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Web 2.0: Where does Europe stand?

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PREFACE

Information and Communication Technology (ICT) markets are exposed to a more rapid cycle of innovation and obsolescence than most other industries. In order to avoid losing market share to competitors in commodity markets, ICT companies have to sustain rapid innovation cycles. As a consequence, the competitiveness of the European industry in this sector must pay attention to emerging and potentially disruptive technologies.

In this context, the Directorate-General for Enterprise and Industry (DG ENTR) and the Institute for Prospective Technological Studies (JRC-IPTS)[1] have launched a series of studies to analyse prospects of success for European ICT industries in the face of technological and market innovations.[2] These studies, under the common acronym "COMPLETE"[3], aim to gain a better understanding of the ICT areas in which it would be important for the EU industry to remain, or become, competitive in the near future, and to assess the likely conditions for success.

Each of the "emerging" technologies (or families of technologies) selected for study are expected to have a potential disruptive impact on business models and market structures. By their nature, such characteristics generate a moving target whose definition, observation, measurement and assessment precludes the use of classical well-established methodologies. The prospective dimension of each study becomes an intrinsic challenge that is to be solved on a case-by-case basis using a mix of techniques to establish lead-market data through desk research, expert group discussions, company case analysis and market database construction. These are then combined with a strong reflection on ways and means to assess future competitiveness of the corresponding industries. At the same time these characteristics result in reports that are uniquely important for policy-makers.

The collection of COMPLETE studies illustrates, and each in their own right, that European companies are active on many fronts of emerging and disruptive ICT technologies and are active in the supply to the market with relevant products and services. Nevertheless, the studies also show that the creation and growth of high tech companies is still very complex and difficult in Europe, and too many economic opportunities seem to escape from European initiative and ownership. COMPLETE helps to illustrate some of the difficulties experienced in different segments of the ICT industry and some of the anguishes of growing global players from the ground up. Hopefully, COMPLETE will contribute to a better understanding of opportunities and help shape better market conditions (financial, labour and product markets) to sustain European competitiveness and economic growth.

The present report reflects the findings of the JRC-IPTS study related to Web 2.0 Technologies. The report starts by introducing the Web 2.0, its characteristics, early market diffusion and potential industrial impact, before moving to an analysis in terms of the contribution to the competitiveness of the European ICT industry.

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[1] IPTS is one of the seven research institutes of the European Commission's Joint Research Centre (JRC).
[2] This report is one out of a series, part of the umbrella multiannual project COMPLETE, co-financed by DG ENTR and JRC/IPTS for the period 2007-2010 (Administrative Arrangement ref. 30667-2007-07//SI2.472632)
[3] Competitiveness by Leveraging Emerging Technologies Economically

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EXECUTIVE SUMMARY

This report provides a techno-economic analysis of Web 2.0 and an assessment of Europe's position in Web 2.0 applications. Firstly, it introduces the phenomenon of Web 2.0 and its main characteristics: technologies, applications, and user roles. It then provides an overview of its adoption, value chain and business models, before moving to an analysis of its drivers, industrial impact and disruptive potential. Finally, the report assesses the position of the European Web 2.0 applications industry and its prospects for growth.

"Web 2.0" is defined as a set of applications, technologies and user roles. The applications include blogs, wikis, social tagging, social gaming etc., even though it may not always be fully clear whether a specific application is Web 2.0 or not. These applications are based on creative combinations of a number of recent web-related technologies, including AJAX, syndication feeds, mash-ups, and wiki engines. Perhaps the most pertinent characteristic of Web 2.0, as compared to the previous "version" of the Web, is that it enables users to do more than just retrieve information. Although the possibility to do so is not entirely exclusive to Web 2.0, the extent and ease with which it can be done now is new: the user can become, with little effort, an integral part and co-provider of most or all of the elements of a service delivered through the Web, and be a content provider, quality manager, technology tester, and contributor to collective intelligence.

The available figures about recent Web 2.0 diffusion deliver two messages. Firstly, its spread is extremely rapid by any standards, although not uniform for all its applications. The most diffused applications, including wikis, blogs and online social networks have, in only a few years, been adopted by some 20-40% of Internet users. Secondly, the intensity with which users participate differs a lot. It can be estimated that about 3% of European Internet users generate content based on their own creative efforts, about 10% of them provide feedback, comment and review existing content, and 40% are passive consumers of Web 2.0.

The rapid diffusion of Web 2.0 has been enabled by several factors. First, Web 2.0 builds on a number of technological innovations and improvements, which enable users to easily create and distribute content and to interact with other users. At the same time, general price reductions and performance improvement in network and terminal equipment, combined with improved broadband availability, have been crucial for the take-up of Web 2.0 applications. In addition, the rise of the Internet version Web 1.0 had already created a generation of young people who have little reluctance to share personal data online. The influence of the open source community has also been important, partly because of the technologies that have been developed, and also because it has set the stage for collaborative communities.

Although value chains are not yet settled and differ from application to application, a few key features are more or less common to all of them. At the centre are the providers of Web 2.0 applications who may be pure Web 2.0 players (e.g. Wikipedia) or traditional players from related industries such as the media and Web 1.0 industry (e.g. Disney or Yahoo). They provide opportunities for users (individuals, companies and other organizations) to network and/or to create content. Many value chains also include advertisers and companies providing advertising platforms. Technological platforms for the applications are made available by providers of ICT services and Web 2.0 software packages, and by ICT goods suppliers who are selling hardware with new functionality and interoperability for users to create and access content.

As yet, no dominant revenue model for Web 2.0 content-hosting sites has been established. Four basic revenue models have been identified: (1) advertising (e.g. YouTube); (2) users paying for content (e.g. online social gaming); (3) bundling and other ways of tying Web 2.0 to complementary products or services (e.g. Big Brother); (4) donations (e.g. Wikimedia projects) and (5) the interim business model where developers of a new Web 2.0 content hosting site set out to sell it to a large established company. The content hosting platforms may in turn choose to remunerate content creators through different revenue-sharing schemes, or simply rely on their voluntary contributions.

We discuss four aspects of Web 2.0 which may have a disruptive impact on industry:

(1) Providers of Web 2.0 applications are becoming increasingly numerous and large, and contribute to growth and employment.
(2) They already constitute an important threat to other industries, in particular content industries. The content industry is responding by diversifying into Web 2.0.
(3) Web 2.0 applications and software are being increasingly adopted by the enterprise and public sectors as tools for improving internal work processes, managing customer and public relations, innovation, recruitment and networking.
(4) The growth of Web 2.0 leads to a derived demand in the supply of ICT hardware and software.

Europe's current position in the supply and development of Web 2.0 applications is rather weak. Although Web 2.0 is used almost as much in Europe as it is in Asia and the US, Web 2.0 applications are largely provided by US companies, while Europe and all other regions are left behind. About two thirds of the major Web 2.0 applications are provided by US companies, with similar shares for revenues, employees, and even higher shares for innovation indicators such as patents, venture capital and R&D expenditures. The corresponding shares for the EU hover around 10%. Hence, as it starts from a rather weak position, Europe may in fact lose ground in the medium-term.

Nevertheless, Europe could have the advantage in some areas of the Web 2.0 landscape, for example social gaming, social networking, and Mobile 2.0. European industry appears to be more competitive in online social gaming, and in the computer gaming industry as a whole, than in other parts of Web 2.0. European firms could also become competitive in online social networking, where there seem to be niche markets for locally-adapted or otherwise differentiated social networks. Finally, the EU has a very strong presence among mobile communications operators and suppliers and is therefore in a good position to establish leadership in Mobile 2.0.

1   INTRODUCTION

1.1   Rationale

Over the last few years, there has been impressive growth in a number of user-driven applications, such as blogs, podcasts, wikis and social networking Web sites. Together, they are often referred to as Web 2.0 or social computing. It has often been claimed that these applications may have a significant disruptive impact on business models, not least in the ICT and media sectors.[4] The objective of this report is to discuss this disruptive potential, and assesses the position and prospects for growth of a European industry in producing Web 2.0 applications.

This final report provides a techno-economic analysis of Web 2.0 and an assessment of Europe's position in Web 2.0 applications. Specifically it offers definitions and overviews of the technologies, applications, usage characteristics, value chain and business models of Web 2.0, as well as a discussion of its drivers, economic impact and disruptive potential. It will also outline the aspects that allow us to examine the competitiveness of the European ICT industry in Web 2.0. Finally, it will look at the positioning of the EU industry with regard to these technologies, the existence and positioning of major EU players, and at strengths and weaknesses in the various Web 2.0 areas.

1.2   Methodology

This report is partly based on research conducted by IPTS in a project entitled "Exploratory Research on Social Computing (ERoSC)", which aimed to analyse emerging Web 2.0[5] applications.[6]

This underlying research was carried out through desk-based data collection, supply and demand monitoring, trend analysis, and critical assessment of multiple data sources. The ERoSC project also included an in-depth analysis of two cases: (1) collaborative content and (2) social networking, as well as interviews with experts and stakeholders. The results were validated in an international experts' workshop attended by participants from industry, NGOs, academia, policy and other institutions. They were also presented at numerous workshops, conferences and to an advisory board. The section on Mobile 2.0 draws on another IPTS exploratory research project on Mobile Content Evolution. Further research for this report was carried out mainly through complementary desk-based research, creating a data base of Web 2.0 companies, and through patent searches. This report was also validated in a separate experts' workshop.

A further methodological note is necessary at this stage. Web 2.0 as used in journalistic - and often even scientific - language is a broad and ill-defined concept.[7] Taking all the proposed and rapidly evolving technologies, applications, markets and industry players, usages, and

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[4]   See for example Pascu *et al.* (2007) and the Gartner Hype Cycle of 2007, where six out of 29 technologies are Web 2.0 related. (see e.g. http://www.upstream.nl/comments.php?id=658_0_1_0_C)

[5]   The ERoSC project uses the term *social computing* instead of Web 2.0, essentially referring to the same phenomenon.

[6]   In doing so, parts of the report draw on the following JRC IPTS deliverables: Pascu (2008), Ala-Mutka (2008), Cachia (2008) and Punie (2008). Project researchers have been: K. Ala-Mutka; R. Cachia; M. Cabrera; C. Centeno; S. Kluzer; S. Lindmark; D. Osimo; R. Özcivelek, C. Pascu; Y. Punie; M. Ulbrich and J. Valverde.

[7]   See further Section 2.1, O'Reilly (2005), Pascu (2007), and http://en.wikipedia.org/wiki/Web_2 [accessed 15 February, 2008].

even philosophies into consideration would render any analysis meaningless. It is therefore necessary to start the analysis by carefully defining and delimiting the concept. In addition, Web 2.0 is a contemporary trend, which has emerged and developed over recent years, with little agreement on measurement issues and tools, poor data availability, and still questionable reliability or comparability of sources of data.

As with any proper scientific analysis of emerging trends and in view of the above two considerations, the following cautionary notes must be sounded:

- The Web 2.0 technologies and applications which have been selected are those which offer the most publicly available – and sometimes verifiable – data and qualitative information.
- The use of data quoted from third parties should be taken as indicative, but never as confirmation of the validity, reliability or comparability of this information.[8]

1.3 Report Outline

This report is structured as follows. After this introduction, Chapter 2 defines and delimits the concept of Web 2.0, mainly in terms of its constituent applications, technologies and characteristics of use. Chapter 3 accounts for the recent diffusion, in terms of supply and usage of the main Web 2.0 applications. Chapter 4, outlines the drivers of this Web 2.0 diffusion, as well as its emerging value network and the main revenue models used. Chapter 5 discusses the main industrial impacts of Web 2.0 in terms of industry growth, disruptive potential, enterprise use of Web 2.0 and also the derived demand for ICT products and services, while Chapter 6 examines the position of the European ICT industry with respect to Web 2.0 applications. Finally, Chapter 7 offers the main conclusions.

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[8] For as recent initiative to collect Official statistics of Web 2.0 related data, see OECD (2008)

2   INTRODUCTION TO WEB 2.0

2.1   *What is Web 2.0?*

The rapid recent diffusion web applications such as blogs, podcasts, wikis and social networking sites has often been referred to as "Web 2.0",[9,10] indicating a "second" phase of development of the Web, which is seen as encompassing qualitatively "more" than the previous Web "version 1". This trend is also named 'social software', 'social computing', 'the participative web' or 'user-generated content', though each expression captures some dimensions of the phenomenon and misses others. In this report, we generally use the term "Web 2.0" as it is broader and more neutral.

There are a number of elements and characteristics which appear to be common across the various observable versions of Web 2.0. Drawing on Pascu (2008) and Osimo (2008), we see Web 2.0 as composed of a set of innovative (1) applications, (2) technologies, and (3) user roles (Table 2-1).[11]

Table 2-1 Towards an operational definition of Web 2.0

Applications	Blog, Wiki, Tagging, Multimedia sharing, Social Networks, Social gaming, etc.
Technologies	Syndication, Web Feed, RSS, Atom, Microformats, Folksonomy, Tag, Tag cloud, Ajax, XML, CSS, Mashup, Wiki engine, Permalinks, Linkback, RIA, etc.
Users' roles	User as a producer, Collective intelligence, Peer review, Perpetual beta

Source: Adapted from Osimo (2008) and Pascu (2008), in turn adapted from O' Reilly and Forrester research

To start with, new *applications* are developing that allow, for example, easy publishing, information sharing, networking and collaboration. These applications are branded under the name of (often new) companies and are commonly identified in the media with Web 2.0: Flickr, MySpace, Facebook, etc. These applications will be further described in Section 2.2. Regarding *technology*, the building blocks of Web 2.0 are those innovations introduced over recent years to increase the usability and interoperability of web applications. These technologies will be further described in Section 2.3.

However, the *users' roles* or *characteristics of use* of Web 2.0 are what really distinguish Web 2.0 from Web 1.0. The most salient new roles occur when users double as producers, provide peer reviews, test applications (perpetual beta), and provide collective (intelligent) input. These roles are further described in Section 2.4.

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[9]   The 2.0 evidently alluding to the version-numbers that commonly designate software upgrades.

[10]   According to Anderson (2007) and O'Reilly (2005), the term 'Web 2.0' was officially coined in 2004 by Dale Dougherty, a vice-president of O'Reilly Media Inc. during a discussion preparing a future conference about the Web, which had the purpose to demonstrate that the Web was more important than ever, with exciting new applications and sites popping up with surprising regularity. (O'Reilly 2005).

[11]   Please observe that this ordering does not reflect any order of importance, but is rather presented this way for pedagogic reasons.

2.2 Applications of Web 2.0

The key Web 2.0 applications are summarised below.[12]

2.2.1 Blogs

Blogs (from weblogs) are websites with frequently updated user-created entries (posts) of text (opinion, information, personal diary entries). They often include the possibility for others to comment and to tag (see Section 2.2.3), providing images, and links (including blogrolls – links to other blogs). Blogs are arranged chronologically with the most recent post first, all in the style of an online journal.

Blogs can be hosted by dedicated blog hosting services, they can be run using blog software, or on regular web hosting services. The large number of people engaged in blogging has given rise to its own term, "blogosphere" – the 'world' of bloggers. Blogs are also stimulating the development of a number of complementary services, such as blog search engines and blog publishing tools.

It could be argued that blogs (and Web 2.0 in general) have some similarity with Usenet newsgroups – the moderated discussion forums of the 1980s. However, modern blogs evolved instead from the online diaries of the mid 1990s, where people would keep a running account of their personal lives.

Examples of popular blogs are Gizmodo, Huffington Post, Engadget, BoingBoing. Wordpress, Movable Type, and Blogger are tools for publishing blogs. Technocrati is an example of a blog search engine.

2.2.2 Wikis

Wikis are websites and/or software which allows users to write and edit content collectively. A wiki is essentially a database for creating, browsing, and searching through information. Wikis use a simple mark-up language based on a web browser. A single page in a wiki website is referred to as a "wiki page", while the entire collection of pages, which are usually well interconnected by hyperlinks, but also by other forms of page navigation and hierarchies, is "the wiki". Wikis may be private or public, require login or not, and include different levels of revision and control systems. They generally have a history function, which allows previous versions to be examined, and a rollback function, which restores previous versions.

Although some of today's information exchange features on the Web were foreseen back in 1945 by Vannevar Bush,[13] Wikis had to await the development of Web hypertext protocol and the graphical interface browsers of the mid 1990s. Wikis started gaining widespread attention around 2002, with the success of Wikipedia. By 2008, there were thousands of Wiki sites and hundreds of wiki engines on the Internet.

Wikis can be created and provided at "wiki farms", such as PeanutButterWiki, Socialtext and Wikia. Wiki software vendors include Atlassian and IBM, while the most widely used Wiki by far is Wikipedia.

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[12] The descriptions and examples draw on OECD (2007); Anderson (2007); Wikipedia, OVUM (2007), Gartner (2008) as well the JRC IPTS ERoSC deliverables Pascu (2008), Ala-Mukta *et al.* (2008) and Cachia (2008).

[13] Vannevar Bush – a US engineer and science administrator who among other things envisaged many features of the WWW in his "As We May Think" essay, first published in The Atlantic Monthly in 1945.

2.2.3   Social tagging

Social tagging, sometimes labeled 'group-based aggregation', 'social bookmaking' or 'folksonomies', enable collection, classification and aggregation of online content. A tag is a keyword that is added to a digital object to describe it, but it is not part of a formal classification system. Social tagging systems allow users to create lists of 'bookmarks' or 'favorites', to store these centrally on a remote service (rather than within the client browser) and to share them with other users of the system. Bookmarks can belong to more than one category.

Objects which can be tagged include websites (as in del.icio.us), photos (as in Flickr), video (as in YouTube) and podcasts (as in Odeo), as well as other applications. Tagging has expanded to include tag clouds, i.e. groups of tags (tag sets) from a number of different users of a tagging service, indicating the frequency with which particular tags are used. They are often displayed graphically as a 'cloud' in which tags with higher frequency of use are displayed in larger text. Tagging also allows social groups to form around similarities of interests and points of view – hence the term social tagging.

Compared to blogs, social tagging is a more recent phenomenon; the first projects began in 2002. Example of social tagging sites include Del.icio.us, Digg, Flickr, Citeulike, and Conntoea.

2.2.4   Social networking sites

Online social networking sites (OSNs) allow users to network with other users and to exchange and share digital assets. Through such platforms, users can upload and share images or audio-visual content, tags, lists of friends, digital gifts and create groups that share common interests, to name but a few of the possibilities. They also allow for the creation of personal profiles, which in addition to text, often include images and videos. Users connect to other users through these profiles, and become "friends". Social networking site profiles can also contain comments from other members, and a public list of the people that a particular user identifies as "friends" within the network. They often include presence technologies and activities, which allows users to track which of their contacts are online and what they have been up to. OSN's may be general, or specialised networks that cater to a wide variety of special interests or demographics.

Modern social networking websites emerged in the mid and late 1990s and include Classmates and SixDegrees. SixDegrees (focusing on indirect ties) was the first site in which user profiles could be created, messages sent to users held on a "friends list". Additionally, a member could seek out other members with similar interests in their profiles– all in one package. More recent innovations have given users more control over content and connectivity. OSNs include, among others, the following sites: MySpace, Facebook, Friendster, bebo, LinkedIn, ZoomInfo, Xing.com, Skyrock, Hi5, Hyves, AsmallWorld, and Netlog.

2.2.5   Multimedia sharing

Sometimes analysed as a sub set of social networking, multimedia sharing services facilitate the storage and sharing of audio and video content produced by the users themselves or by others. This functionality is provided through websites and applications that facilitate the upload and display of different media. Most multimedia sharing sites provide multiple views (such as thumbnails, and slideshows for images), and the ability to classify and add annotations (such as captions or "tags") and comments

The first photo sharing sites originated in the mid to late 1990s, primarily from services providing online ordering of prints (photo-finishing). The early 2000s saw the emergence of many more which provided permanent and centralised access to a user's photos, and in some cases, video clips too. Examples of multimedia sharing sites are YouTube (video), Flickr and Photobucket (photographs) and Odeo (podcasts).[14]

2.2.6   Social gaming – virtual (online) worlds and MMOGs

A virtual (online) world is a simulated environment which allows users to inhabit and interact via "avatars", which usually take the form of two or three-dimensional graphical representations of humanoids (or other graphical or text-based avatars). Communication has, until recently, been text based, but now real-time voice communication using VoIP is available. This category of applications includes more traditional games (massively multiplayer online games – MMOGs) such as "World of Warcraft", which people typically play to win, and social games or "virtual worlds" built for people who want to be entertained and interact, such as Second Life.

The precursors of virtual worlds can be traced back to Multi User Dungeons on the Internet and stand alone virtual reality. Since then the virtual worlds, sometimes labelled social gaming, have gradually developed to include more advanced features and interactivity. Similarly, though MMOGs have their roots far back in the history of computer gaming, the Internet-based versions only started to emerge in the mid 1990s.

Popular games and virtual worlds include: Second Life, World of Warcraft, Active Worlds, Habbo Hotel, Xivio, Citypixel, ViOS, EverQuest, Ultima Online, Lineage, RuneScape, Entropia Universe, The Sims Online, There, and Kaneva.

2.2.7   Other applications

In addition to the major applications described above, there are many others that may well qualify as Web 2.0. For instance, *aggregation services* (e.g. iGoogle) are websites which gather information from diverse sources across the Web and publish in one place. They typically include news and RSS feeds and tools that create a single webpage for all of a person's feeds and email. Data *mash-ups* are web services that pull together data from different sources to create a new service (i.e. aggregation and recombination).[15]

Podcasting are audio recordings or multimedia files which are distributed over the Internet using feeds, for later playback on, for example, computers, mobiles or MP3 players (iPod in particular, hence the term *podcast*). A podcast is made by creating e.g. an MP3 format audio file, uploading the file to a host server, and then alerting subscribers to its existence through the use of a syndication format such as RSS or Atom.[16] This process (known as enclosure) adds a URL link to the audio file, as well as directions to the audio file's location on the host server, into a syndication file (see below on technologies). Podcast listeners subscribe to the feeds and receive information about new podcasts as they become available. Podcasting was popularized by Apple's iPod in 2004. Popular podcasting sites include Apple/iPod, BTPodShow, Odeo. Podcast software include: Feedburner, iPodderX, WinAmp and @Podder.

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[14]   However, although often having OSN features, the audio-visual share has some characteristics which are distinct from OSNs. This may require that we separate them in the final report.

[15]   Anderson (2007)

[16]   RSS feeds are essential features in other Web 2.0 applications including blogs and mash-ups

Recently, with Twitter, *Micro-blogging* has gained substantial popularity. Micro-blogging allows users to write brief text updates (usually less than 200 characters) and publish them, to be viewed either by anyone or by a restricted group, which can be chosen by the user. These messages can be submitted by a variety of means, including text messaging, instant messaging, email or the web. The most popular service is called Twitter, launched in July 2006. Competing services include Jaiku and Cromple. Other Web 2.0 providers (such as Facebook) have also included micro-blogging into their services recently.[17]

More in general, one should note that established Web 1.0 sites are increasingly adding Web 2.0 features to their offerings. Many websites, including e-commerce platforms, search engines, guides, thematic portals, and media sites are gradually adopting the main features of Web 2.0, allowing users to provide feedback, comments, rankings and content. It is expected that this will accelerate the participatory nature of the Web in general.[18]

2.3 Web 2.0 Technologies

Web 2.0 applications are based on a number of underlying software technologies, (features, standards and protocols), most of which have been introduced in recent years. These technologies increase the usability and interoperability of web applications. A selection of such technologies is presented below.[19]

One set of technologies often associated with Web 2.0 is AJAX (Asynchronous JavaScript and XML), which is a group of interrelated web development techniques used for creating interactive web applications. One characteristic of AJAX is that it enables the exchange of small amounts of data, which means that entire web pages do not have to be reloaded each time there is a need to retrieve data from a server. This increases the responsiveness and interactivity of Web 2.0 applications.

