to facilitate knowledge collaboration and enable the unconstrained recombination of knowledge. Faraj, Jarvenpaa and Majchrzak [3] characterize on-line communities as fluid entities, where boundaries, norms, participants, artifacts, interactions and foci continually change over time, and it is this central characteristic that enables new knowledge collaborations, as it leads to novel alignments and allows for the reciprocal assimilation of knowledge by both firms and communities.

Faraj et al. emphasize the ways in which on-line communities can lead to dynamic changes. By introducing interactions in the community, by shortening reaction times, and by discussing a wide variety of ideas, online communities generate responses that are valuable to firms' product development efforts, and the

fluidity of community operations can dynamically change boundaries between firms and community members, transforming users' roles and their levels of involvement in new product development processes.

While the lead user approach maintains the boundaries between communities and firms, with lead users being invited into firms to participate in product development, the fluidity of on-line communities blurs those boundaries [8], and this boundary permeability can impact different dimensions: (1) appropriability, as community involvement in innovation – or perhaps pre-existent innovation within that community – may prevent the firm from fully appropriating or patenting co-generated product concepts; (2) tools may be shared between the firm and the community (as is typically the case with open source software); (3) identities become blurred [4], and community members may come to have dual identities, as both gamers and developers for firms. When company boundaries become permeable, the question arises of the community's identity vis-à-vis that of the company. Organizational identity is an important element of both parties, since it answers the question “who are we?” [14], defining who is part of the group and who belongs to a different group. Identities in on-line communities cannot be defined by member's locations or roles as individuals are usually involved in different communities simultaneously [4,15,16]. To what extent do such communities remain independent from the firms? The literature identifies different situations where user communities are independent from the companies, while other authors report common boundaries: firms can originate and host communities [17] – or can even originate from user communities, as for example MySQL [1].

The notion of a user community as a new locus of innovation represents a radically different organizational structure from the lead user approach, where the firm controls the innovation process, even if it builds on user/lead user ideas. When innovation originates from within the community, the firm acts as a specific member of the community and is just part of the innovation process, co-innovating with users to propose ideas, prototypes and products which fit their needs. Appreciating this structural difference is crucial for a better understanding of how such communities work.

2.2. Building on online user communities

In the online user community model, the boundaries, roles and identities of firms become blurred – and the same individuals may be both firm employees and belong to (perhaps several) user communities, playing different roles in each setting [2]. How the community functions affect the innovation process, and firms need to make sense of the fluid boundaries typically involved in this style of innovation process, allowing (and managing) convergence or divergence between user communities and firms, stimulating the pull effects of users on innovations and enabling the dynamic emergence of different roles as part of the interaction. User communities – whether on-line [5,18,19] or off-line – such as those which help design new consumer goods in the sports sector [20–23] are generally organized around three main pillars: individual objectives and motivations; community governance and leadership; and circulation of information and running recurring events.

2.3. Individual objectives and motivations

User communities are (generally) groups of individuals who share similar interests and need to interact to perform their activities (e.g., on-line gaming), and so value information exchange and sharing. Their members are generally highly motivated by the prospect of improvements in their focal product or service, and can provide firm developers with different contributions depending on whether their interests are orientated towards using the product or towards its technology [2]. Jespersen and Frederiksen [17] found that users usually contribute from a ‘hobbyist’ standpoint, a perspective that positively affects their willingness to share their innovations. So they tend to reveal their ideas and innovations to firms' product platforms freely, thus contributing to improving its position at no cost to the company, as resultant new product features become available to all users via user-to-user sharing, or via product sales. They respond to ‘firm recognition’, which we can define as a motivating factor for them in joining the firm's domain and in exercising their creativity in innovating around its products. Raymond [19], Osterloh and Rota [24] and Lerner and Tirole [25] all note that open source communities are often started when users develop new software by and for themselves. The chance to gain reputation, to exchange ideas and experiences with like-minded enthusiasts, and to signal to potential employers beyond the community for purposes of advancing their careers, are their main motivations for being involved in communities, whose social norms include a strong sense of commitment towards the community and its members [26]. Members are keen to gain high reputations in the eyes of their peers [5,19,25], or of the company [17], to build up their identities and so perhaps improve their career prospects [25].

Firms and users pursue different, non-aligned goals, firms seek to improve their profitability and to generate turnover and benefits, while users seek the pleasure of using the product, of exchanging and sharing ideas, as well as of being involved in product innovation, with the chance of achieving recognition for their efforts. Developing innovation in partnership with a user community involves attracting users' attention and cultivating and motivating them with relational systems adapted to each user category, and first and foremost, aiming at establishing relations with those who have the highest levels of innovativeness and creativity and interest in and knowledge of the product (thus, effectively, lead-users).

2.4. Governance and leadership

O'Mahony and Ferraro [27] examine how a social group designed a shared basis of authority and thus, a governance system, and detail how the system introduced formal authority and leadership into 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’ behaviors which align individual actions and collective activities for coordination and cooperation [28]. Assessing a large online community of software developers, Stewart and Gosain [29] show that community members tend to evaluate each other's reputation and status according to publicly available social references. Burger-Helmchen and Cohendet emphasize the different roles of users within their

communities and how each role is enacted at any moment. Community governance mechanisms may be based on implicit or on more explicit hierarchies [30]. In many ways, although community boundaries may remain fuzzy, community governance depends on similar mechanisms to those operating in firms. Community leaders play central roles, motivating members to participate, and become 'heroes' with whom community members identify; their roles are based more on animation than on hierarchical control: status and skill recognition are central. When individual members are sponsored by companies, they are more likely to develop quality relationships with others and thus gain more important roles in their communities [31], so sponsoring the more active members of a community seems a good strategy for a firm seeking to harness that community's energy and make it a complementary asset. But the degree of alignment between firm and community interests is also important – too much alignment increases similarities and can kill off the community's creativity, but complete decoupling will not support effective interactions. Two levels of alignment have to be managed: community members' alignment with the product or game, and the alignment of firm and community objectives.

