New learning network paradigms: Communities of objectives, crowdsourcing, wikis and open source

J. Alborsa,*, J.C. Ramosb,1, J.L. Hervasa

aDepto. Org. Empresas, Universidad Politécnica Valencia, Camino Vera s.n., 46022 Valencia, Spain
bAvanzalis, Knowledge Associates, Paseo de Gracia, 12, 08007 Barcelona, Spain

Abstract

This paper analyzes the new learning and network collaboration paradigms, their motivation and consequences. The origins of these practices are traced to the development of the Internet and the impact of globalization. The paper analyzes their advantages and the factors which have led to their development. Three contexts or diverse points of view have been followed: academic and scientific, business and social. The paper aims to develop and propose a taxonomy of these practices according to certain variables related to communication, social interaction, information, intellectual property, knowledge access and values.

1. Introduction

1.1. Objectives

The objective of this paper is to analyze, from a conceptual point of view, new learning and network collaboration paradigms. It will discuss their motivation and predict their evolution. Why do these practices seem brilliant, novel and different from current practices? What factors have led to their development? What are their future prospects for academics, business and society? The paper will propose a taxonomy which will facilitate the analysis according to social interaction, information and intellectual propriety management, knowledge access and social values, utilizing certain variables related to communication.

The paper is set out as follows. First, the state of the art is presented in the form of a review of the academic and non-academic literature that studies the evolution of the various forms of collaboration communities. These various alternatives and their characteristics are then analyzed by means of a number of variables, which are proposed in order to develop a taxonomy. An analysis is also made of how the various models fit with academic, business or social contexts and requirements. Finally, the paper concludes with a vision of the future of these communities taking into account the analyzed aspects.

1.2. State of the art, learning evolution, the actual communities of practice

For a long time, learning has been considered within a social context. Bandura (1977) pointed out how a relevant part of human behavior is learned and modeled by observation of others and how these codified models serve as a guide for action.

We will not deal here with the diverse schools of learning which organizational behavior has discussed extensively. Thus, from the point of view of Argyris (1992) the organization learns through individuals and individual learning activities are also facilitated or inhibited by an ecological system of factors which can be denominated the learning organization.

An earlier model of this author (Argyris, 1976), “the double loop learning”, postulates that learning alters the
variables or values which govern the learning process. This organizational learning model has also defined learning as a higher or lower learning level (Fiol & Lyles, 1985), “adaptive versus generative learning” (Senge, 1990), or “tactical versus strategic learning” (Dogson, 1991).

Various authors have analyzed the efficiency of various modalities of learning groups, such as formal or informal groups and learning communities and sharing knowledge networks, etc. These have been also denominated and defined as “Communities of Practice” (Brown & Duguid, 1991; Lave & Wenger, 1993; Wenger & Snyder, 2000), “Learning Organizations” (Garvin, 1993), “Virtual corporations” (Chesbrough & Teece, 1996; Davidow & Malone, 1992; Hale & William, 1997), “Network Companies” (Bessant & Francis, 1999; Miles & Snow, 1995), etc. Clarke and Cooper (2000) support the idea of knowledge management as a collaboration activity in a social context or “shared context”. Moreover, some authors have related work, learning and innovation in a common context (Brown & Duguid, 1991). Thus, formal organization hides on some occasions informal communities of practice which facilitate learning and innovation.

These concepts have recently been extended. Thus, Wenger (2000) argues that the success of an organization depends on its ability to constitute itself as a system of social learning and to participate in learning systems of a larger geographic scope, pointing out three relevant elements: communities of practice, border processes and their need to manage knowledge in a distributed form, sharing knowledge and collaborating beyond the limits of their organizations (Hildreth, Kimble, & Wright, 2005). All this appears linked to new innovation models (Chesbrough, 2003, 2007). Some of these have also been reported with diverse approaches, such as “Crowdsourcing” (Howe, 2006; McConnon, 2006), “folksonomy” (Bernard, Chautemps, & Galaup, 2006), “Produsage” (Bruns, 2007) or WebBlogging (Bernard et al., 2006; Du & Wagner, 2006; Ras, Avram, Waterson, & Weibelzahl, 2005).