Another set of technologies relate to web syndication, i.e. to make web feeds (or syndicated feeds) available from a site in order to provide people with a summary of content recently added to a website (for example, the latest news or forum posts). A feed is a data format for providing users with frequently updated content. The dominant formats for feeding are (1) RSS (Really Simple Syndication, initially developed by Netscape in the late 1990s) and the Atom Syndication Format (an XML language currently standardized by IETF).

The technological basis for wikis is Wiki software, which typically allows web pages to be created, edited and linked using a web browser. It is usually implemented as a software engine that runs on one or more web servers, with the content stored in a file system and changes to the content stored in a relational database management system. This software, called 'wiki engines', are usually open source, and available under the GNU General Public License (GPL). Leading wiki engines includes TWiki, MoinMoin, PmWiki, DokuWiki and MediaWiki, while TWiki and Atlassian Confluence are popular on intranets.[20]

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[17] http://en.wikipedia.org/wiki/Micro-blogging [Accessed 2008-03-04]

[18] IDATE (2008)

[19] The information in this section is to large degree from Wikipedia and also Anderson (2007) and http://www.rossdawsonblog.com/Web2_Framework.pdf [Accessed 2008-05-14].

[20] There is multitude of wiki software and providers of such software, see e.g. http://en.wikipedia.org/wiki/List_of_wiki_software and http://c2.com/cgi/wiki?WikiEngines.

Several Web 2.0 services are based on mashup technology – web application hybrid technology. Mashup means merging content from different sources, e.g. using cartographic data from Google Maps to add location information to other services, thereby creating a new and distinct web service that was not originally provided by either source. Mashup platforms that help users create mashups include: (1) Yahoo pipes, (2) Microsoft Popfly, (3) Google Mashup Editor. In addition, many Web 2.0 sites make use of widgets, i.e. small portable applications that can be embedded into any web page.

Blogs use some of the above mentioned technologies, including AJAX. Additionally, many blogs make use of permalinks. A permalink is a URL that points to a specific blog (or forum) entry after the entry has passed from the front page into the blog archives. Because a permalink remains unchanged indefinitely, it is less susceptible to link rot. A linkback is a method for Web authors to obtain notifications when other authors link to one of their documents. This enables authors to keep track of who is linking to, or referring to their articles. There are three methods (Refback, Trackback, and Pingback) which accomplish this task in different ways.[21]

Rich Internet Applications (RIA) have the features and functionality of traditional desktop applications, and are therefore not always considered to be Web 2.0. Still, RIAs have some features and technologies in common with Web 2.0. RIAs typically transfer the processing necessary for the user interface to the web client, but keep the bulk of the data (i.e. maintaining the state of the programme, the data etc.) back on the application server. RIAs typically run in a web browser, and either do not require software installation or run locally in a secure environment (a so called sandbox which provides a tightly-controlled set of resources for guest programmes to run).

Many Web 2.0 applications also include some sort of presence engine, i.e. a technology that provides an application with an indication of online availability of contacts. Originating from IM, a conferencing application, presence engines are now spreading to other applications including Web 2.0 ones (such as OSN) and business applications.[22]

To these technologies, we could add all the recent improvements in networks and device technologies (improvements in processing, storage, display, bandwidth, etc) which are making Web 2.0 (see Section 4.1) more attractive.[23]

It is fair to say that, individually, none of the above technologies are revolutionary. They do not represent radical technological leaps. Instead, it is the effect of the technologies used together that offers innovative potential for developing application platforms.

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[21] For a list of the wide variety of available (user-hosted, free/open source/proprietary and developer-hosted) blog software see http://en.wikipedia.org/wiki/Weblog_software .

[22] Gartner (2008)

[23] We may also add technologies behind MMOG and social games. These are however of very different character than the other Web 2.0 because of the game-like features, 3D environments, etc. To cover these technologies, is beyond the scope of this report.

2.4 Characteristics of use

A pertinent feature of Web 2.0, as compared to the previous "version" of the Web, is that it enables users to take on a more active role than before. "Use" in this sense is not limited to its traditional meaning of passive consumption, such as information retrieval, but involves an active role of the "user". Users typically provide content, provide comments and evaluations, test new applications, and contribute to collective intelligence. All of this is possible because of the extreme ease of use, which enables even non-specialist users to get involved with limited personal investment in terms of both time and money.[24]

The user as provider of content is the most prominent feature in social networking, where all the content is provided by users, but it is widespread in all Web 2.0 applications. Most blogs are simply users giving their opinion. YouTube is full of amateur videos, Flickr has private photos; Wikipedia is exclusively based on user-provided content; and so on. This does not mean that all users take on this role; indeed, only a small number of users do so, while the majority of site visitors will simply consume this content. Nevertheless, the possibility for all to provide content, even if only occasionally, and the ensuing stream of content that is quite different from what traditional content providers would have produced, gives Web 2.0 applications a unique disruptive potential.

Providing content on one's own tends to require some effort, such as filming or photoshooting plus uploading, and often some equipment and is therefore a minority activity. Other forms of user involvement are much easier and therefore much more widespread. Commenting on and evaluating the content provided by others, both professionals and users, is the most common of these form of involvement. It allows for content to be improved by the "wisdom of the crowds", e.g. by rapidly pointing out errors or adding new information. It is also the Web 2.0 feature most often copied by traditional media nowadays, though in these cases it does not yield the same quality filtering effect. The comment sections on newspaper or TV websites are rarely read by others than by the people who intend to comment themselves, while comments on real Web 2.0 applications are a key component of the site. For example, the stars YouTube users attribute to postings play a key role for other users in selecting videos they want to see. This filtering effect brings higher quality content to the front, without the need for a traditional editor, disrupting the raison d'être of editors in a variety of media outlets.

A similar role is played by a specialist sub-set of users in terms of technologies. Web 2.0 applications are typically released in "beta" versions, meaning that they have not been completely tested and revised. These versions are then tested in real life by users. Often, applications remain in "beta" status for years, which each updated version still not considered final. There is also a legal reason for this – as a "beta" version, the application provider has less liability. However, the permanent feedback from users on the application software has two more fundamental advantages. Firstly, by remaining open for improvements all the time, the software will not be overtaken by more recent releases. Secondly, the testing of the software is effectively outsourced to unpaid volunteers. Both features disrupt the traditional software business model: they do away with an important part of software development, i.e. in-house testing, and they undermine the system of periodic releases of updates.

Finally, in Web 2.0 users also contribute to collective intelligence by categorising information. Tagging articles, photos, videos or other sites by users allows a "folksonomy" to

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[24] Osimo (2008).

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emerge, which enables users to navigate the rapidly increasing quantity of available content. This folksonomy has the particular feature that it does not impose a hierarchical organisation of content, as traditional practices like online dictionaries or file management systems do. Instead, it allows multiple tags, often overlapping and on different levels, to be attached to a given item. As a result, this has the potential to not only disrupt search engines and directories, but more importantly to do away with standardised information classification and the multitude of professions in media and other industries whose main task it is to organise information.

As a result of these four characteristics of use – user as provider of content, quality manager, technology tester, and contributor to collective intelligence – Web 2.0 applications are uniquely participatory. Not all of these characteristics of use are exclusive to Web 2.0. For example, it was possible before to put content online, by creating a website and uploading text, photos or video and any interested user could also communicate his experiences with a given software to the producer. In these respects, the novelty is based on an entirely different scale of involvement, which is several orders of magnitude greater than before because of the radical improvements in ease-of-use. Conceptually, a blog may only be a frequently updated personal website, but hundreds of millions of blogs are fundamentally different from hundreds of thousands of personal websites.

2.5 Summary and conclusions

In this report, we consider "Web 2.0" to be those applications which enable interaction and collaboration, where users are also participants and co-creators (not only end-users). These applications include blogs, wikis, social tagging, multimedia sharing, social networking and social gaming, though it may not always be fully clear whether an application is Web 2.0 or not. It should also be noted that although the concept only gained recognition from 2005, several of the applications had already appeared in their first versions during the Web 1.0 era of the late 1990s.

These applications are based on creative combinations of a number of web-related technologies, including AJAX, syndication feeds, mash-up, wiki engines, etc. Perhaps the most pertinent characteristic of Web 2.0 as compared to the previous "version" of the Web is that it enables users to do more than just retrieve information. Although this is not entirely exclusive to Web 2.0, it can be argued that a distinguishing feature of Web 2.0 is the magnitude and ease with which the user can become an integral part and co-provider of most or all of the elements of a service delivered through the Web: which include being a provider of content, links, referral, contacts, relevance, reputation (the user can thus develop into a quality manager), feedback, and guidance, a technology tester, and a contributor to collective intelligence.

3 DIFFUSION OF WEB 2.0

This chapter will briefly introduce and discuss some further figures which indicate the diffusion of major Web 2.0 applications as well as the level of user participation, which was discussed as a distinguishing feature of Web 2.0 in the previous chapter. Before doing so, a methodological note is necessary, since measuring the diffusion of Web 2.0 services is notoriously difficult, not least since it is a recent phenomenon and lacks reliable official statistics. The research[25] is therefore based primarily on data available from either Internet audience measurement companies (e.g. Hitwise, comScore, Nielsen Netratings, Mediametrie), international research companies (like IPSOS Mori) or research projects of non-profit centres (e.g. Pew Research Centre's Pew Internet and American Life project in US), international firms like Edelman, or the industry itself (e.g. Technorati, Wikipedia, SecondLife, PodLook, Feedburner).[26]

3.1 State and rate of diffusion

A few major observations on the state and rate of diffusion are summarised in Table 3-1. In the last couple years, the rate of Web 2.0 diffusion has been dramatic. In just a few years, Web 2.0 sites have managed to attract a large share of Internet users attention. Online gaming, wikis, blogging, social networking and tagging especially have spread widely and rapidly, with about 20-40% of Internet users using such applications. Virtual worlds (such as Second Life) have lower levels of usage.

Table 3-1 Observations on the state and rate of diffusion of major Web 2.0 applications

Application	State of diffusion (indications)	Rate of creation of new content (indications)
Blogs	- 39% of US Internet users read blogs - 70+ M blogs tracked by Technocrati - active blogs are substantially fewer.	- Doubling every 5-7 months until mid 2006 - After then about linear 120.000 with new blogs created daily
Wikis	- 7.5 M articles in all combined Wikipedia - circa 250 languages - Almost 10% (reach) of global Internet users visit Wikipedia a month (much higher in some statistics)	- Growth in number of articles in EN Wikipedia tailed off since 2006, still about 600.000 articles are created each year. - Reach of Wikipedia is still rising
OSN	- 250M profiles in OSNs - 25-50% of Internet users visit OSNs	- major sites MySpace and Facebook level off after extremely rapid growth rates.
Multimedia sharing	- 1+ billion images in photo sharing sites - 40M videos on video sharing sites	- 1M new photos are uploaded daily in Flickr - 65,000 daily video uploads in YouTube (2006)
Online (social) gaming	- 25% of Internet population play online games. 6+ million subscriptions in WoW (2006). - 9 million users in 2L with active users much lower (2-500.000)	N/A
Social tagging	- Millions of photos tagged in Flickr, videos in YouTube, - 230 million blog posts using tags or categories - Some 7% of US Internet users tag content online on a typical day	- over 1M tags added per week in Flickr (2006); 2.6M geotagged photos in Flickr in Aug 2007 , up from 1.6 M in 2006

Note: Figures are not fully comparable for methodological reasons. Figures are from 2007 or some month during that year unless otherwise stated in the table.

Source: Adapted from Pascu (2008) as presented at the ERoSC workshop in February 2008.

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[25] The statistics in this section draws mainly on Pascu (2008).

[26] Pascu (2008)

Clearly, one feature which has caught the attention of the media, and reinforced the Web 2.0 buzz, is the spectacular growth of some OSNs (e.g. MySpace, Facebook) and multimedia sharing sites (e.g. Youtube). Indeed, in terms of how often people visit these sites (pages views, see **Error! Reference source not found.**), growth has been spectacular in recent years, in fact much more rapid than for the most popular wiki and blogging sites (e.g. Wikipedia, Blogger). On an aggregate level, US data shows that the market share of top Web 2.0 sites rose from about 3% in mid 2005 to over 15% in mid 2007[27].

Thus, clearly the scale of Web 2.0 supply and usage is already impressive. Some observers claim that the levelling off or decline in numbers (as for MySpace) may actually be a sign of application fatigue and users abandoning these services after an initial curiosity-driven trial. Or it may simply be that the current generation of Web 2.0 applications is starting to reach its market potential, and that only product improvements (new functionality/better performance/lower costs) or differentiation allowing for the activation of new market segment will drive further adoption. It may also be the case that most Web 2.0 will eventually be replaced by radically new services, partly based on the existing ones. For instance social tagging may lead the way towards the long-anticipated semantic web.

3.2 Levels of user participation

However, one should not jump from the fact that large numbers of people participate in one way or another to the conclusion that participation in Web 2.0 is evenly distributed. On the contrary, it has often been observed that the roles of users in Web 2.0 range from very active for a few to overwhelmingly passive for the large majority. As a general rule, the more effort needed for a contribution, the smaller the share of contributors. Very few people have enough time, money or skills to provide detailed technical comments for "beta"-versions, or self-produced audio-visual content. More people will actively participate in social networks. Even so, these two categories tend to be dominated by teenagers and students, who have enough time on their hands. More people again will post comments on blogs, tag items, provide ratings etc. The least involved, usually the majority, will use Web 2.0 passively, by listening to podcasts, reading blogs, or using RSS, still generating indirect effects and sometimes contributing to the value of Web 2.0 sites. . Note that a similar categorisation can be applied within individual applications: a few contribute very intensely to Wikipedia, some a bit less, many occasionally, and most not at all. Still, the very few contributions of the many often add significantly to the content of many Web sites.

One slightly different attempt to visualize and to quantify this distribution of roles is the Concentric Model of Participation Intensity (CPMI), see Figure 3-3. It starts from a core of participative users of Web 2.0, who are those who generate content based on their own creative efforts, including content on blogs, Wikipedia articles and videos on YouTube. These represent only a small minority of Internet users, generally younger and more IT-savvy. For Europe, these content creators represent about 3 % of the Internet users.[28] Those users who provide feedback, comment and review existing content are represented by a second circle. This includes, for example. those users who rate products, write reviews for Amazon, tag bookmarks on del.icio.us, or even those who click on the "love or ban" buttons on online

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[27] Tancer (2007)

[28] Deere (2006). See also Tancer (2007). According to Rainie (2007) and Young (2007) this percentage is much higher in the U.S at 13%. It is unclear at this point if these figures represents an actual higher share of content creators in the US, or if it simply a reflection of different methodologies for data collection.

radios such as LastFM. Osimo (2008) estimates that around 10% of the Internet population in Europe participates at this level.[29,30]

- ➢1.Producing content
- ➢2.Providing ratings, reviews
- ➢3.*Using user-generated content*
- ➢4.Providing attention, taste dat

3% 10% 40% 100% of Internet users (50% of EU population)
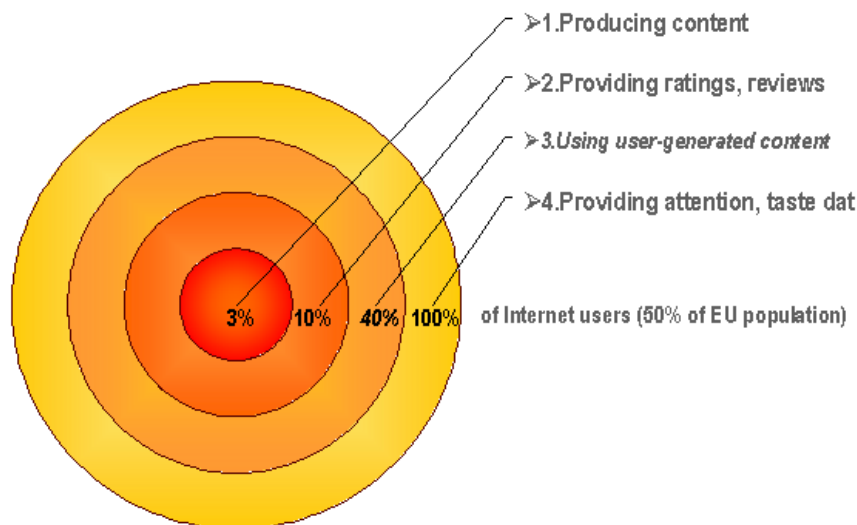
Figure 3-1 Degrees of user participation Web 2.0 applications
Note: percentages are rough estimations based the sources below
Source: IPTS (Osimo 2008) elaboration of Deere (2006); Rainie & Tancer (2007); Young (2007)

The third circle corresponds to Internet users who access, read and watch the content produced by the two inner circles of more participatory users. Although not active, these users benefit from new Web 2.0 applications. For example, they could be customers who read others' reviews before booking a hotel or buying a book. It can be estimated that about 40% of Internet users fit into this category.[31] Finally, the remaining Internet users, although not deliberately using Web 2.0 applications, provide input and intelligence that is transformed by Web 2.0 applications into services for other users (for instance, when a book is bought on Amazon, this information is exploited by the website functionality "Customers who bought this book also bought").[32]

3.3 *Summary and conclusions*

The available figures on Web 2.0 dissemination deliver two messages. Firstly, its spread is extremely rapid by any standards, although not uniform for all its applications. From not having existed some 10 years ago, many Web 2.0 applications are now on the verge of becoming mainstream. Secondly, although user participation is what distinguishes it

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[29] Osimo (2008). Deere (2006) states that 7-11% of Internet users post reviews about product/services, and Young (2007) proposes a figure of 19% for the category of "critics", and 15% for "collectors" in the U.S.

[30] For a resembling perspective see Slot and Frissen (2007) who analyze 150 top Web 2.0 sites in terms of the possibilities they provide to consume, create, share, facilitate and communicate content.

[31] based on data by Deere (2006) (in Europe, 17% read blogs, 40% read other customer's reviews), Rainie (2007) (36% of Internet users in U.S. use wikipedia) and Young (2007) (33% in U.S. are spectators).

[32] Osimo (2008).

fundamentally from Web 1.0, most users do not actually participate much (which in turn may be a sign of potential still to be tapped).

4 DRIVERS, VALUE CHAIN AND REVENUE MODELS

Section 4.1 looks at what the main drivers of the rapid Web 2.0 diffusion of the last few years have been. Section 4.2 introduces the emerging value network/value chain of Web 2.0, i.e. what the main categories of players in the industry are and how they are related. Finally, Section 4.3 identifies emerging revenue models for application providers and users as content providers.

4.1 Why Web 2.0 spreads

So far, we have defined what Web 2.0 is, and observed that it has spread like wildfire. We will now look at what drives the success of Web 2.0. This is built on a combination of technological, economic and social factors. Fundamentally, technological innovation has succeeded, because it has had the right background of economic developments and social attitudes.

It is fairly obvious that Web 2.0 is built on technological innovations. The recent invention or radical improvement of the technologies described in Chapter 2, such as Ajax, RSS and wikis, has created new opportunities for Internet surfers, who have avidly taken them up. As argued before, the key success factor is that these innovations provide extreme ease-of-use. Web 2.0 could not have happened a few years ago, before these technologies had been created.

At the same time, the general trend of price reductions in ICT goods and services has enabled large numbers of users to take advantage of the new offers. Broadband has become cheaper over the years, leading to a fairly widespread – and still growing - broadband availability, at least in the developed countries, with its implications of always-on connectivity and rapid downloading capacity. Terminal equipment such as cameras, camcorders, camera-equipped mobile phones, MP3 players, etc. have become sufficiently affordable to allow large numbers of users to upload their audiovisual content. Computing power and memory capacity has also become sufficiently affordable to allow most modern computer to handle all their owners' Web 2.0 activities easily. Price therefore was another factor that prevented Web 2.0 from happening a few years earlier, when prices were still too high for many people to have camcorders, broadband or sufficiently powerful computers.

Additionally, one should not forget that Web 2.0 follows Web 1.0. The rise of the Internet had already introduced a generation of young people, as well as a generation of computer scientists, to the potential of communicating online, of unlimited information availability, and to the power of collaborating with complete strangers. Partly as a result of this, there is little reluctance to share personal data online, a key component of Web 2.0. Moreover, the collapse of web 1.0 had left a large number of entrepreneurial ICT specialists in search of a new concept. Web 2.0 could not have happened in the 1990s before people got used to Web 1.0.. One may also argue that users have become more accustomed to a wider variety of interactive services over the last couple of decades.

Finally, it must be observed that the open source movement plays a key role in Web 2.0, both by providing much of the technology (such as Ajax and wikis), and by providing an ethos of voluntary contributions to collective projects, such as Wikipedia. Many of the applications have been written specifically with the ideal in mind that volunteers would work together, for a variety of non-economic reasons, such as intellectual interest, a wish to express their opinions, to contribute to a community etc. Web 2.0 could not have happened if only traditional software firms had been providing software.

One could also argue that the relative success of open software has shown that collaborative communities can prosper, gain significance and be also used for business purposes. Web 2.0 uptake is further enabled by commercial interest in user-created content and "long tail" economics[33] and through greater availability of advertising, and new business models to monetise such content.[34] How such commercial activities are organised, and how value is extracted from them, is the topic of the following two sections.

4.2 Value chain

Mapping out the value chain for Web 2.0 is not straightforward for a number of reasons: (a) the value chain depends on which application is considered; (b) value chains are still emerging; (c) some Web 2.0 applications revolve around non-commercial players creating value without any expectations of profits or remuneration. Against this background, a first generic sketch of the Web 2.0 value chain, including some of the incentives for the different actors in the value chain to participate is provided below. The major actor categories discussed below are: (1) Web 2.0 platform and site providers; (2) users; (3) producers of content (be they professional or users); (4) suppliers of ICT goods, software and services enabling Web 2.0; (5) traditional players in related industries such as media; and for some value chains (6) advertisers and providers of advertising tools. The simplified Web 2.0 value chain of Figure 4-1 illustrates only the most important content related interactions

At the centre of the Web 2.0 value network are Web 2.0 **application providers** such as Wikipedia or Facebook. They could be either stand-alone applications or providing third-party application providers using Web 2.0 applications, such as Facebook, as platforms. These applications provide opportunities for **users** (including also companies and other organizations) to network and/or to create, provide, distribute and exploit content.

