Social computing – Implications for the EU innovation landscape

POR **CORINA PASCU, DAVID OSIMO, GEOMINA TURLEA, MARTIN ULBRICH, YVES PUNIE Y JEAN-CLAUDE BURGELMAN**

(*) "© European Communities, 2008. The information and views set out in this article are those of the author(s) and do not necessarily reflect the official opinion of the European Communities. Neither the European Communities institutions and bodies nor any person acting on their behalf may be held responsible for the use which may be made of the information contained therein.

(**) The paper is an adapted version of the article published in Foresight: the journal of future studies, strategic thinking and policy vol. 10, issue 1 ; Reproduced with kind permission of Emerald Publishing group Ltd.http://www.emeraldinsight.com/10.1108/14636680810856017 . Reproduced with kind permission.

(***) All at European Commission´s Directorate General Joint Research Centre, Institute for Prospective and Technological Studies (IPTS), Seville , Spain.

Introduction

The trends under scrutiny, i.e. blogs, podcasts, wikis, social networking websites, search engines, auction websites, games, VoIP and peer-to-peer services, exploit fully the connectivity dimension of the Internet to support the networking of people and content. In addition, the user is an active participant, co-producing content (blog, wiki, Flickr, MySpace), taste and relevance (Amazon, de.li.cious, Google pagerank), reputation/feedback (eBay, TripAdvisor), storage /server capacity (P2P), connectivity (wifi sharing, mesh networks) and collective intelligence (business web2.0). Time Magazine□s selection last December of □You□

(1) as the person of the year may be viewed as the recognition of the new digital democracy, of the people behind social computing trends, going mainstream.

The rapid growth of social computing applications, both in terms of number of users/subscribers and in terms of usage patterns leads to the fact that the phenomenon is also increasingly being considered by policymakers, both as tool and object for policymaking. As a tool, it is used to connect to citizens and other stakeholders (e.g. weblogs of European Commissioners (2)) and as an object, it is being considered how social computing could play a role in information society policies, as for instance is being touched upon in a recent speech from the European Commissioner responsible for Information Society and Media on “The Disruptive Force of Web 2.0: how the new generation will define the future” (3).

Research is starting to look at social computing applications, given their exponential diffusion but also and more fundamentally, because they give signs of societal re-engineering (engendering positive, concrete social outcomes such as the development of friendships, dating relationships, and collective action, democratisation of innovation (4)) and creative institutional destruction (5) (new players emerging, old actors refusing to adapt disappear).

The exponential growth of social computing applications

An extensive desk-based survey of secondary data (Pascu & all, 2007) carried out since 2005 shows very clearly that the diffusion and usage of social computing applications have been growing dramatically. In many cases the growth is so high that it reminds us of Metcalfe´s law (square growth of network utility), or even Reed´s version (exponential growth of group-forming networks) (6). The service gets better as more people use it. More content leads to more traffic which leads to more edits which generate more content (7).

The number of Blogs, for example, have doubled every 5 months for the last 2 years; social networking websites usage is multiplying year on year; peer-to-peer has become the largest source of traffic on the Internet in 3 years, wikipedia celebrated the publication of its 1.650 millionth English-language article and it maintains a growing base of over 1.5 million registered users; 100million clips are viewed daily in YouTube; and FON, the wifi-sharing network, has become the largest wifi network in the world in just one year (see annex (1)).

Sometimes this explosive growth is due to the very small starting base (wifi sharing, blogs, social networking), and, in some cases, it is still more a future projection than a reality (like podcasts). However, their growth has generally been continuous over the last 3 years, and cannot be considered just a passing trend. Furthermore, some of these trends have already reached the mainstream of Internet usage. In terms of penetration, most Internet users rely on search engines to find information, half of them visit social networking websites, and a very large share visit blogs, use eBay, and make phone calls via VoIP. With regard to intensity of usage, social networking websites are the most visited websites in terms of page views, and the largest part of Internet traffic by far is peer-to-peer file sharing.
Some commentators argue that only a minority of users appear to make active use of these

applications, by writing blogs, contributing to Wikipedia, creating podcast and videos, and offering goods for sale on eBay. The majority simply “lurks” in the background (Marham, 1998). In most online communities, 90% of users are “lurkers” (i.e. read, observe but don´t contribute) and only 1% is a “contributor”. Most of Amazon´s reviews are for instance contributed by a few “top-100″reviewers (less than 1 %).