2.5. Information and events

Community leaders are central to the life of communities: they manage and animate them by setting new challenges and promoting information exchange, and usually play a wide variety of roles – as experts, animators, testers and as advisors. The circulation of information is a key element in how communities function, creating and fostering community feeling, sharing news and technical information, and promoting the status of community members. At the same time, the activities of searching for problems and developing new functionalities also have an important impact on the value of communities' contribution to product development [12]. Organizing events is another important factor in keeping communities lively – for virtual communities these are usually on-line events, but some also run actual physical meetings, such as the Nadeo community's worldwide competition. These gatherings help structure the life of the community, giving members the opportunity to meet leaders personally and to be recognized as members, to validate their status and to meet and gain the recognition of fellow members. Such events (competitions, beta tests, evaluations, and thematic events) enable heterogeneous users to become involved as early as possible in the community's innovation activities, encouraging the development and diffusion of innovation throughout the community [32]. Firms can channel participation through supporting community events, helping leaders to organize them, and so encourage innovation activities and community development. Such interactions help evolve and refine the boundaries between firms and their communities. Virtual interactions reinforce participation in events and the development of ideas, and their heterogeneous membership means online communities can stimulate more 'out of the box' ideas and innovations that are likely to arise from within firms, where developers tend to be over-conscious of existing concepts and solutions.

The intensive use of internet and the introduction of Web 2.0 logics have profoundly changed innovation models. The online user community innovation model emphasizes the central role of community, which blurs the boundaries of organization, and requires additional understanding of what communities are, how they work and how they interact with firms.

Table 1 sums up the characteristics of lead users and on-line user community models as loci of innovation. To study the management of innovation in user communities, i.e. the articulation between firms and user communities to achieve innovation, and compare the mobilization of lead users and the co-development with user communities, we analyze the innovation processes in four firm/user community couples. We focus our attention on firm/community relation, creation and communication tools and community events that encourage members to contribute to the innovation process and to the vitality of the community, and also consider the question of how firms orchestrate their user communities' innovation efforts.

3. Methodology

3.1. Research design

The paper focuses on digital creative industries and aims to understand the interplay between online user communities and firms, to describe the user community innovation process and thus understand how firms manage, and benefit from innovation in collaborating with user communities. We used a multiple case research design [33] to examine the interactions between firms and their user communities via four case studies: comparing two direct case studies (Trackmania and Freebox) with two that have been well documented in the literature (Propellerhead and MySQL). Our research focuses on two units of analysis: the innovation processes and the organization of firms and user communities. Case study selection was based on theoretical criteria – the ways in which firms established their connections with their user communities, and the size of those communities – and we selected cases addressing two distinct ways in which user communities are hosted by firms: in three cases, the communities were at least partially hosted by the firm and one was independent of the company. The relational mechanisms between the companies and the communities also took a variety of forms: forums and toolkits supplemented content creation in the Trackmania case; MySQL employed forums and open source development tools; Propellerhead drew on a forum and partial toolkits; and Freebox used forums, a setting and open-source software tools. Our four selected firms operated in different activity sectors – three in software sectors (in video games, music and in databases) and one (Freebox) in the telecommunications sector: all provided support for user/creators to design new games, to create music or to disseminate creative products or updates. Table 2 characterizes our sample cases.

3.2. Data collection

Our data collection strategy focused on tracking the co-creation activities between firms and user communities,

Table 1

Characteristics of lead users and online user communities as loci of innovation.

	Lead user as a source of innovation	Online user communities as a locus of innovation
Who?	Individual users who have advanced requirements and who benefit from their satisfaction	Interplay between developers within firms and users within communities
Who manages the innovation process?	The firm manages the innovation process and tests new products or services with lead users.	User's community is pulling innovation and acting to modify objects.
Alignment	The firm accommodates users' needs.	Users and developers are pursuing different goals. Their temporary alignment is embodied in products.
Boundaries	Clear boundaries of the firm which manages the innovation process	Fluid boundaries between firms and communities. Boundaries are evolving.
What is managing innovation?	The management of innovation is the management of projects which may source ideas within user community.	Management of community interactions, with partial release of on-going products
Risks	Choosing irrelevant lead users	Problem of strategic alignment between firm and community

which we define as those in which the users contribute – directly or indirectly – to innovation processes: they may range from debate in a forum with users about idea of product improvement to direct product development by users. In the cases of Trackmania and Freebox, we carried out 24 semi-structured interviews with community entrepreneurs. For the former, we focused on the most active individuals in the general forum – managers of the most well-known sites, developers and the director of Nadeo; for the latter, we interviewed the developers and managers of the most recognized sites. We supplemented these interviews with documentary research on the community sites and in the specialist press. The data was collected over a period of three years with a historical restitution for the pre-data collection period. For case studies based on the literature, we used the research articles describing these cases, as a basis: three articles and a thesis in the case of MySQL [1,5,31] and two articles about Propellerhead [17,34]. The richness of this case material allowed us to access information about the user/firm relationships, the mechanisms

firms used to involve users in the innovation process, and the systems they used to manage that involvement. The management science literature provided a rich source of secondary data (such as Weick's article on the collapse of sense making in organizations based on an account of the 1949 Mann Gulch forest fire disaster [35]), and we supplemented this data from documentary research on blogs and websites (videos, interviews, and articles), company websites and community forums. We used these data to write chronological case histories for each firm which identified their co-creation activities with their communities.

3.3. Analysis

For Trackmania and Freebox, we used a coding method with a theoretical objective [36] to analyze data, supported by Altas.ti software, and triangulated all the facts and arguments identified during our data collection via analyses of the community forums. The theoretical objective coding method involved categorizing and interpreting the qualitative data,

Table 2

Case characteristics and data.