Content on Web 2.0 sites may be created in different ways and by different actors. It may be provided independently by users having either commercial or non-commercial incentives.[35] This content may be provided by more traditional players in **related industries** (such as the *media industry*). They may do so not only for the purpose of generating online revenues, but also to encourage use of their traditional content. By reaching out to Web 2.0 audiences they promote their own content, and retain their audience and advertisers. They may do so also for defensive purposes, preventing Web 2.0 from reducing their revenues from other content and/or prevent disintermediation.[36]

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[33] See Anderson (2006)

[34] Ala-Mutka (2008)

[35] OECD (2007)

[36] OECD (2007)
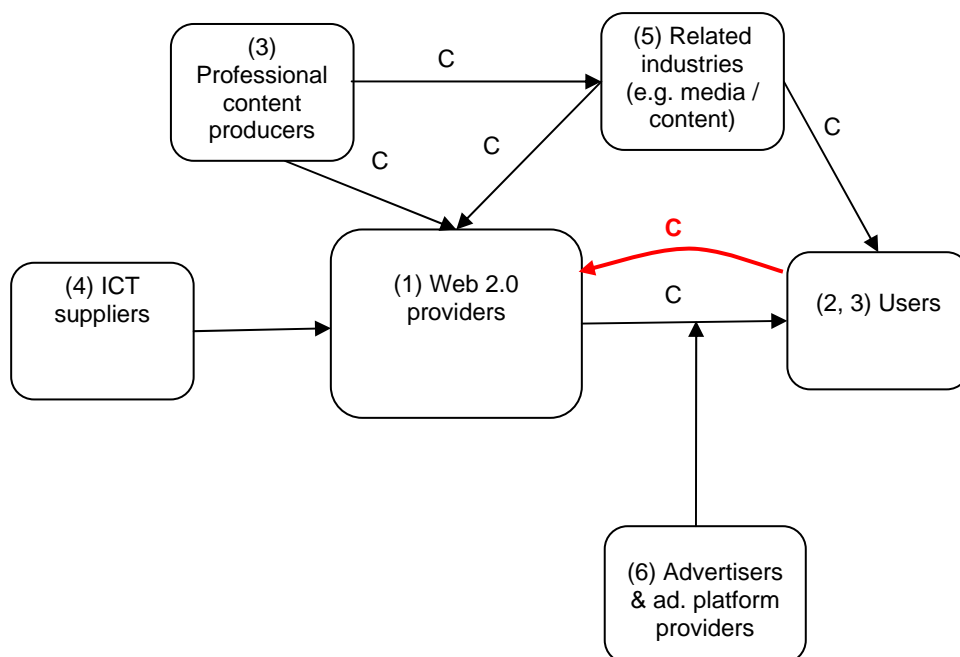
Legend: C = Content

Figure 4-1 Simplified Web 2.0 (Content related) value network

Professional content creators (journalists, photographers), previously producing their content to the media industry, are now also producing for Web 2.0 sites and have to find ways to compete with free web content. Other examples of related industries include *Web services/portals/search engines/ISPs* that use Web 2.0 to build more attractive websites, customer services and information (e.g. a travel agency or hotel chain that encourages users to post pictures and share appreciations or a portal providing an OSN).[37]

Companies providing the necessary technology for Web 2.0 include software producers, who provide ICT services and software for the creation, hosting and delivery of Web 2.0 services and consumer electronics, and **ICT** goods **suppliers** who sell hardware with new functionalities and interoperability allowing users to create and access content.[38]

Although not present for all value networks, the dominant revenue model for for Web 2.0 so far has been advertising (see below). In such cases **advertisers** and companies providing advertising platforms (like Google and Yahoo) become major players in the value chain, participating in increasing online advertising directed at communities on Web 2.0 platforms. Related to this activity are, quite naturally, marketing firms and brands expanding customer loyalty through promotion of brands on social networking sites or by advertising to Web communities.[39]

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[37] OECD (2007) A prime example is perhaps Yahoo, which has since long provided services and applications which elements of Web 2.0. These include not only recent acquisitions such as Flickr and del.icio.us, but also Yahoo! Groups, Geocities, Yahoo! 360°, Yahoo! Answers, Yahoo! Video! And Yahoo! Mxd. (See OVUM 2007)

[38] OECD (2007)

[39] OECD (2007)

4.3   Revenue models

Just as for the value chain, Web 2.0 revenue models are still emerging and differ between application and sites. These can be categorised in various ways (see e.g. OECD 2007). Based on observed revenue models, we have identified the following dominant groups of models so far(including combinations): (1) advertising; (2) end-users paying for content or premium services; (3) Tying Web 2.0 offerings with complementary goods (including bundling and razor and blade); (4) donations. These will be elaborated below, together with the (5) interim business model of aiming for acquisition. This overview of Web 2.0 models will be limited to the revenue models of the Web 2.0 application providers and to users as content creators.

4.3.1   Advertising model

Many Web 2.0 services contain advertisements. In principle, the advertising model is similar to that of traditional media, e.g. newspapers and commercial TV channels, and to online advertising in general, the latter emerging in the late 1990s using what is known as banner advertising. Prices for such advertisements plummeted during the burst of the dot.com bubble since these banners were not very effective neither for branding nor for directs sales, due, among other things, to low click-through rates. In response, recent innovations in online advertising include (a) new ad appearances (flashing, moving etc.), (b) contextual-based advertisement making the advertisement increasingly personalised and (c) new pricing models (such as pay-per-click or cost per action, where advertisers only pay the publisher for each time someone clicks through or completes a transaction).[40] Web 2.0 brings possibilities of advertising one step further, using specific features of Web 2.0 (user profiles, communities etc.) into viral marketing and social marketing. However, this has been implemented very little so far by Web 2.0 sites.[41]

Thanks to the information available about web site visitors (e.g. previous website, geographic location, topic interest) advertising can often allow better targeting than other media. Also, in relation to TV advertising, Web 2.0 adverts are substantially cheaper with less than $2 per thousand views for MySpace, in relation to $30 for prime-time TV. Google and Yahoo are the largest enterprises that mediate advertisements on the Internet, with ads by Google being the most widespread and popular tool used.[42] Also there are a number of privacy issues related to advertising, as exemplified by the failed Facebook *Beacon* in 2007, a marketing initiative that allowed websites to publish a user's activities in their Facebook profile as "Social Ads" and promote products.[43]

Product placement is also used in Web 2.0, not least in online gaming, where advertising can be easily included in some game environments that imitate the real world. A well known example is Second Life, where enterprises can build their own online presence,[44] although this does not generate advertising revenues for Linden lab in the traditional sense.

Web 2.0 advertising is starting to grab a substantial share of the online advertising market. For instance, according to Nielsen Netratings about 9% of advertising impressions (viewed pages with advertisements) are from community sites (roughly OSNs).[45] Advertising revenues

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[40]   See e.g. http://www.pbs.org/mediashift/2007/06/digging_deeperyour_guide_to_on.html and
       http://computer.howstuffworks.com/web-advertising1.htm

[41] IDATE (2008)

[42]   VTT (2007) and Cachia (2008)

[43] See e.g. http://en.wikipedia.org/wiki/Facebook_Beacon [Accessed 2009-04-23]

[44]   VTT (2007)

[45]   http://www.nielsen-netratings.com [Accessed 23 March 2008]

for some Web 2.0 companies have already become substantial. YouTube, for instance, declared revenues from advertising: of about 15 M / month before being purchased by Google.

However, as noted by IDATE (2008) in terms of advertising revenues SC sites are underperforming in relation to their traffic. CPM (cost per mille – per thousand views) is substantially lower at e.g. MySpace than average online media. This is partly a result of their inability to adapt advertising beyond Web 1.0 and to capitalise on their key features (member profiles, user involvement, community tools etc.). In 2008 only some 5.5% of the $ 26 billion spend on online advertising come from social networks in the US (of which more than 70% from Facebook and MySpace, still not making those sites profitable)..[46]

4.3.2   Selling content to users model (for basic or premium service)

Revenue models where users are paying (often in the form of a subscription) for access to platforms are also developed around Web 2.0 services. Fee-based services include online gaming, such as World of Warcraft, which had 8 million paying users in 2007 paying about €10 a month[47] In Korea, popular OSN Cyworld relies to a large extent on charging end-users: in 2006, it had estimated revenues of $140 million, of which about 70% came from the sales of 'dotori', a virtual currency for which Cyworld users buy items for personal pages (most of the remaining 30% comes from users uploading pictures from mobile phones). Another example is Second Life which sells a currency called Linden dollars, which can be used in its virtual economy.[48] The latter example borders between selling content to users and the subsequent model, complementary goods.

Basic access to a service is often free of charge in order to attract customers.[49] In many cases, the services were initially brought to the market at no cost, and subsequently, as the services gained popularity, fee-based additional features were built on. Examples of such partially free platforms are:[50]

- Flickr: where basic functionality is free as anyone can upload images. An annual fee of about $25 gives users extra functionality such as more space for photos etc.
- Last.fm radio allows radio listening free of charge. At the same time, users add the musical tastes of different people to the services database listing. A monthly fee of a few euro gives access to radio channels better personalised to the user's tastes.
- LinkedIn is available free of charge. If more extensive information of the surrounding networks is required, the user needs to pay an amount ranging from about $20 per month for the less advanced premium services to several thousands of dollars for more advanced corporate solutions.
- Blogging platforms often provide blogging facilities for free, but can also tend to charge for extra space or services.[51]

4.3.3   Tying Web 2.0 with complementary goods models

In many cases Web 2.0 applications are add-ons to other services, such as search engines and email. This means than Web 2.0 functionality comes bundled with these services and

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[46] IDATE (2008)

[47]   VTT (2007)

[48]   OVUM (2007:48)

[49]   VTT (2007)

[50]   VTT (2007)

[51]   See, for example, http://wordpress.org/hosting/

customers pay for the bundles instead of the separate offerings. In those cases Web 2.0 applications do not generate revenues directly, but only indirectly through the effect of service differentiation. For instance, tracking friends and creating personal-profile pages are services provided by Yahoo, Microsoft and AOL. Google's Gmail allows users to see when their friends are online and to send them Instant Messages through a chat box. Google also allows users to share pictures, word documents and excel sheets through their email account.

Related to the bundling model is the case where the platform uses the Web 2.0 service to promote other goods, sometimes through cross-subsidising. For instance, the Big Brother TV series uses OSNs functionality on their web page in order to boost the TV show's popularity. It stimulates discussion and produces free content for the programme, such as making up tasks, in addition to increasing interest towards the show. This creates added value that can be utilised in the actual TV programme as well as in other media supporting it, such as tabloids.[52] Another example is photo-sharing sites, offering storage free of charge as a vehicle to sell prints or other goods.[53]

4.3.4 Donations model

Revenue can also come from voluntary donations; however, in this case, it is difficult to speak of a "business" model. This is a common model for projects where the content is produced through collaborative authoring. For example, Wikimedia Foundation projects, such as Wikipedia, Wikibooks, Wiktionary, and Wikispecies are only supported by donations and the voluntary work of the community participants.[54] To this, we may add voluntary pricing, i.e. cases where users decide themselves if they want to pay and if so how much, as a partial form of the donation model.

4.3.5 Acquisition as a business model…?

The wave of emerging Web 2.0 applications has initiated various buyouts, mergers, acquisitions and partnerships. This often involves building up a large customer base before selling. The most popular Web 2.0 companies are being sold for high amounts, to established players such as Google, Disney, Yahoo and Microsoft. For instance, Disney paid $350 million for Club Penguin (a social site for children) NewsCorp paid $580 million for MySpace, and Yahoo! bought Flickr for an undisclosed amount of money, rumoured to be around $ 40 million. [55,56] In March 2008, Time Warner's web portal AOL acquired Bebo, an online social network, for $850 million[57]

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[52] VTT (2007) In principle, it also possible to use the information on user behaviour generated from Web 2.0 and use that information for other commercial purposes.

[53] http://en.wikipedia.org/wiki/Metacafe#Producer_rewards

[54] Ala-Mutka (2008). All content is created under GNU Free Documentation License, and the foundation is committed to keeping the project non-commercial. This, however, similarly to FLOSS still allows business models based on packaging and additional services, e.g. printing and selling Wikipedia books or offline versions. Hardware manufacturers can also bundle Wikipedia as additional value in their products. (*ibid*)

[55] http://www.readwriteweb.com/archives/yahoo_acquisition_pattern.php

[56] Acquisitions of Facebook have also been much rumoured. In March 2006, Facebook declined an offer of $750 million (Rosenbush, 2006). and in September 2007, Facebook was reporting seeking investment that valued the company at around $10 billion, more than twice the market cap of The Times. In October 2007, Microsoft purchased a 1.6% share of Facebook for $240 million (Stone, 2007).

[57] Economist, Online social networks, Everywhere and nowhere, Mar 19th 2008, http://www.economist.com/business/displaystory.cfm?story_id=10880936 [Accessed 25 March, 2008]

Some observers regard the starting of a company in order to later sell it as a business model in itself. This is a bit questionable however. It could possibly be considered as a way to earn money for the founder, but not for the service or platforms.

4.4   Content producers revenue models

One of the distinguishing features of Web 2.0 is the role of users as producers of content for many applications. There are different options for monetary compensation for this role, including the possibility of contributors not being financially compensated at all for their work.[58] First of all, as mentioned above, platform providers sometimes **share advertising revenues** with content producers, whereby they reward the content creations based on the attraction drawn by the content. For example it is reported that Newsvine (a user generated news and discussion site) users are paid 90% of all advertising revenue generated by it.[59] Another well-known example of this model is YouTube Partners Program, which offers independent video creators and media companies the possibility of sharing advertising their revenues from YouTube videos.[60]

Users may also be remunerated by the application providers, if the product is purchased by a third party. The applications provider will then act as an **intermediary**. For example, photo agency Scoopt was set up by 16,500 amateur photographers. When an image is sold, the photographer gets 40% in royalties.[61] Some content platforms also **compensate** content contributors **directly**, as they get their revenues from further content related activities. For example, Weblogs Inc pays its blog contributors. Also companies who gather user innovations and input through collaborative platforms – crowdsourcing – may reward the best ideas, or buy them.[62]

Metacafe is yet another example of the latter model. In October 2006, the company announced its Producer Reward program in which video producers are paid for their original content. Through this programme, any video that is viewed a minimum of 20,000 times, has achieved a certain rating and does not violate any copyrights or other Metacafe community standards, is awarded $5 for every additional1,000 views. As of December 2007, the top 20 producers on Metacafe have earned over $10,000 each, with the top producer, KipKay, having earned over $100,000. In total, more than 550 independent video creators have earned more than $1 million through the Producer Rewards programme.[63]

Finally, a large part of the Web 2.0 content is created by **voluntary contributions** of content creators, as, for instance, in all WikiMedia projects. Often the motivation behind such contributions to the content production are non-commercial and similar to those behind open

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[58]   This section draws on Ala-Mutka (2008).

[59]   Sparkes (2007)

[60]   http://www.YouTube.com/partners/ The criteria for joining the programme is i) creating original videos suitable for online streaming ii) owning the copyright of the videos iii) regularly uploading videos that are viewed by thousands of YouTube users. Hence, this revenue possibility is available only to those who manage to create videos with high interest and a large audience. This revenue option is also used by major media companies, for example YouTube announced to have content partnership deals with thousands of content providers, including CBS, BBC, Universal Music Group, Sony Music Group, Warner Music Group, NBA, and The Sundance Channel.

[61]   Sparkes (2007)

[62]   Sparkes (2007) Another example is Activephone's momo platform, was launched in 2006 in order to enable users to paid for content uploaded on mobile platforms (OVUM 2007:49).

[63]   Wikipedia

source communities.Even so , there are sometimes commercial aspects related to uncompensated content production. For example, blog contents may be promoting products that the blog author is producing or selling. Uploading content to collaborative platforms can also be done for promotion purposes, especially in the case of photo, picture or music artists. For example, the UK band Koopa reached the UK top40 list without a record deal.[64]

4.5   Summary and conclusions

The rapid diffusion of Web 2.0 has been enabled by a number of technological, economic and social factors. First and perhaps foremost, Web 2.0 builds on a number of technological innovations and improvements, recent ones including Ajax, RSS and wikis, which enable users to easily create and distribute content and to interact with other users. At the same time, general price reductions and performance improvement in network and terminal equipment combined with improving broadband availability have been crucial for the take-up of Web 2.0 applications. In addition, the rise of the Internet had created a generation of tech-savvy young people, with little reluctance to share personal data online. The open source community has also contributed as a technology developer, and also by setting the stage for collaborative communities.

Although **value chains** for Web 2.0 are still emerging, have not yet settled and differ between applications, a few key features are more or less common to all of them. At the centre of the value chain are the providers of Web 2.0 applications, who provide opportunities for users (including companies and other organizations also) to network and/or to create, provide, distribute or consume content. These platforms may be provided by new "pure" Web 2.0 players or by more traditional players from related industries such as the media and Web 1.0 industry. The applications are made available by providers of ICT services and software for creation, hosting and delivery of Web 2.0 services, as well as by ICT goods suppliers who sell hardware with new functionality and interoperability for users to create and access content. Many value chains also include advertisers and companies providing advertising platforms.

As yet, no dominant **revenue model** for Web 2.0 sites has been established. As is common in the early phases of the life-cycle of innovations, revenue generation is only beginning now and revenue models are still in flux. Four basic revenue models have been identified: (1) advertising (e.g. YouTube); (2) users paying for content; (3) bundling and other ways of tying Web 2.0 to complementary products or services to make money on those instead or to rely on (4) donations (e.g. Wikimedia projects) as well as the (5) interim business model of aiming for acquisition. The content hosting platforms may in turn choose to remunerate content creators through direct payment or through revenue-sharing schemes, or simply rely on their voluntary contributions.

Clearly, Web 2.0 is already a commercial activity to some extent, with increasing attempts to generate revenue. As such, it is bound have economic impacts, disruptive or not. Analysing those impacts will be the purpose of the next chapter.

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[64]   Beer (2007)

5 INDUSTRIAL IMPACT OF WEB 2.0

The economic impact of Web 2.0 has only just started kicking in. Despite that, its effects are already rippling trough the economy as illustrated in Figure 5-1.

At the centre there is (1) the Web 2.0 industry itself, which shows phenomenal growth rates, even by the demanding standards of the Internet. The sector which has suffered the most from this growth so far is (2) the traditional media industry, whilst other industrial sectors are still at the very beginning of their own Web 2.0 take-over. And even those sectors (3) which are not directly threatened by Web 2.0 have to adapt to the impacts caused by Web 2.0 – most importantly in their relations with customers, but also in their internal work processes. Finally, one should not overlook the effect of Web 2.0-created demand on (4) the established ICT industries.
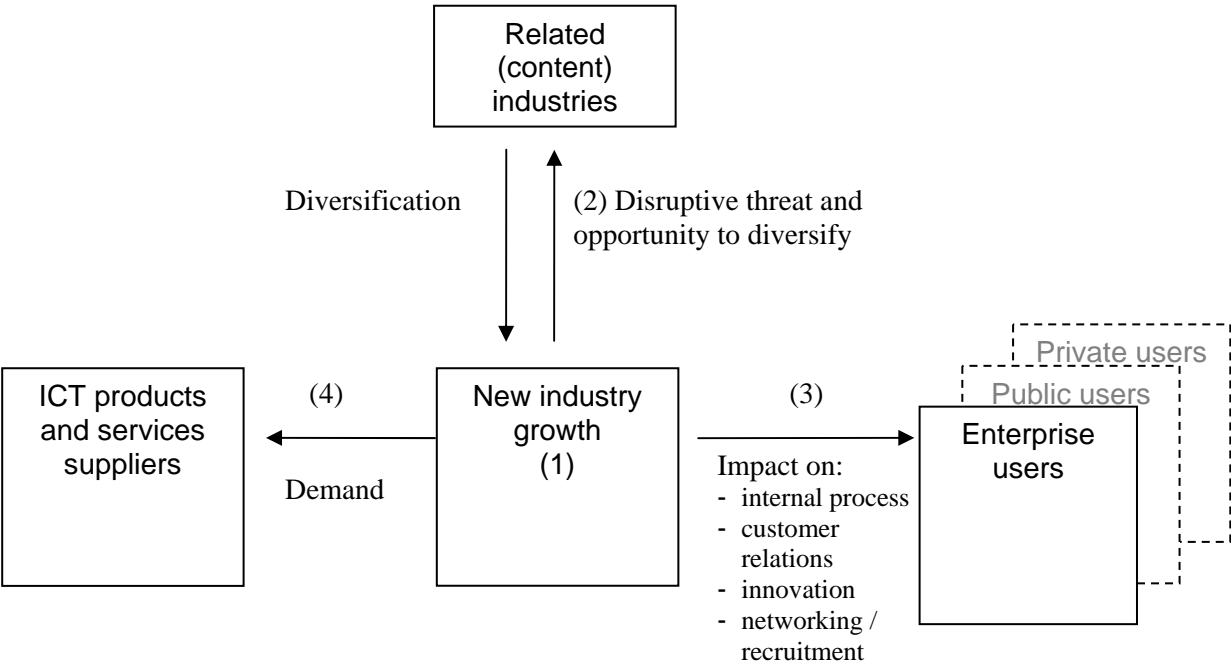
Figure 5-1 Major industrial impacts of Web 2.0 illustrated

Note the difference between (2) and (3) where (2) are the industries whose core products and services (e.g. media content) are directly affected by a substitutive threat from Web 2.0. (3) Includes industries that can make use of Web 2.0 applications in their value creating activities. Still, there is an overlap in the sense that industries threatened by Web 2.0 may also use it for other purposes.

5.1 Growth of a Web 2.0 applications industry

At the centre of the Web 2.0 value chain, the application providers themselves create employment and revenues, thanks mainly to advertising. In this way, even a small blog can become a source of revenue and a full time job for its owner. To exemplify, the blog BoingBoing generates advertising of more than $1 million / year.[65] As mentioned in the previous chapter YouTube declared revenues from advertising of about $15 million / month before being purchased by Google. Cyworld, the major Korean OSN, has an estimated $140 million in yearly revenues, while online gaming site WoW could have as much as $1 billion per year in revenues from paying customers. In total, the online social gaming market could be as large as $3 billion.

Box 5-1 The long-tail of Web 2.0 and related Web 2.0 economics

Web 2.0 applications (as well as more traditional Web 1.0 ones) have been claimed to provide greater opportunities for niche content to be distributed and consumed through the so called "*Long Tail*" effect, first coined by Chris Anderson in a Wired magazine article (Anderson 2004, 2006) to describe certain business models such as the one for Amazon.com. In essence, he pointed out that the Web opened up for businesses with distribution power to sell more niche-products (i.e. the Long Tail, the low-frequency part of statistical distributions). [a]

The Long Tail phenomenon has several drivers. On the supply side, it is driven by the reduction of storage and distribution costs (e.g. in the form of cost of shelf-space) allowing for businesses to address a much broader market. However, increased variety of supply makes it difficult for consumers to choose. Therefore, on the demand side, search tools, sampling tools, recommendation systems, advisers, dynamic Web-based storefronts, customer reviews, and online communities make it easier for customers to find products. This may in turn lead to a number of second order effects, including increased incentives, to develop niche products as well as changes in customer tastes (Brynjolfsson and Smith 2006).

The effects of the long tail are potentially great. Combined with the low cost and ease of producing content for Web 2.0 a potentially more dynamic and diversified content market is opened up, with economic incentives (for both established players and users themselves) to create content which appeals to smaller niches also. The creative potential of a larger set of content creators can then be unleashed, generating a wider variety of new low-priced content to a consumer base with increasingly varied tastes (the long-tail). However, there may be risks involved as well, for instance abusive and low-quality contents.

Economic effects result in more informed and demanding customers. In the Web 2.0 world, reputation is built online, but with much greater speed and more permanent visibility. Users also publish product and service reviews on special websites or on blogs, and take them into account when making purchasing decisions (e.g. Deere 2006 and Ipsos 2007). Reputations can be made or destroyed very fast. Companies have to react quickly to such exposure, and quality control becomes more important (Ala-Mutka 2008). This may lead to a structural impact, closer to the "perfect market". All in all, this tendency is well in line with what economic theories have to say about informed customers and the functioning of markets.

[a] See also http://en.wikipedia.org/wiki/The_Long_Tail

The combined yearly revenues of 99 SC application companies in the IPTS database (see further Chapter 6) was estimated at about $3 billion for 2007.[66] The total number of employees among the database companies is estimated at about 7000-8000.

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[65] Tazzi, J. (2007).