These figures are nevertheless a only a snapshot of a highly dynamic phenomenon. Secondly, one shouldn't underestimate the creative use that the information acquired by passive users might have inside and outside the virtual space. In fact, increasingly, the behavior of “passive users” is being explored via technological means, as can be observed for instance, from Amazon´s recommendation system: “people who bought this book, also bought these other books”. Otherwise saying, the so called “rear wear” (8) effect (i.e. the simple activity of reading or using leaving enough traces for it to being used anonymously as a way of sharing preferences and interests) is increasingly seen as a way of exploring the usability of the community of passive users).

The changing role of users

A particular powerful characteristic of social computing applications is that users are becoming much more deeply involved in the process of production and service innovation (9). The distinctive roles of producers and consumers are beginning to blur and even to merge, that is that people are increasingly both producers and consumers. This idea of the *prosumer* is of course not new, as coined by Alvin Toffler in 1980 in his book *The Third Wave.* What is different however, is that now, the idea is becoming reality.

Firstly, the user is a supplier of content. Social computing applications (such blogs, podcast, wikipedia, YouTube) enable the user to easily publish and share text, audiovisual content, and contacts (in social networking websites). The relevance of this phenomenon with regard to the media industry cannot be underestimated. Secondly, the user supports the distribution of content and service. In peer-to-peer networks and wifi sharing, the user is a provider of the transport infrastructure and services. Thirdly, the user plays a fundamental role in finding/selecting/and filtering the relevant content and services. Search engine ranking relies on other websites' links in order to estimate the relevance of the search; wikis rely on users to evaluate and select the quality of content; tagging and taste-sharing by users, and finding what other users like, is a fundamental way to share and find interesting information and content (like music!) over social networking websites; feedback by users is the basis of the reputation management system of eBay.

This may lead to a long-term societal trend since in every application mentioned above, the role of the user is essential to the delivery of the service: in the production, the distribution, and the selection/retrieval of content and services. A common “dream“ for many communication technologies seems to become close to reality i.e. that “every sender should become a receiver and every receiver a sender“ (10).

In addition, users are becoming more powerful in economic terms. The *cluetrain manifesto*

(11) noted that “a powerful global conversation has begun. Through the Internet, people are discovering and inventing new ways to share relevant knowledge with blinding speed. As a direct result, markets are getting smarter—and getting smarter faster than most companies.”

These new areas of innovation lay at the crossroads of an increasingly complex process of both tacit and codified knowledge production. As such, we believe they contribute substantially and directly to shaping the emerging Knowledge Economy and Society. The Value Map underneath depicts this new dynamics. Figure 1 (2).

The reasons for which people are actively contributing go beyond the simple monetary rewards. Rather, it seems that people are taking up the possibilities of social computing applications to do things differently, to things in ways that have not been able before and that make sense to people. As Benkler (2006) also argues, “Personal computers, camera phones, audio and video editing software and similar utilities are examples of tools whose value increases for users as they are enabled to explore new ways to be creative and productively engaged with others.”.

Towards a new Techno-Economic Paradigm

The spectacular growth of social computing and the changing role of users do seem to indicate that things are being done differently. These new dynamics have both a strong social and economic relevance. The combination of all these factors is leading to what can be described as a new techno-economic paradigm.

Social relevance

Customers and users are becoming more aware and demanding, thanks to horizontal sharing of information, mainly through blogs. Information, content and services are increasingly available for free or at low cost, either thanks to advertising or to piracy, and users are becoming more selective in what they are ready to pay for. With the help of technical solutions such as RSS (Really Simple Syndication) and news aggregators, every user is able to build his/her own personal newspaper. The idea of a “Daily Me” was also put forward by MIT Media Lab founder Negroponte (1995) in his book Being Digital.