	Trackmania	Propellerhead	MySQL	Freebox
Activity of firm	Video game	Music software	Database software	Internet box
Community size	Forum in web site of the publisher and hundreds of web sites of players for discussion and exchange of content 34,000 members registered in the official forum in 2008.	Web site of the publisher and a hundred sites for user discussion and exchange of content 3850 members (see [17])	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 members at 23,000.	A dozen web site users In 2008, it was one of the top 5 sites, with 200,000 members registered in the forums.
Device	Forums, user toolkit, and site for sharing of content	Forums, user toolkit, and site for sharing of content	Forums, open source language, and code-sharing site	Forums, open source software, news site, and 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 of "guide" of the community	Administrators of sites and forums of the most visited sites in the communities
Internal sources	16 interviews, at 134 pages			8 interviews, at 115 pages
External sources	34,000 posts 14 interviews on blogs and information websites 2 videos	Two research papers 77,000 posts Storing contribution to Rebirth software on the dedicated web site, and Rebirth museum	Three research papers and one thesis 230,000 posts Ten interviews in websites	200,000 posts Ten interviews in websites
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

with the first order analysis categories based on our theoretical framework. We coded the linkages between firms and communities (forum activities, and meetings inside and outside the firm), users' contribution to the innovation process (creation of content, of new functionality, of new tools and ideas, appearance of new uses, beta tests, bug descriptions, and evolutions of product and services) and the life of community (creation of websites, events, leaders' appearance, clashes and disputes), and then compiled this information into chronological case studies focused on co-created innovative activities. Tables 3, 4 and 5 display what the different cases under review have in common and where they differ. All the cases follow the same innovation process framework, which is structured in three phases: design (identification of problem, idea generation, idea selection, and development of new concepts), production (R&D, development of product and service, and creation of content), and post-production (product and service diffusion and further improvement). These phases are not always linear in creative industries: when a user creates content for a product diffused via the internet, the product/service may be in post-production, but the user may continue to participate in its development by producing content for it. Next, we analyzed our chronological cases to find theoretical constructs, interactions and emerging patterns of relationships and activities within each case, and then sought to match those patterns across to other cases to develop more robust theoretical concepts. Finally, we looked for similarities and differences between the innovation processes in each case to discover which processes and

activities facilitated innovation in user communities – these are reported at the bottom of each table. The following section illustrates the history of the four user communities and their members' involvement in innovation processes.

4. The case studies

4.1. Trackmania

Founded in 1999, Nadeo is a small video games producer which was acquired by the video games editor Ubisoft in 2009. Nadeo develops and edits the Trackmania on-line series of car races; the game includes a toolkit which enables players to create content – circuits, cars, video, and mini web sites – as well as activities: races within a network, local forums and instant messages. By 2009, the Trackmania forums had registered 34,000 members who exchanged 450,000 messages, and its players had created more than 150,000 circuits in 3 years, launched dozens of competitions, and produced thousands of videos. Trackmania's site directory lists over 400 sites for players, of which some – TM Exchange, Car Park and TM Lignes – have become very popular. Players group together in teams to participate in competitions, share out tasks between creators, managers and competitors to manage the race servers, create their own types of cars, and plan training sessions. Trackmania's CEO and his collaborators participate regularly in the user community's general forum, and the company supports the players' competitions and has encouraged a large new community web site – financing its hosting, supplying technical support,

Table 3
Opening firm boundaries.

Activities	Conversing with users	Sharing tasks	Sharing knowledge	Results
Definition	Communicating with users through the 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, and ideas of new functions and products	Externalization of the development: codes, functions and identification of bugs Production	Collective training on the use of the product Identification and problem solving Post-production	
Phase	Design			
Plan of action	Discussion forum and face to face meetings	Development platform; free access to code source	Mutual aid forum	
Trackmania	Propositions by the players for improving the game (scores, circuit exchanges, and 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 4

Opening products/services for co-creation.

Activities or systems	Taking new usages into account	Supporting users' creation	Supporting community	Results
Definition	Designing 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	Organization of events for the community and a status attributed to the largest users	Development of a community's creative content and events
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	Integrating user contributions directly into the product and service
Phase	Design	Production	Post-production	
Plan of Action	Discussion forum User tool box for innovation	User tool box for innovation Development management platform	Forum, demo tour, competitions, and contests	
Trackmania	Decision to add listings and tools for direct sharing of the game circuits	Tool kit in the game to create content and organize activities: cars and circuits	Organization of events: World Cup video game, and LAN party Tool kit in the game to organize activities	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	Designation of a moderator Training, demo tour, and development contests	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	Designation of a moderator Demo tour, and creation contest	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	Designation of a champion Financial support of the associations and community internet sites	Creation of thousands of videos and hundreds of mini sites circulated by Freebox

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 published versions of the game, including automatic management of graphic resources, exchange of

circuits, and access to players' mini sites. Observing the players' creation and behavior has allowed Nadeo to encourage the game's evolution by including news about community and regional player rankings, and offering more diversified graphical worlds: so the community has now become an inseparable

Table 5

Identity convergence around products and services.

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 a part of the product and service, or a low price is maintained over a long period	Development of a company friendly community
Outcomes	Common identity	Justification of the contribution of users	Attractiveness of the product	
Phase	All phases	All phases	All phases	
Plan of action	Company history Logos Name of the domain Language elements	Post for the forum Interviews with company managers Meetings with the community leaders	Open source, and limited free version	
Trackmania	Circulation of colors 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 favorable to the company
MySQL	Circulation of colors and the MySQL logo on the community sites	Founding of the company by the community leaders	Double license: free for individuals, and with charge for companies for business use	Development of a community that is very favorable to the company, except since the takeover by Sun, then Oracle
Propellerhead	Circulation of colors 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 favorable to the company
Freebox	Circulation of colors 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 favorable for the company

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 players to have direct access to the community's different forums. The players see Nadeo not just 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 distributing several complete versions of the games for free, and has continued these practices since being acquired by Ubisoft.