[66] See Lindmark (2009) for details on this database, for which information has been collected until December 2008.

These figures may in fact underestimate the size of the industry as they only partly consider companies diversifying into SC services and applications (such as Google and Yahoo's), and companies using SC applications internally (captive markets). For instance, revenues stemming from the Enterprise 2.0 market (SC for enterprise use), have been estimated at about $ 0.5 billion.[67] On the other hand, most SC companies struggle to generate revenues,[68] which is common for new emerging industries. Youtube, one of the most popular SC sites has been estimated to generate losses (for Google) of almost $ 0.5 billion in 2009 due to high costs of bandwidth, content licensing, ad-revenue shares, hardware storage, sales and marketing and other expenses.[69]

Even so, most sites are not profitable and do not generate revenues corresponding to their audience, not even leading sites such as Youtube, MySpace and Facebook. Youtube is known to be unprofitable for Google and Myspace, and Facebook generates about between $ 0.2 and $ 0.4 per visitor per month, which is much less than traditional Web 1.0 sites such as Yahoo ($1.2/vistitor/month). This raises some question marks over the sustainability of the phenomenon or, at least, it opens up opportunities to exploit SC better by finding ways to extract more of the value created by SC services.[70]

In addition, the new Web 2.0 industry includes websites, such as MySpace and Youtube, which have been acquired for large sums[71] by established players or have attracted investment, which can also be taken as an indication of the value (or potential value) attached to these applications by the market;[72] although implied values based on small share acquisitions may be misleading.

Yet another indicator is the inflow of venture capital into Web 2.0. Web 2.0 venture capital backing in the US has about doubled for five subsequent years surpassing $1 billion in 2007 (for total number about 180 deals, see Figure 5-2)[73] This number corresponds to a little less than1/10 of the total VC investment in ICT (see e.g. Figure 6-6). IPTS research shows, that the 50 companies in the Web 2.0 database (see further Section 6.1), for which we have investment data, raised about $4 billion either as VC-investment or as acquisitions.[74]

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[67] Forrester (2008)

[68] See http://www.ft.com/cms/s/0/6c968990-2b4c-11dd-a7fc-000077b07658.html and http://www.ft.com/cms/s/0/f449acaa-2b47-11dd-a7fc-000077b07658.html.

[69] See e.g. http://www.multichannel.com/article/191223-YouTube_May_Lose_470_Million_In_2009_Analysts.php

[70] See IDATE (2008)

[71] See Section 4.3.5.

[72] Pascu *et al.* (2007)

[73] http://www.techcrunch.com/2008/03/20/chart-me-up-web-20-venture-deals/. See also *ibid* for a list of top deals. Note that also these figures should be taken as indicative.

[74] Yet another indication of the economic value is actual valuations of Web application providers, as made by e.g. Silicon Alley insider (http://www.alleyinsider.com/sai25) which provide valuations of 11 of the 93 companies in the IPTS database (see Section 6.1). These valuations summed up to more than $ 28 billion (including a $ 7 billion valuation of non-profit Wikipedia). Although such valuations appear to be inflated at a first glance, they imply on average a 10*revenue, which is not completely out of line, if compared valuations in other growth markets. Note however, that the valuations are likely to have lowered after the crises of autumn 2008.
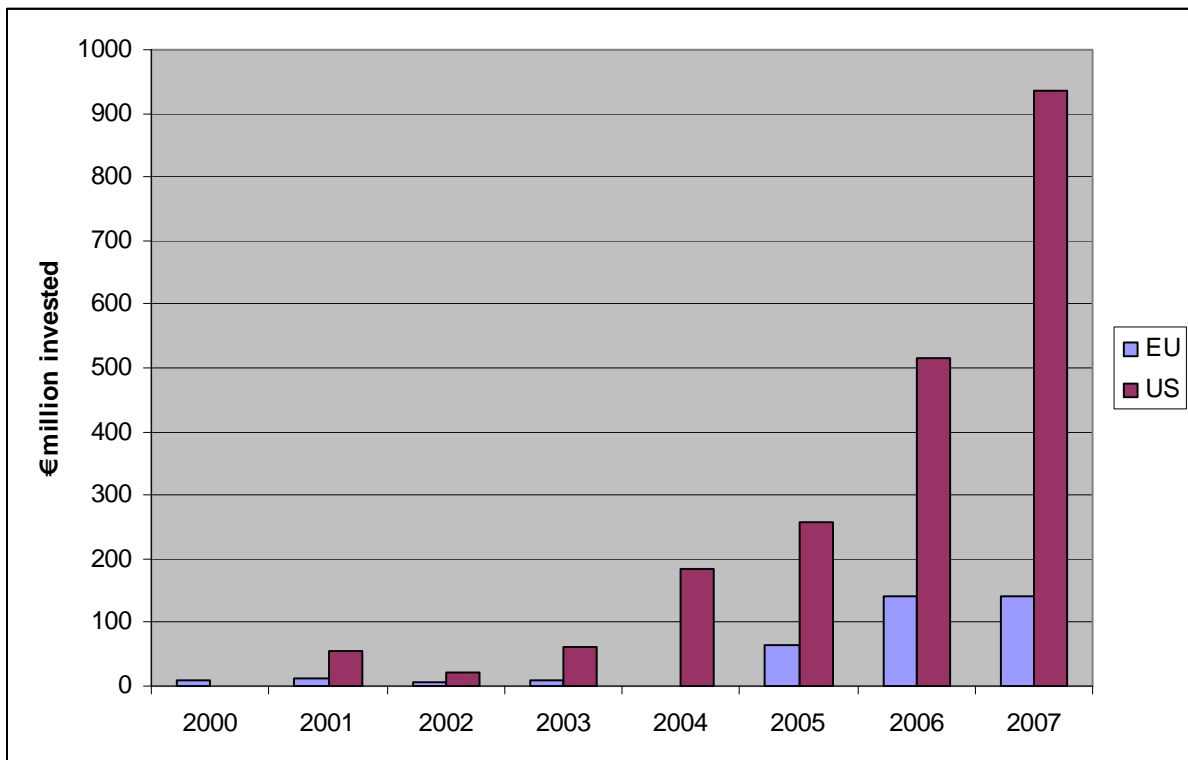
Figure 5-2 Europe and US Web 2.0 venture capital investments

Note: Since US and European data are taken from different sources, they are not necessarily fully comparabl.,
Sources: European data are estimated from Library House (2007a). 2006-2007 US data are from http://venturebeat.com/2008/03/18/dow-jones-web-20-investments-peaking/ while 2001-2005 US data are estimations based on a similar chart in http://www.techcrunch.com/2008/03/20/chart-me-up-web-20-venture-deals/ .

European VC investments have also risen rapidly but at lower levels. Data from Library House (2007a) show that after the burst of the dot.com bubble, venture capital investment in European Internet companies picked up in 2005, partly driven by the emergence of Web 2.0 (Figure 5-2 Europe and US Web 2.0 venture) and partly also due to the emergence of viable Web 1.0 business models (Web 1.0 venture capital investment picked up again in 2004/2005).

Taken together, the above figures and observations indicate that the Web 2.0 industry itself is already a multibillion dollar industry in terms of revenues and valuation, providing abundant entrepreneurial opportunities, not the least in the US. The figures may still underestimate the size of the industry since they only partly take companies diversifying into Web 2.0 services and applications, and those using Web 2.0 applications internally into account.

5.2 Disruptive impact and opportunity on media and other industries

Web 2.0 represents not only a strong growth industry, but also a threat to established industries. The most immediate impact of Web 2.0 services, based on user generated content, is on the **traditional media and publishing industries**. This is independent of their previous business model, whether based on pay-per-view, subscription, or advertising.

For its competitors, the popularity of Web 2.0 applications leads to a loss of audience, since it diverts attention from other media offerings, either traditional ones such as television, or Web 1.0 offerings such as professional websites. To this authors' knowledge, there are no statistics available specifically regarding Web 2.0 usage effects on other media. However, there are

statistics on general Internet usage and its effects on offline media consumption (e.g. OECD 2007:58-59) which show that Internet usage has a negative impact on TV watching and national newspaper rates in particular, especially among younger users.[75] Since we know from Chapter 3 how Web 2.0 has spread among Internet activities, it is reasonable to conclude that Web 2.0 reduces the consumption of traditional media even though this cannot be quantified at this point.

Less consumption typically means less revenue for producers, in the media/content industry cases, stemming potentially from fewer customers who pay less as well as from less advertising revenue. Incumbent companies in some segments of the media and publishing industry lose revenue because there are simply less fee-paying subscribers or pay-per-view customers. One of the most striking examples is the encyclopaedia publishing business, where there is 500 times more traffic on Wikipedia than *Britannica online,*[76] and where well-known publishers such as Brockhaus (Germany) have now stopped their printed editions.

Web 2.0 is also gaining an increasing share of the growing advertising market, although we cannot say exactly how much at this point.[77] There are indications of a decrease in the relative advertising shares of TV and newspaper advertising and a simultaneous increase in Internet (online) advertising (e.g. Figure 5-3), much of it undoubtedly related to Web 2.0. In fact, already by 2007, almost 20% of the advertising shares in the UK came from the web. Still it should be noted that this share is higher in the UK than in most other places in the world, not least the other major European markets.
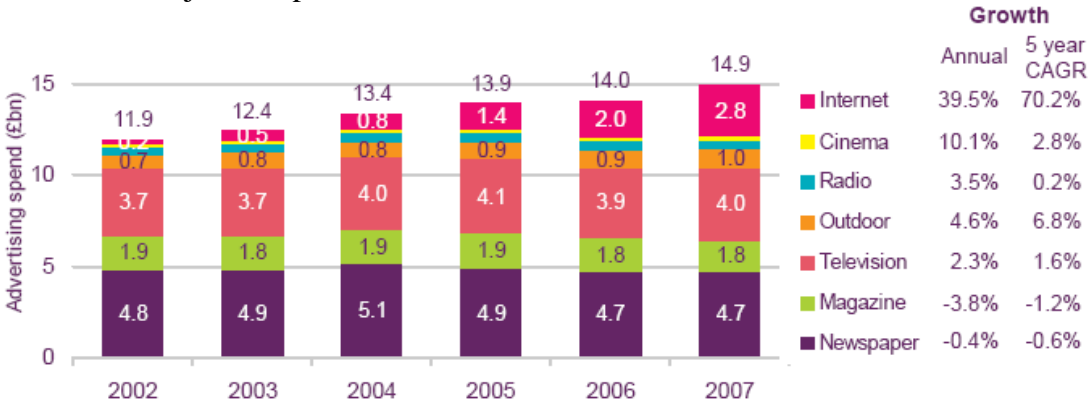
Source: The Advertising Forecast, Advertising Association statistics published by www.WARC.com, Nielsen Media Research, World Advertising Research Centre
Note: These figures include all advertising spend, including display and classifieds. Internet expenditure includes paid-for search. All figures are nominal. Magazines includes consumer and trade.
© Ofcom

Figure 5-3 UK advertising spend per medium

Source: Ofcom (2008)

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[75] Across all countries, the Internet appears to have less substitutional impact on DVDs and videos, than on TV. This may be because watching DVDs and videos is a conscious deliberative act, i.e. watching a certain programme, whereas watching television in general may have a less specific goal. (Ofcom, 2007)

[76] See www.alexa.com [Consulted April 1, 2008]

[77] However, the following simple calculation could serve as a rough indication: Assuming the global advertising market to be €300 billion per year, and that 10% of that amount is spent on online advertising and that 10 % of that is on Web 2.0, this yields an approximate advertising spending of €300*0.1*0.1 = about €3 billion per year on Web 2.0. The estimation of the Online/Internet market should be fairly correct and is compatible with other sources such as: Zenith Optimedia (Global market $ 31 billion) Interactive Advertising Bureau (US market $ 20 billion) as reported by Future Exploration Network (2007). The share of Online/Internet advertising revenues related to Web 2.0 are more difficult to estimate.

For content supply, media companies not least in the music industry, now face competition for those contents they want to publish, as content producers can use Web 2.0 channels.[78] As a result, Web 2.0 weakens the position of media companies in relation to content producers. Previously, they (taken as a group) held gatekeeper positions and selected which content was available. This provided little space for audience intervention, except for features like letters to the editor in newspapers and phone-ins in television and radio, all of which are controlled (filtered) by the established media companies. Similarly, professional content providers now face competition from low-cost or no-cost user generated content.[79]

Partly in response to the increasing competition from Web 2.0, traditional media are starting to participate in user generated publishing platforms to open their offerings, reaching out for these audiences in order to promote own content. They are both opening specific sites to show their contents online,[80] and developing partnerships with popular Web 2.0 platforms.[81] Indeed, for traditional media companies Web 2.0 constitutes not only a threat but also an opportunity, where they can take advantage of the new applications to improve their products and services. Many major newspapers and broadcasters broaden their offerings accordingly by using Web 2.0 (© Ofcom Figure 5-4). For example, CNN Exchange invites user contributions to its news services,[82] and there are also specific platforms for users to publish and sell their pictures for news and magazine usage (See Section 4.4, for example, on Scoopt). In addition, Web 2.0 may stimulate the consumption of traditional content and vice versa, which is in fact one of the business models described in Section 4.3.3. Thus, the impact on the traditional content industry is not only one of predation and competition, but also complementary and collaborative.

Paper	Website	Mobile	Podcasts	TV	Blogs	RSS	Digital edition	Email	Desktop	Business model
The Guardian	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Ads
The Times	Yes	Yes	Yes	Yes	Yes	Yes				Ads
The Telegraph	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Ads
The Independent	Yes		Yes	Yes		Yes	Yes	Yes		Ads
The Financial Times	Yes		Yes		Yes	Yes		Yes		Subscription and ads

© Ofcom

Figure 5-4 Content and functionality offered online by UK broadsheet newspapers

Source: Ofcom (2007b)

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[78] The music industry is well known to have been disrupted already by Web 1.0, since it opened up a completely new low cost distribution channel where content could also be easily copied. Web 2.0 further drive this disruption since it allows not only for users to expose their music on the web, but it also allows for the crowds to take control of more activities in the value chain, previously in the control of record industry. Initially this meant that artists could publish and expose their music to the masses on platforms such as MySpace. New Web 2.0 sites are taking this a step further, e.g. Slice the Pie which enables individuals to select, invest and speculate in the success of emerging artists. See http://www.telegraph.co.uk/money/main.jhtml?xml=/money/2008/05/25/ccslice125.xml [Accessed 2008-05-26]

[79] Ala-Mutka (2008)

[80] For example, Hulu http://www.hulu.com/, and NBC Direct

[81] Such as the previously mentioned YouTube Partners Program.

[82] http://www.cnn.com/exchange/

In general, it could be argued that Web 2.0 competes with and constitutes a threat for any content related off-line or Web 1.0 service: Web 2.0 can substitute off-line games, dating services, email, and much more. With regard to the software industry, the threat is perhaps less immediate and less visible.

It may also be argued, that the growth of Web 2.0 services will further drive a shift of revenues away from traditional telephony services, since it increases internet traffic and drives customers to opt for broadband (which then again also drives Skype and VoIP).

5.3   Web 2.0 use by enterprises

The previous chapter clearly shows that Web 2.0 is largely perceived as a consumer phenomenon. However, there is also an increasing take-up by enterprises and other organisations.[83] In principle, Web 2.0 tools can be used both for improving internal processes as well as interacting with suppliers, partners and customers. According to McKinsey (2007, 2008), Web 2.0 percentage usage was about 25-35 % depending on application in 2008, a significant rise from the year before. It also showed that about 94 % of organisations which use Web 2.0 tools use them for managing internal collaboration while 87% use them for interfacing with customers, and 75% % to interface with suppliers and partners. These surveys also indicate that the willingness to invest in Web 2.0 technologies applies to a wide range of industries, especially retail, high tech, telecommunications, financial services and pharmaceuticals.

According to recent study by Forester (2008a) corporate Web 2.0 sales (labelled Enterprise 2.0) amounted to almost half a billion USD in 2007, of which some 150 million were related to OSNs. Forrester expects the corporate market to grow with 43% per year, and to tenfold by 2013. The same study shows that adoption is essentially higher in large enterprises. Over 50% of enterprises with 20,000+ employees were purchasing Web 2.0 solutions compared to only 20% for small enterprises (6-99 employees). Still, according to Forrester, one of the main challenges of getting Web 2.0 into the enterprise is getting past the IT departments. Otherwise, interest in Web 2.0 is usually generated in the R&D, marketing and corporate communication departments, while IT departments are often reluctant, spending most of their budget on legacy systems. Web 2.0 is also often perceived as a security threat. In a survey by McKinsey (2008) it was noted that many companies were actually dissatisfied with their Web 2.0 tools, that there was a correlation between companies dissatisfied with Web 2.0 and those adopting Web 2.0 tools from IT departments.

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[83]   As professionals are using Web 2.0 also outside the enterprise, it becomes increasingly difficult to distinguish between enterprise and consumer use of these technologies.
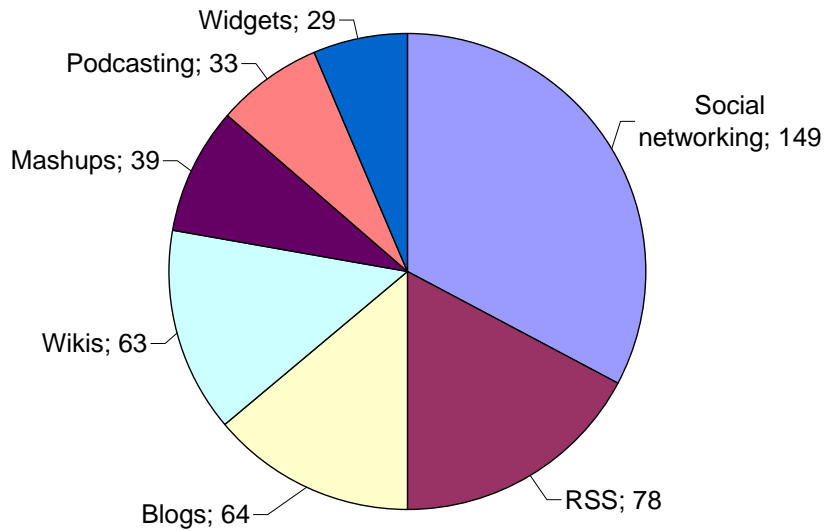
Figure 5-5 Enterprise 2.0 market in ($ million 2007)

Source: Forrester (2008a) as reported by Perez (2008)

Hence take-up of Web 2.0 is still lower in enterprises than by private users. However, it is likely to increase rapidly. According to Bryant (2008) Enterprise 2.0 applications have the potential to: (1) lower transaction and co-ordination costs, (2) lower ICT costs (being more cost effective than many traditional corporate applications including not least email.), (3) keep and attract talent, (4) exploit diversity in global corporations and (5) practice more open innovation and "co-opetition".

The following main (partly overlapping) uses and results of Web 2.0 in enterprises[84] can be identified as:

(1) improving internal work processes,

(2) a tool for customer and other relations

(3) utilising user knowledge and support innovation; and

(4) a tool for recruitment and networking

5.3.1 Improving internal work processes

Web 2.0 applications are already being used for professional purposes in the private and public sector. Companies can use Web 2.0 tools for intra-company content creation, collaboration and sharing purposes.[85] Blogs are increasingly used in enterprises for teamwork and communication.[86] In a business environment, they can help foster a culture of sharing expertise and knowledge. At IBM for example, employees have an internal blogging centre and the possibility for social tagging.[87]

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[84] See Bernoff and Li (2008) and Chui et al. (2009) for alternative categorizations. In addition to those major areas of usage, others have been identified. For instance Virtual worlds and (serious games) have been considered as promising for education and simulation.

[85] Ala-Mutka (2008) referring to Forrester Consulting (2007)

[86] VTT (2007) See also McAfee (2006).

[87] IBM (2007)

Another important characteristic of Web 2.0, especially OSNs, is their speed at getting information across to different people who are interested in the same topic, often through the use of groups or forums,[88] which may be internal as well as external. Most IT professionals, for example, state that they save time by using online communities to find answers.[89] Social tagging enables colleagues to search these tags, locate experts and "look over their shoulders" at the relevant articles, research or blogs that those experts found useful—without interrupting them with an e-mail or an instant message.[90] Clearly, just as Web 2.0 applications can be used inside organisations, their interactive nature facilitates collaboration between companies also.

Compared to traditional productivity tools and software suits, such Web 2.0 applications also offer the benefits that they are typically easy to install and use and easy to integrate between departments and enterprises. They are often free of charge or at least very inexpensive and often based on open source software, providing modifiability and transparency.[91]

Here one should note that there are potential negative effects of Web 2.0 as well, i.e. concerns about the amount of time spent on Web 2.0, in particular on OSNs, and the resulting possible loss of productivity. In the UK, for instance, Peninsula (an employment law firm) claimed that UK firms were losing more than £130 million a day.[92] Even though such figures are highly disputable, the study showed that some employees spend up to two hours a day visiting social networking sites during work time. As a result, many companies and other organisations are blocking access to OSNs.[93] Although the major reason given for such blocks is virus or spyware protection, it is directly followed by employee productivity losses and by concerns for using too much bandwidth.[94]

5.3.2   Tool for customer and other relations

As already touched upon in Chapter 4 on value chains and business models, consumers are changing their media consumption; businesses therefore need to change their promotion strategies accordingly. In relation to Web 2.0, they need to become more interactive. Blogging, for instance, provides new ways for customers to give public feedback and comments to companies and for companies to respond and communicate. Such feedback both allows and obliges companies to respond more rapidly to customer concerns. According to McKinsey (2007) 70% of organisations that already use Web 2.0 tools use them to interface with customers (including entering new markets). In fact, corporate blogging has become the norm in the several industries, such as ICT, media and consumer goods, and not least the Web industry itself where companies such as Google and Facebook are announcing major events on their corporate blogs rather than through press-releases.[95]

Collaborative content sites have the potential to generate as much feedback as traditional customer research and surveys. For example, Dellarocas et al. (2005) show that movie reviews volunteered online provide information that is as accurate a predictor of public

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[88]   Cachia (2008)

[89]   Ala-Mutka (2008) referring to King Research (2007).

[90]   IBM (2007)

[91]   VTT (2007)

[92]   The study was based on a survey of 3500 UK companies. [Online] http://news.bbc.co.uk/2/hi/technology/6989100.stm as reported by Cachia (2008)

[93]   As much as half the businesses in UK have blocked employees' access to OSN according to a survey carried out by web security company Barracuda Networks Inc. (Cachia 2008)

[94]   Cachia (2008)

[95]   Gartner (2008)

opinion as information collected by surveys of representative samples of respondents.[96] However the self-selection feature of Web 2.0 risks generating highly skewed results.

Feedback and customer reviews have already become standard in e-commerce Web sites, often used as a promotional tool for increasing customers' trust and usage of the service. Online auctioning sites (e.g. eBay) have incorporated user generated evaluations of the seller/purchase as a part of the auction process. Also, online shops (e.g. Amazon) benefit from user reviews that inform and support customers for their purchasing decisions. Such user provided reviews have become part of the marketing information of many different platforms, often complemented by automatically collected information of most popular choices or product combinations.[97] Moreover, blogs are becoming important in influencing purchasing decisions.[98]

Essentially, in economic terms this means that the providers of various goods and services can benefit from cheaper sources when investigating tastes and trends and getting in contact with consumer needs. Observe that that the effect of increased interaction is a challenge as well as an opportunity. Manufacturers and service providers need to deal with the fact that unhappy customers nowadays will make their views known online and therefore available to other potential customers. This requires a much greater emphasis on the speed of responses, before negative publicity spreads. There is even the possibility of fake unhappy customers, such as false bloggers, providing reviews and other type of content with the sole purpose of destroying businesses of others.