Bloggers are influencing the way public opinion is shaped, particularly in terms of agenda setting, and focussing attention on issues which would not otherwise be considered by mainstream media. Blogs played a major role in the 2004 American elections, and in the “No” campaign in the French referendum on the EU constitution. For instance, an Internet study (12) explored the potential influence of blogs on the referendum and its aftermath (13). The study showed that the ´ No´ campaign set up by 161 of the 295 sites focusing on the constitutional debate, helped redress a bias towards the ´ Yes´ campaign in the mainstream media (14). Figure 2 (3)

Moreover, as people become more networked and interconnected through the use of ICTs,

new forms of social organisation are emerging which are different from the ones known in traditional societies (i.e. social relations based on physical proximity and close social ties such as the extended family ones). These issues echo the ongoing debate in social sciences, dating back to the 19th century, regarding the changes in community life due to economic and technological advances. Some feel community life has been ´lost´ due to the emergence of the industrial society, while others, by looking beyond locality as a defining characteristic of community, point to transformations in social life and the emergence of a ´liberated´ community (Quan Haase and Wellman, 2004). The breakthrough of the communicative use of ICT, as illustrated by social computing applications, is providing clear signs that people are indeed building new social ties and new social networks (e.g. communities of interest), possibly leading to greater social engagement and providing the basis for a ´glocal´ (i.e. simultaneously both global and local) civil society (Van Bavel et al, 2004). These digitalised social networks allow people to construct and maintain personal digital identities and provide ontological security (Giddens, 1993) – that is, having basic trust and confidence in the world you live in, which was provided by physical proximity and traditional ties in earlier times. It is this trust and confidence that is being developed in ICT-mediated communications that is having an important impact of on the social fabric of society.

Economic relevance

There are different aspects to the economic relevance of social computing. Some net-native companies have become big corporations, showing huge profits, like Google and eBay. The wave of emerging Web 2.0 applications has also initiated various buyouts, mergers, acquisitions and partnerships (for example, Yahoo buying Flickr, Google buying YouTube (15), eBay buying Skype, News Corp. buying MySpace). Often this involves building up a large customer base before selling (16).

Many small websites are also generating revenues now, mainly thanks to advertising. In this way, even a small but well written blog can become a source of revenue and a full time job for its owner. In a similar way, trading on eBay has become a full-time job for many of its users: about 1 million people rely on it as primary or secondary source of income.

Secondly, many social computing applications and players represent a direct threat to established industry leaders, in different ways for the different products, such as telecommunications and content industries. VoIP, for instance, puts the revenue sources of telecom operators at risk (with regard to voice traffic); wifi sharing threatens the revenue streams of Wireless Internet Service Providers (with regard to subscriptions for home connections and consumption fees for nomadic hotspot connections). And a combination of WiFI with VoIP might well change the whole operator business for good.

With regard to content industries, freely available user-produced content (blogs, wiki and podcast) is competing with content produced by established providers (broadcasters, newspapers, encyclopaedias) in terms of audience and advertising. Also, we cannot underestimate the degree to which sharing of audiovisual content through peer-to-peer platforms threatens the revenues of content industries, although it is uncertain the how long

this will persist in the future, bearing in mind the increasing numbers of legal complaints by the audiovisual industry. With regard to the software industry, the threat is perhaps less immediate and less visible. However, Google, for example, has just launched several web-based collaborative applications (Google Apps service), which could become competitors of MS Office.

Thirdly, social computing applications are already being used for professional purposes. Blogs and wikis are increasingly used in the corporate world to collaborate inside and outside the company. Peer-2-peer is being used by companies, especially in the media sector, to distribute content efficiently. Most broadcasters distribute content via podcasting. Google Earth has been used in the aftermath of the Katrina hurricane to support the relief effort. And of course, as this paper shows, researchers increasingly rely on wikipedia as a reliable source for their work.