4.2. Freebox

Iliad, founded in 2002, was the first broadband internet operator to market a triple play access package¹ based on the innovative Freebox modem, which can enable users to configure specific services, set their machines up in a network, produce original multimedia configurations, edit telesites,² and broadcast their videos on TVperso. The Freebox community is made up of about a hundred web sites directly managed by community members, via which they exchange technical information ideas and advice. As soon as operations started and communities emerged, Iliad established numerous connections with them, 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 most quickly developing sites, and Iliad now organizes regular meetings between its CEO and managers of the largest community sites. Iliad gives financial aid to Freenews (55,000 registered members, and 600,000 forum messages in 2010) and hosts its servers for free, as well as those of the ADUF³ (74,000 members, and 600,000 messages) and Freeplayer (40,000 members, and 57,600 messages), and provides technical and administrative aid to UniversFreebox.com (12,000 registered members, and 70,000 messages), a user association that attracts foreign television channels to become part of Freebox's TV package. The community also produces service ideas via its forum discussions or during regular meetings with the site managers, and has inspired some of the innovations that have been progressively integrated into successive Freebox versions: Wi-Fi, TNT tuner, multicast video, digital video recorder, TVperso and Freeplayer. As with Trackmania, the community's identity is part of the Freebox image: the main user sites' names begin with the radical free (thus using it as a brand), and show a Freebox on their first page. Iliad is considered one of the most innovative service providers on the internet, and as marketing the best offer in terms of quality/price. Iliad has held the Freebox price the same for 6 years, and its CEO regularly defends the interests of the 'Freenauts' against those of Iliad's share holders, which has strengthened community members' loyalties, even though Iliad's own web sites do not promote its communities' sites.

¹ The package combines internet, telephone and television services, all operated from the same box.

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

³ ADUF is a not for profit association which manages the linkages between Free and its users and communities.

4.3. Propellerhead

Founded in the 1994, Propellerhead is a computer-assisted music software editing package which offers users 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 currently markets the virtual studio Reason which includes a sound library to support users' composition efforts; Record for recording and mixing inputs from musical instruments; and Recycle for creating sound loops. After its original Rebirth application was hacked by its users, Propellerhead opened up part of its code and supplied tools for modifying the sound bank and its interfaces, and its musician users have subsequently made hundreds of modifications (called Refills) which together now constitute an original music creation system which features an associated sound bank and graphic resources. Propellerhead regularly makes bundle offers available via community-created Refill 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 on such sites. In all, the user 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, give each other advice and encouragement (via text or video) on how to use the software, propose ideas for its further evolution and organize composition competitions. Propellerhead employees interact regularly with their user communities about software evolution and development problems via their forums, which give the most experienced users the chance to propose ideas and solutions to the company's software developers, and meet members face to face during Propellerhead tours, a cross between software demos and group music performances. Propellerhead has integrated the most innovative user 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 intertwined: the company provides clear links from its website to those of its community sites, and has even created a 'museum' site dedicated to its original synthesizer Rebirth, which ceased in marketing in 2010⁴.

4.4. MySQL

MySQL created proprietary software for managing relational data bases, which – together with its associated programming language PHP – is 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 two different licenses, depending on how it is used: the GPL license (for non-commercial applications) is free, and there is also a proprietary license for commercial applications. MySQL was created by three members of the open source community who had contributed most actively to its development, and its community is made up of

⁴ This software was reedited in 2011 for the Ipad tablet.

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 promoting and following up developments. At the community level, MySQL appealed above all to users with development skills, and those who were most active in writing codes, contributing to forums and conferences, and sending instant messages every year were designated as 'guides' and their names posted on the official site. These developers proposed and wrote new functions for MySQL, depending on their needs, and others emerged during community discussions, with MySQL controlling and certifying the code developed by the community. Company employees have been strongly involved in forum discussions, and organized regular training sessions and demo tours to meet developers and promote MySQL applications. Again, the community is an integral part of the identity of MySQL and its site uses the same graphic identity as the firm's web site. Sun retained the GPL license after buying the company in 2008, although the company's founders and main developers left the firm.

The four cases highlight the interrelationships with different communities. They all emphasize an original route of co-creation along the three phases of innovation development (design, production and post-production): online user community innovation.

The research design, based on two original case studies and two secondary case studies has of course limitations. First of all, it focuses only on video games while digital creative industries are larger than just games. Second, the paper deals with a limited number of cases. However, the main focus remains on digitalization, which is common to all the sub-sectors of the digitally creative. In addition, in the discussion, the generalization is mainly based on the mechanisms rather than dedicated empirical results.

5. Results

The mechanics of innovation in collaboration with online user communities differ from lead user patterns, in terms of how the firm manages not just its own innovation processes, but also its relationship with its communities and the degree to which it monitors the whole innovation process beyond its boundaries, the co-creation process, the respective contributions of firm and community, and finally the identities of the two entities.

Our data analysis identified a long list of items related to the management of innovation when user communities are involved. The transformation of innovation management is characterized by three elements: permeability of firm boundaries; opening of products and services to community input and reducing or reorganizing intellectual property rights; and reshaping organizational and product identities. Firms open their boundaries to involve users in the innovation process, open their product and service boundaries to foster and develop their users' creative abilities and integrate their contributions directly into the firms' development efforts, and open their identity boundaries to build common identities with their communities around the product/service and to promote themselves as community-friendly companies. All

these processes allow the companies to benefit from their user's contributions throughout the innovation process.

5.1. Opening firm boundaries

Opening company boundaries consist of setting up 'cross-over' points in those boundaries to establish direct links with users so as to involve them in the innovation process. Our data (summarized in Table 3) shows that firms use three activities to open their boundaries: conversing with users; sharing tasks; and sharing knowledge.

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 ('doors') [37,38] – such as discussion areas – for exchanging opinions and ideas and for giving advice on the products or services. By this means, the firm engages in conversations with users. These conversations commonly take the place in internet forums where users and employees can discuss products and services and the problems users encounter, as well as community events, and the exchange of tutorials and advice between users are seen as part of the firm's after-sales service. Analyzing these forums – usually situated on the company web site (Trackmania, MySQL, and 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 where forthcoming products can be presented and ideas for improvements and innovations discussed (Freebox, and Trackmania). This is an important phase, in which the company can reshape and adapt its product design, although such interactions are not completely original and replicate how the company sources and develops knowledge and ideas within its internal environment. In this framework, users do not participate directly in the production process, but act as a source of ideas and play a 'tester' role [2].