5.3.3 Utilising users for innovation

Considering that innovation has been claimed to be increasingly driven by user input and interaction,[99] we would expect Web 2.0 to play a role in stimulating innovation. Interfaces with customers for product feedback can be a source of research and development for companies so as to monitor user innovations and development ideas for improving their products.[100] Specific Web 2.0 applications can also harness the collaboratively created user innovations for their product development, hence potentially raising the rate of innovation at a low cost. For example, Lego Mindstorm[101] provides customers with the possibility to design personally tailored products, which can later be added to the general product selection. Threadless[102], an Internet-based clothing retailer, sells T-shirts which have been designed and rated by members of the public. TomTom improves its maps through Map Share which allows customers to make changes to their maps directly on their navigation devices.[103] Cambrian House[104] applies a *crowd sourcing* model (i.e. outsourcing to an undefined, large group, in the form of an open call) to identify and develop software and web-based

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[96] Ala-Mutka (2008)

[97] Ala-Mutka (2008)

[98] Deere (2006) and Ipsos (2007)

[99] It is also widely claimed that innovation is increasingly come from outside the corporate walls, in open innovation processes (Chesbrough 2003) driven by e.g. globalisation, increasing venture capital and rise the Internet as an infrastructure for innovation. (See also Tapscott 2006). Collaborative innovation is well known from the open source software development community.

[100] McKinsey (2007)

[101] http://mindstorms.lego.com/

[102] http://www.threadless.com/

[103] See e.g. http://www.gpsbusinessnews.com/TomTom-s-crowdsourcing-5-millionth-map-correction_a1234.html [Accessed 17 April 2009]

[104] http://www.cambrianhouse.com/

businesses: by allowing users to send suggestions and vote on them, the community attempts to find software ideas that are developed using a combination of internal and crowd sourced skills and effort.[105]

Thus, the emerging and increasing role of the user in the innovation-development process[106] as well as the ongoing shift towards open innovation[107] is further driven by Web 2.0. However, so far this impact appears to be quite limited and in an emergent phase.

5.3.4 Tools for recruitment and business networking

One of the main benefits of OSNs is to provide improved possibilities to extend professional networks. As a result a new niche of professional business networks has emerged. Examples of such sites are LinkedIn, Ryze.com and VisiblePath. Similar to other OSNs, they operate through a profile, contacts sharing, invitations and search through "friends of friends" list for business contacts. They act like a directory of business contacts and facilitating users' communication with other users, whether you want to inform your contacts about new professional developments, or whether you want to develop online business events.[108] Surveys indicate that 65% of business professionals connect through personal and professional OSNs. [109]

In particular, research shows that employers rely heavily on information given by their social contacts when looking for employees. The value of this can be indicated by the fact that on the major professional networking site LinkedIn over 350 corporate customers pay up to $250,000 each to advertise jobs to its expanding network.[110] Again, the cost and productivity losses due to time spend on OSNs must not be underestimated.

5.4 Impact on the ICT sector – derived demand on ICT products and services

Albeit not necessarily very disruptive, a major impact of Web 2.0 is the derived demand of ICT products and services. By drawing more people to the Internet, and making them stay for longer, Web 2.0 services and applications increase the demand for connectivity (e.g. more and better Internet access), for software tools, (e.g. recommendation engines), software(blogs, Podcasting)which allow and enable users to create audio and video files, for support services (e.g. firewalls, file backups), as well as for the necessary hardware (e.g. personal devices used to create content, e.g. digital cameras, digital video recorders and mobile phones, servers, databases). In combination with the uptake of interactive services such as IP-telephony, Web 2.0 may also drive a need for increased capacity of the up-link in broadband and mobile networks, such as High-Speed Uplink Packet Access (HSUPA) for mobile communications.[111]

New application service providers are also emerging, especially for video content, offering for instance publishing, syndication, commerce, content management, content delivery, one-stop video upload, converting and transmitting optimised content services security and other

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[105] Ala-Mutka et al 82008)

[106] von Hippel (1988)

[107] Chesbrough (2003)

[108] Cachia (2008)

[109] BigMouthMedia (2007).

[110] The Economist" Social networking Joined-up thinking - Social-networking sites are not just for teenagers. They have business uses too" The Economist, 4 April 2007, available online at http://www.economist.com/business/displaystory.cfm?story_id=8960555

[111] See Ala-Mukta et al (2008) and OECD (2007)

platform components in the form of software-as-a-service.[112] Examples include companies which specialise in social network tools (a market estimated to $ 258 millions in 2007) such as Awareness, Communispace, and Jive Software.[113]

Companies developing knowledge management solutions also incorporate Web 2.0 tools to respond to the demand of customers. For example, IBM, Oracle and several other companies have published enterprise suites including wikis, blogs and other networking tools. Microsoft's SharePoint, for example, now includes wikis, blogs, and RSS technologies in their collaboration suite. IBM offers social networking and mashup tools via their Lotus Connections and Lotus Mashups products and SAP Business Suite which includes social networking and widgets. In fact, it has been forecasted that the market for Enterprise Web 2.0 tools will be commoditised, with eroding prices, and incorporation into enterprise collaboration software over the next five years.[114]

Web 2.0 services also increase the traffic and business of traditional telecom operators, for broadband communications and, possibly in the future, for wireless communications also. However, changing revenue schemes and pricing models may counteract this trend so that it does not lead to increased revenues for telecom operators.

To exemplify how Web 2.0 generates revenues upstream the value chain we could use the example of Facebook. First of all, because it is so popular and heavily trafficked, Facebook requires massive amounts of storage space, both in a digital and physical sense. At this writing (May 2009) Business Week reports that Facebook secured another $ 100 million of funding with the purpose of buying some 50,000 new servers, which in turn would cover its needs for the coming two years.[115] This is perhaps the most important economically derived demand for a company like Facebook.

At another level, since June 2007, since Facebook first allowed third-party developers to create applications, developers have provided more than 7,000 programmes on the Facebook platform. It has been reported that developers introduce another 100 applications to the site each day. Facebook estimates that more than 80 percent of all members have used at least one third-party application.[116]

5.5   Summary and conclusions

This chapter has elaborated on four aspects of economic and potentially disruptive impact of Web 2.0: (1) the providers of Web 2.0 applications are becoming increasingly numerous and large, and contribute to growth and employment. (2) At the same time, they already constitute an important threat to other industries, in particular content industries. The content industry on the other hand is responding by diversifying into Web 2.0. (3) Web 2.0 applications and software are increasingly adopted in the enterprise (and public) sectors as tools for improving internal work processes, for managing customer and public relations, for innovation and for

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[112] OECD (2007)

[113] Forrester (2008s) according to Perez (2008)

[114] Forrester (2008a) as reported by Perez (2008)

[115] See:
http://www.businessweek.com/technology/content/may2008/tc2008059_855064.htm?chan=top+news_top+news+index_news+%2B+analysis

[116] http://computer.howstuffworks.com/facebook4.htm

recruitment and networking. Finally, (4) the growth of Web 2.0 leads to a derived demand in the supply of ICT hardware and software in order to facilitate for these services.

Although there is need for further evidence and analysis, the various impacts are potentially substantial in all four areas, presenting European industry with opportunities of growth and improved competitiveness. At the same time, the inherent disruptive potential of Web 2.0 presents threats to established players, in particular for content related industries. An assessment of Europe's position to respond to these opportunities and threats is the purpose of the next chapter.

6   EUROPE'S INDUSTRIAL POSITION IN WEB 2.0

This chapter addresses the position and competitiveness of the EU industry in Web 2.0. The objective is to identify and assess the prospects for growth of a European industry in producing Web 2.0 applications.

We will focus on the following indicators of industrial strengths and weaknesses:[117]

 (1) The current European position within Web 2.0 will be indicated by the global share of Web 2.0 companies and sites. The number of firms in Europe, and their share of revenues and employees will be assessed, for Web 2.0 as a whole as well as by its different application categories (online social networking etc.) (Section 6.1)

 (2) Its' near and medium term future position will depend primarily on the ability of European firms to innovate, for which patenting, venture capital and R&D activities will serve as a proxy. (Section 6.2)

While (1) is rather straightforward to analyse, (2) is more complicated. The ability of European firms to innovate using Web 2.0 will depend on a number of factors related to the functioning of the European Innovation System[118] relevant to Web 2.0. This includes:[119] input conditions / factor endowments (supply of financial and most often sector-specific human resources, infrastructure etc.); incentives for innovative investments and entrepreneurial activity (e.g. appropriability conditions, IPR regimes); intensity of local rivalry; presence of complementary industries; presence of clusters; access to and interaction with an advanced and large home market; absence of strong vested interests in technologies that are to be replaced. In this report, access to venture capital as well an advanced local demand will be quantitatively indicated, while the rest of the determinants will be assessed in terms of quality where appropriate (Section 6.2).

Based on this assessment of the position of the EU Web 2.0 industry, three current and potential areas of EU strength will be identified: (1) Online social gaming; (2) Online social networking and (3) Mobile 2.0. These are further analysed in Section 6.3. The chapter is concluded in Section 6.4.

6.1   Major Web 2.0 sites and companies – current EU position

One of the most useful indicators of the EU position in Web 2.0 applications is the presence of EU firms which supply such solutions. Most quantitative and qualitative evidence indicates that the supply of Web 2.0 lies largely in the hand of US companies, especially those based in the San Francisco Bay area (*aka* Silicon Valley). For instance, an early attempt to map new Web 2.0 applications geographically (Annex B) shows a very strong over-representation of US companies, especially of those in California.[120]

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[117] Perhaps needless to say, given the emerging character of Web 2.0 and limited data available, we can offer only a partial view on the development of the industry, its enterprises and country competitiveness.

[118] 'Innovation system' is an analytical construct notoriously difficult to operationalise. While R&D and patenting can serve as indicators of inventive capability, it tells less about the performance of companies and nations in commercializing these inventions. Further, there is a limitation if the innovations are not technological or if they are difficult to patent. Still, in a technology-based industry like Web 2.0, patents and R&D investments can be argued to be strong indicators of innovativeness.

[119] See e.g. Porter (1990), Edquist (1997), Mowery and Nelson (1999), and Bergek et al. (2008)

[120] See e.g. http://www.fourio.com/web20map/

In order to provide a complementing picture, IPTS is in the process of building up a database of Web 2.0 companies. At the time of this writing (December 2008), it had incorporated data on 99 major Web sites and the companies providing them. Information includes, where available: name of web site, applications category, launch date, company providing the web site, location of company,[121] ultimate owner (if acquired), revenues, employees, amount venture capital and/or acquisition amount, estimated market value and year of foundation. The major sources for collecting identifying the sites/companies are listed in Annex A. The variety of sources, compensate for much of the bias of each source, and the database should therefore represent the major Web 2.0 sites quite well.

Table 6-1 Top Web 2.0 sites according to traffic ranking

Site	Alexa Rank [c.]	Category	Company	Country	Empl.	Rev.	VC ($ mn)	Owner (if acquired)	Acq. for ($ mn)
Youtube	3	MM sharing (Video)	(see owner)	US	N/A	180	11,5	Google (US)	1650
MySpace	6	OSN	(see owner)	US	300	N/A	N/A	Fox/News Corp. (US)	580
Facebook	7	OSN	Facebook, Inc.	US	500	150	493 [a.]	-	-
Wiki-pedia	8	Wiki (encyclop.)	Wikimedia found.	US	18	-	3 [b.]	-	-
Blogger	9	Blog (platform)	Pyra Labs	US	N/A	N/A	N/A	Google (US)	N/A
Orkut	11	OSN	Google (US)	US	N/A	N/A	N/A	-	-
Hi5	18	OSN	Sona Networks	US	N/A	N/A	35	-	-
Photo-bucket	26	MM sharing (photo)	(see owner)	US	60	6,3	13,5	Fox/News Corp. (US)	N/A
Vkontakte.ru	30	OSN	N/A	Russia	N/A	N/A	N/A	-	-
Youporn	33	MM sharing (Adult video)	N/A	US	N/A	1,5	N/A	N/A	-

Source: IPTS-COMPLETE based on www.crunchbase.com, www.alexa.com, Wikipedia, among other sources.

Notes: [a.] Includes also Microsoft's $ 300 million stake in Facebook

[b.] Top donation. Total amount is not available

[c.] Alexa rank (all web sites, also non Web 2.0 ones), www.alexa.com, May 2008. Alexa is a subsidiary company of Amazon that provides information on web traffic to other websites. Note that there is some controversy over how representative Alexa's user base is of typical Internet behaviour. See e.g. http://www.antezeta.com/web-analytics/web-statistics-suppliers.html, for an overview discussion. Note also that sites with many local variants will get a lower ranking in this table (i.e. sites which use different local URLs).

The top ten sites (in terms of traffic ranking) in the database are listed above in Table 6-1, from which a number of observations can be made. First of all, the dominance of US sites among the top ones is overwhelming. Secondly, several of them have been acquired by firms from related industries, in this case either Google (Web 1.0) or Fox/News Corporation (Media). It should also be noted that the online social networks category is the most prevalent, followed by multimedia sharing, where the latter also includes adult content. As well as this, we can see that Web 2.0 occupies a large share about 1/3 of the overall Web top-traffic sites, since 10 of the 33 sites generating most traffic are Web 2.0 However, this underestimates the diffusion of Web 2.0 since many traditional web sites such as Google-sites and Amazon-sites,

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[121] When determining locations, we have used the location of the head quarters. However, where there are indications that the main part of a company's activities take place at a different location from the headquarters, we have used that location instead.

include substantial elements of Web 2.0-functionality. Finally, data on employees, revenues, financing are only partially available, and even less available for those less visited sites (outside the top 10 listed in table.).

Table 6-2 classifies the 99 companies currently in the database according to their main activity/application category and HQ location. Most of the sites are either Online Social Networks – OSNs (37) or Multimedia sharing sites (24). These application categories also have a very large share of the venture and acquisition capital that is injected into Web 2.0 applications (about $3,5 billion of the total $4 billion invested),[122] be it a sign of hype surrounding these sites or not. However, in terms of revenues and employees it is the Online social gaming segment that accounts for the largest share instead, with $1,6 from a total of $2,5 billion in reported revenues (as well as a similar share of employees).

Table 6-2 Web 2.0 Sites distribution

Application Category / Region	Asia	EU	US	RoW	Total
Blog	1		8	1	10
Multimedia sharing	5	1	17	1	24
OSN	5	9	18	5	37
Social gaming	1	3	5	2	11
Social tagging	1		5		6
Wiki			2		2
Other (e.g. suppliers of technology, plugins)		1	8		9
Grand Total	13	14	63	9	99

Source: IPTS – COMPLETE

Table 6-2 confirms that the supply of Web 2.0 lies in the hand of US companies, especially those based in the San Francisco Bay area.[123] Thus, IPTS research confirms that US companies constitute the overall majority (about 60%) of the SC sample and a majority in each category. The corresponding figure for Europe is at about 15%. Estimations based on available data show similar percentages for revenue and employee data, while the US shares of injected capital is even higher (85-90%).

For two application categories, online social networks (OSNs) and Online social gaming, the EU position looks slightly better whereby the US share is at about 50%. These application categories also host a relatively larger share of EU companies (about 25%). Hence, there may be opportunities for Europe to further build on this relative strength. This will be further investigated in Section 6.3.

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[122] IPTS-COMPLETE database, not shown here

[123] See Lindmark (2009) elaboration of data as reported on http://www.fourio.com/web20map/ [Accessed 2008-05-19]

6.2 Innovative capability

6.2.1 Patenting

Patenting is commonly used as an indicator of innovative capability. We have searched for patent applications in the World Intellectual Property Organization (WIPO) patent database.[124] As a first observation, patent data shows that development of Web 2.0 technology is mostly a recent phenomenon, with a sharp and persistent increase in patent applications starting in 2005, and seemingly accelerating (Figure 6-1).
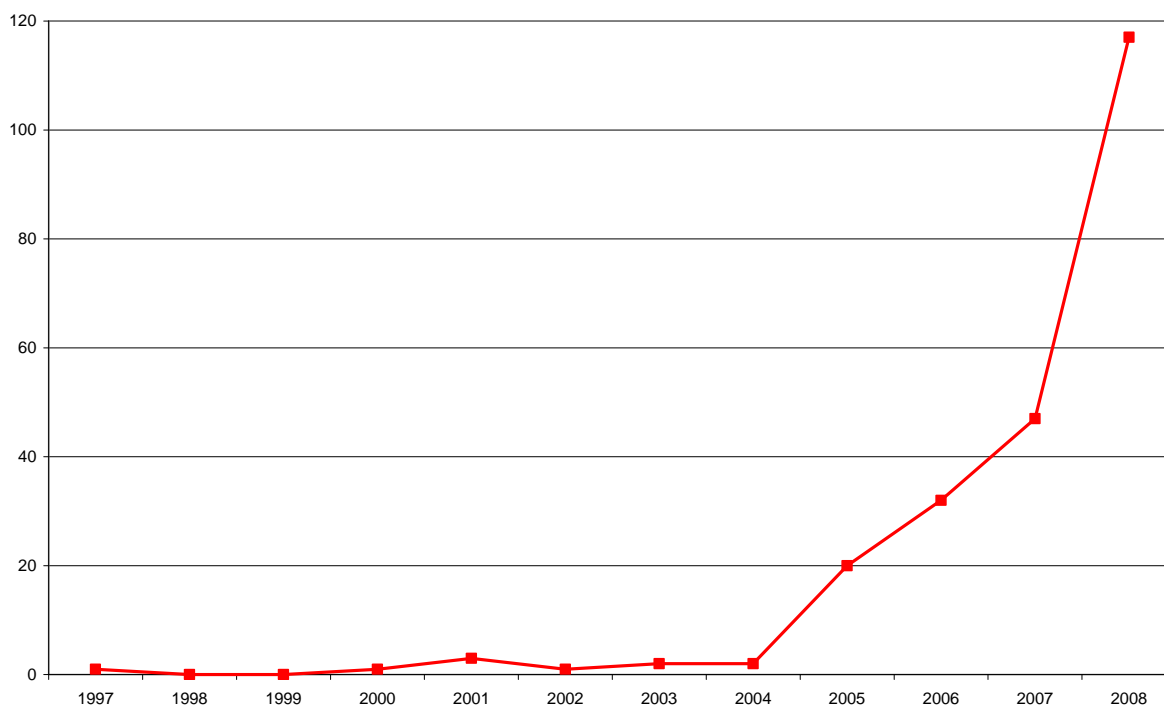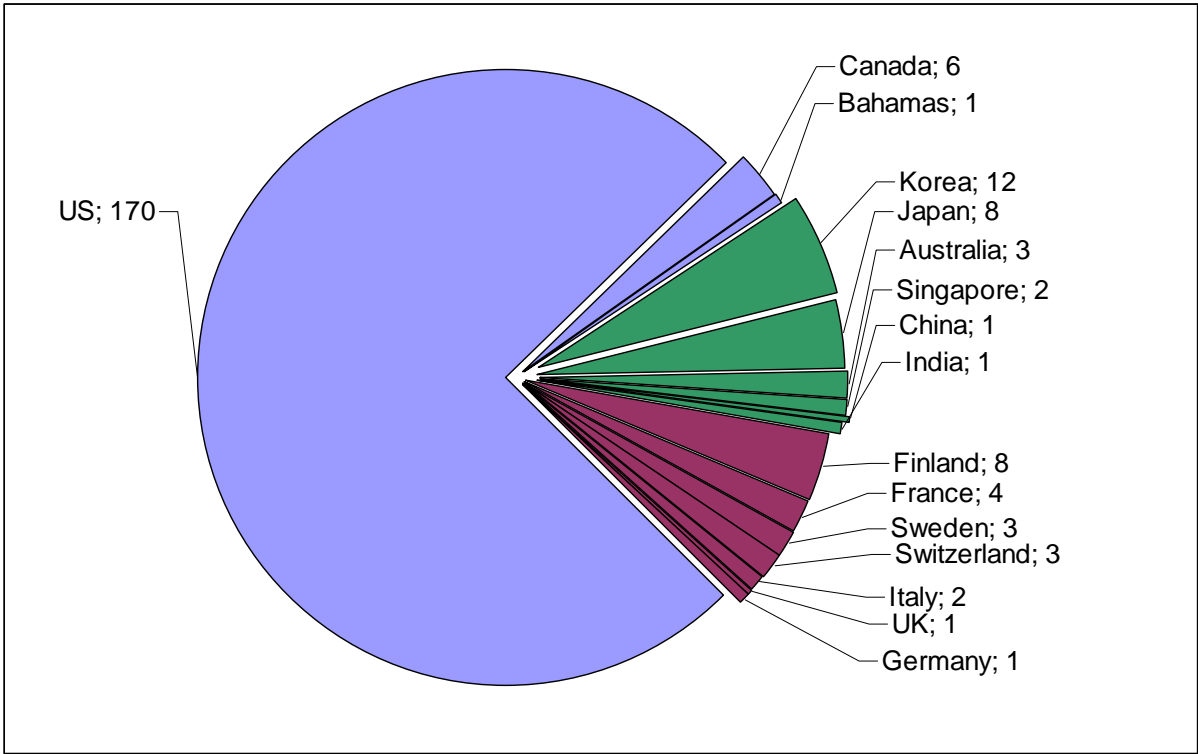

Figure 6-1 Web 2.0 related WIPO Patent applications (1997-2008)

Source: IPTS search in WIPO Patent scope data base 2008-12-12 Search: (ABE/"social network") OR (ABE/blog) OR (ABE/wiki) OR (ABE/"RSS feed") OR (ABE/Widget) OR (ABE/folksonomy) OR (ABE/AJAX)

Note: The database includes patent applications until 2008-12-04. Hence 2008 figures may rise a bit further before year's end 2008.

About 3/4 of all Web 2.0 related patent applications are of US origin, the rest being fairly evenly split between Europe and the RoW (including Asia). Such figures need to be considered in relation to the regional shares of the overall patenting figures, which are fairly evenly split between regions, each contributing to about 1/3 of all WIPO patent applications. Hence in Web 2.0, the US contributes to more than double the share of patenting compared with other technologies, while Europe and Asia have much lower contributions. In Europe, Finland stands out as the top patent applying country in Europe (Figure 6-2). This data further corroborates our previous indications that US dominates overwhelmingly in Web 2.0 technological development.

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[124] There are some potential caveats in using this approach, see e.g. Smith (2005) and Picci (2009). Examples of issues that need to be considered are potential geographical biases in the database used as well as differing legal possibilities to patent software inventions between different regions.