Last but not least, social computing applications change the relation between final customers and suppliers by reducing the information asymmetries. Thanks to horizontal sharing of information between users, customers become “smarter”, more demanding, and more aware of the choices in one word, empowered. “Blog-alike” feedback and customer reviews are now standard in e-commerce websites, and bloggers, for example, have been instrumental in drawing attention to the faulty Sony batteries in some Dell products, forcing the firm to recall 4.1 million pieces.

Implications for innovation and competitiveness

Digital technologies have lowered the costs and complexities of content production and distribution to such a degree that, potentially, every individual or group could become a content producer, thus offering an important development potential for Internet-based start-ups. However, with the burst of the Internet bubble, it appeared that low entry barriers alone do not necessarily guarantee start-up survival in the longer term, if this is not accompanied by a viable business model, based on real revenues (Punie, Burgelman & Bogdanowicz, 2002). Although this seem to be the difference today as compared to 7 years ago, it remains to be seen if the business models for many applications are sustainable in the longer run. Nevertheless, the economics of social computing look much less shaky than the economics of applications during the Internet bubble a second bubble of the type of Internet bubble is not impossible, but we assess it as unlikely. Social computing companies tend to have a smaller cost base, since they rely on users for a large part of their output, viable business models, and real market and they are much more closely integrated with the old economy, providing increasingly predictable income streams.

In addition, since the basics of social computing consist of networking and communication between humans, it is quite unlikely that services adressing the social needs of interacting with people will diminish or disappear. It has been proven many times in the past that the drivers for information society have been those addressing the need for communication rather than information (Silverstone & Sorensen, 2006), as can be illustrated by the growth in take up of communication facilities (email, mobile) against for instance the failure of

information services such as WAP. Additional indirect evidence for the importance communication is that communication services have registered the highest growth over the last few years as a category of expenditure in household consumption, compared to other spending categories such as for instance recreation and culture (although a problem is that information spending is not a separate category (OECD 2005). Figure 3 (4).

Social computing developments not only give signs of societal re-engineering, including through reshaping the economic relationships. The emerging and “dominant” role of the user in the innovation process and its disruptive impact in the economic system (the democratisation of innovation (17)) generates and accelerates the creative destruction (new players have emerged addressing the shift towards participation and new community practices; old actors refusing to adapt to the new environment will disappear).

The emergence of social computing has significant impacts on the value chain of affected industries. In particular, the role of platform providers is fundamental. Platform providers attempting to integrate downstream and upstream of the value chain will influence the alignment of different layers of the ICT industry (18). A key issue seems to be thus how the competition model will look on these emerging markets, especially in the integration of vertical chains and emergence of new horizontal markets.

In particular, for the creative content industries, the impact can be observed across the whole value chain: for *content creation* (lowering the barriers to entry, blurring the boundaries between creators and users and bypassing the need for intermediaries e.g. publishers); *distribution (*trend towards disaggregating in constituent parts e.g. singles, emergence of new aggregators and integrated platforms and of a whole new range of attention services); and finally *user interaction (*new channels for user feedback, self-publishing paradigm) (19).

The “economy of abundance” (20) is challenging for businesses. The abundance of information causes scarcity of attention on the users´ side and, in turn, it has consequences along the value chain. Recommendation systems like Amazon, last.fm, Pandora etc address the relevancy issue, i.e. showing the user relevant content by generating relevant, personalized recommendations based on user preferences (e.g.. the music you are listening to). Approaches fall into either personalized recommendation (based on the individual´s past behavior) or social recommendation (based on the past behavior of similar users). However, issues like standards and infrastructure for building attention services need to be addressed.

A particular issue for innovation- led growth in ICT is IP protection. Anyone can for example post a video in YouTube without owner permission and anyone can see it. People can exchange potentially copyrighted material in MySpace. Current IPR systems need to be adapted to the specific features of the social computing trends. Alternative licensing frameworks such as Creative Commons (21) (CC) have emerged. CC enables owners of copyright-protected material to publish material online and license this work free of charge to users but with conditions (“Some Rights Reserved”). The BBC implemented a similar model (BBC´s creative archive) (22) that released online nearly 500 clips, programmes and audio tracks for the public to license and share in different ways.

