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An Empirical Analysis of the Creation, Use and Adoption of Social Computing Applications

IPTS Exploratory Research on the Socio-economic Impact of Social Computing

Corina Pascu

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PREFACE

The European Commission's Joint Research Centre runs an exploratory research scheme which aims to build competences in strategically relevant scientific fields. One of the chosen projects at IPTS,[1] following a call for proposals, was "Exploratory Research on Social Computing" (ERoSC). This was carried out by the Information Society Unit at IPTS during 2007 – 2008.

This project aims to explore (1) the socio-economic impact of social computing; (2) the sustainability of social computing applications (business models and viability); (3) the relative position of Europe in terms of creation, use and adoption; and (4) options for EU research and innovation policies. Such research is important and urgent because social computing is already impacting many aspects of society and the previously available evidence was largely anecdotal and not comparable. Also, the recent nature of social computing applications, their strong growth in terms of creation, use and adoption, and the continuous changes in technologies, applications and user behaviour, reinforce the need for continuous monitoring and scientific capacity building. Therefore, the ERoSC project undertook a systematic empirical assessment of the socio-economic impact of social computing applications.

The methodological framework for the assessment consisted of desk-based research using available studies, reports and statistics on social computing in general and on collaborative content and social networks in particular. In addition, interviews with experts and a validation and policy options workshop were undertaken to tackle the challenge that the domain of social computing applications is quite recent and moreover, changing rapidly.

The research was undertaken in-house by a number of key researchers, supported by a larger multidisciplinary team of people belonging to the different areas of activity of the IS Unit.

This is the first of five reports from the ERoSC project. It provides a systematic empirical assessment of the creation, use and adoption of the following social computing applications: blogging, podcasting, collaborative content, social networking, multimedia sharing, social tagging and social gaming. All the ERoSC reports will be available at http://is.jrc.ec.europa.eu/.

While completing the ERoSC project, the IS Unit at IPTS is continuing its work on social computing, and is currently investigating the impacts of social computing on health, government, learning, inclusion, competitiveness and the ICT/media industries.

[1] IPTS (Institute for Prospective Technological Studies) is one of the seven research institutes of the European Commission's Joint Research Centre (JRC).

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EXECUTIVE SUMMARY

Over the last few years, the take-up of social computing applications has been impressive. These digital applications are defined as those that enable interaction, collaboration and sharing between users. They include applications for blogging, podcasting, collaborative content (e.g. Wikipedia), social networking e.g. MySpace, Facebook, multimedia sharing (e.g. Flickr, YouTube), social tagging (e.g. Deli.cio.us) and social gaming (e.g. Second Life).

The importance of social computing has been acknowledged by European policy makers.[2] It is considered to be a potentially disruptive Information Society development, in which users play an increasingly influential role in the way products and services are shaped and used. This may have important social and economic impacts on all aspects of society. There is, however, little scientific evidence on the take-up and impact of social computing applications.

The objective of this report is to provide a systematic empirical assessment of the creation, use and adoption of social computing applications. Therefore, up-to-date evidence has been collected on seven specific social computing application areas: blogging, podcasting, collaborative content, social networking, multimedia sharing, social tagging and social gaming. In addition, the report offers a definition of social computing in order to clarify what is meant, in the face of many different angles, and points to the new area of mobile social computing. The dynamics of user participation in social computing are also discussed. Finally, extensive empirical data is presented in the Annex to this report.

The research indicates that there seems to be a regional difference in social computing usage. Asian countries are leading, with more than 50% of Internet users across all applications, followed by US (with about 30% of Internet users) and Europe (with about 20%).

The analysis shows that the creation, use and adoption of social computing applications have been growing strongly since 2003. The size of the 'blogosphere' has doubled every 5-7 months and more than 100,000 blogs are created daily. More than 1 billion photos (1 million updated daily) and 40 million user-created videos (~70,000 uploaded daily) are uploaded in photo- or video-sharing sites. Tens of billions of objects are created by the users of Second Life and social tagging is on the rise with millions of photos tagged in Flickr or videos in YouTube (1 million tags added per week in Flickr). Blogging, photo- and video-sharing, social networking, social tagging and social gaming have spread widely and rapidly, and a minimum of 20-25% of Internet users in Europe use these applications. Podcasting, however, is only used by a limited number of Internet users (around 2% of Internet users in Europe).

The growth in take-up of social computing applications was initiated by young Internet users. More recently, however, new user groups are emerging that are not made up of the typical ICT early adopters: more and more woman and older people are starting to use social computing applications. In Europe, a significant increase in the usage of video-sharing sites, for instance, came when women and those aged 50-64 (the so-called ‘Silver Surfers') took them up. This trend may indicate that the diffusion of social computing is entering the maturity phase, which follows a period of exponential growth. This is further confirmed by the observation that the exponential growth curves of social computing take-up are levelling off. This slow down may, however, be related to other issues such as techno-fatigue, or the

[2] http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/06/773&format

fact that the novelty of these applications is wearing off. Another reason could be that users are shifting from the well-known social computing applications to more local and niche-based platforms. More research is needed to get a better understanding of these trends.

Another important observation is that although user participation is a key aspect of social computing applications, not all users participate in the same way. The majority of users tend to be 'free riders' i.e. they use social computing content created by a small group of core users (the 'creators'). We estimate that only around 3% of Internet users in Europe are “creators” e.g. they create blogs or Wikipedia articles, or upload their user-generated videos on YouTube or photos on Flickr. Some 10% of Internet users provide feedback (posting comments on blogs and reviews), share content on Flickr, YouTube and tag content in deli.cio.us. A third of Internet users (30%) use social computing content - e.g. they read blogs, watch user-generated videos on YouTube, listen to podcasts, visit wiki sites, or visit/use social networking sites. Simply reading or using social computing content can leave traces which can be used (anonymously) as a way of sharing preferences and interests (practically 100% of Internet users).

Furthermore, the intensity of use of these applications is very diverse. People engage in a broad range of activities e.g. they can be 'creators' and, at the same time, 'free riders' e.g. someone who writes a blog may also visit social networking sites or listen to podcasts.

Europe has strengths in mobile technologies and mobile connectivity, and has a market lead in mobile devices. There is, therefore, a possibility that Europe could further develop relevant services, applications and platforms for mobile 2.0. A lot of innovation is taking place around the mobile social computing area, where new concepts are emerging like mobile lifecasting, mobile socialcasting or mobile lifestreaming. Video streaming from mobile to Web is seen by some as the next killer application with services like Kyte.TV or Seeismic.

While about 20-25% of Internet users in Europe use desktop-based social computing applications, the take-up of mobile social computing does not seem to follow the same patterns. Mobile social computing has been adopted by only a small user base, though there is evidence of growth. In the EU countries selected for the study survey (i.e. the UK, France, Germany, Spain, and Italy) only 2.6% of mobile users access social networks via their mobile phones and 5.5% watch videos online. Teenagers are the most active users of mobile social computing.

Further quantitative and qualitative research is needed to monitor and understand better the creation, use and adoption of social computing applications over longer periods of time. New adoption and usage patterns, including the use people make of social technologies as part of their everyday lives, should be documented. It is also important to look at how companies, organisations and the public sector are taking up social computing applications, and also to understand better the socio-economic impacts of using social computing applications.

Research into social computing presents numerous challenges. Social computing is a moving target, with rapidly evolving technologies, markets and user behaviours, all of which have emerged and developed over just a few years. The measurement issue is a crucial one, in particular in the context of informed policy implications. While the report attempts to make a critical analysis of best publicly-available data and statistical sources on social computing, which may increase the validity of the findings, there is a strong need for better, systematic measurements and internationally comparable data.

1 INTRODUCTION

This report is based on an exploratory research project on social computing (ERoSc) conducted by IPTS. The research aimed to explore the socio-economic impact of social computing and was carried out from April – December 2007 (some recent research was also incorporated into the report during January 2008 – May 2008) through desk-based data collection, analysis of trends and critical assessment of data from multiple sources. The research was validated by an expert advisory board and insights from this report have been presented and discussed at an international workshop, attended by experts from industry, NGOs, academia, policy and other institutions, held in Seville, at IPTS premises, on 26-27 February 2008. Results were also present at the European Communications Policy Research Conference (EuroCPR2008) on 31 March-1 April 2008.

Several terms are used interchangeably to describe social computing applications. It was therefore necessary to start the analysis by defining and delimiting the concept. A number of key issues[3] appear to be common across the various terms. According to Pascu et al (2008) and Osimo (2008), social computing should essentially include technologies, applications and user roles or values (see Figure 1).

Applications have been developed to enable interaction, collaboration and sharing between users e.g. for blogging, collaborative content creation e.g. wiki, podcasting, social tagging e.g. Flickr, del.icio.us, social networking e.g. MySpace, multi-media sharing e.g. Flickr, Youtube, social gaming e.g. Second Life.

Many technological innovations have been introduced in recent years to increase the usability and interoperability of web applications e.g. Ajax.[4] Many applications like Facebook, MySpace, Google, etc have opened their APIs (Application Programming Interface), thus enabling outside developers to add new features and content. More services are expected to add data portability, in order to allow users to access their friends and media across all the applications.

What distinguishes social computing most is the *active role of the user* as a producer and innovator of the service**.** Users can be active by directly providing the services (i.e. producing content), by offering referral/guidance/feedback which improves the service, by helping other users to better use the service (such as in social bookmarking websites as *del.icio.us*), by testing applications (perpetual beta), and by providing collective intelligence.

[3] A more detailed description of social computing and its features can be found in previous work by IPTS (Pascu et al. 2007).

[4] Ajax is a programming technique used for creating interactive web applications

Values	User as producer, Collective intelligence, Perpetual beta, Extreme ease of use
Applications	Blog, Wiki, Podcast, RSS feeds, Tagging, Social networks, Search engine, MPOGames
Technologies	Ajax, XML, Open API, Microformats, Flash/Flex,

Figure 1: Operational Definition of Social Computing
(IPTS, adapted from O' Reilly and Forrester research- Osimo 2008)

On the Internet, traditional boundaries tend to blur so that traditional approaches to studying media measuring the interaction between supply and demand no longer seem to hold in a networked information society where users become co-producers of content, taste, profiles, services and so on. People that read blogs are contributors at the same time, posting comments and archiving links in social bookmarking web sites such as del.icio.us.

The approach of the ERoSC study has therefore been to look at the way in which users add value to digital content by creating, sharing and networking (of content, people, information, resources, etc.). This approach includes looking at usage and adoption. A longitudinal perspective has also been incorporated i.e. the change over time in the adoption of social computing.

The analysis drew upon data obtained from sources on tracking traffic (in particular for content creation) and also sample-based measurements that indicate user activity as a percentage of Internet users. It was completed by data from various sources e.g. academic research, industry, weblogs, etc.

There is a lack of internationally comparable data on social computing from national statistical sources. OECD notes[5] that, at this time (2008), Japan, Korea and the countries covered by EUROSTAT collect some data. Non-official statistics are available from either Internet audience measurement companies like Hitwise, comScore, Nielsen Netratings, Mediametrie, international research companies (like IPSOS Mori), research projects of non-profit centres (e.g. Pew Research Centre's Pew Internet and American Life project in US), international firms like Edelman, and the industry itself (e.g. Technorati, wikipedia, SecondLife, PodLook, Feedburner).

Measuring content creation is not straightforward. The content creation levels (e.g. number of blogs, number of Wikipedia articles etc) and their growth over time are available in some cases from industry e.g. Technorati, Wikipedia, Lindenlab or from private analyses using data logs from industry itself. Mapping regional differences in content creation is also difficult, since the Web has no spatial boundaries. According to OECD, the predominance of Anglo-

[5] http://www.oecd.org/dataoecd/44/58/40003289.pdf

Saxon hosting sites and the problem of double-counting[6] (the same content is accessible on a variety of sites) are two important issues to be considered.

“Traditional” ways of monitoring user activity around a website e.g. tracking metrics like page views, unique site visitors, etc, are becoming less adequate for online social media measurement. Increased use of streaming video, music and online games across the Web is challenging the accuracy of tracking metrics like unique visitors, page views or cookie-based measurements. The latter are particularly questionable, as they can potentially over-represent the number of unique visitors to a site by a factor of 2.5x (or 150%).[7] If these web analytics are not sufficient on their own, then which additional attributes should be measured? Guidelines are expected to be released in 2008, which will also review factors that can tarnish panel-based measurements such as cookies and Web spiders. These guidelines should make it possible to give a much more comprehensive and meaningful portrait of people’s interactions and activities online.

Mixed meanings in the terminology (e.g. podcasting can mean both the content itself or the method by which the content is distributed) can make measurement even more challenging. In addition, the definition of what constitutes a "user" (i.e. active user) can also be very different (e.g. Second Life uses 60 days, other companies use 30 days, and yet others in Korea use 7 days). To complicate matters further, there are some "proprietary" definitions like for instance Second Life's "active resident" i.e. "a uniquely named avatar with the right to log in to Second Life, trade currency and visit the community pages".

Along with tracking traffic, surveys are used to gauge Internet usage. Methodologies for data collection in surveys differ from one company to another. In some cases, national surveys use random digit-dialling of phone numbers of respondents via telephone, or quality controlled Internet panels (selected offline using a random sampling approach). The population samples can have different compositions, sometimes they are a percentage of adult Internet users or even young adults, or broadband users, or a percentage of households. Moreover not all surveys are representative surveys and European data is based on only a selected number of countries.

The measurement issue is a crucial one, particularly in the context of policy implications. Social computing is a moving target, with rapidly evolving technologies, markets and user behaviours, which has emerged and developed in just a few years. There are clear limitations to such an exercise. There are currently very few statistical sources that are committed to providing stable statistical data over time and there is a lack of internationally comparable data on social computing from national statistical sources. Non-official sources are not always reliable or comparable. This report attempts to make a critical analysis of the best publicly-available data and a wide range of statistical sources on social computing, which may increase the validity of the findings. Despite limitations, it is necessary to engage in this kind of assessment, though the results should be seen as indicative and treated with caution.

The paper starts (Section 1) by defining the concept and the approach, and by putting forward some measurement issues. Then, content creation, the use of social computing, user participation and socio-demographic profiles of adopters and users are analysed and the main findings presented (Sections 2, 3, 4 and 5 respectively). Section 6 explores some areas of convergence of social computing with mobile. Finally, Section 7 identifies the challenges

[6] OECD "Participative Web: User-created content" April 2007

[7] comScore "Cookie Deletion Study and its Implications for Internet Audience Measurement", 2007

associated with this analysis, suggests directions for future research and identifies the lessons that can be learned in terms of policy-related consequences for Europe. The main empirical data is presented in the Annex.

2 CONTENT CREATION IN SOCIAL COMPUTING

This section will analyse content creation in social computing across the seven selected areas i.e. blogging, podcasting, multi-media sharing, collaborative user-generated content, social networking, social tagging and social gaming. Several categories of analysis results are presented and discussed i.e. the amount of content (in absolute numbers) and the rate of creation of new content. Annexes 1 and 2 contain the main empirical data.

New forms of content have been taken up by the masses. More than 1 billion photos and 40 million videos are uploaded in photo- or video-sharing sites; tens of billions of objects are created by users in Second Life while social tagging is on the rise with millions of photos tagged in Flickr and videos in YouTube. The state and the rate of creation of new content are summarized in Table 1.

Application	Amount of content (absolute nos.)	Rate of creation of new content
Blogging	70M blogs and doubling every 5-7 months for the last 2 years (Technorati, April 2007)	120000 new blogs created daily - Slowing down in the doubling of the size of the blogosphere, as well as a slowing in growth in the rate of posts created per day since Oct 2006 (Technorati, 2007)
Photo-sharing	1+ billion images in photo sharing sites (Aug 2007)	900,000 new photos are uploaded daily on average in Flickr; growth levelling off (private analysis based on Flickr log 2007)
Video-sharing	an estimated 40M videos on video sharing sites (June 2007)	More than 65,000 videos uploaded daily in YouTube (June 2006) ; in a single month (Aug 2006) the number of videos on the site grew 20% ; no. videos appearing to decrease since March 2007 (analysis of YouTube data 2007)
Social networking	Over 250M profiles in Social Networking sites (Oct 2007)	After a stage of exponential growth, the growth in number of profiles in MySpace slowed down (analysis weblog 2007)
Wikipedia	7.5 M articles in all combined Wikipedia sites in approximately 250 languages (Oct 2007)	Growth in number of articles in EN Wikipedia tailed off since Sep 2006 (Wikipedia 2007)
Social gaming	Tens of billions of user-created objects in Second Life (April 2006)	70% of those that logged in every day have at least created an object in SL (Clickable Culture statistics 2006)
Social tagging	Milions of photos tagged in Flickr, videos in YouTube, tracked by Technorati in blog posts (Aug 2007)	over 1M tags added per week in Flickr (Yahoo Research 2006); 2.6M geotagged photos in Flickr in Aug 2007 , up from 1.6 M in 2006 (analysis Flickr data 2007)

Table 1 – Content creation in social computing

Differentiation in content creation, i.e. the shift towards more and richer content, seems to be accompanied by a slow down in the growth rates in content creation (see

Figure 2). The inflection point in the growth curve is, in some cases, mid-2006 e.g. the growth in the number of blogs (also called the blogosphere) seems to have been slowing down since Oct 2006 (Technorati 2007).[8] Another indication of this trend is that it took a lot more time to double from 35 million blogs to 70 million (about 320 days) than it took to double from 5 million to 10 million blogs (about 180 days).[9] From September 2006, the growth in the number of articles in the English Wikipedia also seemed to slow down,[10] as did the growth in the number of photos uploaded in Flickr[11] and in the number of profiles created in MySpace.[12]

In other cases, the inflection point is mid-2007. For instance, the number of videos uploaded in YouTube appeared to decrease from March 2007.[13]

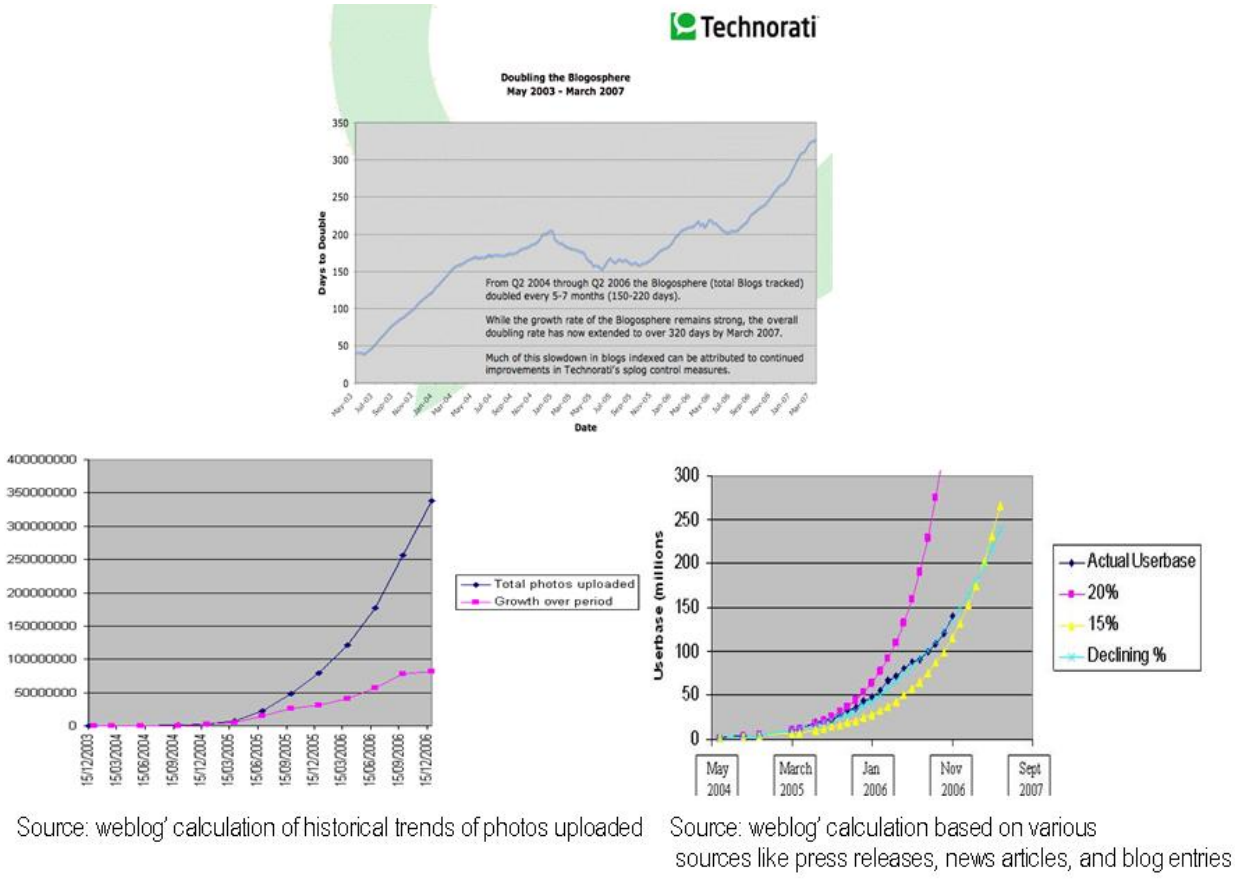


Figure 2 – Examples of growth curves (see the Annexes for empirical data)

8 See Figure 16
9 "State of the blogosphere" April 2007 at http://www.sifry.com/alerts/archives/000493.html
10 See section ANNEX 1 – EMPIRICAL DATA
11 idem footnote 10
12 idem footnote 10
13 idem footnote 10

3 USAGE OF SOCIAL COMPUTING

This section will analyse the use and take-up of social computing across the seven selected areas i.e. blogging, podcasting, multi-media sharing, collaborative user-generated content, social networking, social tagging and social gaming, in terms of usage levels (percentage of Internet users) and growth in usage over time. Annexes 1 and 2 contain the main empirical data.