Opening boundaries in this way also involves opening production, by making development follow-ups (MySQL), beta version tests (Propellerhead, and Trackmania) or information about bugs (Freebox) available to platform users. Community users and firm developers interact to share tasks, and the integration of community users into the firm innovation processes facilitates exchanges between the two types of organizations. Companies (e.g., Trackmania) may recruit leaders to moderate company/community exchanges, and these actors act as gatekeepers, while the boundaries between community and firm are maintained. In some cases (e.g., MySQL) it is community leaders themselves who set up the firms. However, if the firm's existing boundaries are too strong, and their objectives too different from those of users, the firm may lose contact with its community and so fail to recruit community members, or to take advantage of their innovation potential. But when firm boundaries are highly permeable, information circulation between users and firm developers is fluid, the innovation process is opened, and the firm manages the relationship with its users, integrating heterogeneous direct contributions from users who are not part of the firm, so that the firms and user communities share knowledge. At this stage, the firm mainly interacts with those community users and actors who propose innovations. Sharing communication platforms is

a way for firms to address community members and to animate the community through the organization of recurring events, beta testing products and prototypes. Boundaries with online communities become even more permeable where members' presence is digital: firm developers can be at work but at the same time remain connected as community members – users can play and develop simultaneously. Firm creators and developers have often been players, users and active members of communities. What is new with digitization of interactions is that they are playing the two roles simultaneously, involved in the company and in user communities at the same time. Online communities enhance the fluidity of user/developer interactions, leading to greater alignment between firm and community objectives and challenging the separation of identities. They have multiple concurrent identities, with instant micro-role transition which is invisible from the outside [15,39,40]. While openness and fluidity between firms and communities can lead to the convergence of both objectives and identities, diversity is still needed to stimulate creativity and to propose new usages.

5.2. Opening product and service boundaries, and sharing ownership

Managing co-creation involves firms opening their 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, so that they can help transform the firm's products, software and services to provide it with enhanced versions to sell in the market. Our analysis indicates that firms use three activities to open their product and service boundaries: supporting users' creativity; taking new uses into account; and supporting communities. Table 4 summarizes our data.

The firm may open its products just to user communities or to outside contributors in general, and such 'opening-up' may be via offering open source licenses, or it may promote community interactions by providing users with toolkits with which they can create content and set up events within or around the product or service. Such toolkits allow community members to involve themselves in the creative process of developing innovations, and firms use them to promote and 'harvest' user innovations [41,42]; to organize competitions of ideas [43,44]; to design new products in collaboration with users [45]; to gain user-created content directly [17]; or to adapt products to meet particular needs as expressed by their users [46,47]. The firm supports creation by users by making new tools available. Innovation within and in collaboration with user communities extends this logic to allow community members to participate directly in the design and development of products or services. When firms provide their user communities with tools for community animation, the firm is acknowledging and paying tribute to how much it benefits from their members' expertise and creativity. The difference of objectives between the firm and the community remain clear – when a community modifies products directly or is deeply involved in the development process, benefits are shared according to the respective objectives of the firms (turnover and profits) and the community (better adapted products or services).

Firms open their product design to user communities during the development process, but users can also be involved in the production and post-production processes, by contributing innovative content (Trackmania, and Propellerhead), and by developing product functionalities (MySQL, and Freebox). Analyzing users' creations can help a company identify new modes of use and new needs, and introduce new functions into upcoming versions to meet them (Trackmania and Propellerhead). Users propose new uses of existing products as part of their input into developing new product versions. The creative dimension in creative industries is twofold: technological creation (adapting existing products or games) and artistic creation (proposing new scenarios, new environments, and new ways to play games, or use products). Online communities can use web 2.0 logic to amend products, so that they are never completely stable, and the continuous implementation of add-ons changes and extends product usage. As products are held on-line, and can be adapted and modified by users, the boundaries between production and post-production become fuzzy, leading to continuous product renewal and continuous flexibility of firm/community boundaries.

Firms and communities also interact on the community animation side, which involves organizing community events connected with the product or service – such as international competitions, (Trackmania), demonstration tours (Propellerhead), or training (MySQL) – to attract new members, to stimulate and recognize members' status and encourage them to create new content. In such ways, the company supports the community. Event organizing tools can also be integrated into the same toolkits community members use to create innovations (e.g., Trackmania). The quality of members' contribution can be directly and automatically verified by the toolkit (Nadeo), or their efforts can be validated after being uploaded onto the company's site. (MySQL and Propellerhead). Users' status can be recognized and increased through such designations as community leaders (Freebox) or 'best contributors' (MySQL), or by company developers acting as forum moderators (Trackmania, Propellerhead, and MySQL). 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 elements created by other players from within the game itself. The firm and the community share ownership of the community-improved product, but the rewards differ: they are mostly monetary for the firm and mostly symbolic for the community (recognition, premium access, etc.). Thus firms partially share the intellectual properties of component of the product, but not its appropriation. Community members may benefit from privileges and recognition but their main rewards are usually not monetary. The support of the community provided by the firm is not only a way to stimulate innovation but also to orchestrate the community to keep the monetary appropriation of returns possible, as the community values other sorts of returns more.

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

The community and the firm are two separate entities – although 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 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 manage identity issues: sharing identifying elements; building common values; and sharing values. Table 5 summarizes our data on identity boundaries.

User communities and firms have separate identities based on rituals, events, and images, and projects on which the two collaborate will also have their distinct identities, perhaps expressed in graphics and logos – these are often shared between firm and community, even if their separate identities remain different. But the two sides work together, so that there is a considerable amount of identity cross-over – thus the firm and the community share identifying elements. Firm websites support virtual communities' identities (Propellerhead, Trackmania and MySQL): community and company domain names often have common elements – 'tm' for Trackmania and 'Free' for Freebox – and companies can share their domain names with their community, e.g., 'freepayer.org' for the Freebox community site. The most active community internet sites can also be linked directly to company web sites (Propellerhead, and Trackmania), even from within the product, as in the Trackmania game's 'Manialink' function. Compared with these cases, the Freebox community is not integrated into its company's identity, although Iliad plays on its community's image in its advertising material, which systematically features one 'geek' who is more astute than others.