Final reflections

Social computing applications have displayed a viral growth over the last past several years and the trend is not likely to stop here. They are responding to underlying societal trends and have already visible social and economic impact.

They represent both a challenge and an opportunity for research and policy. More research is needed on the areas that would be most impacted, and to what extent. We assess that low technological and financial entry levels, contribution of the user contribution of the users and viable business models make them likely to stay despite possible mini-bubbles. However, more research is needed as to assess whether these developments would become mainstream, what is the positioning of Europe and how important it is for Europe to have a base in social computing applications.

New approaches are required so as to capture this new innovation dynamics and translate it into a holistic approach to policy-making (in terms of R&D, deployment policies, business, education, regulation). The development of social computing applications opens a wealth of policy-related research questions (the following list is not exhaustive):

Users as creators and innovators – The role of users is a key driver and shaper of the current technological revolution. This would mean that policies need to be more open to user-led innovation and to provide the right context and platforms that would favour user-led, bottom up innovation. In addition, there is a role for policy-makers to educate and raise skills so that as many people as possible are able to play the role of creators and innovators.

Innovation and technology – Investment in R&D is even more important, however it needs adapted to new realities.

Competition-friendly environment – New business practices and different business "mindsets". Businesses need to address the shift towards participation and new community practices. A key issue seems to be how the competition model will look on these emerging markets, especially in the integration of vertical chains and emergence of new horizontal markets.

Creating IPR- and DRM " friendly" environment.

The move towards stronger IP and DRM protection needs to be balanced between the interest of producers and users. A new model of innovation is emerging, which is open, collaborative, multidisciplinary and global. New regulatory frameworks have also to ensure an adequate balance between protection and the use of content. Potential solutions could be Creative Commons, or new DRM forms such as "forensic" DRM. Harmonisation of IPR throughout Europe is also an issue.

References and Selected Bibliography

Aghion, P. and Howitt, P. (2005) Appropriate Growth Policy: A Unifying Framework, http://www.economics.harvard.edu/faculty/aghion/papers.html.

Anderson, C. (2006) The Long Tail: How Endless Choice Is Creating Unlimited Demand, Hyperion, 2006.

Battelle J. (2005) The Search: How Google and Its Rivals Rewrote the Rules of Business and Transformed Our Culture, Nicholas Brealey Publishing, London.

Benkler Y. (2006) The Wealth of the Networks, How Socila production transforms markets and freedom, Yale University Press

Bowman S, Willis C (2003) We media: How audiences are shaping the future of news and information, http://hypergene.net/wemedia/weblog.php

Burgelman J.C & Y. Punie (2006) Information, Society and Technology, pp.17-34 in E. Aerts & J.L. Encarnacao (eds.) True visions. The emergence of ambient intelligence. Heidelberg, Springer.

Castells, M. (1996-1998) The Information Age. Blackwell: Oxford. de Certeau, M. (1984) The practice of everyday life, Berkeley/Los Angeles/London: University of California Press.

Flichy, P. (1995) Une histoire de la communication moderne- Espace public et espace privé, Paris: La découverte poche.

Freeman, C. (1988) Japan: A new national innovation system?, in G. Dosi, C. Freeman, R. R. Nelson, G. Silverberg and L. Soete (eds.) Technology and economy theory, London: Pinter.

Giddens, A. (1993) Modernity and self-identity. Self and society in the late modern Age, Cambridge: Polity Press (First published 1991).

Graham, P. (2004) What the Bubble Got Right, www.paulgraham.com/bubble.html

IDATE (2006), Digiworld. Montpellier

Lazonick, W. (2005) Evolution of the New Economy Business Model, http://www.thebhc.org/publications/BEHonline/2005/lazonick.pdf.