The analysis of existing surveys[14] points to interesting regional differences and to usage patterns which depend on the application (see

Figure 3). By application, blogging, photo - and video-sharing, social networking and social gaming have been taken up by around 20% - 50% of Internet users worldwide (figures tend to be higher for Asia). Social tagging is on the rise. In some cases, the adoption levels are evenly split between regions e.g. Wikipedia is used by a third of Internet users in the US, Europe and Asia. Podcasting, however, still shows low levels of adoption, despite the fact that podcasting was considered to have considerable potential (in 2005, the New Oxford American Dictionary declared "podcast" the word of the year) and that podcasts are produced by practically all media companies and also by 'private' podcasters.

Social computing is a global phenomenon. However, generally speaking, it seems that Asian countries lead in the usage of social computing with more than 50% of Internet users across all applications, followed by the US (with about 30% of Internet users) and Europe (with about 20%). This assessment needs to be taken cautiously since, as regards podcasting and social tagging, there is limited data availability, particularly in Asia and Europe.

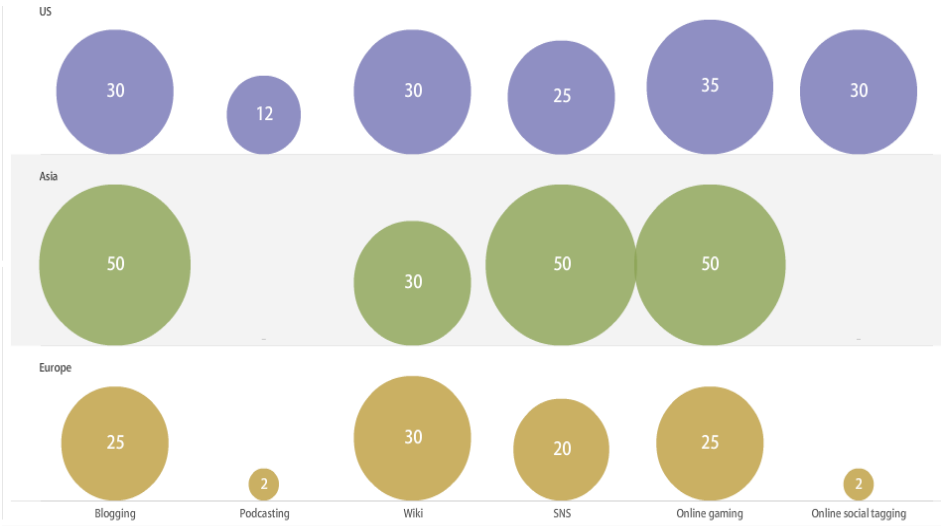


Figure 3 – Usage of Social Computing
(Source: Author's estimation in % Internet users, based on surveys mentioned in annexes)
Note: Different methodologies for data collection and population samples; colours correspond to different regions; when blank spaces- no data available on the usage of podcasting and social tagging in Asia

[14] Different methodologies for data collection and different population samples; Data mostly available for US, and where available for Europe, surveys carried out mostly in UK, France, Germany, in some cases, Spain, Italy, the Netherlands and Nordic countries; data for Asia mostly in national languages;

The few surveys in subsequent years[15] that monitor the change show high levels of growth in areas like **blogging** (45% year-to-year growth in the percentage of US Internet users reading blogs in 2007, compared to 2006)[16] and **online video** (45% year-to-year growth in the percentage of US Internet users that have visited a video-sharing site in 2007, as compared to 2006;[17] 150% increase in the percentage of Internet users in Europe watching TV, film or video clips online since 2006[18] - see Figure 5).

Different growth rates are reported in the podcasting application area, depending on the type of usage (listening to podcasts/downloading for later use). Only 2% year-to-year growth is reported, for instance, in the percentage of US Internet users listening to podcasts in 2007 vs 2006),[19] while downloading a podcast for future listening seems to be somewhat more popular (70% yearly growth in the percentage of Internet users that have downloaded a podcast in 2006[20]).

Surveys indicate that, on a weekly basis, playing games is the most popular online activity in US, and more popular than watching short video clips or visiting social networking websites.

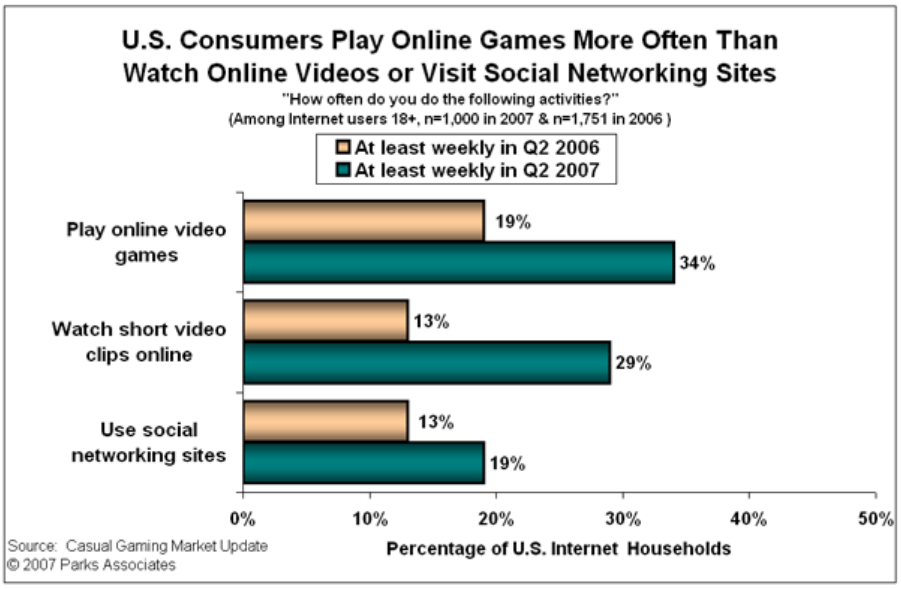


Figure 4 – Weekly usage of Social Computing (source: Park Associates 2007)

On a monthly basis, using social networking sites is the third most popular online activity in Europe. The activity areas with most growth are watching online videos (150% year-to-year growth) and posting ratings and reviews (42% year-to-year growth).

[15] As for example Pew Internet in USA, EIAA Mediascope in Europe
[16] Pew Internet surveys 2006 and 2005
[17] Pew Internet 2008 study
[18] EIAA Mediascope Europe Study 2007
[19] Arbitron/Edison 2007
[20] Pew Internet 2006

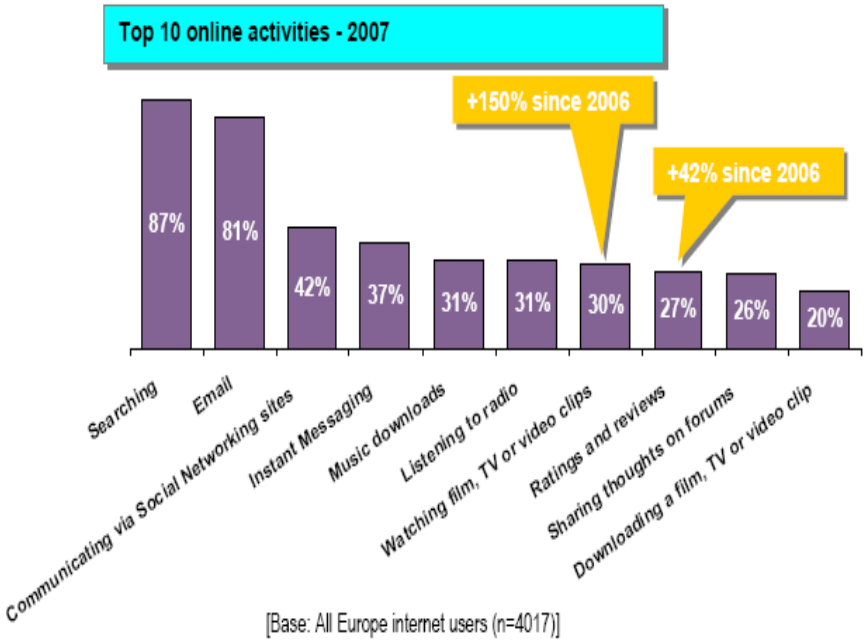


Figure 5 – Monthly usage of Social Computing applications
(Source: EIAA Mediascope Europe 2006 and 2007)

The analysis shows that the growth in usage of social computing seems to be slowing down. There are indications that, after 3 months on average, usage of social computing tends to get less active. For example, only 20% of blogs are still active;[21] and around 30% of teenagers had not logged in to view their MySpace profile (about 5% of them had not done so in more than a year). Only about 10 % of newly created residents are still logging in weekly in Second Life,[22] and the rate of new account registration in Wikipedia declined by 25% in 2007.[23] This may be related to the fact that users like to try new types of social media. An indication of this could be the rise in the usage of new services like micro-blogging.[24]

[21] Technorati, April 2007
[22] Lindenlab
[23] http://www.techcrunch.com/2007/10/11/wikipedia-hits-mid-life-slow-down/
[24] http://twitterfacts.blogspot.com/2008/01/number-of-twitter-users.html

4 DEMOGRAPHICS OF ADOPTION

This section will analyse demographic profiles of the adoption of social computing, across the seven selected areas, in terms of usage levels (percentage of Internet users) as well as growth in usage over time. In Annexes 1 and 2 the main empirical data is given.

The adoption is shaped not only by age but also by gender. This is another sign that social computing has matured. Those in their teens and twenties, the 'digital natives'[25] - the first generation born and raised completely wired – are those who have taken up social computing most. 45% of teens aged 12-14 have online profiles; "older" teens (aged 15-17, especially girls) are more likely to visit social networking sites and have profiles while young adults (those aged 18-29) are among the most active video viewers (see Figure 6).

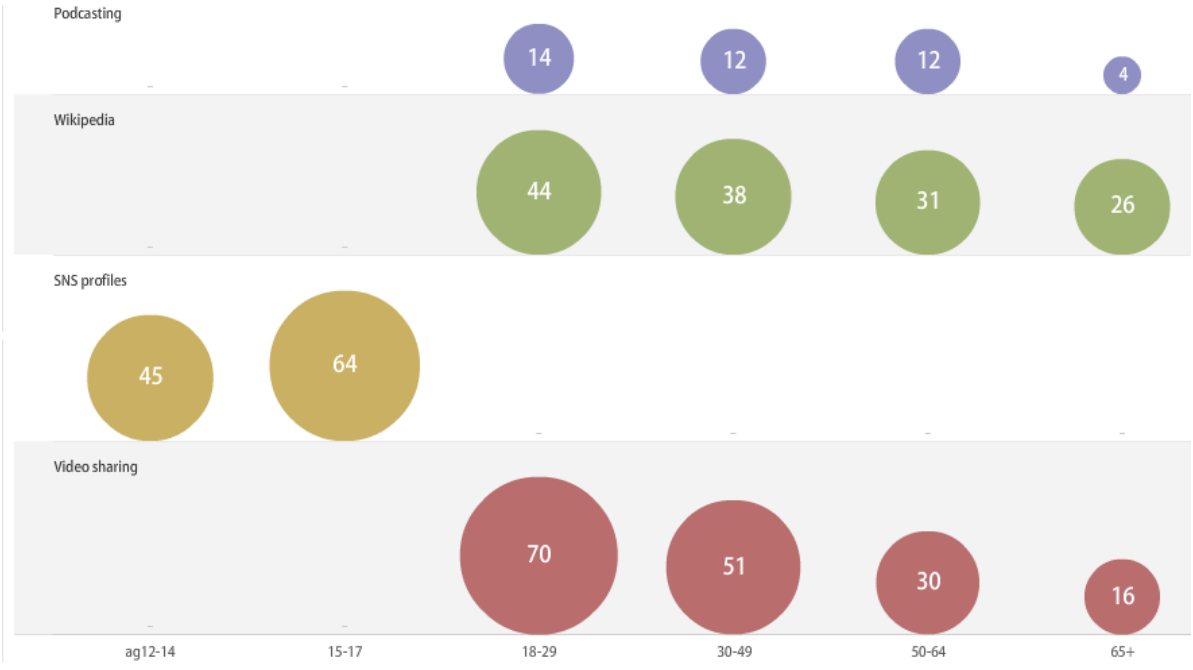


Figure 6 Demographic profiles and Internet users in each age group
(Source: Pew Internet surveys; not all age groups are present in each of the surveys)

There are signs of shift however. Data show that **most of the increase in the growth** in usage of video sharing and social networking sites, out of all the demographic groups, comes from **women and those aged 50-64** - the so-called 'silver surfers', see
Figure 8.

According to Pew Internet,[26] the use in the video-sharing sites surged in particular in some demographic groups (i.e. women) and those aged 50-64 by almost 60% year-to-year for both categories (see Figure 7.).

[25] 'Born Digital: Understanding the First Generation of Digital Natives' by John Palfrey and Urs Gasser, Feb 2008

[26] Pew Internet memo January 2008: http://www.pewinternet.org/pdfs/Pew_Videosharing_memo_Jan08.pdf

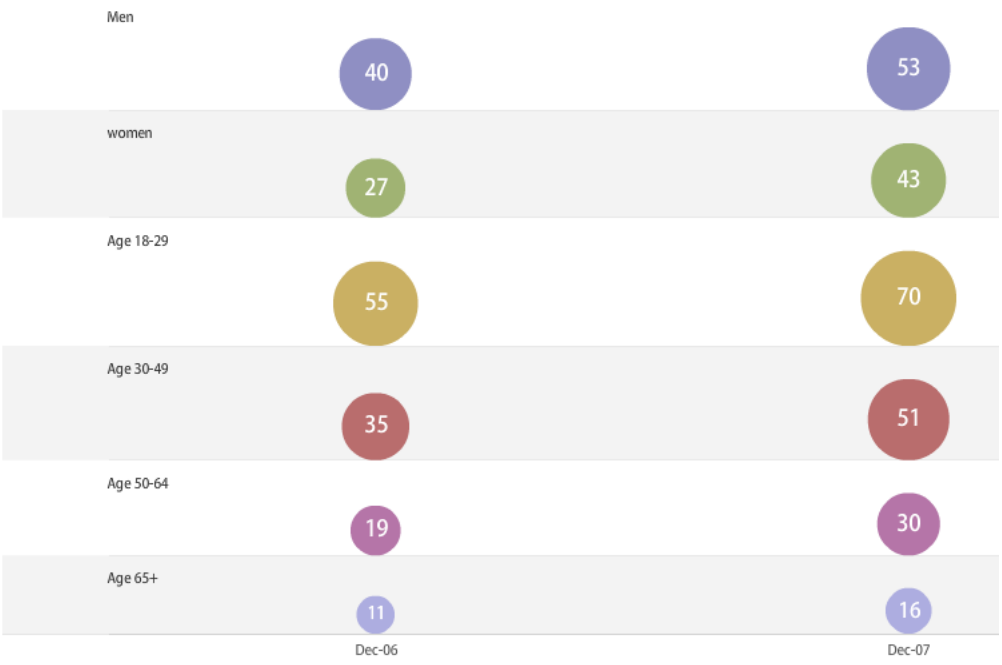


Figure 7 - Growth in usage of video sharing sites among demographic groups by age and gender (% Internet users who have ever visited a video-sharing website) (Source: Pew Internet Project January 2008)

'Silver Surfers'[27] appear to be developing a deeper engagement with online content, making the most of online tools and services to communicate with friends and family. Use of online forums has seen significant growth since 2005 and 18% now visit social networking sites at least once a month (Figure 8).

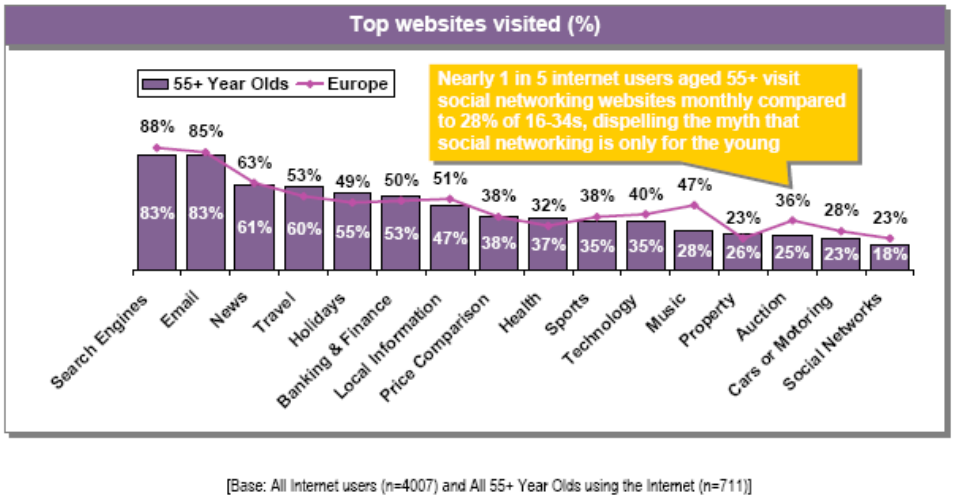


Figure 8 Growth in the usage of SC by +55 year olds (Source: EIIA Mediascope Europe 'Silver Surfers' report 2007)

[27] EIIA Mediascope 2007 Silver Surfers special report: http://www.eiaa.co.uk/Ftp/casestudiesppt/EIAA%5FSilver%5FSurfers%5FExecutive%5FSummary%2Epdf

5 USER PARTICIPATION IN SOCIAL COMPUTING

In order to understand social computing adoption, there is a need to see how people approach these technologies. Social computing is used not only by the few people posting blog entries, photos on Flickr and videos on YouTube, but by a large share of Internet users in many different ways. The present research[28] confirms that, statistically, the pattern of participation in social computing follows what has been described as a power law distribution.[29]

Moreover, the behaviour of "passive users" is increasingly being explored via technological means.[30] Simply reading or using social computing content can leave traces which can be used (anonymously) as a way of sharing preferences and interests (practically 100% of Internet users). The intensity of online participation then diminishes gradually (as described by the Concentric Model of Participation Intensity (CPMI) – see Figure 9) to at least a third (30% - 40%) of Internet users using social computing content e.g. reading blogs, or watching user-generated videos on YouTube, listening to podcasts, visiting wiki sites, or visiting/using social networking sites. Some 10% of Internet users provide feedback (posting comments on blogs and reviews) or share content on Flickr, or YouTube, or tag content in deli.cio.us. Only around 3% of Internet users in Europe are “creators” e.g. they create blogs or Wikipedia articles, or upload their user-generated videos on YouTube or photos on Flickr.