Interactions between company and communities foster a sense of common values. Discussions in forums or interviews on community sites contribute to the convergence of values and shared objectives between firms and communities. These values are reinforced when members belong to both, when a company recruits community leaders to manage relations between the two entities (Trackmania), or when it is actually created by members of a pre-existing community (MySQL).

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, Propellerhead and MySQL are not considered as purely commercial firms: passions for games, music and software development are shared between employees and community members, and company founders and employees are considered – and in many cases actually are – real user community members. From the company's perspective, its task is to develop and market the best possible games, the most useful music software or the most efficient database system, at the lowest possible cost. The community's specific objectives are the ability to play, to create and to share with others – respecting those objectives is important if firms wish to maintain their community members' interest in collaborating.

The common identity is stronger in the Trackmania and MySQL cases, and these firms have adopted economic models that are partially cost free to preserve and strengthen this common identity. Trackmania regularly offers free add-ons and new game versions, while MySQL's double license system means the software is free to individual users anyway. In situations where commercial market moves have led the commercial model to supplant the free model, the respective identities of the firm and the community become clearer and may even compete against each other. The acquisition of

MySQL by Sun, and then by Oracle, provoked the departure of the founders, and led the community persistently to question Oracle's intentions. Iliad's attempt to charge for upgrading its Freebox device 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 converging identities. But, beyond their differences, they recognize themselves as part of the same wider 'family' of shared values, whose identities become incorporated in the product(s). One of the key results is to split the ideas of identity and where it is embodied: the convergence of firm and community identities can lead to homogeneity of attitude towards the product/service, which will eventually reduce creativity, and (in the mid-term) risks weakening the community's 'pull' role. Where identity is embodied in the product, firm and communities add different elements to that identity, leading to better diffusion, but keeping firm and community identities separated.

As digitization proceeds, the user community can become the new locus of innovation in the creative industries, blurring the distinction between production and post-production. Users are involved in developing products which are only stable for short periods before they are further refreshed: firms benefit from users' involvement to adapt their platforms to give them wider market appeal, and communities benefit as the product serves their needs more accurately. This continuum between creation, production and post-production allows communities and firm to keep their own identities and at the same time to collaborate in the on-going product use and utility dimensions.

6. Discussion

While networks were the locus of innovation for science based industries [48], online user communities are becoming the locus of innovation in the digital creative industries, where creativity can be a bottleneck in the innovation process. Fluidity of interactions and fuzzy boundaries between production and post-production are the characteristics of a new model of innovation in such contexts. We have examined four 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 their boundaries and in managing co-innovation on the one hand and monitoring and orchestrating user communities on the other.

6.1. Managing the innovation process within the firm

The firm remains central in orchestrating communities as loci of innovation. Managing the innovation process involves both managing the firm's internal processes and opening them up to build on contributions from online user communities. Decisions need to be made at different levels: the first is for the firm to open up its development process, as co-innovation with a user community involves opening the company's boundaries, its products and services, and its identity to facilitate that innovation. But a firm opening its innovation process risks losing control of it, so decisions have to be made about the appropriate degree of openness. Dahlander and Gann argue that the more open firms are in revealing their processes, the greater the community's contribution can be. Opening the

innovation process implies that the firm loses the control on the development process, on the direction where the product goes and on the product life cycle. As it is risky, such opening will always remain partial, and how firm/community links are managed differs according to the companies and their situations [49].

The second decision is to identify which elements are to be opened and which should remain purely internal. For example, whether the source code of software is open (so the product is completely customizable) or remains closed, but the product/service is open to user contributions, with some kind of communication channel established via which users can give feedback which developers can use in creating new offerings. Nadeo has only opened up the content area of its software – the game code remains its property. The company has institutionalized its relationship and interactions with its community via the Trackmania toolkit, which ensures that connections between the two are partly automated. Propellerhead has only partly opened up the content dimension-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 – only a few settings are accessible to community developers. So (to different extents) all these firms have limited the amount of their openness so as to keep control of their innovation processes, and in certain cases, to retain their control over their intellectual property. But opening the product alone is not enough to reap the full rewards of co-innovations with users – the innovation process must be opened too, as well as the company's boundaries and identity.

The last decision is how to appropriate and share the benefits of co-innovation, which may or may not be monetary. Firms and user communities are not after the same objectives: their definitions of value will differ, and the firm must understand what is specifically valuable to user communities, which may take the form of symbolic rewards, improved tools for managing the community or for playing/using/modifying the product, etc. When the firm considers offering its community only monetary rewards, it may disappoint the community members who are expecting recognition and rewards such as individual service or premium access, additional access for the community members, discount or monetary rewards (cf. Apple apps model), or additional pleasure to play upgraded games, etc. Improved tools support to organize events and activities are also important rewards for community members who value both individual symbolic recognition and community recognition.

The appropriation of the returns may include a symbolic dimension related to the identity of the product. Is the co-developed product only associated with the firm or is it also attributed to the user community – in which how is its contribution recognized? Blurring the boundaries between different development stages (production and post-production) reinforces the converging identity between user communities and firms, but some level of distinction between the two will be required to avoid over-convergence.

The digitization and virtualization of interactions between creative industry firms and their communities give their relationship greater fluidity, and have radically changed how innovation is managed within such firms, so it is no longer about the simple launch of a new product, but has become

about firms co-developing on-going products with their user communities.

6.2. Orchestrating the community

Achieving innovation with user communities requires the firm to balance opening up its innovation and development processes – but at the same time giving up some level of control over those processes – and maybe even of part of their returns – against the value involving their user communities in co-innovation can create. The temptation for companies is to try to combine monitoring and value creation by directly controlling their communities' activities, but such actions can provoke conflicts with their members [50]. Effectively, such control means integrating the community within the firm, but Danneels has shown that 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 by reducing diversity and external sources of innovation [51]. So companies more frequently adopt the role of orchestrating their communities' activities, which avoids this problem and respects the specific identities of each player, and tries to ensure that they continue to collaborate fruitfully, each contributing their own expertise. Thus, to maintain both parties' freedom of action, the firm has to manage a combination of strong and weak ties. When a company adopts an identity that is partially shared with its community, its degree of freedom is reduced, as it has to negotiate each evolution of its strategy with the community. 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 community members, explaining and justifying the choices it makes to them.