Leslie et al, 2003, Scooped again , http://iptps03.cs.berkeley.edu/final-papers/scooped.pdf

Markham, A. (1998) Life Online. Researching real experience in virtual space, AltaMira Press, Sage Publications: London & New Delhi.

Moser P. (2003) How Do Patent Laws Influence Innovation? Evidence From Nineteenth-

Century World Fairs, (National Bureau of Economic Research, Working Paper No. 9909, 2003), *available at* https://www.nber.org/papers/w9909)

Moulthrop, S. (2004). From work to play: Molecular culture in the time of deadly games. In N. Wardrip-Fruin & N. Montfort, The New Media Reader. Massachusetts: The MIT Press, p 56 – 70.

Nielsen//Netratings (2006) http://www.nielsen-netratings.com/pr/pr_060821.pdf;

OECD (2005) Communications Outlook. Paris.

O´Reilly, Tim. 2005. What Is Web 2.0. Retrieved, 12 September, from http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html

Negroponte, N. (1995) Being Digital, MIT Press: Cambridge.

Pascu, C., Osimo, D., Turlea, G., Ulbrich, M., Burgelman ,J.C. (2007) The potential disruptive impact of Internet 2 based technologies, in First Monday March 2007 issue available online at http://www.firstmonday.org/issues/issue12_3/pascu/

Pérez C. (2006) Re-specialisation and the Deployment of the ICT Paradigm – An essay on the Present Challenges of Globalisation, in R. Compano, C. Pascu, A.F. Bianchi, J.C. Burgelman, S. Barrios, M. Ulbrich. & I Maghiros (eds.) The future of Information Society in Europe: contributions to the debate, Sevilla, IPTS Technical Report. http://www.jrc.es/home/pages/detail.cfm?prs=1453.

PEW/Internet & American Life Project (2006) Bloggers – a portrait of the internet´s new storytellers, 19 July 2006

Punie, Y., Burgelman, J-C. & Bogdanowicz, M. (2002), The future of online media industries. Scenarios for 2005 and beyond, The IPTS Report, 64, May 2002, 35-42.

Quan-Haase, A. & Wellman, B., How does the Internet affect social capital. In M. Huysman & V. Wulf (Eds.), Information Technology and Social Capital, 2003.

Saveri, A., Rheingold, H., Pang, A. S. K., & Vian, K. (2004). Toward a new literacy of cooperation in business: Managing dilemmas in the 21st century. Institute for the Future Technology HorizonsProgram. Retrieved, 4, July, from http://www.iftf.org/docs/SR-851A_New_Literacy_Cooperation.pdf#search=%22´cooperation%20in%20business´%22

Seely Brown, J. & P. Duguid (2000) The social life of Information. Boston, Harvard Business School Press.

Seely Brown , Hagel John (2005) From Push to Pull- Emerging Models for Mobilizing Resources, Working Paper

Silverstone, R. & Sørensen, K. (2005) Towards the Communication Society, in Silverstone, R (ed.) Media, Technology and Everyday Life in Europe: From Information to Communication, London: Ashgate Publishers Ltd, pp. 213-222.

Tuomi I. (2002) Networks of Innovation. NY, Oxford University Press.

Van Bavel, R., Punie, Y. & Tuomi, I. (2004) ´ICT-Enabled Changes in Social Capital´, The IPTS Report, Special issue: Building the Information Society in Europe: the contribution of socio-economic research, Issue 85, June 2004, 28-32.

Von Hippel, E. (1976) The dominant role of users in the scientific instrument innovation process, pp. 212-239 in Research policy 5 (3).

Ya-De Wong, T. (2003) Move Over, First Mover – *A Theoretical and Empirical Analysis of First-Mover Advantage in the Internet Economy,* http://www-econ.stanford.edu/academics/Honors_Theses/Theses_2003/Wong.pdf.

Zerdick, A, Picot A., Shrape K., Silverstone R., Burgelman J.C., Feldmann V., Heger, D., Wolff C. (eds.) e-Merging Media: Communication and the media economy of the Future. Munchen, Axel Springer Verlag.