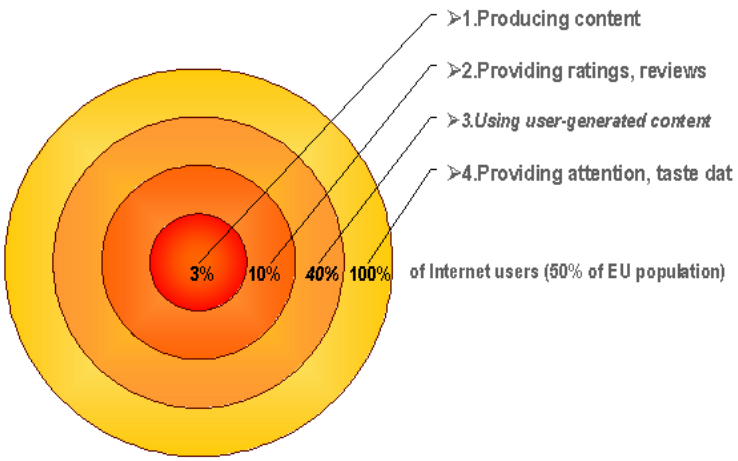
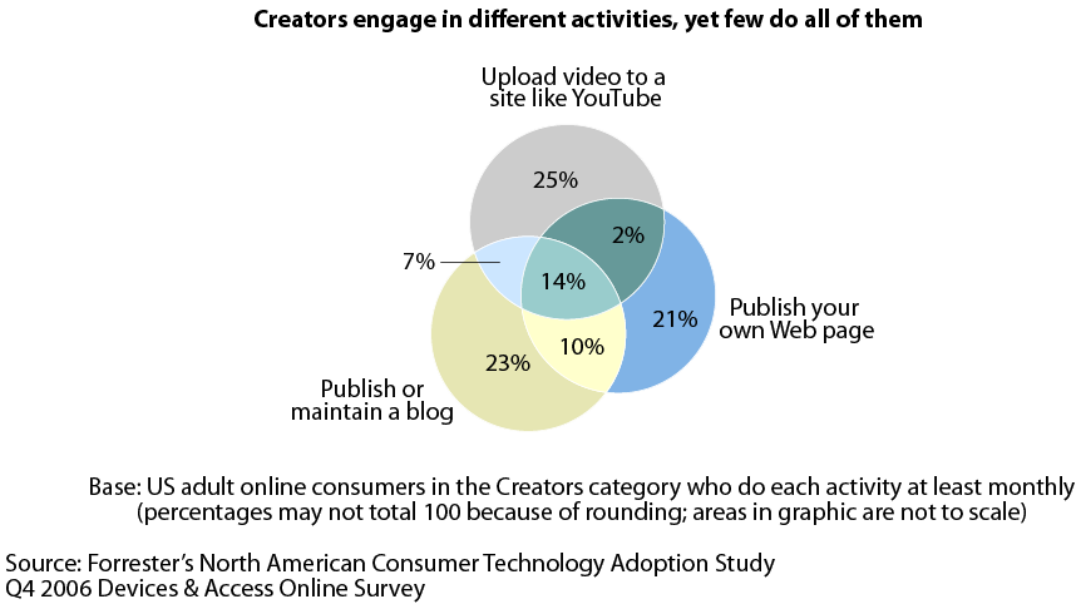


Figure 9 Degrees of user participation Web 2.0 applications
(*Source*: IPTS (Osimo 2008) elaboration of Deere (2006); Rainie & Tancer (2007); Young (2007)

People also switch between activities. For example, while reading blogs, they may also visit social networking sites, contribute to Wikipedia, or upload their photos on Flickr. The latest surveys from Forrester (see Figure 10) show that the so-called 'joiners' (representing, according to Forrester, about 20% of US adult online population and mostly comprising Generation 'Y' i.e. 18-25 year olds) do a variety of online activities. For example, apart from using social networking sites, 56% of them also read blogs, while 30% publish blogs.

[28] See also a quantitative analysis of user-generated content on the web http://journal.webscience.org/34/
[29] Ross Mayfield based on http://www.orgnet.com/BuildingNetworks.pdf
[30] For instance, from Amazon's recommendation system: "people who bought this book, also bought these other books"

'Creators', on the other hand, only do a few activities (e.g. only 14% of these 'creators' upload videos, and also publish their own web pages and blogs. Most of the 'spectators', representing a third of US online population, read blogs while only 11% of them watch videos online, read blogs and also listen to podcasts.



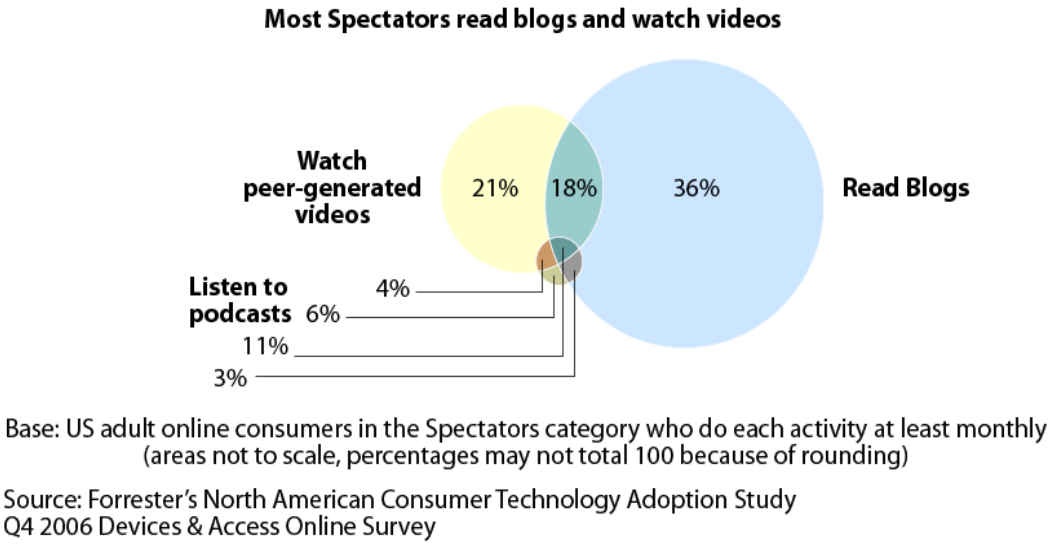


Figure 10 - Users in participation category engaging in different activities (Source: Social Technographics, Forrester 2007)

6 MOBILE SOCIAL COMPUTING

Many experts point to mobile social computing as the next important wave of social computing applications (e.g. Pascu et al 2008). This chapter explores several areas where there has been convergence between social computing and mobile platforms (i.e. mobile blogging, mobile podcasting, mobile social networking, mobile tagging, mobile media-sharing, etc) and assesses the availability of these applications, their usage and the growth in their usage.

6.1 The concept

Two concepts used interchangeably have received a lot of attention lately, i.e. mobile web2.0 and mobile 2.0. Mobile web2.0 concerns web2.0 applications extended to the mobile "with the mobile device as the means of harnessing collective intelligence" (Jaokar and Fish, 2006).[31] Besides personal media, and always-on features, mobility brings two unique aspects. Firstly, the mobile is the input tool at the point of creative impulse, always there at the moment of inspiration,[32] e.g. for taking a picture.

Secondly, mobility brings context-aware aspects that are unique to mobile devices, i.e. positioning not only in time and space, but also in the personal as well as the social context.[33] This includes, for instance, the relationships existing among a group of users, the presence of peers in the vicinity and matching them on the social network data available to the mobile environment, allowing for instance on-the-go group recognition. This social context information can be used in different situations, e.g. context-aware mobile tourism guides.[34]

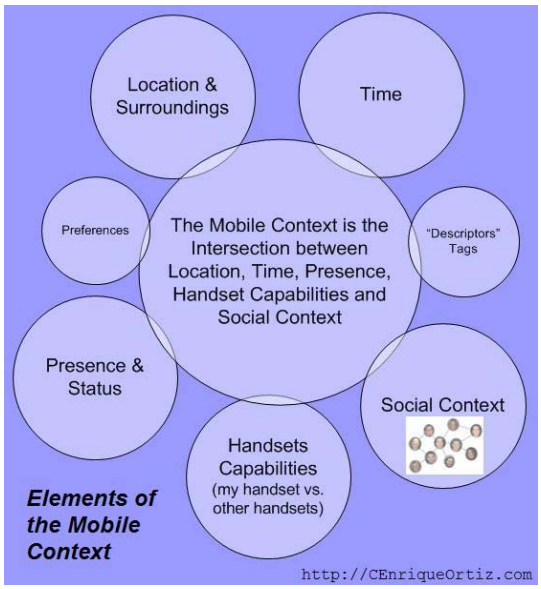


Figure 11: Mobile Context (Source: E. Ortiz)

[31] In their work on mobile web2.0, Jaokar and Fish (2006) described the concept; For a more complete definition and the approach behind it, see Jaokar & Fish (2006)

[32] See Tomi Ahonen on "Mobile as the 7th mass media' at: http://communities-dominate.blogs.com/brands/2007/02/mobile_the_7th_.html

[33] http://cenriqueortiz.com/pubs/themobilecontext/TheMobileContext-CEnriqueOrtiz.pdf

[34] See for instance Buriano, L., 'Exploiting Social Context Information in Context-Aware Mobile Tourism Guides' TelecomItalia, 2006

Furthermore, the future of mobile services seems to lie with services delivering richer interactions driven by user goals i.e. mobile 2.0.[35] Consequently, essential features of mobile 2.0[36] would be more user choice in the ways to communicate and share experiences with others and more open access to the Internet rather than through operators' "walled gardens".

6.2 Mobile Social Computing applications

There is a lot of innovation taking place in the mobile social computing area. New concepts are emerging like mobile lifecasting, mobile socialcasting or mobile social streams. Taking thus upon the definition and approach towards social computing described in section 1 and the above concepts, we shall explore some cases of mobile social computing applications developed to enable interaction, collaboration and sharing between users where mobile specificities seem to open up new usages and interactions with content.[37]

Mobile micro-blogging

Over the last year, we have seen the rise of services called micro-blogging or micro-publishing like Twitter or Jaiku. People want to join the services that their friends already use, and so each new user adds value to the network as a whole. These micro-messages[38] can be submitted by a variety of means. Their convergence with mobile adds however a new perspective. Services like Twitter or Jaiku on-the-go allow micropublishers to keep up with their social network more efficiently than any other platform alone could manage e.g. presence and availability of peers in the vicinity.[39]

Furthermore, video streaming from mobile to Web (or video-based Twitters) has been dubbed as the next killer application with services like Kyte.TV, Qik or Seeismic,[40] where people are constantly interacting around both user-generated and professional content and where videos created by users using webcams can be published in the respective websites as well as other social networks, like YouTube, Twitter or any of the major video sharing sites. Future features of these services, e.g. in Seeismic, will allow interaction with shows watched on Joost[41] or the creation of community-driven online TV channels.

Mobile lifestreaming

Social networks like Twitter create an online presence and share it with friends, however they need to make use of a vast range of tools and services to manage the variety of online media e.g. upload photos to Flickr, videos to YouTube and post current whereabouts using Dopplr or Twitter.

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35 A term first used by Daniel Appelquist and then also elaborated by Rudy De Waele

36 See for instance Rudy de Waele presentation in Plugg conference 2008 http://www.slideshare.net/rudydw/mobile-20-plugg

37 Evidence of impact on the incumbent telecoms or handset manufacturers, incumbent PC based internet actors etc as well as on the social sphere (e.g. changing usage patterns) is further explored in another paper (Pascu, C. "Towards the convergence of social computing with mobile', paper submitted for 19th European Regional ITS Conference, Rome, 2008

38 Micro-blogging is a form of blogging that allows users to write brief text updates (usually less than 200 characters)

39 Jyri Engestrom calls this 'social peripheral vision'; see for instance " Blind Men's Baseball - The Social Importance of Peripheral Vision" presentation at Reboot8

40 Mobile video streaming emerged this year in Davos for instant reporting of events ; See for instance at http://www.qik.com/davos or http://www.loiclemeur.com/english/2008/01/davos-wrap-up.html

41 http://www.techcrunch.com/2007/10/08/loic-le-meurs-new-startup-launches-seesmic/

Lifestreaming[42] applications like Jaiku,[43] Tumblr[44] or Lifestrea.ms[45] are social media aggregators, i.e. they aggregate social media across many online services. Lifestrea.ms, however, is less an aggregation service than a "nerve center" - i.e. a single location on which you can both gather and author the vast majority of social media without having to visit multiple websites. The convergence of Jaiku, for instance, with mobile (Jaiku Mobile launched in Aug 2007) adds connectivity 24/7 from mobile and handheld devices to activity streams, and the location of Jaiku contacts.

Mobile social tagging

In the context of mobile, a 'tag' refers both to explicit information entered by the user (i.e. an explicit tag) but more importantly to any digital footprints[46] that the user leaves behind e.g. any information captured implicitly when the image was captured - for example, the user's location. Digital Footprint metadata comes from the 'Screens of Life'[47] concept explored in Mobile Web 2.0 as a mechanism to describe how we interact with media. The "screens of life" are the cinema, TV, PC, HeadRest (Airplane or Car), Mobile Device, or informational ones like the iPod. In this paradigm, a fixed access Web model may get 10% of the available data of your daily pattern, TV maybe 1%, but the mobile device opens up the possibility of 90%.[48]

Social tagging is one of the web2.0 success stories, as it allows users to connect with others, and enables social discovery and connections. Point-of-capture annotation on mobile devices, coupled with the success of social networking sites like Flickr, increases the likelihood of tagging. Recent emphasis on contextual metadata is indicated by a growing number of projects like Nokia's Lifeblog,[49] Garage Cinema Research[50] and Yahoo's Zonetag.[51] The ZoneTag application, for instance, facilitates the annotation of photos taken with camera phones by suggesting relevant tags immediately after capture.[52]

Mobile podcasting

There are slightly different interpretations of the same term showing that a standard terminology has not been found yet for bridging podcasting with mobile. In 2005, Andy Carvin[53] described the mobcasting concept which is a blend of 'smart mobs'[54], mobile phones

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42 Lifestreaming, according to Wordspy is "an online record of a person's daily activities, either via direct video feed or via aggregating the person's online content such as blog posts, social network updates, and online photos".; http://www.wordspy.com/words/lifestreaming.asp

43 Jaiku's acquisition by Google in October 2007; Google statement http://www.jaiku.com/help/google

44 Tumblr is a platform that makes it easy to create 'tumblelogs' i.e. 'a variation of a blog, that favours short-form, mixed-media posts over the longer editorial posts frequently associated with blogging. Common post formats found on tumblelogs include links, photos, quotes, dialogues, and video. Unlike blogs, this format is frequently used to share the author's creations, discoveries, or experiences without providing a commentary'. It also supports audio and video posts.

45 "offers you a single solution for gathering all of your various online identities and publishing destinations into a single social media space" (Lifestrea.ms statement)

46 Nicholas Negroponte described the concept of ' the slug trail' in Being Digital

47 A. Jaokar – "Mobile Web2.0 "

48 Tony Fish on 'Bothered by 2.0" at: http://opengardensblog.futuretext.com/archives/2007/05/bothered_20_by_tony_fish.html

49 http://r2.nokia.com/nokia/0,,71739,00.html

50 http://garage.sims.berkeley.edu/

51 http://zonetag.research.yahoo.com/

52 Ames, M., Naaman, M.., "Why we tag. Motivations for annotation in mobile and online media" http://yahooresearchberkeley.com/blog/wp-content/uploads/2007/02/chi2007-Ames-whyWeTag.pdf

53 In January 2005, Carvin began advocating mobile phone podcasting as a tool for citizen journalism and human rights monitoring; he called the concept mobcasting. Utilizing free online tools including FeedBurner, Blogger and Audioblogger, Carvin demonstrated the potential of mobcasting at a February 2005 Harvard blogging conference

and podcasting. He stated that the concept describes a kind of mobile activism - i.e. “groups of people using mobile phones to create podcasts on a common subject, particularly in the contexts of civic engagement or political action.”[55] The Mobcasting Experiment was demonstrated later as part of a collaborative blog called Katrina Aftermath,[56] which allowed members of the public to post multimedia content regarding Hurricane Katrina.

In the mobile industry, the term mobcasting is more often used to mean “mobile podcast” i.e. subscribing and downloading podcasts on a mobile device. Examples are Nokia, Motorola, Yahoo or Virgin.[57] Mobile video podcasting was described in 2005 by some authors[58] as the killer application of mobile video, as it has the ability to manage video content, in addition to audio podcasts. A personalised ‘video channel’ (podcast) can be created by any individual and downloaded by interested subscribers.

Kyte.TV is an example of 'mobile Socialcasting' (also referred to as the "Twitter that moves"[59]). It offers media remixing services that allow anyone "to create their own interactive TV channel," i.e. by uploading video, photos, and audio and mixing them into slideshows that other people can watch via blogs, Facebook, MySpace etc. Kyte has a multitude of uses, including life casting (aka life streaming) as well as video streaming. By August 2007, Kyte.TV[60] had over 8,000 channels and had produced 50-60,000 shows resulting in millions of views since its April 2007 beta launch.

Mobile social networking

Driven by the explosive growth of online social networking sites, many companies are racing to replicate this success on the mobile platform. Typical examples of "social networking going mobile" are MySpace, Facebook and so on. There are also a number of emerging mobile-only social networks such as ZYB and Mocospace and Mig33.

Presence detection and information exchange with other users - i.e. the real time location-based element which uses satellite positioning to track users' whereabouts – adds a new dimension to social networking on mobile. Knowing when your friends are around, and meeting people sharing the same interests, is expected to drive the adoption by users. Examples of such services are Bliin or Trackut (in UK) or Dodgeball (in US). Yahoo also announced the OneConnect service featuring "proximity alerts" when friends also using the service come within a certain distance of one another.[61]

Latest generation mobile phones may also be regarded as environment sensors.[62] Mobile phones have become the ideal way to study both individuals and communities and their behaviour. Reality Mining[63] makes possible the modelling of conversation context, proximity

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54 The concept was introduced by Howard Rheingold in his book *Smart Mobs: The Next Social Revolution*. A smart mob is a form of self-structuring social organization through technology-mediated, intelligent emergent behaviour. Examples of these growing technologies include the Internet as well as mobiles etc

55 http://www.andycarvin.com/archives/2005/01/when_mobile_pod.html

56 http://katrina05.blogspot.com/

57 http://www.m-trends.org/tag/mobcasting/

58 http://opengardensblog.futuretext.com/archives/2005/07/mobile_video_po.html

59 http://www.readwriteweb.com/archives/kyte_its_like_t_1.php

60 In June 2007, Nokia became a key investor in Kyte, joining Swisscom, Telefonica and other companies. While Swisscom aims to offer Kyte.tv as a feature on its mobile phone service, Nokia provided no specific details other than that the company hopes to help the Web startup "grow its audience globally."

61 http://news.cnet.com/8301-10784_3-9870252-7.html

62 More on privacy issues, see Giesecke & all (2007)

63 MIT Media Lab's Human Design research group at http://reality.media.mit.edu/

sensing, and time-spatial location throughout large communities of individuals. The emergence of such services has, however, additional privacy implications. Mobile social networking sites could be used by offenders to locate their victims.[64] They could also be used by advertisers, as in the case of Facebook's Beacon,[65] to monitor the surfing habits of users and the use they make of information.

Mobile social networking goes however beyond extending social networking to the mobile or location-based features. Users need more choice in the ways they communicate and share experiences via the mobile e.g. for accessing any social network through any operator and by using any handset. For this to happen, cross-carrier approaches and integration are needed. Most mobile social-networking services are still only offered by a limited number of operators or only on compatible handsets, or exclusively to the carrier's subscribers. An example of emerging new communities offering a cross-carrier approach is EyeVibe, a mobile video community that combines 3's 'SeeMeTV'[66] and O2's [67]'LookAtMe!' services and users.[68] Members of the EyeVibe community will be able to access a vast library of videos captured from mobile handsets, and will also be able to interact using messaging, voting and comments and invite their friends to become members.