The firm may organize the co-existence between convergence of values and differentiation of identities by reinforcing product identity and image, in which of both the community and the firm. Blurring the boundary between production and post-production reinforces the role of product identity – so that it is no longer identified as a 'finished' item, but as an on-going product resulting from co-innovation between the firm and the community, which incorporates part of their respective values and objectives. This enables each side to keep its own identity, but also limits the degree of freedom of the firm. (A good example is the reaction of the Free community when Free tried to raise its prices – a policy it quickly reversed in the face of community opposition.) The notion of the 'on-going product' represents a boundary object which incorporates the identities of the co-developers [51].

In the long-term, firm/community relationships have a tendency to become institutionalized: events and meetings reoccur, and common identities becomes 'locked', reducing its development possibilities. In three of our cases (Trackmania, Propellerhead and MySQL), the communities are partly hosted by the firms, reinforcing the institutionalization of such connections. In the case of Freebox, the relationship is more distant and interactions remain limited but are still highly institutionalized – meetings with users and demo tours are regular events – and the firm meets community leaders on its premises. The community expects the firm will seek its advice before launching new software or hardware, and community

forums will include discussions on their evolution, as the community has privileged access to relevant company information and its members test 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, to limit potential changes on the product, 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 affects the product life cycle: the product is constantly evolving, and has remained as a beta version for a long time – there have been 7 versions of Trackmania over 8 years, but without the game reaching its final phase. Freebox functionalities have also 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, involving an active community in the innovation process has allowed MySQL to continuously renew its product/service offer and maintain its innovativeness over a long period, so its database software is constantly being enhanced with new functions. 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, sometimes extending their target market.

7. Conclusion

We have argued that online communities of users are the new locus of innovation in digital creative industries, and that firms involved in this style of co-innovation must develop specific and strong ties with user communities to capture their innovative contributions. Co-innovation with communities requires companies to open up their boundaries, products and services, and company identities, and to successfully manage the relationships between firm and community; their users' contributions and their respective identities. Our results show that, to increase the capacity for innovation, the collaboration must be established within both organizations, and across all functions and types 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.

Involving whole user communities in the innovation process also renews and complements the 'lead user' concept, as defined by von Hippel. Methods for detecting isolated lead users are expensive, and they may only be sporadically involved in innovation [53]. When the firm co-innovates with online user community the question is no longer about identifying lead users, but how to manage interrelations with the community, to orchestrate and to find ways to maintain and to benefit from heterogeneity between the firm and the community in terms of co-innovation. We argue that innovating with online user communities based on fluid interrelations changes what the firm considers as 'its' product or service. When users are involved, when user communities innovate and are able to adapt the product and

its possible uses, the firm must accept the notion of marketing 'on-going' products or services that can be specified or modified by users. Innovating in collaboration with users implies that firms no longer fully control product/service development, at the same time being connected to user communities means they know their users better. The firm does not just launch new products without taking user community input into account. As the boundaries between production and post-production are blurred, the firm can control neither the community – which requires independence to be lively – nor product development, which is on-going. Thus the management of innovation evolves from control of users/partners and products to orchestration of communities of users who are co-developing the product.

Further research should study the differences between digital creative industries and other industrial sectors. Additional studies should also attempt to find the way to manage innovation with several user communities and attempt to identify hindrances to this type of innovation process.

References

- [1] L. Dahlander, M. Magnusson, How do firms make use of open source communities? *Long Range Plann.* 41 (2008) 629–649.
- [2] T. Burger-Helmchen, P. Cohendet, User community and social software in the video game industry, *Long Range Plann.* 44 (2012) 317–343.
- [3] S. Faraj, S.L. Jarvenpaa, A. Majchrzak, Knowledge collaboration in online communities, *Organ. Sci.* 22 (2011) 1224–1239.
- [4] S.L. Jarvenpaa, K.R. Lang, Boundary management in online communities: case studies of the nine inch nails and ccMixter music remix sites, *Long Range Plann.* 44 (2011) 440–457.
- [5] L. Dahlander, M.G. Magnusson, Relationships between open source software companies and communities: observations from Nordic firms, *Res. Policy* 34 (2005) 481.
- [6] C. Dhanaraj, A. Parkhe, Orchestrating innovation networks, *Acad. Manage. Rev.* 31 (2006) 659–669.
- [7] L.B. Jeppesen, K. Laursen, The role of lead users in knowledge sharing, *Res. Policy* 38 (2009) 1582–1589.
- [8] G. Schreyogg, J. Sydow, Organizing for fluidity? Dilemmas of new organizational forms, *Organ. Sci.* 21 (2010) 1251–1262.
- [9] E. Von Hippel, Lead users: a source of novel product concepts, *Manag. Sci.* 32 (1986) 791.
- [10] G.L. Lilien, P.D. Morrison, K. Searls, M. Sonnack, E. Von Hippel, Performance assessment of the lead user idea-generation process for new product development, *Manag. Sci.* 48 (2002) 1042.
- [11] C. Lüthje, Characteristics of innovating users in a consumer goods field: an empirical study of sport-related product consumers, *Technovation* 24 (2004) 683.
- [12] D. Mahr, A. Lievens, Virtual lead user communities: drivers of knowledge creation for innovation, *Res. Policy* 41 (2012) 167–177.
- [13] D.A. Pitta, D. Fowler, Online consumer communities and their value to new product developers, *J. Brand Prod. Manag.* 14 (2005) 283–291.
- [14] J. Battilana, S. Dorado, Building sustainable hybrid organizations: the case of commercial microfinance organizations, *Acad. Manage. J.* 6 (2010) 1419–1440.
- [15] N. Battard, V. Mangematin, Idiosyncratic distances: practices around mobile technologies, *Technol. Forecast. Soc. Chang.* 80 (2013) 231–242.
- [16] C. Sundaramurthy, G.E. Kreiner, Governing by managing identity boundaries: the case of family business, *Enterp. Theory Pract.* (May 2008) 415–436.
- [17] L.B. Jeppesen, L. Frederiksen, Why do users contribute to firm-hosted user communities? The case of computer-controlled music instruments, *Organ. Sci.* 17 (2006) 45–63.
- [18] G. Hertel, S. Niedner, S. Herrmann, Motivation of software developers in open source projects: an internet-based survey of contributors to the Linux kernel, *Res. Policy* 32 (2003) 1159–1177.
- [19] E. Raymond, *The Cathedral and the Bazaar*, 1998.
- [20] C. Lüthje, C. Herstatt, The lead user method: an outline of empirical findings and issues for future research, *R&D Manag.* 34 (2004) 553.
- [21] C. Lüthje, C. Herstatt, E. Von Hippel, User-innovators and "local" information: the case of mountain biking, *Res. Policy* 34 (2005) 951–965.