2. Development of collaboration models

2.1. Origin of the Internet

Internet origins go back to as early as 1969 by ARPANET (Segaller, 1998), a robust network that allowed communication among various military computers, not solely for time sharing of high-investment computers, but to avoid attack or connection loss between nodes. In 1974, Vin Cerf developed the TCP protocol, which allowed the long distance transmission of large data packages. In 1980, the Ethernet protocol was developed in XEROX, providing a network of individual PCs. In 1982 and of HTML language in 1990 at CERN, and Mosaic in 1993 at Illinois University, the Internet era was established with the launch of Netscape, the first commercial browser. The number of present Internet users worldwide has been

Kolbitsch and Hermann Maurer (2006) analyzed the construction of communities around encyclopedic knowledge and although they have focused their work on technical aspects, and they also approach how to manage the contribution’s quality in spite of the absence of a responsible authority.

Dalle and Jullien (2003) analyzed the sustainability of free software and how contribution systems reinforced their diffusion. Some of their peculiarities have allowed these systems to improve at a higher speed than proprietary software and also to attain excellent market penetration in their field with existing standards. Dahlander and Magnusson (2005) analyze the case of communities of practice in the field of free software, coexisting with competitive proprietary software firms in the Scandinavian countries, and their relationship with the latter, since they try to capture the communities’ resources. On the other hand, Osterloh and Rota (2007) analyze the phenomena of the development of open software, and question whether these projects represent a new development. According to these authors, the open software community developed an institutional innovation in open software licenses, allowing them to survive as common property. Secondly, these licenses are reinforced socially by motivated contributors. Sustainability will depend on whether there is sufficient community support for the collective initiative (Henkel, 2006).

Globalization introduces elements which influence the evolution and development of these phenomena (Friedman, 2005; Raymond, 2001; von Hippel & von Krogh, 2003). All this appears linked to new innovation models (Chesbrough, 2003, 2007). These of some have also been reported with diverse approaches, such as “Crowdsourcing” (Howe, 2006; McConnon, 2006), “folksonomy” (Bernard, Chautemps, & Galaup, 2006), “Produsage” (Bruns, 2007) or WebBlogging (Bernard et al., 2006; Du & Wagner, 2006; Ras, Avram, Waterson, & Weibelzahl, 2005).
estimated at 1,117,000,000 million (www.internetworldstats. com).

2.2. Initial steps in collaboration: discussion groups

Initially, computer inter-connections facilitated the access of universities to scarce and remote digital resources. Hence, collaboration was based on distributed resources in mails and shared articles similar to news bulletins (http://www.isoc.org/internet/history/cerf.shtml).

2.3. World Wide Web

A revolutionary technology, HTTP (hypertext transfer protocol) and browsers allowed more people without specialized computers skills to interact on the web. The World Wide Web (initiated around 1990) is a hypertext document system that works on the Internet. With a browser, the user can read the web pages, which can contain texts, images and other multimedia, and navigate among them utilizing hyperlinks. Interaction was still limited; the main function was publishing static contents in order to allow access to numerous individuals. The web pages had little functionality, but progressively a certain interactivity was introduced. After this stage, portals were introduced as integrated access to information on a certain topic (Segaller, 1998).

2.4. The Internet bubble: electronic commerce and dot com

At the end of the 1990s, a revolution took place in the business world, and was given the name of the Internet bubble. New firms with a suitable strategy generated e-business. The web became a new channel for customer interaction. According to some authors, this gave rise to the second globalization wave (Friedman, 2005).

The relevant fact was that technology had been developed sufficiently to allow collaboration (Adams & Freeman, 2000; Hildreth et al., 2000). Intranet appeared as a common access point adapted to the particular requirements of the user organization. Within them, new devices were developed (i.e., IRC, MS net meeting, Lotus Sametime and more recently Skype), workplaces for collaboration and content sharing (i.e., Ruppel & Harrington, 2001; Stenmark, 2002).

2.5. Open source (and industrial property)

A new alternative for software development originated with Linux (Dahlander & Magnusson, 2005; Osterloh & Rota, 2007; Raymond, 2001). Open source (OS) recognizes individual authorship but not exclusive intellectual rights. A new alternative to intellectual property, Creative Commons (creativecommons.org) is a non-profit organization that offers an alternative to full copyright. It provides free tools that let authors, scientists, artists and educators easily mark their creative work with whatever freedom they want it to carry. Offering work under a Creative Commons license does not mean giving up copyright, but limiting its scope. There are six different levels of protection under this label (Crawford, 2006).