Mobile media sharing

In addition to YouTube or Flickr Mobile, there is a lot of start-up activity around mobile photo or video- sharing, fuelled by increased availability of mobile phones with cameras. Services are specifically designed to help users upload photos, videos or other types of media to the Web (either to Flickr, YouTube or to another photo-sharing site like ShoZu[69] or Twango[70]). Shozu, for instance, now available on 40 types of handsets, allows users to exchange photos, videos, status updates, comments, tweets and other content between their mobile devices and more than three dozen online social networks, photo communities, personal blogs and other social media sites with a click. ShoZu supports photo and video communities ranging from YouTube and Flickr to Facebook, Photobucket, Google Picasa, Pikeo, blip.tv, Seeismic and Dailymotion, as well as Friendster; and micro-blogging services like Twitter. Pikeo is a photo sharing community recently unveiled by telecom operator, Orange, offering photo storage, tagging and sharing capabilities, as well as geotagging, that enable members to associate their photos with online maps to show where they were taken. Mobile is strongly tied in, with the site providing connection to the ShoZu mobile application.

Mobile social gaming

Some analysts and venture capital (VC) predict that gaming-on-the-go[71] will be the upcoming trend for 2008. Others point to limitations in the technology and the lack of platform standards in the industry that will prevent this from happening.

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64 http://news.bbc.co.uk/1/hi/technology/6767593.stm

65 When Facebook users shopped online, the Beacon software told third-party advertisers what they looked at or bought

66 http://www.three.co.uk/

67 http://www.o2.co.uk/

68 SeeMeTV and LookAtMe enable subscribers to buy and sell user-generated content

69 http://www.shozu.com/

70 acquired by Nokia in July 2007 as to realize its vision of 'providing seamless access to information, entertainment, and social networks - at any time, anywhere, from any connected device, in any way that you choose'. – Nokia press release

71 For instance, game maker John Carmack, famous for developing landmark PC titles Wolfenstein, Doom, and Quake

As far as mobile worlds are concerned, Second Life has been exploring the possibilities of interfaces to Second Life from mobile devices, including mobile phones and PDAs. Second Life's residents can communicate with each other using either IM, or SMS or MMS, depending on their phones' capabilities.

Some other virtual worlds have also generated their mobile spin-offs. An example is Habbo Hotel, though this is only available on Nokia's Symbian platform.

There are however technological and cost limitations that raise doubts as to whether putting virtual worlds like Second Life on mobiles is the best use of mobile technology. A possible approach is a 'stripped down' version of the PC-based virtual world for the mobile space instead of a full release, giving just basic controls over the avatars (simple 'go' commands). This is the case of Sulake's Mini Friday Habbo Hotel-inspired project supported on the Nokia Series 60 phones.

Mobile could be a useful platform for Second Life users, but as a complementary feature to the PC-based version, rather than a substitute. Some operators have developed specially designed services to allow interaction between characters ('avatars') in Second Life and real mobile phones e.g. Vodafone's InsideOut service.

Mobile-only virtual worlds, versions of either Second Life- or Habbo Hotel, have also been recently launched. UK Micazook's i-Citizen 3D is a Habbo Hotel style isometric virtual world, which lets the user travel around a series of locations based on real-world cities. Media Groove Inc.'s Chipuya Town features a Second Life-inspired virtual economy and avatar environment that allows users to navigate around and interact with avatars, and create avatar items. A 3D virtual world, currently referred to as Lamity,[72] and described as the mobile equivalent to Second Life, is under development, based on Google's open Android platform.

6.3 The adoption of mobile social computing

By November 2007, there were three times more mobile phone subscriptions worldwide than Internet users[73] and an increasing number of Wi-Fi-capable devices on the market[74] (including all three of the seventh generation consoles that support Wi-Fi, and consumer electronics such as TVs, DVD players or digital cameras). However, the growth of mobile devices does not necessarily translate into the growth of the mobile Internet.

Mobile social computing has been adopted by only a small user base, though there is evidence of growth, depending on the application area. Due to the increasing popularity of phones with cameras**, uploading videos or photos** is the application most used on mobiles, both in the US and Europe (in the selected countries). The US has the largest number of users accessing a social network via their mobile phones (4.2% of US mobile subscribers in March 2008), followed by Europe with 2.6% of mobile subscribers. In Europe, the UK leads (4.7%) followed by Spain, Italy and France.

[72] http://www.eitarosoft.co.jp/
[73] Informa 2007
[74] ABI Research 2007

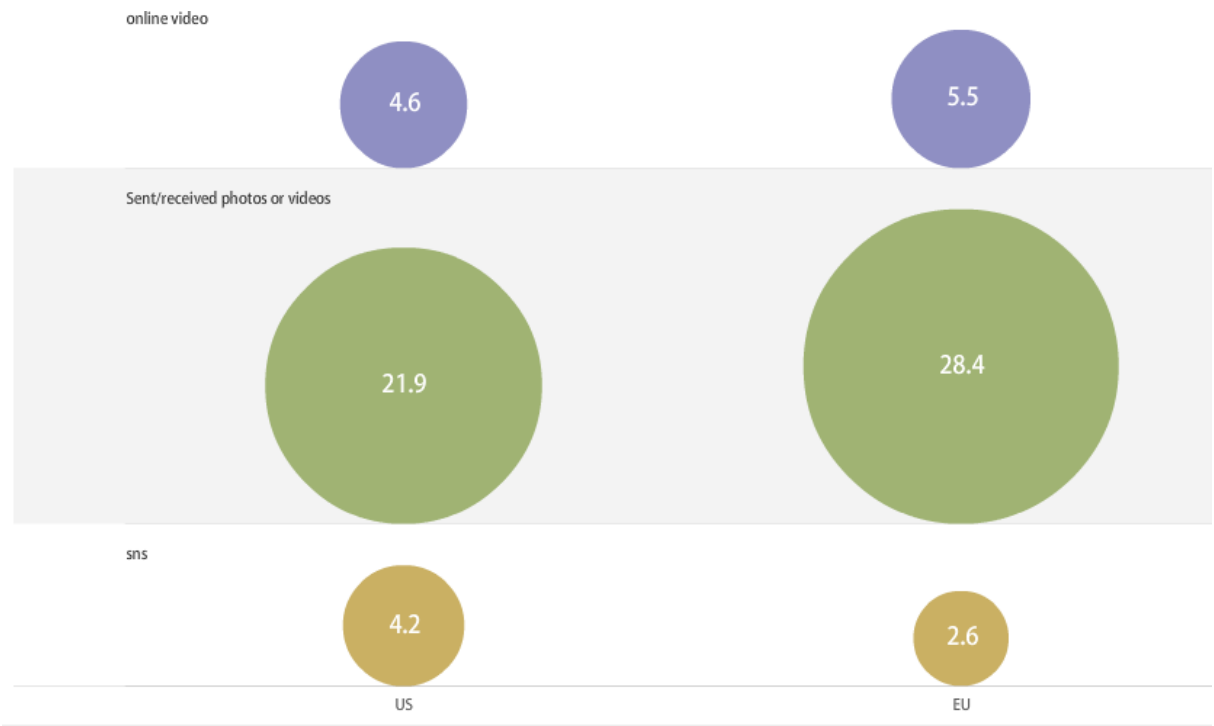

Figure 12 Usage of Mobile Social Computing applications
(Source: Author's estimation based on M:Metrics, data for March 2008 in % mobile subscribers; sample of mobile subscribers may differ). Data set in Annex 2.

In June 2007, MySpace was the most visited for the US and the U.K, Facebook was used mostly in Italy, Spain, and France, then YouTube and Bebo. There is a strong correlation between popularity and the availability of these social networks across operators (e.g. MySpace were used in Helio and Nextel, Facebook in Virgin and Sprint, both of them in Amp'd and AT&T, as well as YouTube in Verizon).

In general terms, mobile blogging is the least common Internet activity from mobile phones in Japan in 2007. However, it still reaches 38% of respondents, on a par with playing games.[75]

Overall awareness and usage of mobile social networking in Japan is still low compared to mobile music or games. A survey by Rakuten Research and the Mitsubishi Research Institute in February 2007[76] reports a 48.5% awareness rate of mobile social networking sites and a 21% "understanding rate" i.e. users that not only know about them, but also have a good understanding of how they work. In China, only 0.9% of mobile subscribers watched video in December 2007, while China appears to have the highest percentage of mobile subscribers listening to music (35%).

Unlike desktop-based social computing, mobile podcasting shows similar levels of adoption with other mobile social computing applications. This depends, however, on the mobile device used. According to Nokia's own studies, about 4% of the S60 phone model users (on which the Nokia podcasting service was available) were active podcast listeners.[77]

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[75] http://www.comscore.com/press/release.asp?press=1742 ; The study was conducted among 3100 people age 15 and over.

[76] http://www.wirelesswatch.jp/docs/JMIR_Sample.pdf

[77] Nokia's senior VP for software platforms- presentation at Symbian Smartphone Show 15 October 2007

Overall, research shows that the use of mobile devices for accessing the Internet e.g. smartphones and, in particular the iPhone, seems to be driving the adoption of mobile social computing. The use of social computing applications by smartphone owners appears to be much larger than the use made by owners of other makes of phone[78] (Figure 13). 31% of iPhone owners watched mobile TV or video, compared to a 4.6% market average. Furthermore, this is more than double the rate for all smartphone users. The usage of social networking is also very popular among iPhone users, with almost 50% of them accessing a social networking site (Jan 2008) - nearly twelve times the market average. 20% of these accessed Facebook, 30% YouTube and 36% Google Maps by using iPhone. In comparison, only 1% of all mobile subscribers accessed YouTube and 2.6% Google Maps for other mobile makers.

Figure 13 Mobile Content usage (iPhone, Smartphone and Total Market), January 2008
(Source: Author's visualization based on M:Metrics, data for Jan 2008 in % mobile subscribers)
Smartphones include devices running Windows, Symbian, RIM or Apple operating systems;

According to the same research, the demographic profiles of iPhone users are similar to those of other smartphone owners i.e. the iPhone users are more likely to be male, aged 25-34, earn more that $100,000 and have a college degree, than the average mobile subscriber.

6.4 Demographics of mobile social computing

Although the mobile is not a 'youth-oriented device' and it is used also by groups that have generally lagged behind in Internet adoption, such as older adults or minorities.[79], in the mobile social computing area however, teens are leading the move to mobile social networks and mobile Web 2.0. Some statistics show that in June 2007,[80] teens were the most active

[78] http://mmetrics.com/press/PressRelease.aspx?article=20080318-iphonehype
[79] http://www.pewinternet.org/pdfs/PIP_Users.and.Cloud.pdf
[80] http://www.mmetrics.com/press/articles/20070815-socialnetworking.pdf

users of mobile social networking (17 years Old, and younger in France, Italy, Germany, Spain, 12-24 years old in the US and the UK).

Currently, the mobile environment is not sufficiently open and interoperable to emulate the success of the Web and win the youth demographic. Generally speaking, it cannot, as yet, mirror youth's social graph[81] - i.e. connecting with their peers and friends. However, there are some examples of mobile social computing applications that appear to succeed in 'mirroring youth's social graph' like Nokia's Ovi concept of circular entertainment (content circulating between friends, who may or may not be geographically close, and thus becoming part of the group's entertainment [82]) or itsmy.[83]

[81] Term used by Facebook to describe their social network; in this context, "social graph" is defined as "the global mapping of everybody and how they're related" i.e. the web of social connections

[82] http://www.nokia.com/A4136001?newsid=1172517

[83] http://www.itsmy.com/itsmy/

7 FINAL REMARKS

User-led ICT-based innovations that enable interaction, collaboration and sharing have grown enormously over the last few years (Pascu et al, 2008; Pascu et al, 2007). In the history of communication technology, not that many examples exist of such exponential growth in such a short time.

The creation, use and adoption of social computing applications have been growing strongly since 2003. New social platforms have emerged that enable people to create more and richer content, which, in turn, generates network effects. Blogging, photo - and video-sharing, social networking and social gaming have been adopted by some 50% of Internet users worldwide (around 25% in Europe) and high levels of growth have been reported in some areas like blogging or online video.

At the same time, the analysis shows that the diffusion of social computing is entering the maturity phase. There are indications that the speed of growth slowed down in 2007, both in terms of creation and use of social computing applications. Given the recent nature of these changes, more research would be needed to get a better understanding of these trends and to assess the extent to which this can be attributed to improved tracking measures or can be interpreted as 'the law of large numbers'[84] (i.e. the chances of sustaining a large percentage of growth diminishes over time), or 'market saturation', specialization of communities or just a 'try me virus'.[85]

Additionally, the range of activities and the levels of participation in social computing are very diverse and new user groups have emerged recently (e.g. women and 'silver surfers'). More research is needed in documenting these new adoption patterns and the impact of network infrastructure (e.g. broadband) or educational attainments. Furthermore, people interact with technology in many different ways. What makes the experience of teens so different from other age groups, however, is that it is "about them and their friends interacting through the machine". Eventually, however, "it's not about the technology or the artefact, but about the culture in which those technologies and artefacts are embedded".[86] More ethnographic studies are therefore needed on how people are using social computing as a part of their everyday lives.

Mobility is an important trend to watch, given Europe's strengths in mobile technologies and devices. Research shows that there are a number of trends in existence.

New concepts are emerging like mobile lifecasting, mobile socialcasting or mobile social streams. It is expected that mobile specificities will open up more and more undiscovered usages and interactions with content (like, for instance, reality mining).

Driven by the growth of desktop-based social computing online, many Internet companies are looking to replicate this success in the mobile area (typical examples are MySpace, Facebook, YouTube, Second Life and so on). There is also a lot of start-up activity in areas like mobile micro-blogging, mobile video, photo- or video-sharing, mobile social networking or social

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[84] David Sifry in his last 'State of the blogosphere' report (April 2007)

[85] According to Clay Shirky, the pattern of a 'Try Me virus' is a "rapid spread of first time users, most of who drop out quickly, with most of the dropouts becoming immune to later use"

[86] http://www.danah.org/papers/talks/4S2007.html

gaming. Mobile operators or handset manufacturers are also trying to adapt. For instance, new user communities have been launched to encourage collaboration, creativity and communication (e.g. Pikeo from Orange, Vodafone's Betavine, Nokia's Ovi or EyeVibe mobile video community). Major companies like Google or Apple are seen as the main drivers behind the next generation of mobile web applications (e.g. Apple's iPhone).

Only a small user base, however, has currently adopted mobile social computing applications, although there is evidence of growth in some areas. The number of users using mobile social computing applications ranges from 2.5% to some 4% of mobile subscribers. Only 2.6% of mobile subscribers in Europe (and some 4% of US mobile subscribers) access social networks via mobile devices, making these applications the least used.

Mobile social computing will probably not be just an extension of desktop-based social computing to mobile devices ('social computing on the go'). Users need more choice in the ways they communicate and share experiences via the mobile. For this to happen, cross-carrier approaches and integration are needed. The analysis points to some examples of innovations which attempt to fulfil this need, however it remains to be seen how this will impact on existing players (such as the incumbent telecoms or handset manufacturers, incumbent PC-based Internet actors, etc) and on the social sphere (e.g. changing usage patterns).

In order to make informed policy recommendations, proper measurements are needed. However, measuring social computing is not straightforward. There is a lack of internationally-comparable data on social computing from national statistical sources, and most of the data comes from non-official sources. Therefore, this research was based on a critical analysis of data from non-official sources. Different methodologies for data collection and population samples, however, made measurement very challenging and limited the reliability and comparability of the study. This indicates, on the one hand, the need for better and systematic measurements. On the other hand, official statistics could be improved by adding qualitative data).

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ANNEX 1 – EMPIRICAL DATA

Blogging

The term "blog" can mean both the content i.e. the weblog (a Web page to which its owner regularly adds content that consists of articles, also called "posts" or "entries"), or the action itself i.e. "to blog," meaning "to edit one's weblog" or "to post to one's weblog".

Content creation in blogging

The number of blogs has doubled every 5-7 months for the last 3 years. Worldwide, in absolute numbers, in October 2006, Technorati was tracking over 50 million Blogs. The number increased to 70 million blogs in April 2007.[87] 120,000 new blogs are created daily - that's about 1.4 blogs created every second of every day. According to Technorati, in December 2007, this figure went up to more than 100 million blogs.[88]

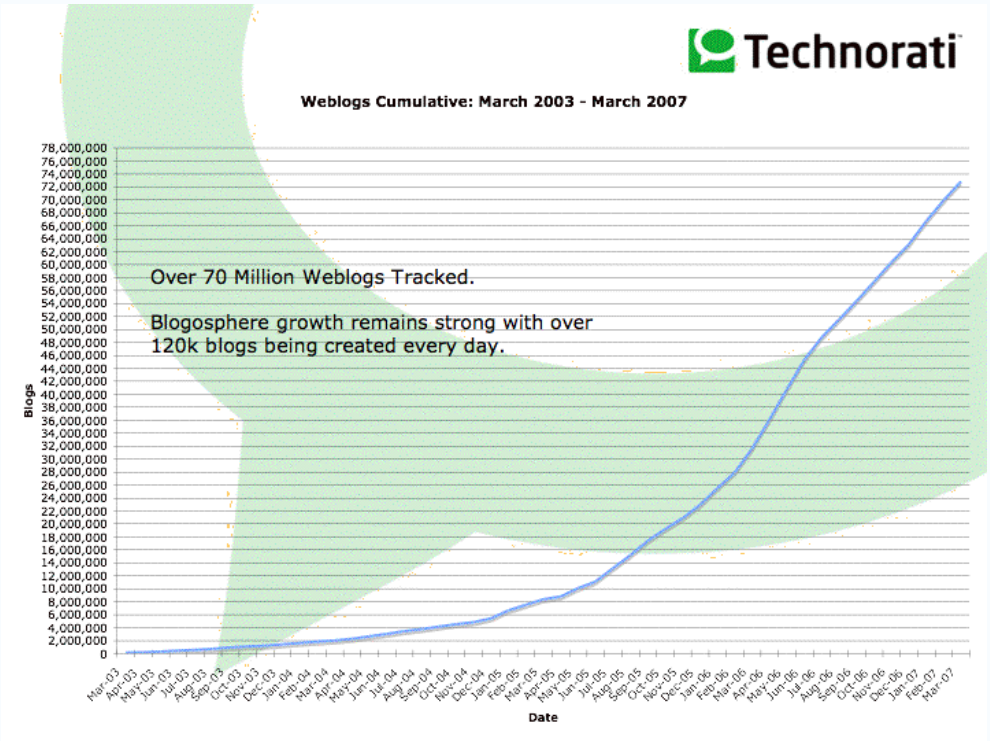

Figure 14 The state of the blogosphere
(source: Technorati "State of the blogosphere" April 2007)

The percentage of blogs that are active compared to the total number of blogs tracked by Technorati is declining, according to the latest Technorati report. As of March 2007, 20% of all blogs are still active i.e. around 15.5 million active blogs, or blogs that have been updated in the past 90 days.