Figure 6-2 Number of Web 2.0 patent application by country origin (Total = 226)

Legend: Blue colour = North American applications, green = Asian + Australia and Purple = Europe

Source: IPTS key word search in WIPO Patent scope data base 2008-12-12 Search: (ABE/"social network") OR (ABE/blog) OR (ABE/wiki) OR (ABE/"RSS feed") OR (ABE/Widget) OR (ABE/folksonomy) OR (ABE/AJAX)

Looking at which companies are patenting, as indicated by Figure 6-3, most Web 2.0 patent applications are filed by large firms in established industries, including major US Internet and software companies (Google, Yahoo and Microsoft) and major European ICT manufacturers (Nokia and Sony Ericsson). There is a notable presence of pure Web 2.0 players (Facebook, Friendster and Xystar). It should also be noted that many of the firms are from Silicon Valley.
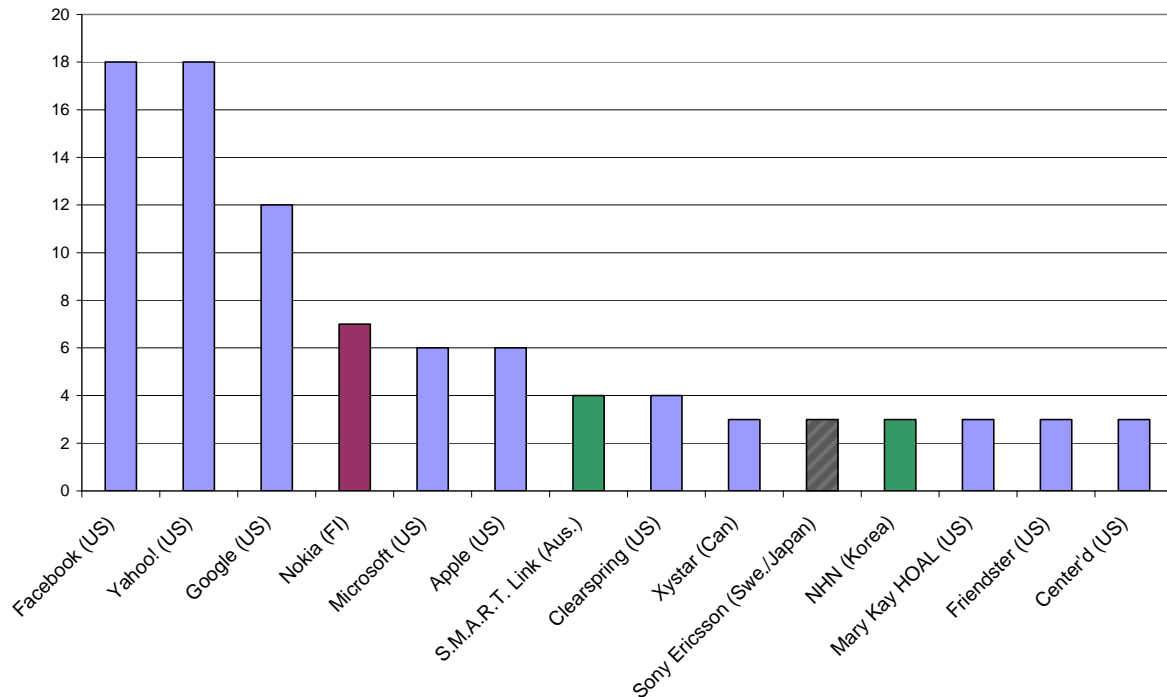
Figure 6-3 Number of patent application by applicant (Web 2.0 key words)
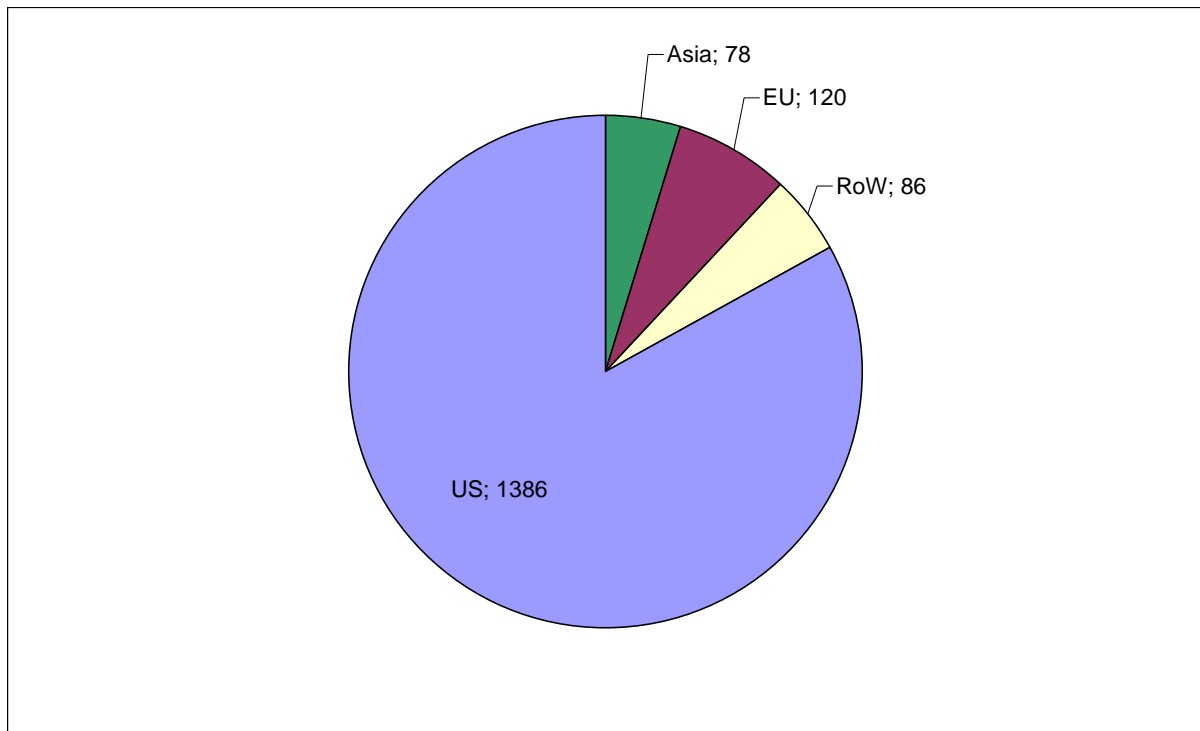
Source: IPTS search in WIPO Patent scope data base 2008-12-12 Search: (ABE/"social network") OR (ABE/blog) OR (ABE/wiki) OR (ABE/"RSS feed") OR (ABE/Widget) OR (ABE/folksonomy) OR (ABE/AJAX)

Notes: Smart Link is included because of a number of applications related to social network analysis. NHN is a Korean Web portal and game provider, Xystar is a Canadian OSN. Clearspring is a widget syndication provider. Mary Kay Hoal is a Web 2.0 entrepreneur and Center'd is an event planning platform provider.

An alternative to key word search is to use International Patent Classification (IPC) classes. While there is no specific IPC class corresponding to Web 2.0: the closest match is G06F-7/00 ("Methods or arrangements for processing data by operating upon the order or content of the data handled"), a class which is generally associated with software. This class includes 1412 patents, distributed geographically as in Figure 6-4. Using this data, the US dominance appears to be even stronger, with some 80% of all patent applications. This suggests that positions in Web 2.0 are related to general patterns of innovative activity in software development industry. The general strong dynamics of the software innovation system in the US, Silicon Valley in particular, relates to the strong Web 2.0 dynamics.

Figure 6-4 Number of patent application by applicant's region in International patent class G06F-7/00

Source: IPTS search in WIPO Patent scope data base 2008-12-14. Search (IC/G06F-7/00).
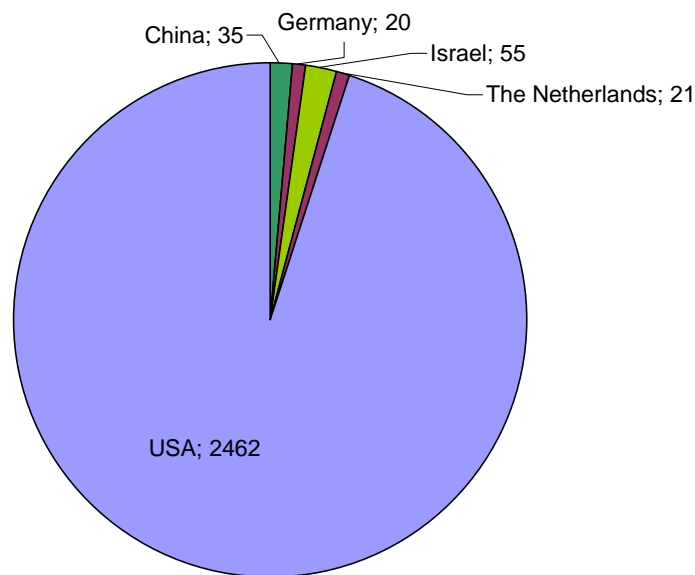
6.2.2 Company R&D

An alternative means of assessing the European innovative capability in Web 2.0 is by making use of R&D data. There are no statistics available on R&D spending in the Web 2.0 field, but there is data available at more aggregate levels. National data show that Computer services and software (ISIC/NACE 72) are the main engine of R&D growth in the EU ICT-sector. This is a positive sign of innovative dynamics in the broader EU Software sector. The problem is however, again, that R&D in the EU is dwarfed by the R&D reported in the US. In 2005 (the most recent year for which there is comparable data), the US BERD (Business Expenditures in R&D) was about €15 billion (PPP adjusted), compared to less than €8 billion in the EU.[125] Of the US R&D expenditures, about €7 billion are spent in California.[126] In fact, there may be almost as much software sector R&D taking place in Silicon Valley as in Germany, France and the UK taken together.

Although such data does indicate the presence of a strong pooled labour market of software engineers etc, in US it does not explicitly measure innovative activities in the Web 2.0 industry. Looking instead at R&D investment as reported by the 2007 EU industrial R&D scoreboard,[127] ICB class 9535 "Internet" provides an indication of R&D investment made by Web-focused companies. Again, as shown in Figure 6-5 R&D investments in the EU are much smaller than the R&D investments made by US firms, which account for about 90% of the €1,9 billion global R&D investments in this sector. It should be pointed out that an overwhelming share (€2.3 of €2.6 billion) of R&D investments are made by the two Web giants Google and Yahoo, both with a strong Web 2.0 presence.

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[125] See Bogdanowicz *et al.* (2008)

[126] Calculation based on data from the US National Science Foundation.

[127] http://iri.jrc.es/research/scoreboard_2007.htm

Figure 6-5 Company R&D investments (€ million 2007) by country for Internet related companies (ICB class 9535 "Internet")

Source: 2008 EU Industrial R&D Scoreboard (http://iri.jrc.es/research/scoreboard_2007.htm)[128]

Finally, it is noteworthy that that much of the Web 2.0 R&D is not only conducted by pure Web 2.0 players, as already indicated by patent data (see Figure 6-3). For example, SAP has integrated Web 2.0 functionalities into its enterprise suites and is also conducting R&D in the form of several key Web 2.0 implementation projects aimed at enterprise users.[129] Nokia is another example of an EU company which has conducted Web 2.0 related R&D for a couple of years. Hence, the R&D data presented here could only be taken as indication of Web 2.0 R&D investments.

6.2.3 Venture capital investments

The provision of venture capital (VC) is useful in stimulating innovation, not least in sectors where innovation is driven by start-ups, which appears to partly be the case in the Web 2.0 domain.[130] As shown in Section 5.1, VC investments into Web 2.0 have been rising rapidly in recent years. In spite of this recent boom of European Web 2.0 activities, Europe is lagging the US in Web 2.0 VC provision. A total Web 2.0 VC investment of less than €150 million in 2006 in Europe could be compared with more than €500 million the same year in the US (Figure 5-2).[131] This gap is comparable with the overall ICT sector VC situation (Figure 6-6), where Europe significantly lags behind the US, but not more than in other sectors. China and India are still behind Europe, but with much higher growth rates (90% annual growth rate in

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[128] In the R&D Scoreboard R&D investment data, and economic and financial data from the last four financial years are presented for the 1000 largest EU and 1000 largest non-EU R&D investors of 2007.

[129] http://www.sap.com/about/company/research/fields/webtechnologies/web.epx [Accessed 2008-06-10]

[130] The data in this section draws to a large extent on one source (Library House 2007a,b) and should therefore be treated with some caution.

[131] The IPTS database of Web 2.0 companies include partial data of VC, also indicating much higher investments in the US.

India and 55% as compared to around 6% in Europe between 2005 and 2006). Therefore, India and China would catch-up in VC with Europe in 1-3 years if they can sustain the current (2005/2006) growth rates.
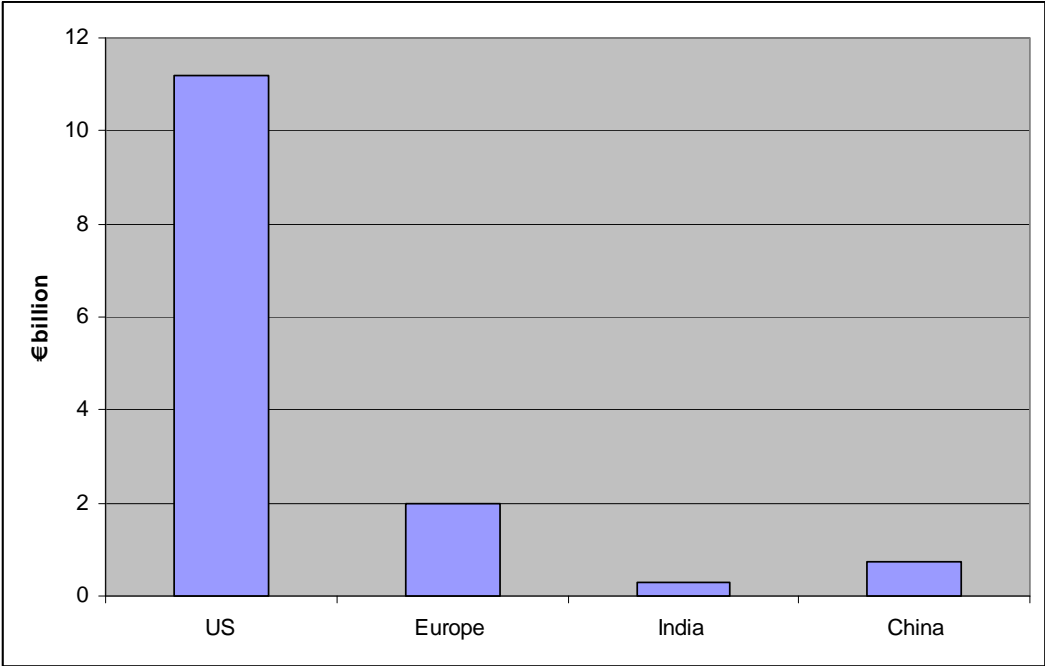
Figure 6-6 US, European, Indian and Chinese Venture Capital Investment

Source: Based on Library House (2007b)

In Europe, most of the Web related (Web 1.0+2.0) investments have been made in the UK, followed by France. In total, some €1.5 billion have been invested in (still active) Web companies of which almost half (€720 million) were invested in the UK and about 1/6 (€254 million) in France. The large UK share can partly, but not fully, be explained by a generally more vibrant VC market (30% of all European VC is invested in the UK).[132]

In terms of hotspots, according to Library house (2007a), Web 2.0 VC investments are clustering in and around London (hosting 23% of investment and 15% of the VC-backed Web 2.0 companies) and Paris (13% of investment and 11% of companies). Interestingly, the top European Web clusters differ a bit from traditional Top IT clusters since Cambridge, Dublin, Grenoble, and Dresden among others are absent from the list of Top web clusters. The top list could also be compared with the ten largest ICT employment regions (Table 6-3). Top VC investors include a mix of US and European firms such as Index ventures (Switzerland), Benchmark capital (US) and 3i group (UK).[133]

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[132] In terms of number VC backed companies this UK dominance is less pronounced.

[133] Library House (2007a)

Table 6-3 Ten largest ICT regions as measured by percentage of EU ICT employment in 2004

Table 3: Ten largest ICT regions as measured by percentage of EU ICT employment in 2004

region	ICT SECTOR			ALL SECTORS			GDP PER CAPITA 2004 (EU25=100)*
	Rank	Share of EU ICT employment	Cumulated Shares	Rank	Share of EU total employment	Cumulated shares	
Île de France (FR)	1	9.40%	9.40%	1	2.65%	2.65%	167.5 (6)
Lazio (IT)	2	3.64%	13.04%	11	1.20%	3.85%	126.5 (32)
Comunidad de Madrid (ES)	3	3.62%	16.65%	4	1.45%	5.30%	126.8 (31)
Lombardia (IT)	4	2.74%	19.39%	2	2.24%	7.54%	135.8 (22)
Danmark (DK)	5	1.76%	21.14%	5	1.36%	8.90%	119.5 (47)
Inner London (UK)	6	1.75%	22.90%	10	1.22%	10.12%	290.7 (1)
Berkshire, Buck. & Oxf. (UK)	7	1.66%	24.56%	44	0.64%	10.76%	166.8 (7)
Darmstadt (DE)	8	1.58%	26.14%	18	0.98%	11.74%	157.3 (11)
Oberbayern (DE)	9	1.49%	27.62%	13	1.15%	12.89%	162.5 (8)
Stockholm (SE)	10	1.41%	29.04%	64	0.51%	13.39%	159.0 (9)

Sources: Eurostat (Structural Business Statistics and Labour Force Survey) and authors' computations.
* EU Rank in parentheses

Source: Barrios *et al.* (2007)

### 6.2.4 EU as lead user of Web 2.0?

It is known that an early local market formation, especially in the form of lead users, proves beneficial for subsequent innovative activities and the competitiveness of a country or region in specific technological field.[134] In the case of Web 2.0, the EU is not as far behind as it is on the supply side, although most studies find that Europeans are using Web 2.0 somewhat less than their US and Asian counterparts.

Figure 6-7 further illustrates how Europe is close to but slightly behind the US and Asia in terms of usage, across all investigated applications with the exception of Wikis, and quite far behind the US in social tagging. Other studies show Europeans spend less time on OSNs than North Americans.[135] It should be noted however, that statistics vary considerably

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[134] See e.g. Porter (1990), Bergek et al. (2008) and von Hippel (2008).

[135] See e.g. Comscore statistics as reported by Cachia (2008).
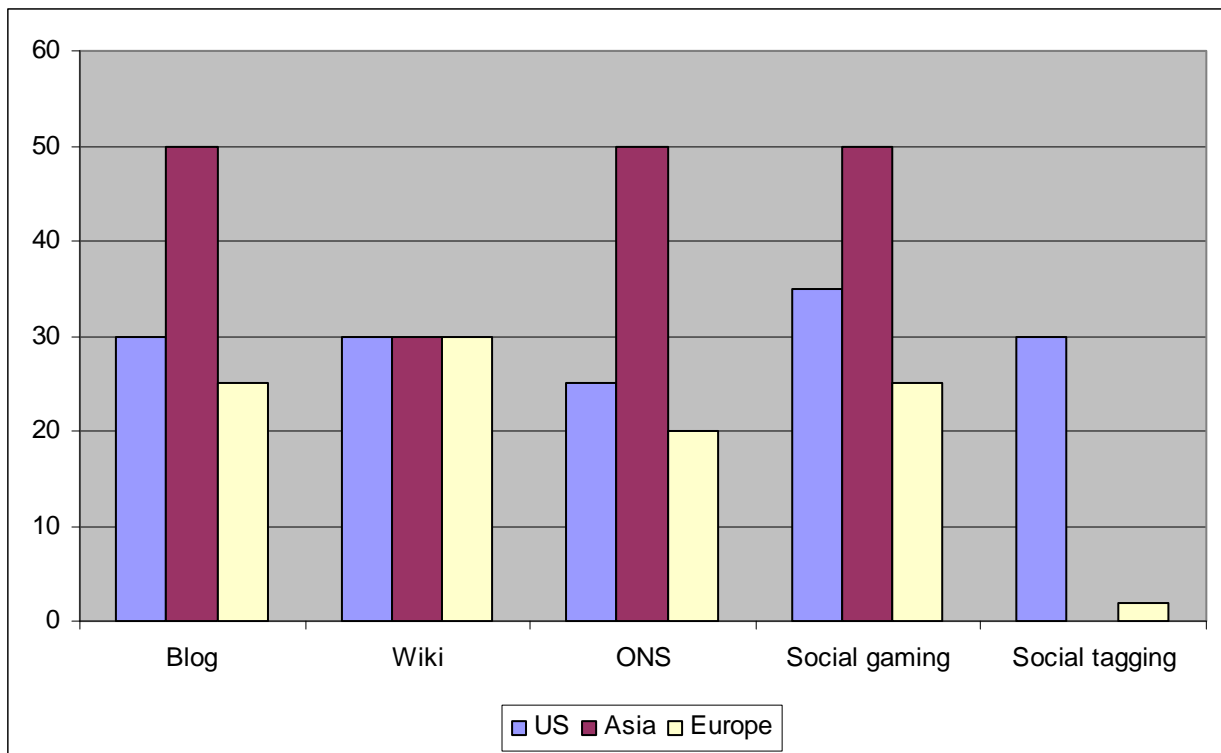
Figure 6-7 Usage of Web 2.0 (as % Internet users)

Source: Based on Pascu (2008) estimations

Note: There is no available data on Asia for social tagging

When it comes to company usage, the statistics available are ambiguous. A McKinsey study (McKinsey 2007) showed no major differences between regions in terms of level of usage. Forrester (2008a), on other the hand, claims a lower Enterprise 2.0 adoption in Europe.

Therefore, for the major consumer and enterprise applications of Web 2.0 Europe appear to a slightly less advanced user than the US and parts of Asia. From the perspective of Europe's innovation capability this lag is probably not too serious. The access to and interaction with those advanced users of truly new and innovative services is more important, as they anticipate global demand. This could be particularly important in an industry where users add value (content) to the service; the earlier a new site can get access to users providing high quality content, the greater its probability of having commercial success. Evidence suggests that the US market is more likely to be such a success than any market in Europe, because of, among other advantages, the lack of language issues and the reduced amount of fragmentation which leads to economies of scale. However, there may still be advanced niches in Europe, such as the ones investigated in the subsequent sections. One area of possible policy relevance in this respect is public services (not treated here).

6.3   Segments for European growth

Two segments of the Web 2.0 were identified in Section 6.1 as being potentially promising for the future growth of a European Web industry: online social gaming and online social networking. They will be examined in Sections 6.3.1 and 6.3.2 respectively.

Further to this, when European opportunities in the realm of Web 2.0 are discussed, mobile 2.0 often comes to mind as a growing segment where European companies could become

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successful.[136] This is due to an alleged strength in mobile communications, which could be leveraged somehow to mobile 2.0. But what is Mobile 2.0? What is its' potential, and can the European position be assessed? This will be the topic of Section 6.3.3.

6.3.1   Online social games

Although it is beyond the scope of this report to make a comprehensive analysis of the overall European computer games industry, a few observations can be made in order to structure later observations on the online social gaming[137] market. First of all, the European computer games industry is a player in all segments of the value chain. The leading countries on the supply side are probably the UK and France. In 2004, some 270 game-related companies employed more than 20,000 people in the UK. Also, with 8000 R&D engineers, the United Kingdom is the largest development community in Europe, and is home to the Sony and Electronic Arts European headquarters.

However, the UK is allegedly weak on games publishing, which is , on the other hand, a major strength of the French games industry. French publishers have a global market share of 15-20%. There are two major clusters in Paris and Lyon, France, and three leading publishers: Infogrames, Ubisoft and Vivendi Universal Games.[138] One major weakness of the European computer gaming industry appears to be hardware platforms, which are in hands on Asian and US suppliers, except for in the case of mobile telephone platforms.