2.6. Search engines: Google

Search engines have played a significant role in the way users work and collaborate. Google has been one of the main successes of the new economy. Its terms and work alternatives and its collaboration relationship has contributed to breaking down a structured and rigid way of understanding directories, taxonomies and the classification of shared information (Battelle, 2005; Vise & Malseed, 2005).

2.7. Peer to peer (P2P)

This alternative involves a technical concept that has extended its use to thematic social networks. It is utilized to refer to collaboration networks in egalitarian terms and to denominate collaboration communities where something is shared. Some software applications such as Bit Torrent are used. There exists certain controversy as to the shared objectives and the intellectual property. The majority of users of this alternative share music, films, books, etc. The fact is that it allows millions of individuals to use enormous amounts of data (Oram, 2001).

2.8. Web 2.0

This label signifies that, although the Internet has come a long way, it is still utilizing most of the technologies previous to the World Wide Web. The term refers to the utilization dimension and not to the physical network that supports it (Le Deuff, 2007; O’Reilly, 2005). The objective of this new concept is to facilitate collaboration and sharing among users.

2.9. Rich site summary (RSS) and blogs

Rich site summary is a family of web feed formats utilized to publish frequently updated digital content, such as blogs, news feeds or pod casts. A blog (short for web log) is a user-generated website where entries are made in journal style and displayed in reverse chronological order (Bernard et al., 2006; Du & Wagner, 2006).

2.10. Wikis

A buzzword originated from Hawaiian slang (quick) that transmits the idea of quick and easy collaboration. The wiki is a website designed to allow individuals to collaborate electronically in an easy way for authoring. Specifically, it enables users to add, remove, edit and link other pages or resources and change contents, generally
without the need for registration (Bernard et al., 2006; McFedries, 2006).

2.11. Wikipedia

A great example of a very popular wiki is the collaborative encyclopedia, Wikipedia. Its name comes from joining the words wiki and encyclopedia. It is, again, a challenging alternative coming from the unstructured knowledge management happening all over the world. From the researchers’ and scientific point of view, Wikipedia has no reliability or accuracy. Anybody can add, edit and modify any content (Korfiatis, Poulos, & Bokos, 2006). There are several mechanisms to avoid vandalism and the collaborators are always seeking for errors. Few studies have analyzed how vandalism behaves and how the community keeps it accurate (Viégas, Wattenberg, & Dave, 2004). In relation to the number of users (contributors and readers), in October 2006 Wikipedia ranked (comScore World Metrix) in the top 10 for global Internet traffic, with over 150 million users. The question is: no matter how reliable or accurate it is, who is going to use the authoritative encyclopedias?

2.12. Folksonomy

This is a user-generated taxonomy utilized to categorize and retrieve web content such as Web pages, photographs and Web links, using open-ended labels called “tags”. Typically, folksonomies are Internet-based, but they may be used in other contexts. The folksonomic tagging objective is making a body of information increasingly easy to search, discover and navigate over time. A well-developed folksonomy is ideally accessible as a shared vocabulary that is both originated by, and familiar to, its primary users (Wikipedia). Folksonomy, another example of open collaboration, sounds like anarchy on the World Wide Web, with people bending rules to their individual needs and tastes, but it is not. In fact, tagging is at the core of some of the most vibrant and cohesive online communities (www.flickr.com). Of course it lies far from the structured comfort of a controlled conventional taxonomy, such as that of librarians but is useful to make digital surfing manageable (Dye, 2006).

2.13. Models for scientific collaboration: Science Commons

It is usually formed by research teams composed of reduced groups of scientific researchers. It is a project that uses the philosophy and activities of Creative Commons in the field of science. The objective of Science Commons is to encourage scientific innovation facilitating consultation by scientists, universities and firms into bibliography, data and other scientific intellectual properties, as well as sharing knowledge. Science Commons, started in 2005, works within the current copyright and patents laws in order to promote legal and technical mechanisms to lower barriers that prevent idea and material sharing (Klump, Bertelmann, & Brase, 2006). One example is LIGO Scientific Collaboration (www.ligo.org). Some relevant journals such as Nature or Scientific American work in this area.

2.14. Virtual communities

A virtual community, or online community, is a group of people who, initially or basically, communicate via the Internet, instead of face-to-face. Online communities have also become a complement to the communications carried out in real life by people who know each other. These usually utilize some type of collaboration software (social software) and adopt an appropriate name for their purpose, such as Open Source communities producing software in open code (Chesbrough & Teece, 1996).