[87] "State of the blogosphere" April 2007 at http://www.sifry.com/alerts/archives/000493.html
[88] www.technorati.com

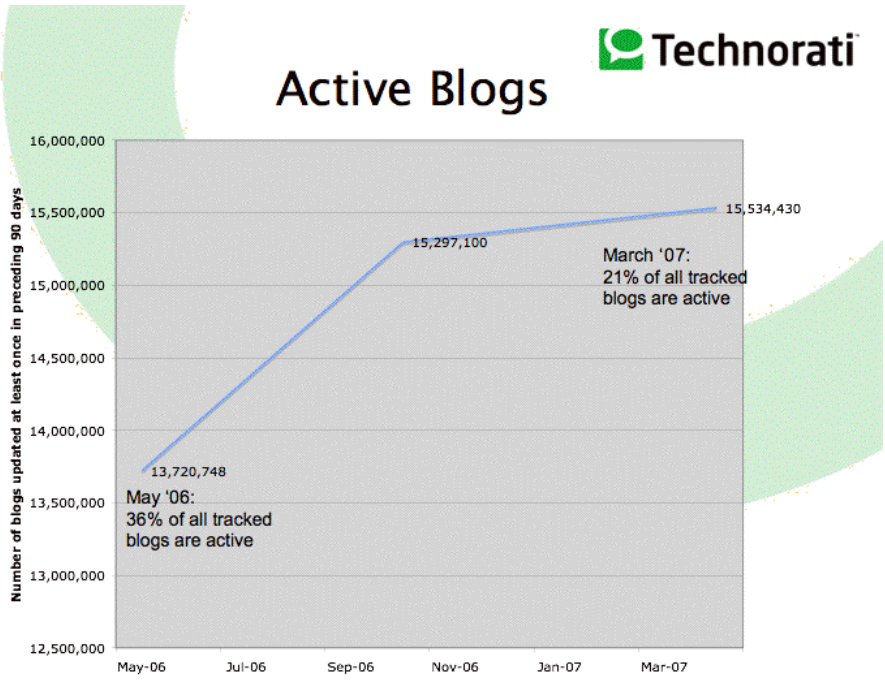

Figure 15 Number of active blogs (Source: Technorati March 2007)

According to Technorati, we are still seeing growth in the blogosphere, but the growth is slowing.[89] As shown in Figure 16, there is a slowing down in the doubling of the size of the blogosphere (e.g. it took 320 days to double from 35 million blogs to 70 million, but only about 180 days when it doubled from 5 million to 10 million blogs)[90] as well as a slowing down in growth in the rate of posts created per day (e.g. in March 2007 there were about 1.5 million postings per day or 17 posts per second, down from 1.3 million postings per day or about 15 posts per second in October 2006).[91]

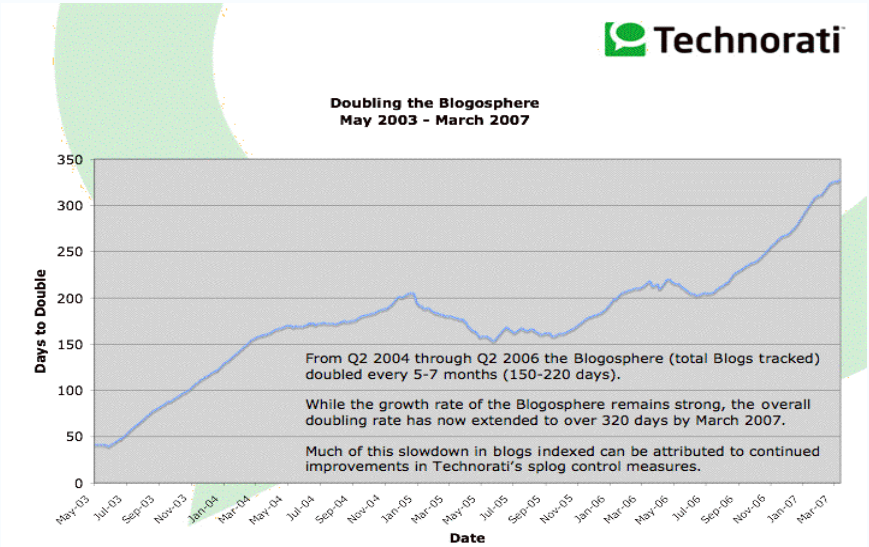

Figure 16 Growth rate of the blogosphere (Source: Technorati March 2007)

89 http://www.businessweek.com/the_thread/blogspotting/archives/2007/04/blogging_growth.html
90 See Figure 16 Growth rate of the blogosphere (Source: Technorati March 2007).
91 See Figure 17 Daily Posting volume in blogs (Source: Technorati March 2007).

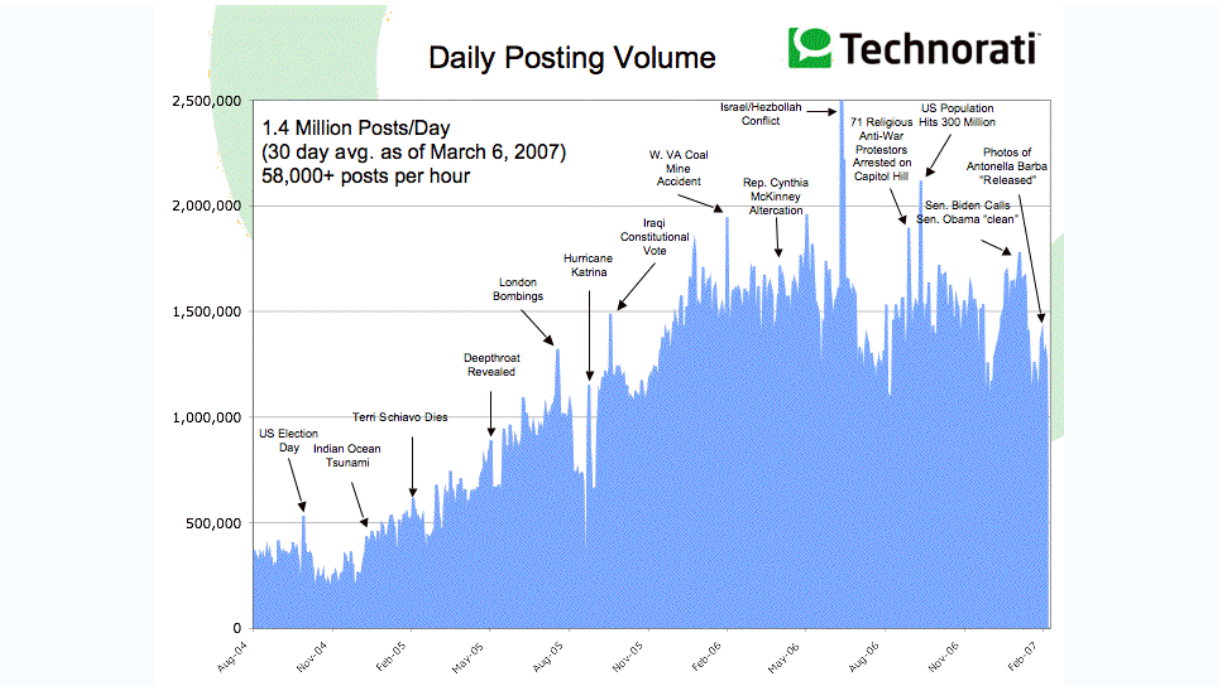

Figure 17 Daily Posting volume in blogs (Source: Technorati March 2007)

Difference across countries

A mapping of the distribution of blogs by language could give an indication of the relative sizes of some individual language-blogospheres. For instance, the Japanese-language blogosphere leads with 37% (up from 33% in Q3, 2006) of the posts, followed closely by the English-language blogosphere at 36% (down from 39% in Q3, 2006). There has been slight decrease in the number of English-language posts (33% in March 2007 from 36% in October 2006). The Italian-language blogosphere has overtaken the Spanish as the 4th largest. The newcomer to the top 10 languages is Farsi, ranked as the 10th.

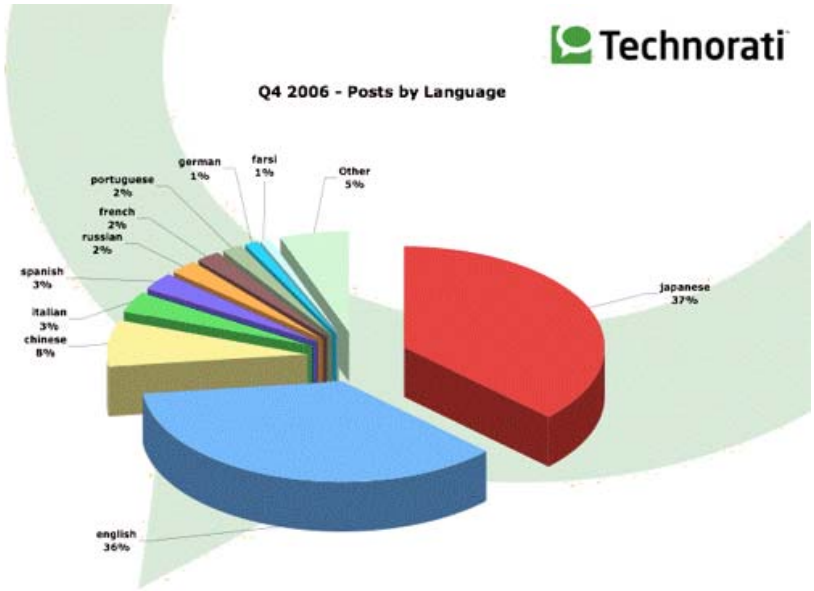

Figure 18 Number of blog posts per language (Source: Technorati March 2007)

Counting blogs based on the country of origin is difficult due to the worldwide phenomenon of people using Anglo-Saxon (US and UK) blogging hosts. For example, a lot of bloggers in Europe use US-based services (Livejournal, blogger etc) with some regional flavours e.g. some Belgium bloggers use services in the Netherlands and France as well as the Anglosphere.

Some attempts have been made to estimate the geographical distribution of blogs. For instance, how many come from France? The US? Asia? A study[92] puts forward a comparison between the geographical location of bloggers and the language in which the blogs are written. While almost 40% of blogs are written in English (according to Technorati), some 42% of the bloggers claim a location in an English-speaking country. Likewise, 38% of the bloggers claim a Chinese location, while only 10% of the blogs are written in Chinese.

The usage of blogging

Most recent statistics, summarised in Annex 1 and 2, show that Asian countries are leading with more than 50% Internet users (e.g. 75% of the Koreans) reading blogs. Usage in Europe has caught up with the US. On average, 23% of European Internet users (most surveys run in Belgium, Italy, France, UK, Germany, Italy, and Spain) read blogs, compared to some 30-40% of American Internet users. In Europe, France and UK are leading (where 20% of Internet users read blogs), with Germany lagging behind. France is considered the European blogging leader, with almost 1 million active bloggers.

Concerning the awareness of the term, 6 in 10 European users have heard of blogging.[93] In France, 73% of Internet users know what a blog is,[94] in the UK around half the Internet users[95] are aware of the term 'blogging'. In the US, the only data available shows that in 2004, some 40% of the US[96] online population was aware of blogs.

Leaving comments on blogs - 19% of US Internet users posted comments on blogs in 2006.[97] In Europe, only 3% of Internet users (surveys available for France, Italy, Spain, UK, Germany, the Netherlands and Sweden) posted comments on blogs in 2006.[98]

Blog creation levels are by far lower than blog readership. In November 2006, only some 3% of Internet users in France, Italy, Spain, UK, Germany, the Netherlands and Sweden were contributing to blogs.

By comparison, 8% of the Americans were writing blogs, though only 0.1% of these users contributed daily in 2006.[99] In Europe, France accounts for close to one quarter of the European bloggers, followed by Italy and Spain.[100]

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92 Hurst, M. , Siegler, M., Glance, N. (all from Nielsen Buzzmetrics) On Estimating the geographic distribution of social media, in ICSWSM'2007

93 IPSOS Mori 2006 survey in F, UK, D, I, E

94 Mediametrie 2005 http://loiclemeur.com/france/files/mediametrieblogs.pdf

95 Nielsen Netratings "21st Century UK Digital Consumer" at: 'http://www.nielsen-netratings.com/pr/PR_100306_UK.pdf

96 Pew Internet & American Life 2004

97 Forrester Social Technographics 2006

98 Idem footnote 100

99 "Participation Inequality: Encouraging More Users to Contribute" Jakob Nielsen's Alertbox, October 9, 2006. Available online at: www.useit.com/alertbox/participation_inequality.html

100 Forrester 2006

Growth in usage

Some statistics seem to indicate a 45% growth in the usage of blogging in the US in 2007, as compared to 2006. In Europe, a direct comparison of growth rates is not possible due to issues with data collection methods.

Frequency of use

Asians read blogs far more frequently. For example, Koreans read blogs twice a week, double the frequency registered in the US. In Europe, Britons and French read blogs more frequently. Only some 2% of European Internet users have written a blog in the past 3 months. European bloggers (surveys available for France, Italy, Spain, the UK, Germany, the Netherlands and Sweden) spent some 16 hours online per week (5 hours more than the average Internet user) in 2006.[101]

Demographics

Overall, the blogging population is young (more than half of bloggers are under the age of 30) and evenly split between women and men (in France, Médiamétrie claimed that 80% of French bloggers were 24 or younger; over 50% were female[102]). There are, however, signs of a shift. In Japan for instance, due to one of the fastest ageing populations in the world, blogs are becoming increasingly popular with middle-aged and older people (typically men).

Podcasting

A podcast can mean either the content itself[103] or the method by which the content is distributed; the latter is also termed **podcasting.** Podcasts are produced either by 'professional' podcasters or 'private' podcasters (i.e. podcasts created by people, such as bloggers and individual podcasters) and an increasing number of uses are being found for podcasts. In this research, we refer to both podcast content and method.

Content creation in podcasting

The number of podcasts is difficult to estimate. According to IDATE research released in July 2007, the estimated number of podcasts to date is **over 100,000,** when only three years ago, there were fewer than 10,000.[104] Statistics on the amount of podcast content and podcast feeds are made available by podcast directories worldwide. Apple iTunes, for instance (see Figure 19), counted over 82,000 podcasts in their directories[105] in 2006 (representing a 10 fold increase since 2005).

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[101] Forrester Profiling Europe's bloggers 2006

[102] Idem footnote 94

[103] For instance, Wikipedia defines it as " a digital media file, or a series of such files, that is distributed over the Internet using syndication feeds (n.b. RSS or Atom feeds) for playback on portable media players and personal computers. In other words, a podcast is a collection of files (usually audio and video) residing at a unique web feed address.

[104] IDATE " Podcasting - Development prospects and strategic implications", July 2007

[105] Digital Podcast (9 October 2006),at: http://typicalmacuser.com/wordpress/?p=134

Category	Total Podcasts
News & Politicis	11409
Music	10342
Religion & Spirituality	9886
Art	7710
Society & Culture	7207
Education	6039
Technology	5878
TV & Film	5671
Comedy	5106
Business	3769
Sports & Recreation	3266
Health	2074
Games & Hobbies	1812
Kids & Family	1301
Science & Medicine	1085
Government & Organizations	423
Total	82978

Figure 19 Number of iTunes podcasts per category of content in 2006
(Source: private analysis Typical Mac User Podcast based on iTunes data)

In terms of the number of **podcast feeds**, in the US for instance, Feedburner reported more than 40,000 podcast feeds under its management in 2006 (see Figure 20). In 2006, the creation of podcast feeds averaged 15% growth month over month. In August 2007, the figure went up to almost 1 million feeds from more than 500,000 bloggers, podcasters and commercial publishers, currently serving 128,358 podcast feeds (as of 4 August 2007).

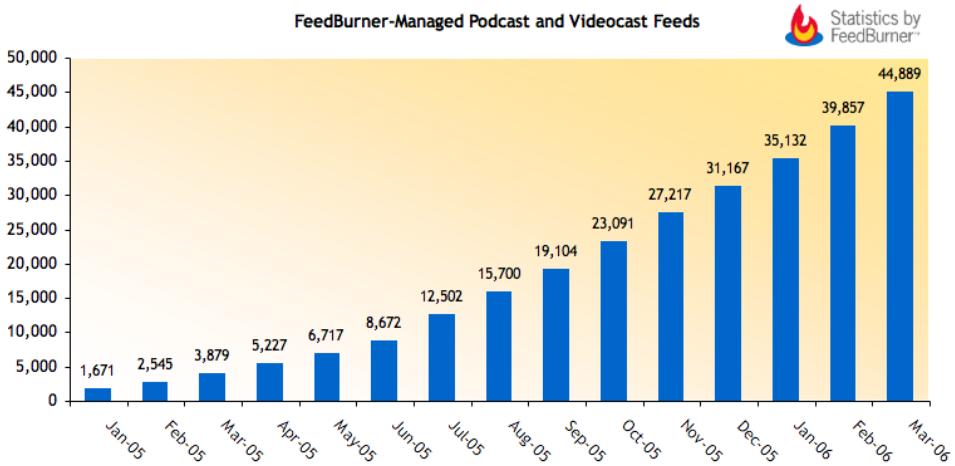

Figure 20 Source: Expanding Universe: Podcasting Market Update, FeedBurner, April 2006

In China, PodLook, the Chinese podcasting directory claims that the number of podcasts (n.b. very probably podcast feeds)[106] in China reached over 2.86 million in January 2007 (see Figure 21) - a 463% increase since Podlook's last statistical report in August 2006 (when more than 500,000 podcasts were claimed).

[106] PodLook's (the Chinese podcasting directory and search service) latest stats on the development of Chinese podcast released in Jan 2007 at http://www.podlook.com/2007_1_Public_Podlook.pdf [in Chinese]

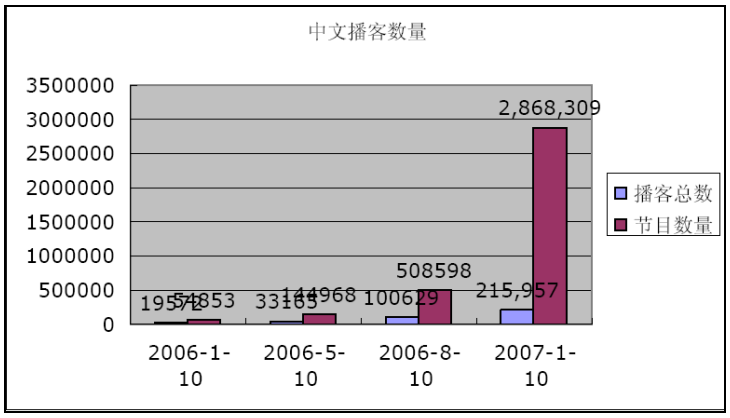

Figure 21 – Growth in number of podcast feeds in PodLook (Source: Podlook)

Podlook reports that in China in 2007, 86.91% were video podcasts, as compared with August 2006 when the percentage was about two thirds (see Figure 22).

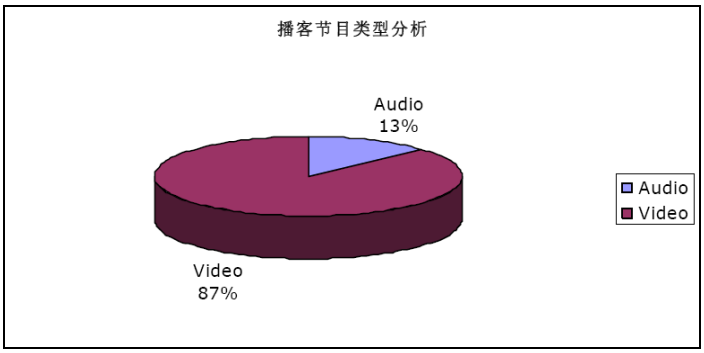

Figure 22 Content format of podcast in PodLook in 2007 (Source: PodLook)

An international survey,[107] run on a sample of 1,000 'private' podcasters in North and South America, Europe, Australia and Asia, shows that audio prevails with more than 90% of the podcasts, followed by photo (65% in Asia) and video (30% in Asia).

The usage of podcasting

Based on the most recent statistics,[108] we can estimate that the usage pattern **(listening to /downloading podcasts)** across regions is similarly low as compared to other social computing applications. Around **12% Internet users in US**, according to Forrester are listening to or downloading podcasts. In Europe,[109] the percentage is around **2%.** No data was available at the time of editing this report on the percentage of Internet users **creating/publishing podcasts.**

The type of podcast content

The content in podcasting is not anymore about music only. Video has rapidly gained popularity with the advent of the iPod with video. Both have strong and weak points, but it is likely that video would not replace audio content for podcasts. It's much easier for people to

[107] Dennis Mocigemba & Gerald Riechmann Jacobs Univ. Bremen and Berlin , " International Podcastersurvey", 2007 at http://podcastersurvey.com/ipcs07.pdf

[108] in **Table 6: Summary of podcast usage** – see the annex

[109] Forrester 2006 " European Podcast Consumer"(no details available on which countries were included in survey)

consume audio on the go, while they can't watch a video podcast while moving around or driving.

Comparing video usage to audio usage online is very difficult i.e. tracking what happens to podcasts after they have been downloaded. For instance, some attempts have been made for playing video and audio podcast content on iPod. A report from Nielsen Media Research at the end of 2006 showed that only 2.2% of files played by Video iPod users on either iTunes or the device itself were videos. When measured by time spent consuming content, video still only made up 11% of the content consumed by Video iPod users.

The use of RSS (Really Simple Syndication) for distribution of podcast content

A Yahoo! / IPSOS Insight survey in 2005,[110] followed by a more recent study by eMarketer in 2006[111] revealed that the use of RSS in web sites is becoming more common. In 2005, only **2% of Internet users subscribed to** podcasts via RSS, while most of the users preferred to access RSS feeds via user-friendly, browser-based experiences.