Online gaming shows many signs of becoming the next big game market together with mobile/wireless gaming.[139] By 2006 the total end-user market size was already at about $2 billion, with the industry was growing by about 25% per year.[140] The size of the European market is smaller than that of the US and Asia (Figure 6-8), where Japan and Korea are the most advanced markets.
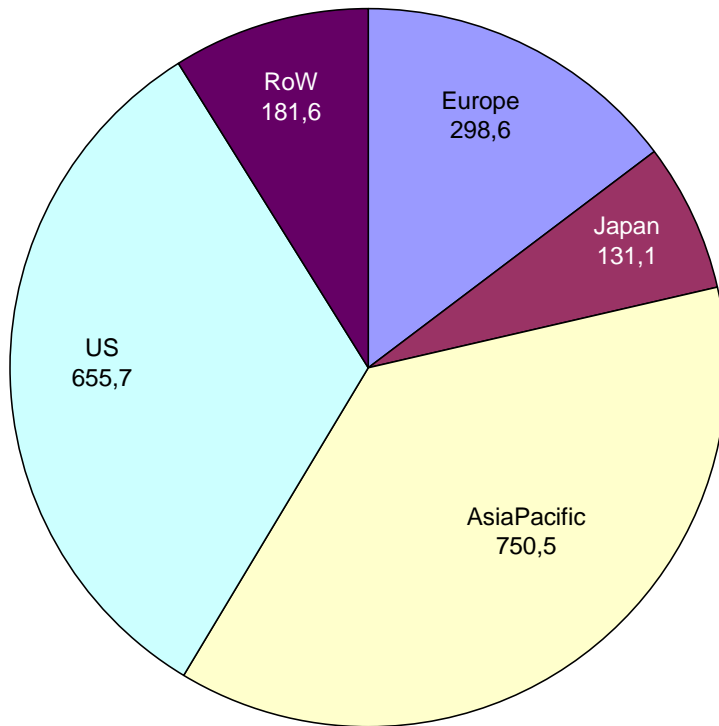
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[136] IPTS ERoSC Validation Workshop, PPTS, Seville 26-26 February 2008.

[137] Gaming is taken as some kind of structured activity, usually undertaken for enjoyment. Please observe that we do not refer to the other meaning of the word gaming, i.e. gambling or betting.

[138] OECD (2005)

[139] See e.g. OECD (2005)

[140] Based on OECD (2007:126)

Figure 6-8 MMOG Market (USD million 2006)

Source: IDATE (2007:216)
Note: MMOG = Massively Multiplayer Online Game

The most popular online social games, i.e. massively multiplayer online games (MMOGs) and virtual worlds, are listed in Table 6-4. These games represent about 50-75% of the total market (which some sources estimate to be around 30-60 million active users).[141] In total, these top 10 firms would have about $1 billion in revenues, and thousands of employees, although the estimation is difficult to make because of missing values and the presence of multi-product companies. Although the Top 10 list includes many North American firms, the US is not as dominant as for other Web 2.0 activities (or Internet or Software companies in general for that matter). European firms do have a significant presence with Habbo hotel and RuneScape positioned at no. 2 and 3 respectively, as well as with Blizzard, the company behind the no. 1 MMOG World of Warcraft. Thus in terms of performance, the position of EU firms appears to be rather good.

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[141] http://gigaom.com/2007/06/13/top-ten-most-popular-mmos/

Table 6-4 Top 10 Online games and virtual worlds and their suppliers

Rank	Title	Description	Release. year	Act. Users (mn)	Company	Based in	Ultimate owner	Empl.	Revenues ($mn)
1	World of Warcraft)	MMORPG allowing avatars to explore, fight monsters, perform quests, build skills and interact.	2004	8,5	Blizzard Entertainment	US	Vivendi (France)	2700 [a.)]	1.100 [a)]
2	Habbo Hotel	Virtual world and online community for teenagers	2000	7,5	Sulake	Finland		300	77 [b)]
3	RuneScape	MMORPG allowing avatars to explore, fight monsters, perform quests, build skills and interact.	2001	5	Jagex	UK		400	50 [c)]
4	Club Penguin	Online game using cartoon penguins as avatars, players waddle around, chat, play mini-games, etc.	2006	4	New Horizon Interactive	Canada	Disney (US)	N/A	65
5	Webkinz	Stuffed animals with code that allows access to the "Webkinz World" – to own a virtual version of the pet for virtual interaction.	2005	3,8	Ganz	Canada		N/A	N/A [d)]
6	Gaia Online	Social networking and forums-based virtual world, with avatars and virtual home purchasable items.	2003	2	Gaia Interactive Inc	US		92	N/A
7	Guild Wars	MMORPG with two modes: cooperative role-playing & player vs. player	2005	2	Arena Net	US	NCsoft (Korea)	140	42
8	Puzzle Pirates	Pirate players having adventures & pillaging money, driven by puzzles representing tasks at ships.	2003	1,5 [e)]	Three Rings Design	US		40	
9	Lineage I/II	Fantasy MMORPG (See WoW)	1998	1	NCsoft	Korea		N/A	240
10	Second Life	Virtual world where "Residents" interact through avatars, explore, create and trade virtual property and services	2003	0,5	Linden Research	US		200	N/A

Sources: IPTS-COMPLETE adapted from http://gigaom.com/2007/06/13/top-ten-most-popular-mmos/ complemented with data from e.g. company websites and Wikipedia

Notes:

[a)] Blizzard has several other successful titles generating revenues. Thus all revenues and employees stated here cannot be attributed to WoW (or social games) alone.

[b)] 2006

[c)] Subscription revenues (RuneScape generate also revenues from advertising)

[d)] Toys are sold for about $10 each

[e)] This figure was later revised by http://gigaom.com/2007/06/13/top-ten-most-popular-mmos/ to 200.000.

Note: MMORPG = Massively multiplayer online role-playing game

Clearly, the online social gaming market is one that has future growth potential, which could also generate important spill-over effects to other parts of ICT-sector and the economy at large. For instance, technology originally developed for games (e.g. computer images, graphics resolution, high-speed interactivity) is often used in other applications including architecture, design and engineering applications as well as education (serious gaming). Such observations, combined with indication that the European industry appears to be more competitive in this segment than in the software industry at large, provides a promising area for future development in Europe, even though the social effects of gaming are debatable and in need for further research.

6.3.2 Online Social networking – OSN

As mentioned above, some 18 of the major 37 OSNs are non-US, and 9 of the remaining 19 OSNs are European. Even so, in terms of traffic, visitors, revenues and employees, the EU share (in our sample) are substantially lower at about 10-15 % This is partly due to globally leading sites such as Facebook and MySpace being from the US. In Europe however, European OSNs enjoy a higher market share at about 40% of traffic, although as an aggregate US ones are even more popular. In Europe MySpace was still the most used OSN in 2007.[142] In some national markets in Europe, local OSNs play an even more important role. In France for instance, local Skyrock had a market share of about 70% of French social networking site visitors. Also one of the more profitable Web 2.0 sites, German XING (elaborated in Box 6-1), operates predominantly on some non-US markets and has a very high share in its home market.

Table 6-5 European visitors on major OSNs (July 2007)

EU sites		US sites	
EU OSN	**visitors**	**US OSN**	**visitors**
Skyrock	13785	Myspace	25176
Piczo	8035	BEBO	12101
Netlog	7450	Facebook	10795
Dada	6689	Hi5	9554
Badoo	5192	MSN Groups	5528
EU Total	41151	US Total	63154

Note: ComScore selection of sites. European 15+ years users.
Source: ComScore World Metrix www.comscore.com

Although European demand tends to favour local OSN suppliers, this tendency is much stronger in Asia and Russia, where local OSNs dominate the market completely. It appears that there are two opposing forces affecting the social networking markets. On the one hand there are increasing returns to adoption in the form of network effects, leading to market concentration to one or a few global general purpose OSNs.

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[142] See Cachia (2008) for an elaboration.

Box 6-1 XING case

Overview
XING is the second largest professional online networking platform after LinkedIn. XING is used by professionals to find contacts, information, business opportunities, employees, ideas and tools for the management, security and updating of contact networks. XING's head office is based in Hamburg, Germany, and it also has offices in Beijing, China, as well as in Barcelona, Spain, and Istanbul, Turkey.

Business model and finances
As of March, 2008, it had 5,7 million members, of which 1,9 million were from Germany. Users can choose between a free "Basic Membership" and fee-paying "Premium Membership", which includes access to special offers and deals from partner companies. Currently (March 2008) 420,000 of all members are paying Premium Members. In 2007 the company had revenues of almost €20 million (of which €17,8 million were from premium subscriptions, ,€0,4 million were from eCommerce and €0,75 million came from advertising) with more than €5 million in profits.

The company and its financing
The company was founded in August 2003 and services were launched in German in November the same year under the name openBC. In a first round of financing in 2004, business angels made capital available, with another financing round following in 2005. As OPEN Business Club AG (later to be changed to XING AG) it has been claimed to have been the first Web 2.0 company to go public, floating in the Frankfurt Stock Exchange in December 2006.

Internationalization
Although initially focusing on German speaking markets, XING internationalised early. In 2005 the company introduced a multilingual platform in 16 languages. At the end of 2005, it entered the Chinese market with a joint venture. In 2006, Swiss First Tuesday AG, was acquired (and later divested), followed in 2007 with Spanish social business network eConozco, and Neurona - the largest business network in Spain and Latin America,.In 2008 it went on to purchase cember.net, the largest business network in Turkey. XING's strategy is to gradually migrate the user base into the XING platform

Innovation – expanding the product offering
XING has also successively developed its product offering. In 2005, the company launched its platforms in a mobile version, subsequently incorporated by improved versions for Blackberry and iPhone. In 2006 it introduced Premium Groups functions, PremiumWorld offers and the integration of Skype Internet telephony. In 2007, the XING "Marketplace" was launched with job listings whereby members can post offers to the XING community, and match jobs with people. In 2007, XING incorporated online advertising and eCommerce, thus expanding its revenue model as well as providing new functionality users. Xing has also developed a number of partnerships for further expansion of the functionality at its site, such as with Zoom Information Inc – a business information search engine, and with Google's OpenSocial APIs opening up the XING - the XING platform to external developers.

In conclusion, XING is second only to LinkedIn in terms of number of users of professional networking sites. Even so , XING users are much more active than LinkedIn ones according to ComScore statistics. This is thanks to XING's strategy of persistently innovating and providing new and richer (useful) features on its platform, an innovation which was in turn enabled through alliances, opening up their API and through internal development. While LinkedIn in seems better positioned in the English speaking community, both companies are now aiming for the Asian market.

Sources:
http://corporate.xing.com/english/investor-relations/basic-information/q-as/,
http://www.crunchbase.com/company/xing
http://www.readwriteweb.com/archives/online_business_networking_linkedin_xing.php
http://corporate.xing.com/fileadmin/image_archive/XING_AG_full_year_results_results_2007.pdf

On the other hand, diversity among user groups favours the development of specialised narrower social networks. One such niche is locally adapted social networks, where the psychical or cultural distance[143] to the US tends to favour local adaptation. However, there is a multitude of other possible ways to differentiate an OSN to accommodate for specialised needs. Some, like aSmallWorld (UK) and BeautifulPeople (US), restrict access to appear selective and elite. Others, such as activity-centered sites like Couchsurfing (US), identity-driven sites like BlackPlanet (US), affiliation-focused sites like MyChurch (US), or occupation-based sites like ResearchGate (Germany), are limited by their target group and tend to be smaller. Finally, anyone who wishes to create a niche social network site can do so on OSN platform providers such as Ning.[144] As already shown by XING, Europe could play a role in the future in supplying such targeted OSNs networks, most likely through niches where there is strong European presence, for instance in the form of lead customers.

6.3.3   Mobile 2.0

Mobile 2.0 is defined here as Web 2.0 over mobile platforms (1) adapting to their limitations while at the same time (2) leveraging the opportunities of the mobile context (such as location based services, the ubiquitous and personal nature of mobile devices).[145] Examples of applications gaining popularity include:[146]

-   *Micro-blogging* which allows users to write brief updates and publish them using e.g. SMS, to be viewed freely or by a restricted group. The most popular service is called Twitter (US), followed by Jaiku (Finland, acquired by Google) and the very recently launched Pownce (US) which includes file-sharing and event invitations. In addition, OSN websites such as Facebook and MySpace contain micro-blogging features – "status updates" – as well as integration with e.g. Twitter.

-   *Mobile social tagging* includes both "traditional" tagging made by users but also other digital footprints such as location information captured when, for instance, the image was taken. Such functionality is provided by e.g. Nokia's Lifeblog and Yahoo's Zonetag.

-   *Mobile social networking* sites include the OSNs adapted to mobile platforms (such as Facebook) but also to applications that leverage the mobile context by taking advantage of knowing the location of the mobile. These include Bliin (Netherlands), Trackut (UK), Dodgeball (US), ZYB (Denmark), Mocospace (US), Mig33m (US), Aka-Aki (Germany), Mobiluck (France), Imity (Denmark), MeetMoi (US) and LimeJuice.[147]

-   *Mobile multimedia sharing*: Includes, for instance, ShoZu (US) which allows for easy uploading and downloading to mobile phones, as well as Pikeo (US owned by Orange), and Twango (US acquired by Nokia) as well as Yahoo for mobile (US).

-   *Mobile social gaming*: social gaming providers are at different stages of adapting their platforms to the mobile environment. SecondLife users can communicate with each other using mobile phones, while Habbo Hotel had 120,000 users on its experimental mobile platform in October 2007. This category also includes dedicated mobile MMOs such as

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[143] Psychical distance is a concept used in internationalization research. It includes country-based dissimilarities including (1) language, (2) cultural, (3) economic and (4) politico-legal differences. The internationalization process of business is known to be inversely related to the psychical difference. See e.g. Johanson and Vahlne (1990).

[144] Boyd and Elison (2007)

[145] See e.g. Griswold (2007), Jaokar and Fish (2006) and Feijoo et al. (2009)

[146] See Pascu (2008).and Feijoo et al. (2009)

[147] http://www.techcrunch.com/2007/09/11/the-holy-grail-for-mobile-social-networks/ [accessed 2008-05-23]

Mobagetown, which is a Japanese social network with free games and customisable personal avatars and has more than 5 million users.[148]

Examples of services, which to a large extent include the context-aware aspect of mobile 2.0 include Dutch-based Gypsii, Twinkle (Twitter with auto-location) and Bliin (another Netherlands-based company whose service lets users broadcast their location and post location-tagged photos). Although their potential has been claimed to be huge, uptake and revenues of Mobile 2.0 are still fairly limited. With revenues estimated at less than $0,6 billion in 2007, Mobile 2.0 is modest compared to other types of mobile content (see Figure 6-9). The limited uptake can be explained by the presence of a number of barriers to adoption such as unclear business models and complex value networks, relatively high barriers for application development, low usability of advanced mobile devices, lack of framework for international services, privacy, security and trust issues, and the somewhat high prices of advanced mobile devices.[149]
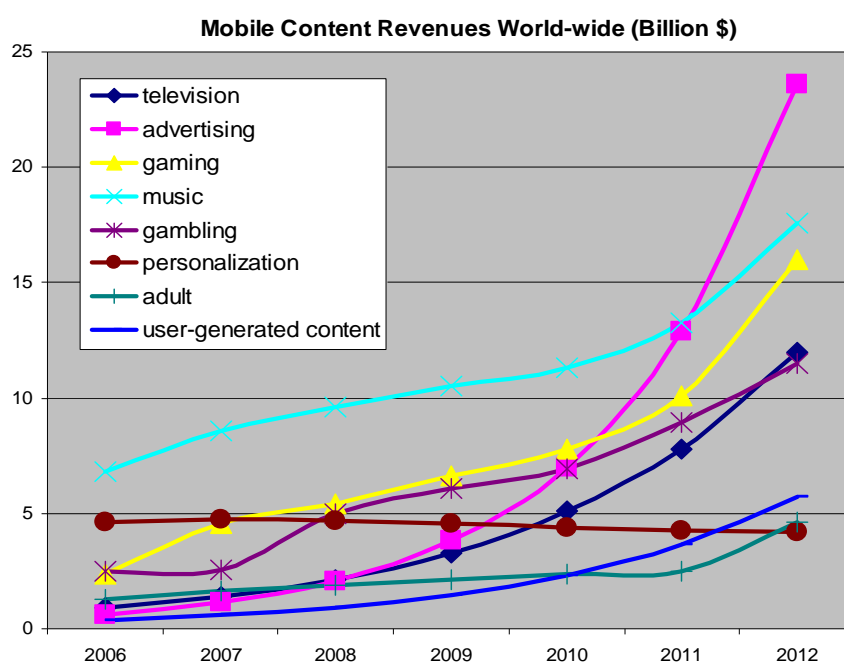
Figure 6-9: Evolution of mobile content revenues

Note: Mobile user genereated content is taken to corresponding roughly to mobile 2.0
Source: IPTS, based on its own elaboration from data and forecasts from Informa, iSuppli, Juniper and Research & Markets

However, Mobile 2.0 is forecasted to grow (Figure 6-9), driven, among other things, by the improvement of enabling technologies, the various increases in network bandwidth, the emergence and diffusion of Web 2.0 capable devices (smart phones),an increasing confidence in mobile technology, as well the lowering of the afore-mentioned barriers.[150]

The JRC Exploratory IPTS-project on Mobile Content Evolution is currently building another company database comprising of mobile content companies only. So far 13 narrowly defined Mobile 2.0 companies have been identified and analysed, of which 5 are from Europe, 7 are

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[148] http://money.cnn.com/galleries/2007/biz2/0707/gallery.web_world.biz2/26.html
[149] IPTS JRC Exploratory Project on Mobile Content Evolution (Feijoo *et al.* 2009)
[150] IPTS JRC Exploratory Project on Mobile Content Evolution (Feijoo *et al.* 2009)

from the US and 1 is from the rest of the world (RoW) Using a broader definition that encompasses a larger part of the Mobile 2.0 ecosystem (together with operators, broadcasters, platform, software and hardware providers, content and advertising suppliers, content enablers and brokers), a larger set of 43 companies has been identified so far. Of those, 18 were based in the EU, 18 in the US and 7 from RoW. This indicates that there is a substantial corporate activity in Mobile 2.0 in Europe. It also appears that most of the innovative activities have shifted, relocated at the edge of what is still a mostly operator-centric ecosystem.[151]

Based on these observations, and on the ongoing IPTS research on Mobile 2.0, European strengths, weaknesses, opportunities, and threats (SWOT) with respect to Mobile 2.0 can be displayed as in Table 6-6. Clearly, Europe, the US and Asia all have different competitive advantages in related fields, and these are advantages that could be extended to Mobile 2.0. Europe has a general strength in mobile communications technology, with world leading infrastructure suppliers (Ericsson et al.) and terminal suppliers (Nokia et al.), as well as strong operators; the US is dominant in Web 2.0; and Asia leads in Mobile Internet deployment and diffusion. Opportunities for Europe seem to lie partly in the innovation of technologies that enable and more specifically, enhance Mobile 2.0 beyond being a simple extension of Web 2.0 (which would favour US application providers).

This strength possessed by European mobile operators could however also be regarded as a weakness. If they kept prices of mobile data communications (e.g. termination rates) high and pursued silo models (e.g., walled gardens in mobile communications), this could hamper the uptake of and innovation in Mobile 2.0.

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[151] Feijoo et al. (2009)

Table 6-6 Mobile 2.0 EU SWOT

Strengths	Weaknesses
• Presence of mobile suppliers in EU • Presence of mobile operators in EU • Significant number of (potential) "early-adopters"	• Spectrum allocation and management still a bottleneck • Prices of advanced mobile devices and mobile broadband • Institutional framework for innovators and entrepreneurship • Lack of framework for international services (i.e. location) • Fragmented market. • Silo models (e.g., walled gardens in mobile communications)
Opportunities	**Threats**

• Mobile 2.0 being more than web 2.0 (Future of Internet, i.e., augmented reality, reality mining, …)
• Room for innovation / development of mobile applications
  - in enabling technologies (batteries, displays, smart materials, …)
  - in enhancing technologies (cognitive, visual recognition, 3D, …)
• Deployment of mobile NGNs
• Development of open solutions: standards; platforms, development; distribution; applications; networks (3rd parties can interconnect)
• Opportunities for new players: enablers, brokers
	• Mobile 2.0 being just an extension of web 2.0
	• Lack of take-up due to pricing and institutional issues.
	• Lock-ins due to proprietary solutions. ("winner takes all ")
	• IPR royalties
	• Wrong digital rights management / rights licensing / rights exclusivity and territoriality
	• Privacy issues
	• Security issues
	• Trust issues
	• No convergent regulation
	• Complex institutional architecture (regulatory bodies, MS, EC)
	• I-phone

Source: IPTS analysis, partly validated by Exploratory Mobile Content Evolution Workshop, IPTS, Sevilla 28-29 April 2008

6.4 Summary and conclusions

This chapter has assessed the European position in Web 2.0 applications. We have used the following indicators of industrial strength and weaknesses. The current European position within Web 2.0 has been indicated by its global share of Web 2.0 companies and sites. Its near and medium term future position will depend primarily on the ability of European firms to innovate, for which patenting and R&D activities served as a proxy.

The overall impression is that Europe's current position in the supply and development of Web 2.0 application is rather weak – at least compared to the US. Web 2.0 is largely dominated by US applications and companies, with Europe, as well all other regions, left behind. About two thirds of the major Web 2.0 applications are run by US companies, with similar shares for revenues, employees, and even higher for innovation indicators such as patents, VC and R&D expenditures. The corresponding shares for the EU are around 10%.

Web 2.0 seems to be just the latest in a series of success stories from the US Software and Internet industry. Its success could therefore most probably be explained by the same factors as for those industries, factors such as the abundance of competent venture capital, pooled labor market of skilled engineers, a large advanced home market, strong clustering effects etc.[152] In this sense, the EU Web 2.0 weakness, as compared to that of the US, is simply a

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[152] See e.g. Mowery (1999)

facet of a more general weakness in the software (and computing) industry. Still, there are signs that established EU ICT firms such as Nokia and SAP are embracing the Web 2.0 opportunity.

It is also clear that a large part of the Web 2.0 industry stems from Silicon Valley. Prominent companies include Web 1.0 giants Google and Yahoo (also very prevalent in Web 2.0) as well as Facebook, YouTube and many others. In addition, companies founded elsewhere, have a tendency to move their operations to this area, be it only partly or full, or to end up being acquired by Silicon Valley firms. Clearly, there is a very strong clustering aspect to the Web 2.0 innovation system, perhaps even stronger than in other parts of the software sector. This is ironic, since Web 2.0 promises to create networks without regard to geographic location.

Still, there are parts of the Web 2.0 landscape where Europe could be better positioned. This report has investigated three such areas: (1) online social gaming, (2) online social networking and (3) mobile 2.0. Clearly, the online social gaming market is one that has potential for future growth \, and could also generate important spill-over effects to other parts of the ICT-sector and to the economy at large. European industry appears to be more competitive in this emerging online social gaming industry, and in the computer gaming industry in general, than in other parts of the software industry, and is therefore better positioned to profit from this growth.

Online social networking is dominated by a few US giants, a dominance which will be difficult to crack. However, there seem to be niches in the form of locally adapted social networks or in social networks that are other way differentiated, whereby European companies can grow, albeit such growth potential may be limited.

The final promising Web 2.0 segment for European industry is Mobile 2.0, an industry which is still in its infancy but shows several promising signs for future growth. The EU has several strengths to draw on in establishing leadership in Mobile 2.0, including a very strong presence in mobile communications. However, if Mobile 2.0 simply becomes an extension of Web 2.0, American companies will most likely dominate. Also, the current semi-walled garden and high pricing approach of operators could hamper the development of Web 2.0. The various opportunities for Europe on the other hand, could lie in innovating the enabling and enhancing technologies , as these influence the opportunities of the mobile context (such as location based technologies), and in opening up standards, platforms, development, distribution and networks.

7 CONCLUSIONS

This chapter first summarises the major observations, conclusions and statements from the validation workshop for the study held on 2 October 2008 in Brussels (Box 7-1). It then offers the main conclusions of this report.