2.15. Crowdsourcing

Innocentive was an initiative launched by a pharmaceutical firm which faced a problem in designing a product. Despite its large R&D department, it had no clue about how to solve a specific problem for developing a new product. A new matchmaking system was devised to link outside experts to unsolved R&D problems. A monetary reward was offered to whoever could solve the problem. Scientists from all over the world competed for the prize. The winner got the prize and the company got the solution at a comparatively inexpensive price (Allio, 2004; Steve, 2006). Another example was seen in the case of Procter & Gamble, who were using less than 10% of internal innovation in their new products, so the company changed its mind on the way they were innovating and changed their policy on intellectual property (IP). They open the patent to any outsider if the idea has not been applied in the last 3 years (Tapscott & Williams, 2006). The IP collaboration loop went further with the emergence of marketplaces such as yet2.com, where ideas (under IP rights) are on sale (Lichtenthaler, 2007).

2.16. Second Life

Second Life is a 3-D virtual world entirely built and owned by its residents. Since opening to the public in 2003, it has grown explosively and today is inhabited by a total of 7,521,484 people from around the globe (www.secondlife.com). It has become a full virtual world and is developing on its own today. In this world, there are people, buildings, businesses, natural places, state properties. The main idea of Second Life is not the way we can see or interact with it; in fact it resembles an advanced electronic game (Rosedale, 2007).

It has more to do with its social and collaboration impact. Sociologists, psychologists and business people are looking at this phenomenon, because it is based on similar structures as our real life (Holtz, 2007). It has an economic system where you can buy things, exploit commercial
resources and develop your own “virtual” business. Actually the currency in SL has a real equivalence with real money ($). Any virtual individual can buy and sell in this world. Enterprises such as Zara or IBM have their own offices there and media companies make some incursions into this second world to broadcast news to our first world (DesMarteau, 2007).

2.17. The way to the Semantic Web

Finally, an important event is now taking place, and is known as the Semantic Web. It is an evolving extension of the World Wide Web in which web content is understood by computers, so that they can perform more of the tedium involved in finding, sharing and combining information on the web (Shadbolt, Hall, & Berners-Lee, 2006). Semantic publishing will benefit greatly from the semantic web. In particular, the semantic web is expected to revolutionize scientific publishing, such as real-time publishing and sharing of experimental data on the Internet.

3. A taxonomy for virtual collaborative contexts

Various authors have analyzed and proposed alternatives for classifying virtual collaborative structures. In a first approach, some of them suggested a taxonomy based on time and space (DeSanctis & Gallupe, 1987a, 1987b; Ellis, Gibbs, & Rein, 1991; Johansen, 1988). Other authors added other aspects such as project management (Chompalov & Shrum, 1999), communication (Jarvenpaa & Leidner, 1999), inter-organizational boundaries (Cummings & Kiesler, 2005), functionalities (Bafoutsou & Mentzas, 2002), etc. Academic collaborative research has been also the object of various studies (Cummings & Kiesler, 2005; Olson, Zimmerman, & Bos, 2007). Some efforts have been oriented towards classifying collaboration from a broader point of view. Bos et al. (2007) proposed seven categories based on organizational and technology uses. Nevertheless, no attempt has been made to approach a broader analysis covering academic, social and business contexts in virtual collaborative networks, taking into account their organizational and informational dimensions.

To begin with, we selected a number of variables which cover the afore-mentioned dimensions and which would help us to develop such a taxonomy. The following table defines these variables, their basic references and their contextual characteristics. Some of them have features common to the three approach contexts (i.e., values, learning, diffusion), while others present relevant differences (i.e., authority, ownership, intellectual property, collaboration, democratization) Table 1.

According to the evolution of these tools and collaboration activities, Bernard et al. (2006) classifies them into two dimensions: the social connectivity and the information sharing potential or information connectivity. Thus, we have three quadrants where the context areas, rich in information, knowledge or social interaction are located. A fourth, the intelligence sharing area (The metaweb) means the future and the evolution of the collaborative paradigms. A similar approach was followed by Bafoutsou and Mentzas (2002), who classified the collaboration tools by their focus on collaboration and information management Fig. 1.

But how can we relate our analysis to this evolution? We have tried to analyze how these dimensions relate with the variables. Fig. 2 shows how these variables are related with both dimensions.