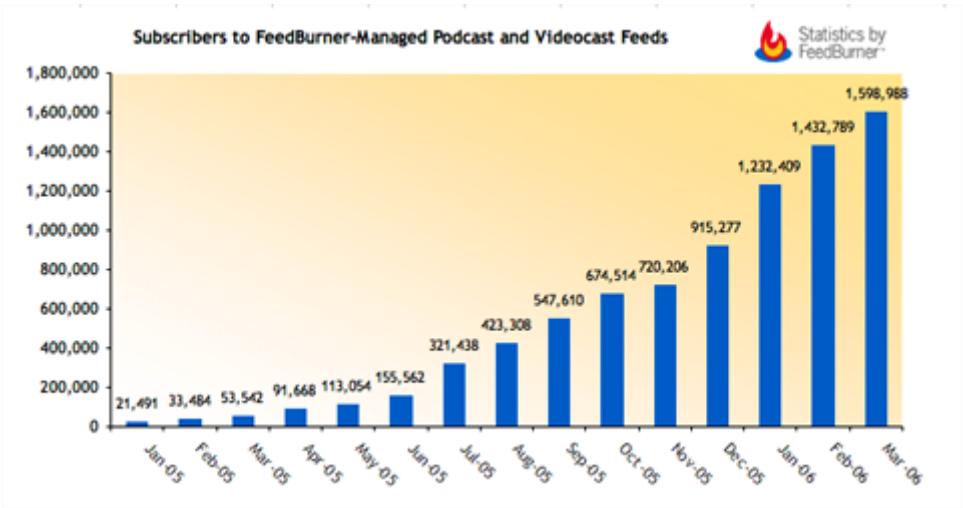

Figure 23 Subscription to podcasts (Source: Feedburner)

Awareness and growth in usage

The awareness of the term "podcast" has grown considerably since 2006, in a greater proportion than the usage. As Yahoo! says, ¨very few Internet users have translated this 'buzz' into personal consumption. Similar to RSS, wider adoption of podcasting might require more consumer-oriented products to bridge the gap between the technology and the benefits of podcasting".[112]

According to Arbitron/Edison Media Research,[113] the growth in usage of podcasting[114] in the US has only increased by 2% since 2006, while awareness has grown considerably: almost 2 in 5 Americans in 2007 have heard of podcasting, compared to 1 in 10 in 2006; the number of people who had 'ever' listened to an audio podcast rose from 11% in 2006 to 13% in 2007; the

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[110] "RSS—Crossing into the Mainstream"

[111] eMarketer study based on Workplace Print Media, August 2006 and MediaBuyer Planner, August 2006, lead amongst a selected panel of 1000 US employees

[112] http://yahoo.weblogsinc.com/2005/10/07/yahoo-study-of-rss-adoption/

[113] Arbitron/Edison Media Research Internet and Multimedia Study, 2007 http://www.edisonresearch.com/home/archives/2007/03/the_podcast_aud.php

[114] Edison's definition of podcasting emphasizes the downloading aspect of podcasting, however it excludes the downloading of individual MP3s or songs or content streaming.

number of people who had 'ever' watched a video podcast rose from 10% in 2006 to 11% in 2007.

In 2006, the Pew Internet & American Life Project found that 12% of US Internet users have **downloaded a podcast** for listening at a future point in time, compared to some 7% in an earlier survey that year by the same Project.

In Europe, available surveys (for the UK) show that 35% of them[115] have heard of podcasting (42% of them know what it podcasting is and a quarter have never heard of it).

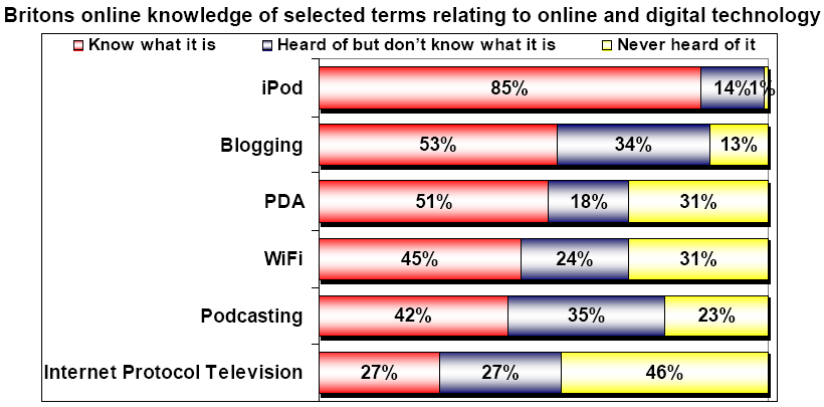

Figure 24 Awareness on podcasting

Two data analyses, in 2006[116] and subsequently in 2007,[117] based on Podlook, the biggest podcast directory in China, may be used as a proxy to understand the Chinese podosphere, although they may not reflect the whole picture. These analyses show that the number of podcasters rose from over 10,000 podcasters in Jan 2006 to over 200,000 one year later in Jan 2007 (2000% growth). The percentage of regular podcasters is below 10% and there are few users using RSS subscription to listen to podcasts.

Frequency of usage

In the US, where data was available, about 1% of Internet users in a typical day and 6% in the last month downloaded a podcast. 70% of those who regularly download podcasts, do so, on average, at a rate of one to three podcasts per week, and only some 10% of all podcast downloaders could be characterized as "heavy users", downloading 8 or more podcasts a week.

Research indicates that the Internet **browser is the main player**. While an iPod or MP3 player is not necessary to listen to or view podcasts, the proliferation of mobile media gadgets has helped fuel the demand for digital content that can be listened to or watched on-the-go.

[115] "21st century UK digital consumer", Nielsen Netratings 2006 at: http://www.nielsen-netratings.com/pr/PR_100306_UK.pdf

[116] Available at http://www.podlook.com/2006_1_Public_Podlook.doc (results in EN at http://www.cwrblog.net/66/chinese-podcaster-analysis-by-podlook.html) Jan-May 2006 and counting only the number of the podcasts played online (the number of downloads is not included

[117] http://www.podlook.com/2007_1_Public_Podlook.pdf

Demographics

An analysis of different surveys on demographics (in Table 2) suggests that men are more likely than women to download podcasts. The same is true of younger adults (18-29 yrs.) Those who have used the Internet for six or more years are twice as likely to have downloaded a podcast as those who have been online three years or less.

Survey	Demographics
Pew Internet & American Life research (2006)[118]	15% of online men say they have downloaded a podcast, compared with just 8% of online women; 14% of the users were less than 30 years old
Arbitron Edison Research (2006) [119]	52% were male, 48% female. One out of five Americans who have ever listened to an audio podcast were 12 to 17 years old, and more than half (53%) were under the age of 35.
comScore (Oct 2006)[120]	Males represented a significantly larger share (63%) of the audience than females (37%). 18-24 year olds represented a substantial share of the audience (29%) and were more than twice as likely as the average Internet user to download podcasts. People between the ages of 35-54 represented about half of the podcasting audience and were also more likely than average to download podcasts.
Nielsen Netratings (Aug 2006)[121]	Web users between the ages 18 and 24 are nearly twice as likely as the average Web user to download audio podcasts, followed by users in the 25-34 and 35-44 age groups, who were also more likely than the average Web user to do audio podcasting. Video podcasters tended to be a little older, with 25-34 year olds indexing the highest. Web users above the age of 45 were less likely than average to engage in podcasting of either sort.

Table 2: Surveys reporting on podcasting demographics
(author's compilation based on available surveys)

[118] http://www.pewinternet.org/pdfs/PIP_Podcasting.pdf
[119] http://www.edisonresearch.com/home/archives/Internet%26Multimedia%202006%20Summary%20Final.pdf
[120] http://www.comscore.com/press/release.asp?press=1438 a study profiling the iTunes podcasting audience
[121] http://www.nielsen-netratings.com/pr/pr_060712.pdf

Wiki

This report will look into the adoption of Wikipedia,[122] the largest publicly-available Wiki[123] and one of the most visited sites (in the top 10 global sites).[124]

Content creation in Wikipedia

The combined size of all the language versions of Wikipedia currently comes to more than **1.74 billion words in 7.5 million articles in approximately 250 languages.** The English-part of Wikipedia is the largest, containing close to 2 million articles to date,[125] over three times as large as the second largest edition, the German Wikipedia (which contains more than 600,000 articles). The French wikipedia comes third with more than 500,000 articles.[126]

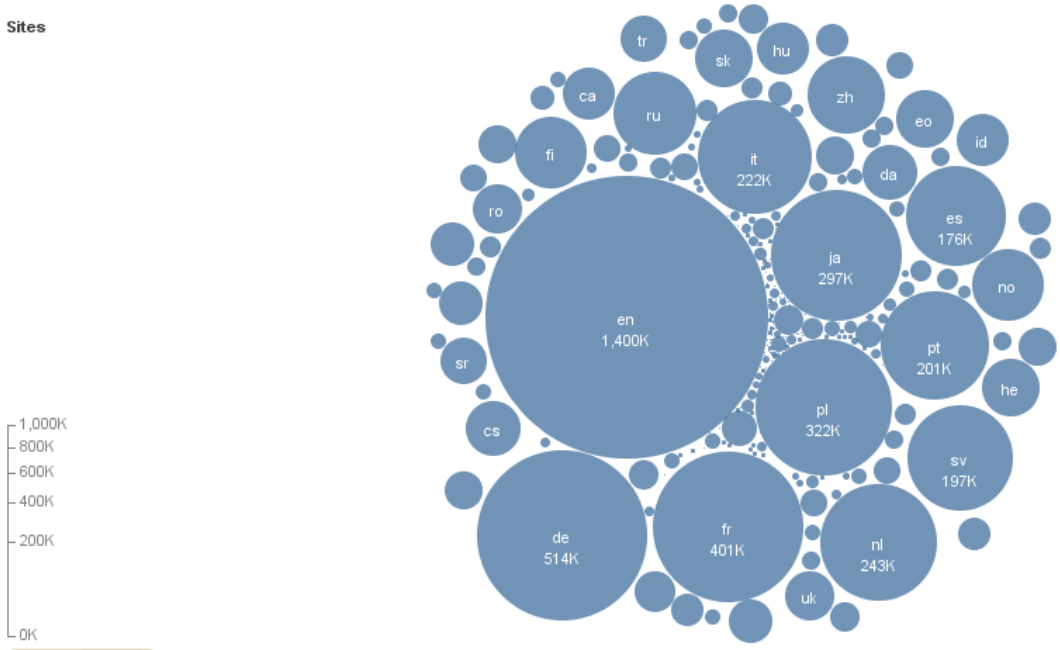

Figure 25 Language distribution of Wikipedia (Oct 2006) via IBM's Collaborative User Experience Research group (http://services.alphaworks.ibm.com/manyeyes/)

Like with blogging, mapping Wikipedia statistics by country is difficult since Wikipedia languages do not translate directly into countries.

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122 A separate IPTS report in the framework on ERoSc project looks into collaborative content: "Social Computing: the Case of Collaborative Content" by K. Ala-Mutka, S. Lindmark, J. Valverde, D. Osimo, Y. Punie, Feb 2008

123 Wikis are Web sites 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

124 comScore Media Metrix, Hitwise

125 http://en.wikipedia.org/wiki/Wikipedia:Statistics

126 http://meta.wikimedia.org/wiki/List_of_Wikipedias#All_Wikipedias_ordered_by_number_of_articles

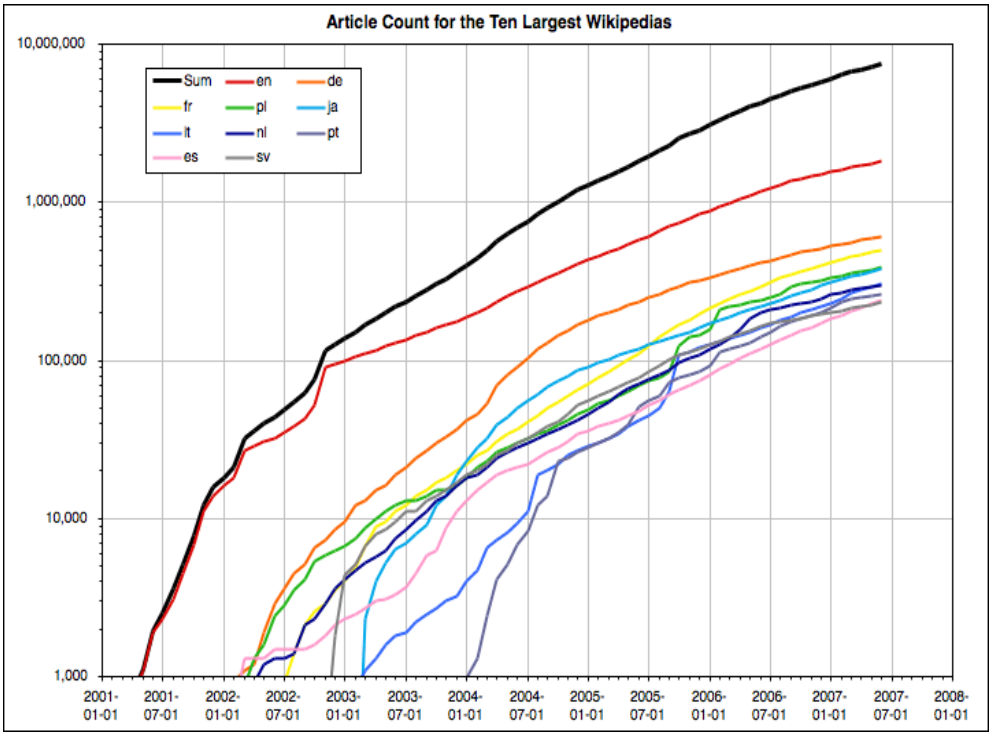

Figure 26 Number of articles for the ten largest Wikipedias
(Source: Wikipedia based on http://stats.wikimedia.org/EN/TablesArticlesTotal.htm)

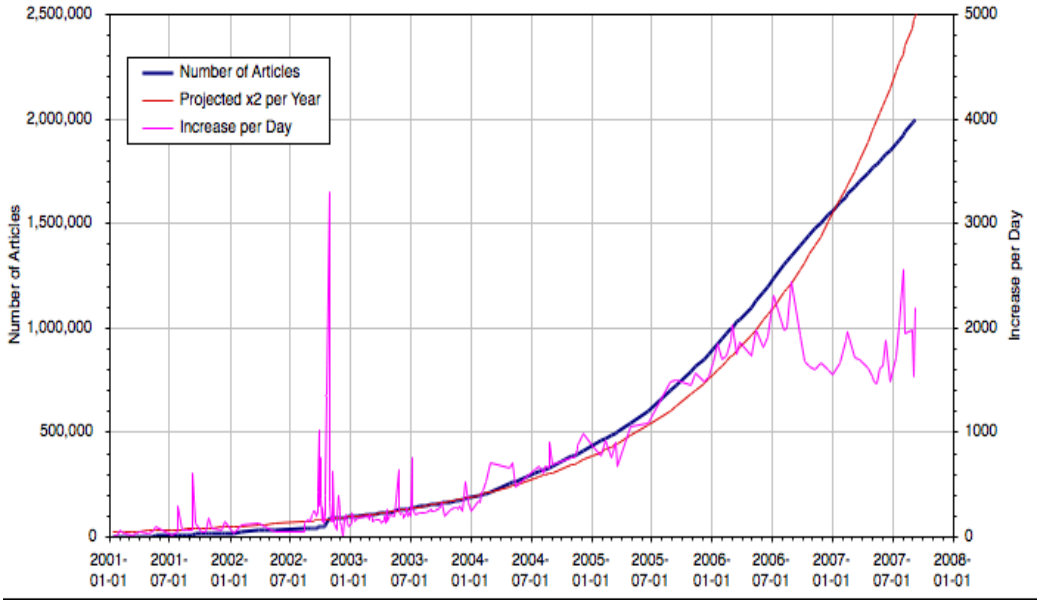

Figure 27 Growth in number of articles (Source: Wikipedia)

According to Wikipedia, **the growth** in number of articles in the English Wikipedia had been approximately 100% per year from 2003 through most of 2006, but has tailed off since roughly September 2006. **The trend is no longer one of exponential growth, and has been closer to linear since that time.** The English edition remains the largest Wikipedia. Many other editions shared the same growth trend as the English edition, though they lagged one to three years behind. As these other Wikipedias have grown, the overall percentage of articles in English has been steadily decreasing, and it fell below 25% in March 2007. The percentage

of articles in the ten largest Wikipedias has also been decreasing, although these top ten still account for about 67% of all Wikipedia articles as of June 2007.

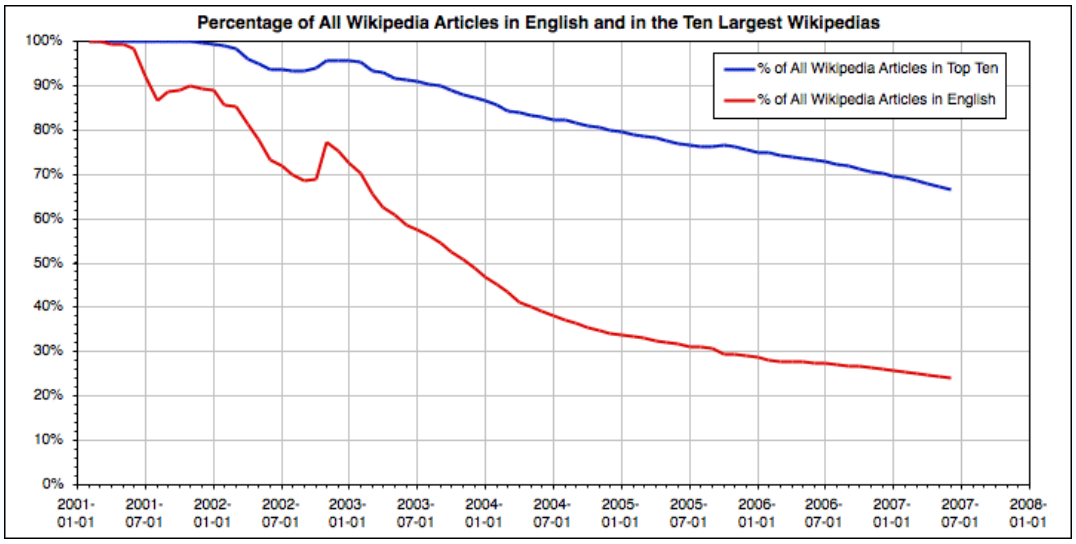

Figure 28 The percentage of articles in EN vs the ten largest Wikipedias (Source: Wikipedia)

So as to have a complete picture of Wikipedia's size, by **number of edits**, the top five language Wikipedias are English, German, French, Japanese and Spanish.

The top five language Wikipedias by new articles created per year (in % share) are the English Wikipedia with a 20% share in new articles per year, French with about 6.5%, German with about 5.7%, and Japanese with about 4.9%.[127]

The usage of Wikipedia

In 2007, Wikipedia had more than 5 million registered users (user accounts). Usage is **evenly split** between regions: about **30% - 40%** of Internet users in US, Japan and Europe (data available for Germany, France and UK) are **using /consulting wikipedia** sites. Although only 16% of US internet users are aware of the term 'wiki,' more than a third of American adult Internet users (36%) consult the citizen-generated online encyclopedia Wikipedia. In Japan, 80% of the Japanese Internet users[128] know about Wikipedia and more than a third of them use it.[129]

Only about 5% of all visits to the Wikipedia sites result in **content editing.**[130] A statistical analysis of active Wikipedians in all languages over time[131] based on Wikimedia data, shows that, in September 2006, there were about 300,000 contributors (6% of its users). Of these, 75,000 active "Wikipedians' contributed 5 times or more in a given month (i.e. 1.5% of its users) and about 10,000 very active Wikipedians contributed 100 times or more in a given month (i.e. 0.2% of its users). The analysis over time also shows that the number of active contributors as a fraction of the total number contributors (users who contributed at least one edit) stabilizes over time (the latest dumps of English Wikipedia at the time of writing this report were for October 2006). The number of very active contributors (users who contribute

[127] http://en.wikipedia.org/wiki/Wikipedia:Multilingual_statistics
[128] http://whatjapanthinks.com/tag/goo+research
[129] See Table for statistics on Wikipedia usage in Annex
[130] Hitwise April 2007
[131] http://stats.wikimedia.org/EN/

more than 100 edits), as a fraction of the total number of contributors, has been slowly decreasing since 2003 (see
Figure 29). This means that a very small number of people make many contributions, and that a lot of people make a small number of contributions.