- [22] N. Franke, S. Shah, How communities support innovative activities: an exploration of assistance and sharing among end-users, *Res. Policy* 32 (2003) 157–178.
- [23] N. Franke, E. von Hippel, M. Schreier, Finding commercially attractive user innovations: a test of lead-user theory, *J. Prod. Innov. Manag.* 23 (2006) 301–315.
- [24] M. Osterloh, S. Rota, Open source software development: just another case of collective invention? *Res. Policy* 36 (2007) 157–171.
- [25] J. Lerner, J. Tirole, Some simple economics of open source, *J. Ind. Econ.* 50 (2002) 197.
- [26] C. Wiertz, K. de Ruyter, Beyond the call of duty: why customers contribute to firm-hosted commercial online communities, *Organ. Stud.* 28 (2007) 347–376, (01708406).
- [27] S.N. O'Mahony, F. Ferraro, The emergence of governance in an open source community, *Acad. Manage. J.* 50 (2007) 1079–1106.
- [28] A. Hemetsberger, C. Reinhardt, Collective development in open-source communities: an activity theoretical perspective on successful online collaboration, *Organ. Stud.* 30 (2009) 987–1008, (01708406).
- [29] K.J. Stewart, S. Gosain, The impact of ideology on effectiveness in open-source software development teams, *MIS Q.* 30 (2006) 291–314.
- [30] E. Raymond, *The Magic Cauldron*, 1999.
- [31] L. Dahlander, *Managing beyond firm boundaries: leveraging user innovation networks*, Department of Technology Management and Economics, Chalmers University of Technology, Gothenburg, 2006, p. 177.
- [32] C. Hiennerth, P. Keinz, C. Lettl, Exploring the nature and implementation process of user-centric business models, *Long Range Plann.* 44 (2011) 344–374.
- [33] K.M. Eisenhardt, Building theories from case study research, *Acad. Manage. Rev.* 14 (1989) 532.
- [34] L. Dahlander, L. Frederiksen, The core and cosmopolitans: a relational view of innovation in user communities, *Organ. Sci.* 23 (2012) 988–1007.
- [35] K. Weick, The collapse of sensemaking in organizations: the mann gulch disaster, *Adm. Sci. Q.* 38 (1993) 628–652.
- [36] A. Strauss, J. Corbin, *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, Sage Publications, Thousand Oaks, 1998.
- [37] R. Duymedjian, C.-C. Rüling, Towards a foundation of bricolage in organization and management theory, *Organ. Stud.* 31 (2010) 133–151.
- [38] P. Carlile, A pragmatic view of knowledge and boundaries: boundary objects in new product development, *Organ. Sci.* 13 (2002) 442–457.
- [39] C. Licoppe, Connected presence: the emergence of a new repertoire for managing social relationships in a changing communication technoscape, *Environ. Plann. D* 22 (2004) 135–156.
- [40] B.E. Ashforth, G.E. Kreiner, M. Fugate, All in a day's work: boundaries and micro role transitions, *Acad. Manage. Rev.* 25 (2000) 472.
- [41] E. Von Hippel, Perspective: user toolkits for innovation, *J. Prod. Innov. Manag.* 18 (2001) 247–257.
- [42] E. Von Hippel, R. Katz, Shifting innovation to users via toolkits, *Manag. Sci.* 48 (2002) 821–833.
- [43] W. Ebner, J.M. Leimeister, H. Krcmar, Community engineering for innovations: the ideas competition as a method to nurture a virtual community for innovations, *R&D Manag.* 39 (2009) 342–356.
- [44] F.T. Piller, D. Walcher, Toolkits for idea competitions: a novel method to integrate users in new product development, *R&D Manag.* 36 (2006) 307–318.
- [45] J. Fuller, G. Jawecki, H. Muhlbacher, Innovation creation by online basketball communities, *J. Bus. Res.* 60 (2007) 60–71.
- [46] N. Franke, F. Piller, Value creation by toolkits for user innovation and design: the case of the watch market, *J. Prod. Innov. Manag.* 21 (2004) 401.
- [47] C. Berger, F.T. Piller, Customers as co-designers, *Manuf. Eng.* 82 (2003) 42–45.
- [48] W.W. Powell, K.W. Koput, L. Smith-Doerr, Interorganizational collaboration and the locus of innovation, *Networks of learning in biotechnology. Adm. Sci. Q.* 41 (1996) 116–145.
- [49] L. Dahlander, D.M. Gann, How open is innovation? *Res. Policy* 39 (2010) 699–709.
- [50] L. Dahlander, Appropriation and appropriability in open source software, *Int. J. Innov. Manag.* 9 (2005) 259.
- [51] E. Danneels, Tight-loose coupling with customers: the enactment of customer orientation, *Strateg. Manag. J.* 24 (2003) 559.
- [52] B. Simpson, B. Carroll, Reviewing 'role' in processes of identity construction, *Organization* 15 (2008) 29–50.
- [53] E. Von Hippel, *Breakthroughs to order at 3 M*, MIT Sloan School of Management, MIT, 1999.