Initially, a higher level of authority and ownership will limit not only social connectivity, but also, as we have already stated, the informational dimension, since authority is associated with restriction and member’s retention (Cifolli, 2003; DeSanctis & Gallupe, 1987a, 1987b). Diffusion is highly related to social—and to a lesser degree with the informational—dimension since larger amounts of information are limited by a higher degree of diffusion. Learning has the same type of correlation and is associated to the organization context, as Argyris (1976) pointed out. Collaboration needs some specialization and could be hampered with an excess of information (Bafoutsou & Mentzas, 2002; Cummings & Kiesler, 2005; Viegas et al., 2004). Knowledge access will be facilitated by social level and information (Clarke & Cooper, 2000). The concept of communities of practice assumes values implicitly, since they possess an identity defined by a shared domain of interest as well as by learning in action (Adams & Freeman, 2000; Wenger, 2000). Values change, as well as learning consequence (Argyris, 1976). Nevertheless, some authors (Bruns, 2007; Dahlander & Magnusson, 2005; Scott & Johnson, 2005) consider values to be the core support of certain collaboration communities. Profits or economic benefits have been considered basically in those contexts linked to business areas and open innovation (Allio, 2004; Chesbrough, 2003, 2007) or associated to cost saving in open source environment (Dahlander & Magnusson, 2005; Dalle & Jullien, 2003). Intellectual property, in principle, has been considered a barrier for collective creativity. Nevertheless, new approaches such as Creative Commons or Science Commons have been developed to overcome these problems (Crawford, 2006; Lichtenthaler, 2007). The open innovation and business models were developed as a business response to globalization, increasing costs of R&D and the opportunity of the models discussed in this paper (Allio, 2004; Chesbrough, 2003, 2007). These models mean a reinforcement of IPR trading.

The variable Democratization is relevant in social collaboration contexts (Bruns, 2007). In the business context, traditional business systems were not appropriate for collaboration. It is not sufficient to assemble financial data, marketing data and information from the Web, a business intelligence system needs to arrange information together in a way relevant to the user, and network democracy is central to business collaboration (Miles & Snow, 1995). The users become actors in this scenario. Similarly, in modern innovation the model user’s
Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Academic, Research</th>
<th>Social</th>
<th>Business</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authority/ownership</td>
<td>Recognition given by institutions and existing authorities (i.e., ISI, the web of knowledge) and citation rankings.</td>
<td>Based on acceptance and relevance obtained by votes (i.e., Google page rank)</td>
<td>Market success driven, i.e., Wikipedia as a knowledge base is a de facto standard</td>
<td>Cummings and Kiesler (2005); DeSanctis and Galleu (1987a, 1987b); Bos et al. (2007); Cifolli (2003)</td>
</tr>
<tr>
<td>Diffusion</td>
<td>Through its own controlled and closed channels</td>
<td>Open, through the Internet and social networks</td>
<td>Based on Intranet, Internet. Externally in marketplaces, i.e., thematic business portals</td>
<td>Ruppel and Harrington (2001); Stenmark (2002)</td>
</tr>
<tr>
<td>Values</td>
<td>Shared</td>
<td>Shared</td>
<td>May not be common</td>
<td>Argyris (1976); Chompalov and Shrum (1999); Jarvenpaa and Leidner (1999); Wenger (2000)</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Unidirectional and slow. Built on existing advances (others publications)</td>
<td>Instant, asynchronous, open to everyone interested in it. “Bazaar” model</td>
<td>Internally, as the social, and guided. Bidirectional collaborations with other organizations, where it gets more benefit which is most implied.</td>
<td>Raymond (2001); Wenger (2000); Lave and Wenger (1993); Bafoutsou and Mentzas (2002); Bos et al. (2007); Cummings and Kiesler (2005); Olson et al. (2007); Lasker, Weiss, and Miller (2001)</td>
</tr>
<tr>
<td>Knowledge access</td>
<td>Restricted and complex. Well structured, but not dynamically</td>
<td>Almost universal access to free contents and progressively to protected ones through P2P. Free structures, without directories, googelized or under folksonomies</td>
<td>Internally restricted and only well managed in large organizations. Outside knowledge absorption.</td>
<td>Bernard et al. (2006); Olson et al. (2007); Chompalov and Shrum (1999)</td>
</tr>
<tr>
<td>Intellectual property</td>
<td>Author and publishing media</td>
<td>Community property, open to anyone. Open/free licenses</td>
<td>In classic business: patents and protection. In open business, use of open license (i.e., eclipse and IBM)</td>
<td>Dahlander and Magnusson (2005); Osterloh and Rota (2007); Raymond (2001)</td>
</tr>
<tr>
<td>Innovation/business model</td>
<td>Closed, centralized by the network of institutions and researchers</td>
<td>Natural, absolutely open</td>
<td>In classic business models, closed and protectionist. In open business models, open innovation (i.e., innocenive)</td>
<td>Chesbrough (2003, 2007); Allio (2004)</td>
</tr>
<tr>
<td>Democratization</td>
<td>Roles and “hierarchies” based on authority</td>
<td>Based on relevance of contributions, equal access.</td>
<td>Business intelligence. New users’ roles.</td>
<td>von Hippel and von Krogh (2003); von Hippel (2005)</td>
</tr>
</tbody>
</table>