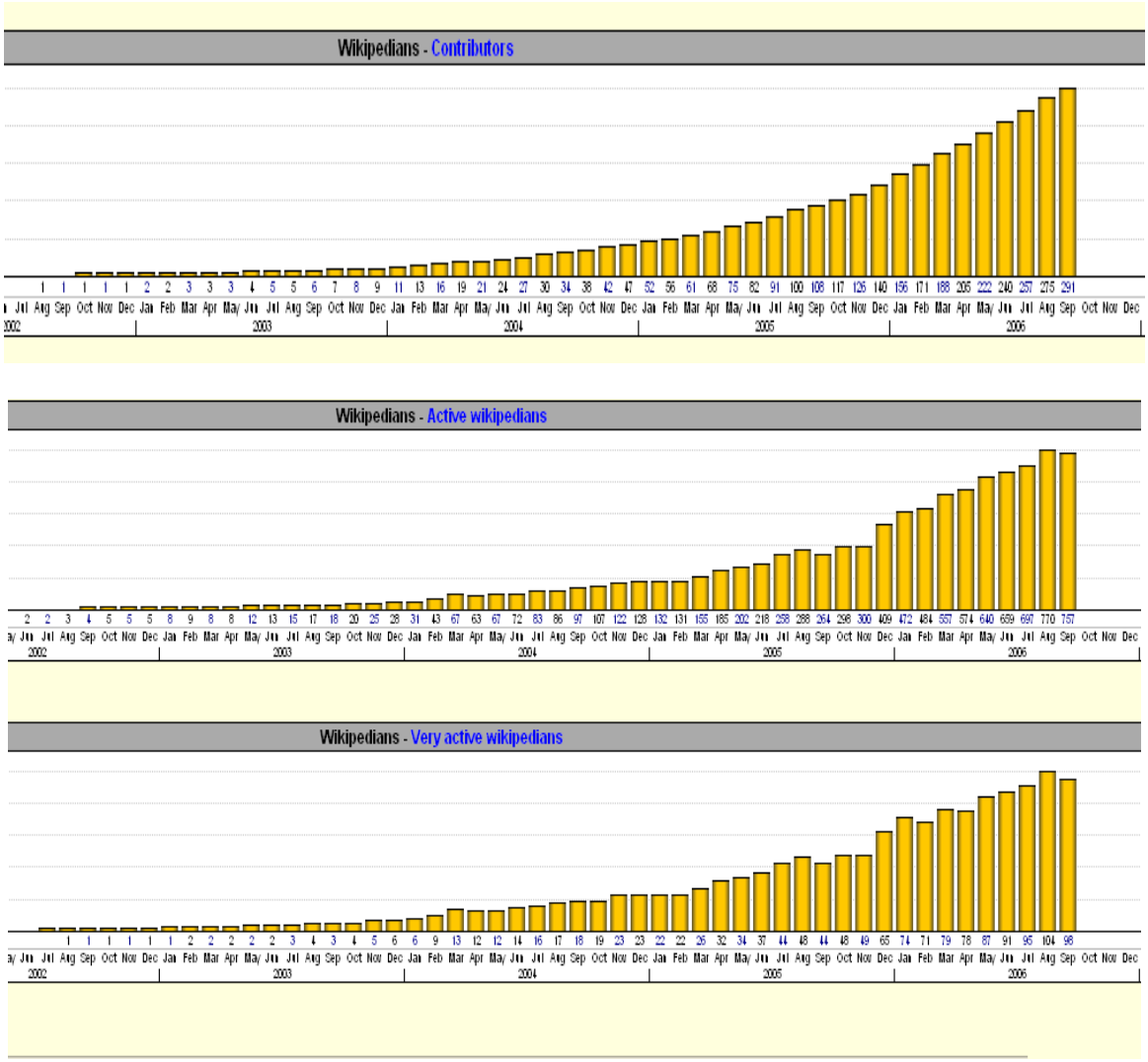

Figure 29 EN Wikipedia active usage over time (Source: Wikimedia)

There is still growth in the Wikisphere, but the growth seems to be slowing down, measured by new edits per month (see Figure 30), new Wikipedians per month and so on .

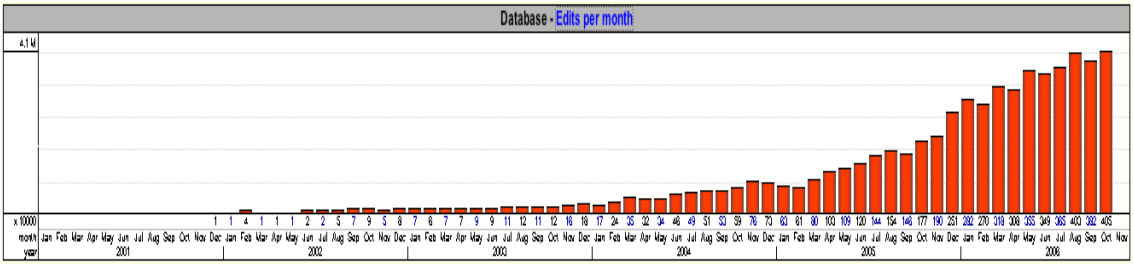

Figure 30 Growth in new edits per month in EN Wikipedia (source: wikimedia)

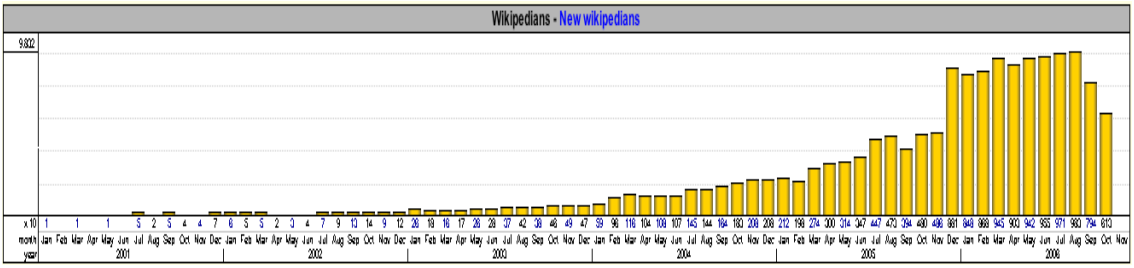

Figure 31 Growth in new Wikipedians per month (Source: wikimedia)

Given the lack of any recent official statistics (latest dumps for English Wikipedia available for October 2006), some authors analyzed further trends using a dump of the Wikipedia log files and by systematically downloading (over many days) the history page contents for 100,000 articles. According to these analyses,[132] the rate at which edits were being made to Wikipedia articles appears to have peaked in February to April 2007 and declined since. It has been claimed that this decline is unprecedented in Wikipedia's history, which has seen nearly exponential growth during much of its history. Several other statistics show declines beginning around the same period e.g. the rate of new account registration (declined by 25%), and uploads (declined by 10%).

Frequency of usage

Overall, **the use** of Wikipedia (i.e. consulting Wikipedia pages) is more popular on a typical day of 2007 than some of the more prominent activities tracked by the Pew Internet & American Life Project, including online purchasing, visiting dating websites, making travel reservations, using chat rooms, and participating in online auctions.[133]

Demographics

Young adults and broadband users are among the early adopters of Wikipedia. While 44% of those aged 18-29 use Wikipedia to look for information, just 29% of users aged 50 and older consult the site. The younger generation contributes more to wikis in Europe (60% on average of 15-24 year old Europeans in the UK, France, Germany, Italy and Spain).[134]

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132 http://www.techcrunch.com/2007/10/11/wikipedia-hits-mid-life-slow-down/
133 http://www.pewinternet.org/pdfs/PIP_Wikipedia07.pdf
134 http://www.novatris.com/services/pubs/NetObserver_Europe_V14en_03_2007.pdf

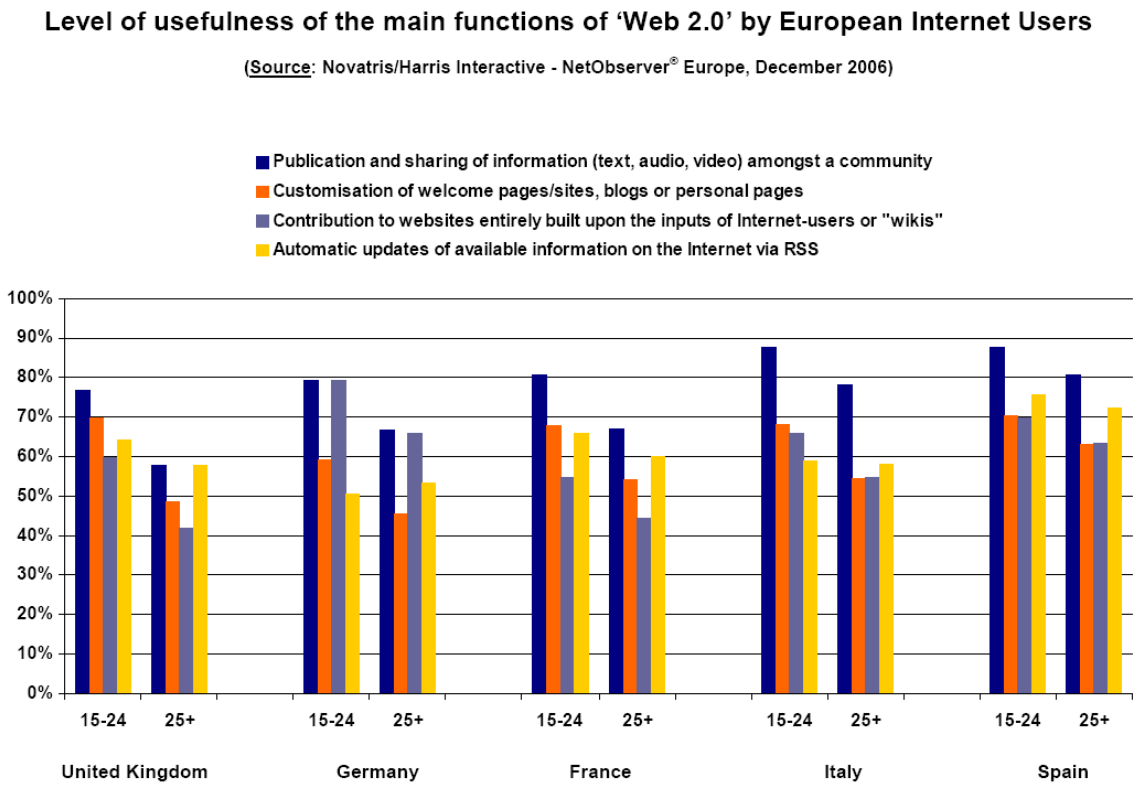

Figure 32 Demographic patterns on the use of wikis in Europe (Source: Novatris)

According to Hitwise (tracking usage in visits),[135] visitors to Wikipedia are almost equally split 50/50 men and women, yet edits to Wikipedia entries are 60% male. There is a clear age difference between visitors to Wikipedia and editors of its content. In 2007, 53.6% of visitors editing Wikipedia entries were over the age of 45 while 47.7% of visitors to Wikipedia were below the age of 35.

Social networking

Social networking includes (but is not limited to) online communities i.e. profiles and also rich content sites that have a set of core users that create content and social systems, like video - and photo - sharing sites.

Content creation in social networking

Profiles

Social networking sites are based around **profiles.** These profiles tend to be rich in content and context: in addition to text, images, videos, social networking site profiles also contain comments from other members, and a public list of the people that are identified as friends within the network. Social networks organize themselves around shared interests in certain forms of content. According to some estimates, there were over 250 million profiles in 2007 for all SNS.[136]

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135 See: http://www.hitwise.com/downloads/reports/Hitwise_US_Measuring_Web_2.0_Consumer_Participation_June_2007.pdf

136 http://www.ft.com/cms/s/59ab33da-64c4-11db-90fd-0000779e2340.html

An analysis of MySpace data[137] claims that after an initial stage of exponential growth, from mid-2005 to mid-2006, the growth in the number of profiles slowed down, as it matured.

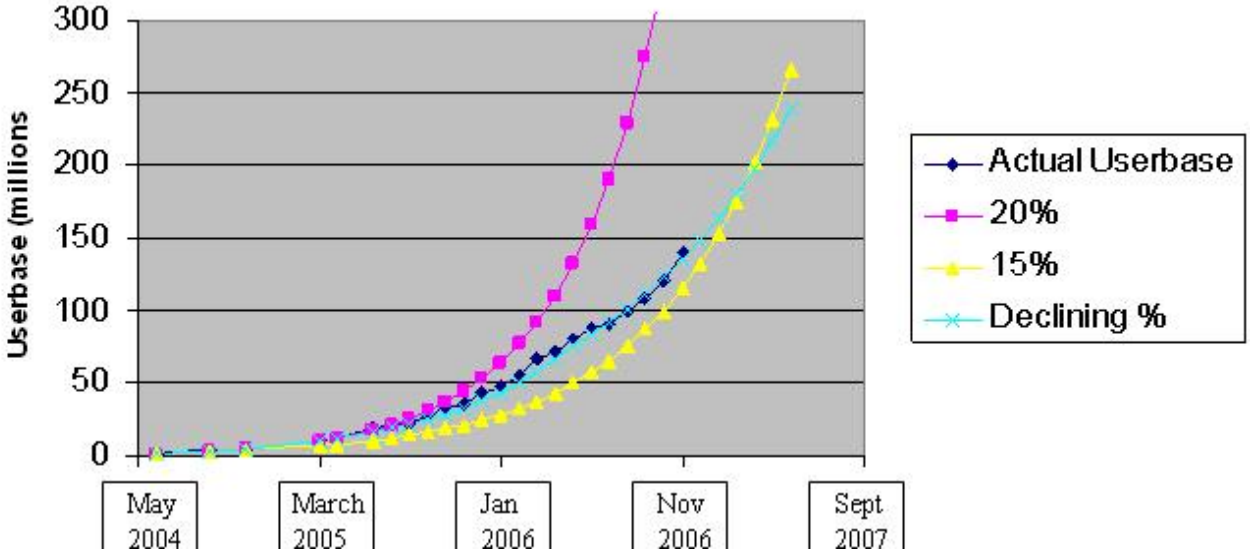

Figure 33 Growth in number of MySpace profiles
(Source: weblog based on press releases, news articles, blog entries)

There is a significant profile cross-over between the most popular social networking sites: a user can have multiple profiles across many social networking sites. 50% of users of the top social networking sites (YouTube, Facebook, the SixApart Network of blogging sites, Xanga, Hi5, Bebo, Friendster and Piczo) also use MySpace. In the case of Piczo, there is a 68% crossover of users.[138]

User-generated video

There were an estimated[139] 42.5 million videos on YouTube, 3 million on Yahoo Video, and around 2 million in Google Video and MySpace in 2007. The French Dailymotion is the second most popular video website after YouTube.[140] Toodou.com is the most popular in China.

In June 2006, 2.5 billion videos were watched on YouTube, with more than 65,000 videos uploaded daily. A recent analysis[141] of YouTube data shows that the number of videos appears to have d sharply since March 2007, after having increased steeply after 2005. The study claims that the decrease in the popularity of recently uploaded videos may be responsible for this (i.e. less new videos are linked by other videos, therefore not likely to be found by the crawler used in this study).

In terms of video categories in YouTube, the most popular category is music, at about 22.9%, followed by entertainment, at about 17.8%; and comedy, at about 12.1%.

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137 http://www.mychurch.org/blog/3201/myspace-viral-growth-numbers based on data from various sources like press releases, news articles, and blog entries.

138 September 2006 report by comScore Media Metrix

139 http://googlesystem.blogspot.com/2007/06/google-videos-new-frame.html

140 comScore June 2007 press release http://www.comscore.com/press/release.asp?press=1496

141 ´Understanding the Characteristics of Internet Short Video Sharing: YouTube as a Case Study´ by Cheng, X., Dale, C., Liu J., School of Computing Science, Simon Fraser University, CAN at http://aps.arxiv.org/PS_cache/arxiv/pdf/0707/0707.3670v1.pdf

The length of YouTube videos is the biggest difference from traditional media content servers. Most of the videos on Youtube and other video sharing services are not full-length features, but short clips running from a few seconds to a couple of minutes (97.8% of the videos' last less than 600 seconds).

User-generated photo

There are billions of images stored in on-line photo-sharing services like Photobucket and Flickr. Unlike Flickr which is a photo community, Photobucket is more a photo-hosting site for storing "your visual content in 1 location and providing a fast, reliable service for you to express yourself wherever you want".

The amount of photos uploaded in Flickr is estimated to date around 1+ billion images[142] (900,000 new photos are uploaded daily on average[143]). Figure 40 shows the growth in the number of Flickr photos[144] over time, for instance between 2006 and 2007.

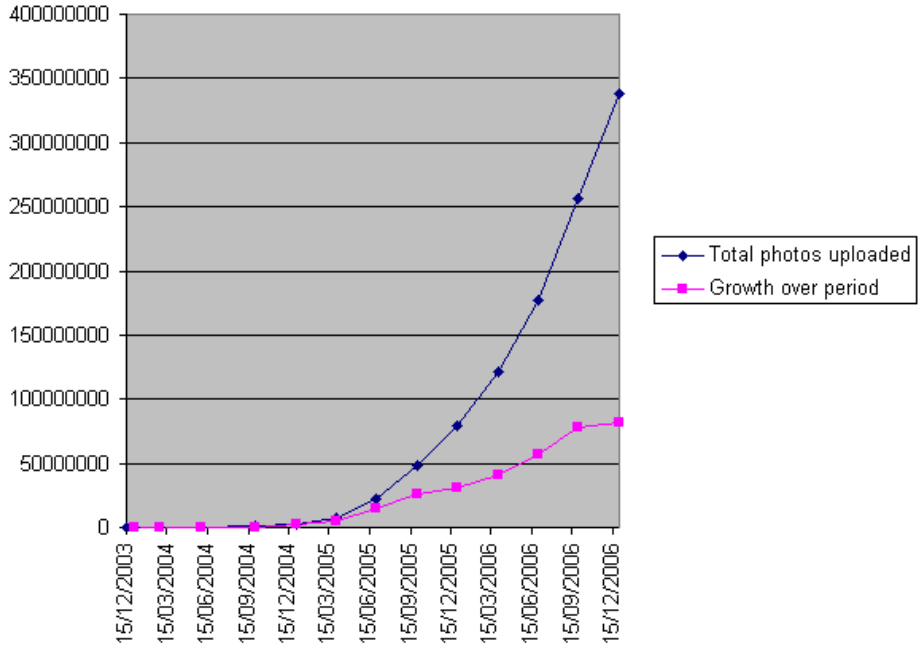

Figure 34 Growth in number of photos in Flickr
(Source: weblog calculations based on Caterina Fake, one of the founders of Flickr)

Social networking usage

During 2007, social networking has taken off globally, and the usage has reached almost a quarter of Internet users visiting social networking (SN) sites. Again, as in blogging, South Korea leads with more than a half of its online population having visited at least one of these sites in the past and over half having done so in the previous 30 days. The popularity of social networking in South Korea is driven by Cyworld. Three out of every 10 South Koreans have a Cyworld account. In comparison, roughly a quarter of US Internet users have ever visited a social networking site.

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[142] Estimation based on an empirical observation that newly uploaded photos get assigned a unique number, that equates to the number of images previously uploadedl As of August 2007, it amounts **more than 1 billion photos-** http://flickr.com/photos/

[143] http://www.techcrunch.com/2006/08/29/12-million-flickr-photos-geotagged-in-24-hours/

[144] For instance, at http://www.zmarties.com/picasa/blog/2007/02/flickr-hits-400-million-photos.html , counting

In Europe, nearly 25% of Internet users in (surveys available for the UK, France, Germany, Denmark and the Netherlands) have visited a social networking site at least once a month. Of these, more than 10% visit weekly. Of this 10%, more than two-fifths visit daily.[145] Currently, Spain, UK and **Germany** lead in the use of online forums with 36%, 32% and 31% respectively interacting with those sites at least once a month, compared to the European average of 23%.[146]

Amongst some 300 social networking sites existing today, according to Wikipedia, MySpace, Facebook, Friendster, Bebo, Orkut, Cyworld are among the most popular sites. MySpace is still the most popular social-networking site in the world, but Facebook is growing the fastest, according to research from ComScore. Since June 2006, the number of users of Facebook has grown by 270 %, while MySpace has more than twice as many users and is growing at a rate of 72%.
Results from a study on MySpace user numbers,[147] for instance, raise questions as to how many people actually use MySpace and how often they use it. The authors note that, of the 9,282 profiles they randomly selected, 548 (i.e. 6% of these profiles) had been deleted, were no longer active or were otherwise invalid. Around 30% of the teenagers had not logged in to view their profile in over three months, and about 5% of these had not done so in more than a year. Retention rates of different social networking sites are an important indicator. According to Nielsen Netratings (see Figure 35), 67% of users visiting social networking sites come back to MySpace after one month and 52% to Facebook.