Box 7-1 Validation workshop conclusions – an idiosyncratic summary

Observations: These are a collection of individual statements/conclusions/observations from the workshop, which do not necessarily reflect the collective view of the participants

The economic implications of Web 2.0 are more far-reaching than the industrial impacts, as described in Chapter 5. This may lead to a greater diversity of content, lower entry barriers, structural changes because of better informed customers, lower IT costs for enterprises as well as better public services. (See also Box 5-1)

The most important impact of Web 2.0 may come from professional enterprises' use of it (Impact 3. in Figure 5-1). The main challenge for the 21st century is to increase the productivity of knowledge work, and it is here – on the demand side - where the real economic impact will be, as innovative and productive uses of new technology are made.

The major reasons for the EU lagging behind on the supply side are: (1) the advantage the US has in terms of education and culture; (2) European language barriers, (3) the lack of marketing capabilities in Europe; (4) the fact that European companies do not buy local start-ups; (5) European weaknesses in seed-funding; (6) the dominant European operators that have threatened revenue sources (e.g. SMS), and (7) a more conservative business culture. (in Europe?)

There are many reasons for the wide use of Web 2.0 applications in public services. They are simple and user-oriented, participative and inclusive. They create spill-over effects into the private sector, even though they are hindered by among a lack of data availability.

Opportunities lie in targeting local markets, providing good examples, such as seed-camp, more capital in early phases, in releasing public data and perhaps most importantly making better use of Web 2.0 technology in order to increase the productivity and competitiveness of European industry.

This report has analysed Web 2.0 applications such as blogs, wikis, social tagging, social networking and social gaming, of which the main distinguishing feature is the extent and ease with which the user can play an integral and participatory role. This role includes proving content, managing quality, testing technology, and contributing to collective intelligence.

Since its emergence in the early and mid 2000s Web 2.0 diffusion has been extremely rapid and some applications are now becoming mainstream, although the intensity of users participation varies considerably. The rapid diffusion of Web 2.0 has been enabled by several factors; namely technological progress which enables users to create, distribute content and interact easily. Other factors include price reductions and performance improvement in network and terminal equipment, broadband availability, the existence of a generation of computer skilled young people with little reluctance to share personal data online and the emergence of collaborative communities.

At the centre of the Web 2.0 value chain, are the providers of Web 2.0 applications. Such applications are either provided by pure Web 2.0 players or incumbent players from e.g. media and Web 1.0. Although the revenues of these players are already substantial (in total several billions of euros) few of them are profitable so far. Revenues mainly come in the form of advertising, users paying for content, bundling and other ways of tying Web 2.0 to complementary products or services or in the form of donations.

These Web 2.0 applications provide opportunities for users (individuals, companies and other organisations) to network and/or to create content, for which they may be remunerated or not. Advertisers and companies providing advertising platforms also play major roles in many value networks. Technological platforms for the applications are made available by providers of ICT services and Web 2.0 software packages as well as by ICT goods suppliers who are selling hardware with new functionality and interoperability for users to create and access content.

The emergence and rapid diffusion of Web 2.0 implies that there are a number of potentially disruptive industrial consequences: it is a growth industry in itself; it constitutes both a threat and an opportunity to content industries; it has the potential to improve productivity and innovativeness in adopting firms (and public institutions); and it generates demand for ICT hardware and software. All of those impacts are potentially substantial, presenting European industry with opportunities for growth and improved competitiveness as well as with threats.

Although there is lot of entrepreneurial activity in the Web 2.0 field in Europe, its current position in the supply and development of Web 2.0 applications is rather weak. Web 2.0 is largely dominated by US applications and companies. Nevertheless, there are some parts of the Web 2.0 landscape where Europe appear to be better positioned: Online social gaming; (2) Online social networking and (2) Mobile 2.0.

Given the disruptive character of Web 2.0, its potentially large industrial impact and the identified strengths and weaknesses of the EU industry, it is important that policy makers consider the following options:

1. The EU could stimulate the development of its Web 2.0 sector. Here it is important to bear in mind that, here, the weakness of the EU in relation to the US is not specific to Web 2.0. It is more a general weakness in both the ICT sector (especially in software development) and in growing companies. Hence any set of policy measures, needs to address a broad range of industrial and innovation policy issues.
2. Since there is some strength to draw on in e.g. online gaming, social networking and mobile social computing, these applications could be the target of more focused efforts.
3. There is an opportunity to stimulate Web 2.0 usage so as to increase demand for Web 2.0 platforms and applications as well as for their underlying ICT products and services. Here implementation of innovative Web 2.0 based public services could play an important role in creating a lead market.
4. Finally opportunities exist to increase the usage of Web 2.0 applications in enterprises as a tool to increase competitiveness among European enterprises. Establishing policy may ensure that European companies are aware of these opportunities and disperse knowledge about best practices accordingly.

8 REFERENCES

Ala-Mutka, K. (2008) *Social Computing: Study on the Use and Impacts of Collaborative Content, IPTS Exploratory Research on the Socio-economic Impact of Social Computing*, JRC Scientific and Technical Report, EUR Number: 23572 EN.

Ante, S. E., Grover, R. and Green, H. (2007) "In search of my profits" *Business Week*, Nov. 5, (Online) http://www.businessweek.com/magazine/content/07_45/b4057047.htm?chan=search.

Anderson, C. "The Long Tail", *Wired*, Issue 12.10, October 2004

Anderson, C. (2006) *The Long Tail: Why the Future of Business Is Selling Less of More*, New York, Hyperion.

Anderson, P. (2007) "What is Web 2.0? Ideas, technologies and implications for education", (TSW0701), Joint Information Systems Committee (JISC), TechWatch, available online at http://www.jisc.ac.uk/media/documents/techwatch/tsw0701b.pdf

Barrios, S., Mas, M. Navajas, E. Quesada, J. (2007) Mapping the ICT in EU Regions: Location, Employment, Factors of Attractiveness and Economic Impact, JRC Scientific and Technical Report, 23067 EN,

Beer, D. (2007) Making 'friends' with Jarvis Cocker: Some early reflections on music culture in the context of Web 2.0, (reference incomplete)

Bergek, A. Jacobsson S., Carlsson, B., Lindmark, S. and Rickne A. (2008) "Analyzing the functional dynamics of technological innovation systems: A scheme of analysis" *Research Policy*, Vol. 37, Iss. 3, April 2008, pp. 407-429

Bernoff, J. and Li, C. (2008) "Harnessing the Power of the Oh-So-Social Web", *MIT Sloan Management Review*, Spring 2008, pp. 36-42

BigMouthMedia (2007) "MySpace and Facebook hooking business professionals". May, 31, (Online) http://www.bigmouthmedia.com/live/articles/myspace-and-facebook-hooking-business-professional.asp/3798/

Boyd, D. and Ellison N. (2007) "Social network sites: Definition, history, and scholarship" *Journal of Computer-Mediated Communication*, 13(1), article 11, available online at http://jcmc.indiana.edu/vol13/issue1/boyd.ellison.html

Bradner, L. et al. (2007.) *Demystifying the WOM Consumer. An In-Depth Look at Those Who Give and Receive Product Advice.* Forrester Research, Inc.

Brynjolfsson, E. Hu Y. (J.), and Smith M. (2006) "From Niches to Riches: Anatomy of the Long Tail", Vol.47 No.4 Summer 2006, pp. 67-71.

Bryant, L. (2008) Enterprise 2.0 Adoption in a European Context, presentation to the "Assessing the Economic Impact of Web 2.0 Technologies on EU ICT Industry Competitiveness" COMPLETE project validation workshop, 2nd October 2008, DG ENTR, Brussels, Belgium.

Cachia, R. (2008), Social Computing: Study on the Use and Impact of Online Social Networking, *IPTS Exploratory Research on the Socio-economic Impact of Social Computing*, JRC Scientific and Technical Report, EUR Number: 23565 EN.

Chesbrough, H. (2003) *Open innovation: The new imperative for creating and profiting from technology*, Harvard Business School Press, Boston, MA

Deere, G. E. (2006) "The Business Impact of Blogs", Ipsos-MORI, 21 November 2006 http://www.ipsos-mori.com/polls/2006/blogging.shtml, [Accessed April 3, 2008]

Dellarocas, C., Awad, N. & Zhang, M. (2005) "Using online ratings as a proxy of word-of-mouth in motion picture revenue forecasting", Working paper, (online) http://web.mit.edu/zxq/www/mit/15575/movieforecast.pdf

Feijóo, C., Maghiros, I., Bacigalupo, M., Compañó, R., Abadie, F. (2009/in Press). *Content and applications in the mobile platform: on the verge of an explosion*. Seville: Institute for Prospective Technological Studies.

Gartner (2008) "Hype cycle for Social Software, 2008"

Griswold, W. G. (2007). "Five enablers for mobile 2.0", *Computer*, Vol. 40 No. 10, pp. 96-98

Forrester (2007) Internet Risk Management in the Web 2.0 World. September 2007.

Forrester (2008a) "Global Enterprise Web 2.0 Market Forecast: 2007 To 2013" April 21, 2008) excerpt available at: http://www.forrester.com/Research/Document/Excerpt/0,7211,43850,00.html

Forrester (2008b) "Getting Real Work Done in Virtual Worlds"
by Erica Driver, Paul Jackson, January 7, 2008, executive summary available online at: http://www.forrester.com/Research/Document/Excerpt/0,7211,43450,00.html

Future Exploration Network (2007) *Future of Media Report 2007*, available online at http://www.futureexploration.net/images/Future_of_Media_Report2007.pdf

IBM (2007) *Achieving tangible business benefits with social computing*, White paper, July 2007, (online) http://whitepapers.zdnet.com/abstract.aspx?docid=321018

Hitwise (2007) Hitwise US Research Note: Measuring Web 2.0 Consumer Participation

IDATE, DigiWorld 2007, IDATE, available online at: http://www.idate.fr

IDATE (2008) *Web 2.0 and Social networking. New applications, new business models?*, IDATE, Montpellier.

International Telecommunication Union (2006) Digital.life ITU Internet Report 2006, ITU, Geneva, available online at: http://www.itu.int/osg/spu/publications/digitalife/

Ipsos (2007) The Impact of Blogs on Corporate Image and Product purchases, http://www.ipsos-ideas.com

IPTS (forthcoming), Feijoo C. "Content in The Mobile Platform. On the Verge of an Explosion: Technological, Economic and Social Overview. Drivers, barriers, scenarios and conclusions", Draft for discussion, Version 2.0, 2008-04-21

Jaokar, A. and Fish, T. (2006) "Mobile web 2.0". Futuretext. London

Johanson, J. & Vahlne, J.-E. (1990). The mechanism of internationalization. In *The Internationalization of Business: Theory and Evidence*, Vol 7(4): 11-24.

Library House (2007a) "Essential Web" Delegate information for "Essential Web 07" at the London IMAX conference, 27 June.

Library House (2007b) "Venture Capital, Innovation and IT – Driving forward the Economy", available online at: www.library.net

Lindmark, S., Turlea, G. and Ulbrich, M. (2008) *R&D Business Investment in the EU ICT Sector*, JRC IPTS Policy brief, 23250 EN, available online at http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1558 Publication date: 2/2008

King Research. 2007. The Value of Online Communities: A Survey of Technology Professionals. June 2007, available online at http://www.kace.com/pdf/KingResearch_The_Value_of_Online_Communities.pdf

Majchrzak, A., Wagner, C. & Yates, D. (2006) Corporate Wiki Users: Results of a Survey. Proceedings of WikiSym 2006, 21-23 August, Odense, Denmark, pp. 99-104. (Available online) http://www.wikisym.org/ws2006/proceedings/p99.pdf

McAfee, A. (2006) "Enterprise 2.0: The awn of Emergent Collaboration", MIT Sloan Management Review, Spring 2006, Vol. 47, No. 21-26.

McKinsey & Company (2007) How businesses are using Web2.0: A McKinsey Global Survey. The McKinsey Quarterly. March 2007.

McKinsey & Company (2007b) How companies are marketing online: A McKinsey Global Survey. The McKinsey Quarterly, September 2007.

McKinsey & Company (2007c) How companies approach innovation: A McKinsey Global Survey. The McKinsey Quarterly, October 2007.

McKinsey & Company (2008) "Building the Web2.0 Enterprise: McKinsey Global Survey Results" *The McKinsey Quarterly*. July 2008, available online at http://www.mckinseyquarterly.com/Building_the_Web_20_Enterprise_McKinsey_Global_Survey_2174

Chui, M., Miller, A. and Roberts, R. (2009) "Six ways to make Web 2.0 work" The McKinsey Quarterly, February 2009, available online at http://www.mckinseyquarterly.com/PDFDownload.aspx?ar=2294

Mowery, D. (1999) "The Global Computer Software Industry" in D.C. Mowery and R.R. Nelson (eds).

Mower, D. and Nelson, R. (1999) (eds). The Sources of Industrial Leadership, Cambridge University Press.

OECD (2005) DIGITAL BROADBAND CONTENT: The online computer and video game industry, DSTI/ICCP/IE(2004)13/FINAL, OECD, Paris, available online at http://www.oecd.org/dataoecd/19/5/34884414.pdf

OECD (2006) OECD Information Technology Outlook 2006, OECD Publishing, Paris

OECD (2007) *Participative Web and User-Created Content: Web2.0, Wikis and Social Networking*, OECD, Paris.

OECD (2008) Measuring user-created content: implications for the" ICT access and use by households and individuals surveys", DSTI/ICCP/IIS(2007)3/FINAL, OECD, http://www.oecd.org/dataoecd/44/58/40003289.pdf

Ofcom (2007) The International Communications Market 2007 available online at http://www.ofcom.org.uk/research/cm/icmr07/

Ofcom (2007b) The Communications Market 2007 available online at http://www.ofcom.org.uk/research/cm/cmr07/cm07_print/

Ofcom (2008) The International Communications Market 2008 available online at http://www.ofcom.org.uk/research/cm/cmr08/

O'Reilly, T. (2005) "What Is Web 2.0 Design Patterns and Business Models for the Next Generation of Software", 30 September, 2005 http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html [Accessed 15 February, 2008]

Osimo, D. (2008) Web 2.0 for government: why and how?, JRC Scientific and Technical Report,EUR 23358 EN

Pascu, C. (2008), *An Empirical Analysis of the Creation, Use and Adoption of Social Computing Applications, IPTS Exploratory Research on the Socio-economic Impact of Social Computing*, JRC Scientific and Technical Report, EUR Number: EN 23415

Pascu, C., Osimo, D., Ulbrich, M., Turlea, G., Burgelman, J-C. (2007) "The potential disruptive impact of Internet2-based technologies" *First Monday*, March 2007, Issue 12 available online at: www.firstmonday.org/issues/issue12_3/pascu/

Pascu, C., Osimo, D., Ulbrich, M., Turlea, G., Punie, Y. and Burgelman. J-C. (2008) "Social Computing: implications for the EU innovation landscape" *Futures*, Vol. 10, No.1, pp. 37-52.

Porter, M. (1990) *The Competitive Advantage of Nations*. The Free Press, New York.

Perez, S. (2008) "Enterprise 2.0 To Become a $4.6 Billion Industry By 2013" ReadWriteWeb, April 20, 2008, available online at:

http://discussionleader.hbsp.com/davenport/2008/02/enterprise_20_the_new_new_know_1.html [Accessed 28 April 2008]

Picci, Lucio (2009) A methodology for developing patent statistics on European inventive activity using the PATSTAT database. Forthcoming JRC-IPTS Technical Note.

Punie, Y. (2007) "Socio-Economic Impact of Social Computing", presentation to the JRC Exploratory research symposium, 12 December, 2007.

Punie, Y. (2008) The Socio-economic Impact of Social Computing, Proceedings of a validation and policy options workshop, IPTS Exploratory Research on the, Socio-economic Impact of Social Computing, JRC Scientific and Technical Report, EUR 23531 EN

Rainie, L. E. and Tancer, B (2007). Wikipedia users. P. E. W. Internet.(incomplete reference)

Rochet, J.-C. and Tirole, J. (2003). *Platform Competition in Two-Sided Markets. Journal of the European Economic Association*, 1(4): 990-1029

Rosenbush, S. (2006) "Facebook on the block", *Business Week.* March, 28. (online) http://www.businessweek.com/technology/content/mar2006/tc20060327_215976.htm

Smith, K. (2005) "Measuring Innovation" in Fagerberg, Jan; Mowery, David C. and Nelson, Richard R. (ed.), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford, U.K.

Slot, M. and Frissen, V. (2007) "Users in The 'Golden' Age of The Information Society", *Observatorio (OBS*)*, Vol. 1, No 3 (2007), pp. 201-224.

Sparkes, M. (2007) "Web 2.0 Wealth Check", *Information World Review*, June 2007 available online http://www.iwr.co.uk/information-world-review/features/2191572/web-wealth-check

Stone, B. (2007) "Microsoft to pay $240 million for stake in Facebook" *The New York Times.* October, 25. available online at: http://www.nytimes.com/2007/10/25/technology/24cnd-facebook.html?ex=1350964800&en=c27e6c86844c7723&ei=5088&partner=rssnyt&emc=rss

Tancer, B. (2007) "Measuring Web2.0 Consumer Participation" Hitwise US Research Note: *June 2007*. available online at: http://www.hitwise.com/downloads/reports/ Hitwise_US_Measuring_Web_2.0_Consumer_Participation_June_2007.pdf

Tapscott, D. (2006) "Winning with Enterprise 2.0" available online at: http://www.newparadigm.com/media/Winning_with_the_Enterprise_2.0.pdf [Accessed 30 December 2008]

Tazzi, J. (2007) "Bloggers Bring in the Big Bucks How a personal obsession can turn into a popular favorite and maybe even a full-time job", *Business Week*, July 13 2007 http://www.businessweek.com/smallbiz/content/jul2007/sb20070713_202390.htm [Accessed 19 March 2008]

TNO (2008) WP3: Review of literature on social computing take-up and impact, IPTS project report draft in progress, version 12 July 2008.

Turlea *et al.* (2009) Annual report on R&D in ICT in the European Union, EC/JRC/IPTS, final annual report of the PREDICT project. To be published 2009.

Von Hippel, E. (1988) *The Sources of Innovation*, New York, Oxford University Press.

VTT (2007) *"Ads by Google" and other social media business models,* VTT RESEARCH NOTES 2384, Esboo 2007, available online at http://www.vtt.fi/inf/pdf/tiedotteet/2007/T2384.pdf

Wijaya1, S., Spruit, M. and Scheper, W. (2009 forthcoming) "Webstrategy Formulation: Benefiting from web 2.0 concepts to deliver business values" in Lytras, M., Damiani, E. and Ordóñez de Pablos, P. (eds.) Web 2.0, the Business Model, Springer.

Young, O. (2007). Topic Overview: Web 2.0, Forrester Research, (online) http://www.forrester.com/Research/Document/0,7211,42027,00.html#heading5

9 ANNEXES

ANNEX A: Database of Web 2.0 sites – sources

Name	Web address	Description
Movers 2.0 / Top Web 2.0 Sites	http://movers20.esnips.com/	A ranking of 99 web 2.0 sites according to their Alexa ranking.
Alexa Global 500	http://www.alexa.com/site/ds/top_sites?ts_mode=global&lang=none	Major site for web traffic rankings: The top 200 traffic ranked websites were checked and included if they were Web 2.0 sites.
Top web 2.0 Websites	http://www.ebizmba.com/articles/user-generated-content	Web 2.0 / user generated content sites ranked by a combination of Inbound Links, Google Page Rank, Alexa Rank, and U.S. traffic data from Compete and Quantcast.
Top 30 Blogs	http://www.ebizmba.com/articles/popular-blogs	Ditto for blogs
30 largest social bookmarking sites	http://www.ebizmba.com/articles/social30	Ditto for social tagging
top ten most popular MMOs	gigaom.com/2007/06/13/top-ten-most-popular-mmo /	Ranking of top ten social games, based on estimations of the number of active users.
Comparison of video sharing websites	http://en.wikipedia.org/wiki/Comparison_of_video_services	Wikipedia listing of major video sharing web sites
Next Net 25 Startups to watch	http://money.cnn.com/galleries/2007/biz2/0702/gallery.nextnet.biz2/	CNN Business 2.0 identification of promising web sites/companies.
Where are they now S10 sites that made it	http://money.cnn.com/galleries/2007/biz2/0707/gallery.web_world_06.biz2/index.html	CNN Business 2.0 identification of non-US web sites/companies which has become successful.
In addition a number of miscellaneous sources have been used.		

ANNEX B: Web 2.0 applications geographical distribution / alternative view

An early attempt to map new Web 2.0 applications geographically (Table B-1) shows a very strong overrepresentation of US companies, especially of those in California.[153]

Table B-1 Web 2.0 Applications geographical distribution as of 2006

Country/Region	Number of companies
US	280
(of which: California)	*(127)*
Europe	32
Canada	21
RoW	11
Total	**344**

Source: IPTS elaboration of data as reported on http://www.fourio.com/web20map/ [Accessed 2008-05-19]

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[153] The validity of the data provided by this source could likely be questioned in various ways. For instance, it is not clear how many of the included companies are Web 2.0 ones according to definition of this report. Moreover, the sources used and selections made, could lead to a geographical bias.

Abstract

This report provides a techno-economic analysis of Web 2.0 and an assessment of Europe's position in Web 2.0 applications. Firstly, it introduces the phenomenon of Web 2.0 and its main characteristics: technologies, applications, and user roles. It then provides an overview of its adoption, value chain and business models, before moving to an analysis of its drivers, industrial impact and disruptive potential. Finally, the report assesses the position of the European Web 2.0 applications industry and its prospects for growth.

"Web 2.0" is defined as a set of applications (blogs, wikis, social tagging, social gaming etc.), technologies (including AJAX, syndication feeds, mash-ups, and wiki engines) and user roles. The most pertinent characteristic of Web 2.0, as compared to the previous "version" of the Web, is that it enables users to become, with little effort, a co-provider of content. The available figures about recent Web 2.0 diffusion deliver two messages. Firstly, its spread is extremely rapid by any standards, although not uniform for all its applications. Secondly, the intensity with which users participate differs a lot.

At the centre of the Web 2.0 value chain are the providers of Web 2.0 applications who may be pure Web 2.0 players or traditional players from related industries such as the media and Web 1.0 industry. They provide opportunities for users to network and/or to create content. As yet, no dominant revenue model for Web 2.0 content-hosting sites has been established, although advertising is the most common one. The content hosting platforms may in turn choose to remunerate content creators through different revenue-sharing schemes, or simply rely on their voluntary contributions.

We discuss four aspects of Web 2.0 which may have a disruptive impact on industry: (1) Providers of Web 2.0 applications are becoming increasingly numerous and large, and contribute to growth and employment. (2) They already constitute an important threat to other industries, in particular content industries. The content industry is responding by diversifying into Web 2.0. (3) Web 2.0 applications and software are being increasingly adopted by the enterprise and public sectors as tools for improving internal work processes, managing customer and public relations, innovation, recruitment and networking. (4) The growth of Web 2.0 leads to a derived demand in the supply of ICT hardware and software.

Europe's current position in the supply and development of Web 2.0 applications is rather weak. Although Web 2.0 is used almost as much in Europe as it is in Asia and the US, Web 2.0 applications are largely provided by US companies, while Europe and all other regions are left behind. About two thirds of the major Web 2.0 applications are provided by US companies, with similar shares for revenues, employees, and even higher shares for innovation indicators such as patents, venture capital and R&D expenditures. The corresponding shares for the EU are around 10%. Nevertheless, Europe could have the advantage in some areas of the Web 2.0 landscape, for example social gaming, social networking, and Mobile 2.0.

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