democracy has become an accepted paradigm (von Hippel, 2005). Thus, democracy can be located corresponding to a high dimension of social and informational connectivity.

Therefore, taking into account the afore-mentioned considerations, we can then classify the reviewed models according to these dimensions. Fig. 3 reflects their position, showing the trends.

4. Conclusions

We conclude by predicting how the social, academic and business collaborative modes may evolve in the future.

It could be expected that collaborative models in the social context will follow the general model predictions, since this is the context where the restrictive variables such as authority, intellectual property or profits have a smaller
influence. As has been mentioned, values act as a cohesive element. The success of phenomena such as Second Life, Wikipedia, Blogging, MySpace, etc. (Bouquet & Favier, 2006; Nardi, 2004; Rosedale, 2007) support this trend. In the past couple of decades, Internet use has grown enormously while it has allowed its users access to many websites and resources, it has also grown largely for the use of social networking. A social networking website, as defined by Wikipedia, is "a website that allows for social networks to be made and opens up different forms of communication". There are many different types of social networking websites available in the World Wide Web. Some examples are online dating sites and open market sites such as eBay, etc. These websites allow users to communicate in a variety of different ways. However, what is interesting from our analysis is the collaboration aspects in their evolution, as well as the communication aspects involved in their creation and upkeep. In the case of MySpace.com (the fourth web site in traffic in the world) users come together to socialize and the collaborative aspects are fundamental for their growth. Again, a recent case, Panoramio (recently acquired by Google from a couple of computer science graduates) is based in the collaboration of users who upload their photos to illustrate Google maps. As cited, eBay creates a network between users by connecting them from all around the world in order to trade with each other.

In relation to the academic context, we should consider two subcontexts: learning and scientific. While limiting variables such as intellectual property, authority and profit have a lower effect on the former, they limit the expansion of the latter. Values are generally linked to the development of communication and trust (Jarvenpaa & Leidner, 1999). While the Internet represents an abundant informational resource, its real educational potential lies in its...
ability to facilitate inter-cultural exchanges through which students may work collaboratively, first gathering and sharing information, and then discussing and analyzing issues (Kasper, 1997). Scientific collaboration presents a number of challenges, basically solving the governing of authority, democracy and profit variables. Cross-boundary collaboration (Chompalov & Shrum, 1999; Cummings & Kiesler, 2005) also present an additional challenge. However, new initiatives such as Open Access publications are being developed (i.e., Bentham Science Publishers).

Finally, it can be concluded that business models are benefiting from the evolution of new alternatives of networking collaboration. Most variables such as diffusion, learning, collaboration, knowledge access, profits, innovation open models, as well as democratization favor its evolution. Moreover, authority and ownership, values and intellectual property are neutral or have adapted to this evolution. Thus, new models such as search engines, Open Source, e-commerce, etc., have been adopted and promoted by businesses which participate actively as well as in, initially, social networks such a Second Life or MySpace.

As we have seen, most of the social de facto standards have developed into business requirements and firms have adopted them. As an example, in technology innovations, MP3 became a standard even though few sound firms predicted its success, since most were investing in and developing products with better sound quality. The same may occur with Wikipedia, blogs or semantic web.

Further research should focus on organizational culture through community methods and tools. As has been pointed out, organizational culture seems to be more difficult to change than the culture of the network communities composed of people, and Internet social networks (different representations of communities) appear to be more conservative than organizations.

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References