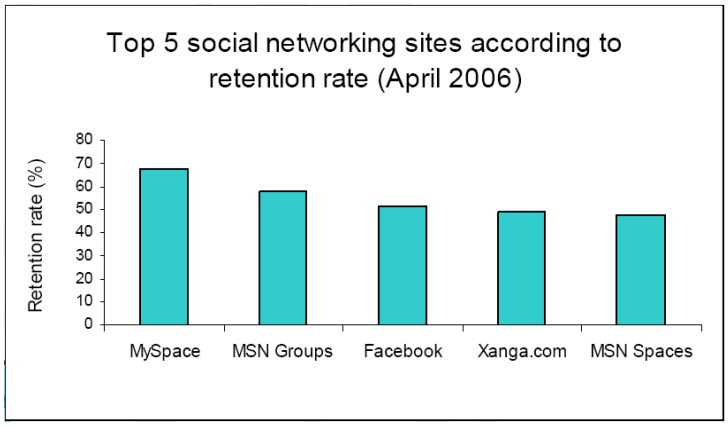

Figure 35: Retention rates on top SN sites in US (April 2006) based on Nielsen Netratings
http://www.nielsen-netratings.com/pr/pr_060511.pdf

While attracting global users, specific social networks have different audiences per regions. MySpace and Facebook attract approximately two-thirds of their respective audiences from North America. Bebo has a particularly strong grasp on Europe, being the most visited site in UK. Bebo.com and Myspace.com now reach 34% and 32% of the total UK online population, respectively, with Facebook.com reaching 24%.[148] 91% of Bebo's users are less than 35 years old. Orkut is very popular in Latin America and Asia-Pacific. Friendster also attracts a significant proportion of its visitors from the Asia-Pacific region.[149] HI5 is the most international social networking site. SkyBlog is very popular in France and Belgium.

[145] Jupiter Research / IPSOS Insight Consumer survey 2007 (UK, France, Germany, Denmark, Netherlands only)
[146] EIAA Mediascope study 2006
[147] http://www.cyberbullying.us/myspace_youth_research.pdf
[148] http://www.comscore.com/press/release.asp?press=1571
[149] http://www.comscore.com/press/release.asp?press=1555

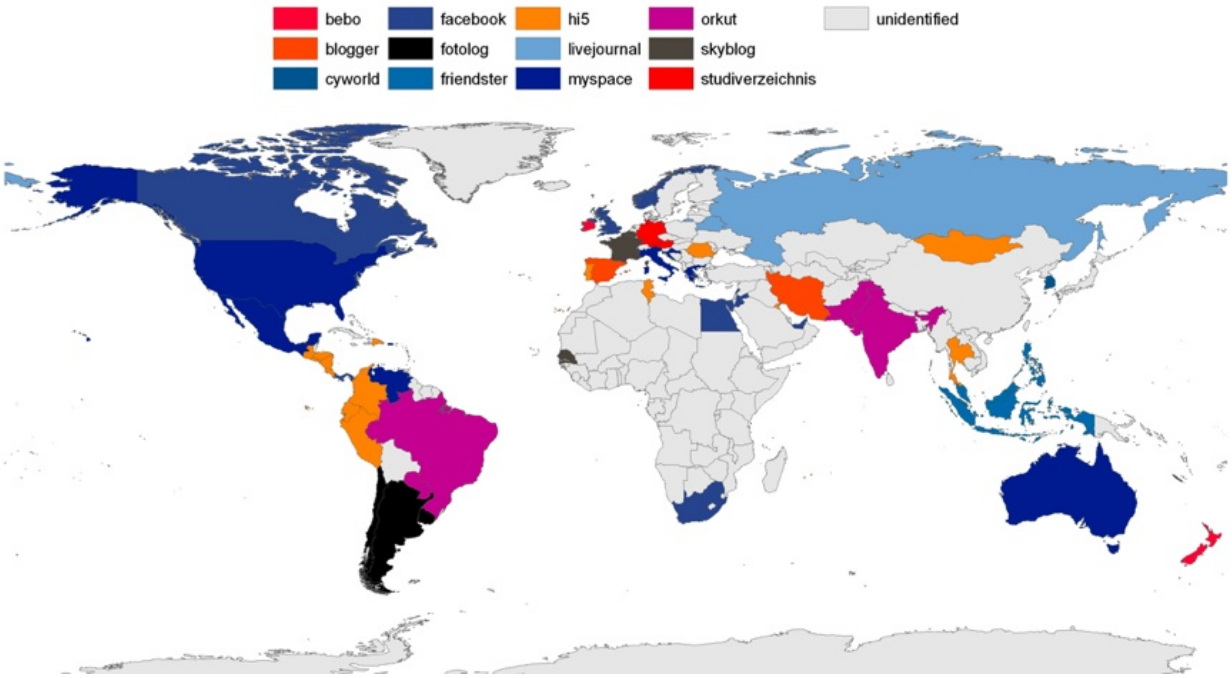

Figure 36 Source: Valleywag http://valleywag.com/tech/data-junkie/the-world-map-of-social-networks-273201.php based on Alexa data

Demographics

More than half (55%) of all online American youths aged 12-17 use online social networking sites.[150] The survey also finds that that 'older' teens (15-17 years old) and particularly girls, are more likely to use these sites. 55% of online teens have created a personal profile online, 48% of teens visit social networking websites daily or more often; 26% visit once a day, 22% visit several times a day.

[150] http://www.pewinternet.org/pdfs/PIP_SNS_Data_Memo_Jan_2007.pdf; The survey defined social networking websites as sites where users can create a profile and connect that profile to other profiles for the purposes of making an explicit personal network. However, in the telephone survey from which the data in this memo was derived, the respondents were allowed to define social networking websites, prompting with two examples of such sites – Facebook and MySpace.

Demographics: Teens Who Create Profiles Online The percentage of online teens in each group who create profiles online:	
Sex	
Boys	51%
Girls	58
Age	
12-14	45%
15-17	64*
Age by Sex	
Boys aged 12-14	46%
Girls aged 12-14	44
Boys aged 15-17	57
Girls aged 15-17	70*
Household income	
Less than $50,000	55%
$50,000 or more	56
Race/ethnicity	
White, non-Hispanic	53%
Non-white	58

*Source: Pew Internet & American Life Project Teens and Parents Survey, Oct.-Nov. 2006. Margin of error is ±5% for profile creators. * indicates statistically significant differences.*

Figure 37 Demographic profiles for profile creation in SN sites (Source: Pew Internet & American Life)

85% of teens who use social networking sites say the profile they use or update most often is on MySpace, while 7% update a profile on Facebook and 1% do so on Xanga. Smaller percentages have profiles at places like Yahoo, Piczo, Gaiaonline and Tagged.com. Young men are more likely than young women to say they use MySpace most often (90% of social networking boys use the site, compared with 81% of social networking girls). Conversely, teen girls are more likely than boys to say that they use Facebook most often; just 4% of boys use Facebook as their primary account compared with 9% of girls. Among older social networking girls (ages 15-17), the percent using Facebook rises to 12%.

Photo-sharing usage

Posting photographs online is one of the most popular online content creation activities, driven by increasing popularity of digital cameras and mobiles with cameras. More than a third of Americans online (37% in 2006, up from a quarter in 2005 and 20% in 2004) upload photos on a photo sharing website so they can share them with others online.[151] In Europe, 50% of the Spanish online have uploaded photos on photo sharing websites in 2006, with only some 20% of the Germans, and 30% for the British and French. Half of the Chinese online have uploaded photos in 2006, but only some 10% of the Japanese have done so. According to McCann surveys, photo-sharing has a strong cultural dimension: broadly, users are most likely to share photos with friends and family, as opposed to sharing videos to the entire world.

[151] Pew Internet and American Life 2006 and Universal McCann's 2006 "Web2.0 The Global Impact" and Universal McCann "Power to the People" tracker study, conducted three times a year ; also, A special study by Universal McCann EMEA, exploring the impact of these developments with online consumers in France, Germany, Italy, Spain and the UK in 2006 and "Power to the People" 2007 ; for a summary of statistics see the Annex

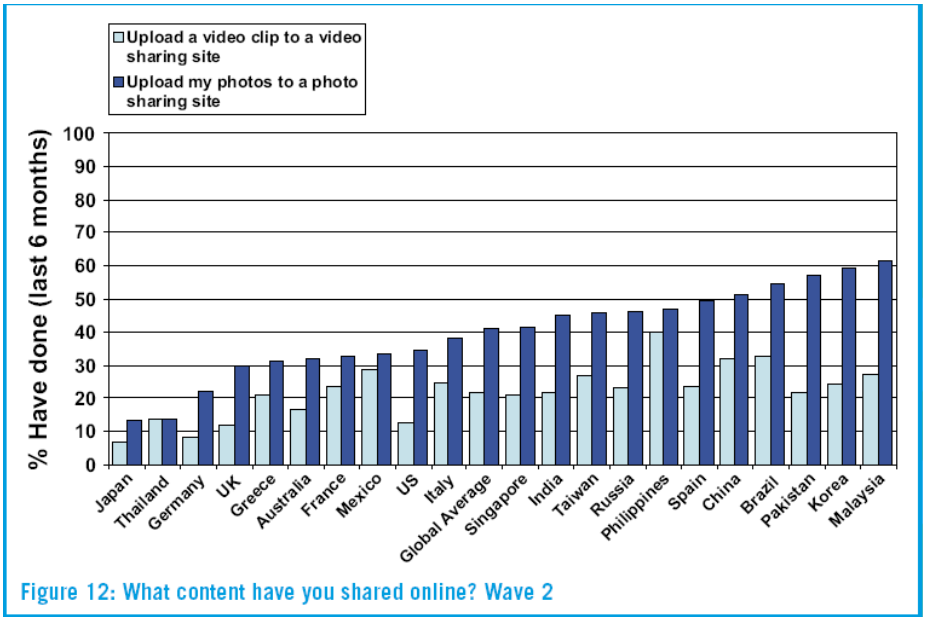

Figure 38 Sharing content online (Source: Universal McCann)

According to Hitwise statistics,[152] Photobucket was the most popular photo-sharing website in 2006, while Flickr was 6th by market share of US visits. Flickr became the 2nd most popular after Photobucket in July 2007.[153] In Europe, Flickr was the second most visited photo-sharing website, while Photobucket came 4th in August 2006.[154] Photobucket has some 40 million registered users,[155] up from 32 million at the end of 2006 and 2 million in 2004; 80,000+ new users register a day. There are no official data, but it is thought that Flickr had around 20 million registered users at the end of 2006.[156]

Demographics

Young men are almost as likely as women to **upload photos** (43% of 18-29 yrs old, data available for 2005).[157]

Video-sharing usage

Online video "consumption" (either streaming[158] and downloading[159]) is one of the most popular online activities worldwide, besides photo-sharing. In Europe, 1 in 3 French people visited a video-sharing website in 2006. In Japan, a quarter of Internet users did so in 2007 and their number more than doubled than in 2006.[160]

Live and/or pre-recorded streaming of video (like those available in YouTube) is very well established. In US, some 70% of the online population is streaming video. The same percentage of Internet users are doing it in Europe (surveys available for UK, France and

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152 http://weblogs.hitwise.com/leeann-prescott/2006/06/photobucket_leads_photo_sharin.html
153 http://weblogs.hitwise.com/leeann-prescott/2007/07/
154 http://www.comscore.com/press/release.asp?press=1018
155 http://blog.photobucket.com/archives/2006/12/30_million_wooo_1.html
156 http://www.flickr.com/photos/lynetter/157183061/
157 Pew Internet & American survey Dec 2005
158 Streaming is a technology for playing audio and/or video files (either live or pre-recorded) directly from a server without having to download the file
159 IPSOS Insight survey "More Evolution Than Revolution: Most Consumers Ambivalent About Digital Video Choices", 2006
160 http://japan.internet.com/research/20070410/1.html Of the 1,088 users, 52.2% were male, 24.7% were in their twenties, 22.4% in their thirties, 21.7% in their forties, 20.9% in their fifties, and 10.3% in their sixties.

Germany) Among the various types of video streams offered online, user-generated videos are not the bulk of online video consumption today. In US, more than 60% of US Internet users prefer to watch "professionally produced" videos. 19% of online video viewers express a preference for content “produced by amateurs”, while 11% say they enjoy both professionally produced videos and amateur online videos equally.[161]

A consumer survey, that was part of the INDICARE project,[162] indicates that even though 60% of European Internet users had their first experiences of watching digital video content from the Internet on their computer in 2006, less than a quarter (22%) do so *frequently*. This compares to 34% of European Internet users who frequently listened to digital music on their computers in 2005. Downloading video content from the Internet is even less common: 38% have ever downloaded content, but only 14% do so frequently. However, a quarter of all Internet users show interest in downloading video content from the Internet in the future. This indicates that there is potential for future video download services.

The emergence of a wide range of new delivery platforms, such as video podcasts, downloads and streaming broadband and new categories, such as user generated content, mash-ups and show highlights popularized by YouTube, make comparing video consumption an increasingly challenging task. Tracking usage by number of visits results in different metrics, reported by either the number of streams and unique users or by share of visits, or page views. The results are not equal, as one visit might result in one or more video streams being viewed. Furthermore, there is more complexity if market share is measured only within a few select sites, and not across the entire Web. Moreover, some rank audience by total time spent by users of a site, so as to make it comparable with traditional TV viewing.

Of those who watch or download videos from more than one location, 29% go to YouTube most often.[163] Other video file sharing sites, such as MySpace and Google Video, are also common destinations for video streamers, with about one in five having accessed those two sites as well. French Dailymotion is the second most popular after YouTube.[164] Toodou.com is the most popular in China (with approximately 50,000 people creating videos). YouTube is also the best known in Japan (86% of Japanese respondents to a gooResearch survey visited YouTube in 2007) followed by Google video. Japanese visit the site more often and for longer than US users.[165]

According to McCann surveys, video-sharing, like photo-sharing, has a strong cultural dimension. Users are most likely to want to share photos with friends and family, then videos with friends and family, then videos with the wider world and lastly photos with the wider world.[166]

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[161] Pew Internet & American Life Project survey "Online video 2007" at: http://www.pewinternet.org/pdfs/PIP_Online_Video_2007.pdf

[162] A consumer survey part of INDICARE project; http://www.indicare.org/ ; The survey was conducted among 2,731 Internet users in five European countries: Spain, Germany, France, the United Kingdom (UK) and Sweden

[163] Pew Internet & American Life Project survey "Online video 2007" http://www.pewinternet.org/pdfs/PIP_Online_Video_2007.pdf

[164] comScore June 2007 press release http://www.comscore.com/press/release.asp?press=1496

[165] http://csp.netratings.co.jp/nnr/PDF/Newsrelease04272006_e.pdf

[166] Universal McCann 2006/2007

Uploading videos

Below 1% of the visits to popular video sharing sites (YouTube Google Video) result in content creation. Only some 0.16 % of visits to YouTube are from "those creative people uploading their videos".[167] Only some 9% of Japanese have uploaded a video in a video sharing website.[168]

Frequency of use

On a typical day online,[169] 19% of US Internet users watch or download videos.[170] Internet users in France and the UK spend around 10% of their time online viewing videos, compared to only 6% in the US.[171]

Demographics

Three in four (76%) young adult Internet users (18-29 years old) watch or download online videos, compared with 57% of online adults aged 30-49. Less than half (46%) of Internet users aged 50-64 watch or download videos and just 39% of those aged 65 and older do so.[172] Among those that stream video online, teens and young adults are the most likely to do so: three in four of all teens aged 12-17 and young adults aged 18-24 in the US have streamed digital video content online.

Young adults in the US are almost twice as likely to point to YouTube as a source for online video: 49% of video viewers aged 18-29 say they watch YouTube videos. MySpace has 15% of the young adult audience, but more than the segment who use cable and network TV sites (7%) or news websites (6%) as sources for video.

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[167] Hitwise April 2007

[168] gooResearch 2007 and 2006

[169] Pew Internet daily tracking survey on Americans' use of the Internet, conducted between February 15 to March 7 2007,

[170] Pew Internet & American Life Project survey "Online video 2007" at: http://www.pewinternet.org/pdfs/PIP_Online_Video_2007.pdf

[171] comScore 2007

[172] According to findings released by Ipsos Insight at: http://www.ipsosinsight.com/knowledge/techcomm/products/motion.aspx July 2007, 44 % of the U.S. population age 12 or older - some 100 million people - have streamed digital video online, with over one in four Americans (28 %) age 12+ having downloaded a digital video file.

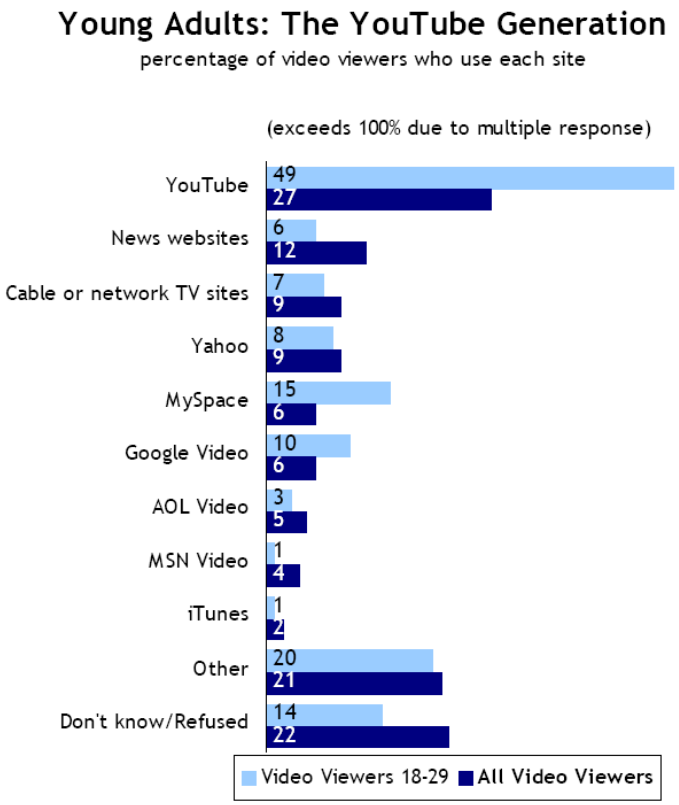

Figure 39 Consumption of online video
(Source: Pew Internet & American Life survey "Online video 2007")

Male viewers are more likely than female viewers to use YouTube (31% vs. 22%). Frequent viewers of online videos also have a greater tendency to use YouTube: 39% of video viewers who say they watched an online video "yesterday" are users of YouTube, compared with just 21% of viewers who did not watch "yesterday."

Overall, 57% of online video viewers have watched with other people, such as friends or family. Young adults are the most social online video viewers: three out of four online video consumers (73%) aged 18-29 say they have watched with others, while only 58% of those aged 30-49, and just 36% of those aged 50 and older do so.

The youngest viewers express more interest in sharing what they find. 2 in 3 video viewers aged 18-29 send others links to videos they find online (a few times per month), compared with just half of video viewers aged 30 and older. There are far more people (75% of the video viewers) who say they receive links to online videos than there are people who send those links on to others (50% of them).

Online Video Gets Social: How users engage *The percentage of video viewers who do the following activities...*	*Total*	*Men*	*Women*	*18-29*	*30-49*	*50-64*
Receive video links	75%	75%	75%	76%	77%	71%
Send video links to others	57	59	54	67	55	45
Watch video with others	57	58	57	73	58	34
Rate video	13	15	10	23	11	4
Post comments about video	13	15	10	25	9	5
Upload video	13	16	9	20	12	5
Post video links online	10	12	9	22	7	2
Pay for video	7	8	6	10	7	3

Source: Pew Internet & American Life Project Tracking Survey, February 15 - March 7, 2007. Margin of error is ±4% for all online video viewers (n=800). Margins of error for subgroups range from ±5% for male video viewers to ±8% for viewers ages 50-64. Those ages 65 and older are not included in this table due to the small number of video viewers in this group (n=84).

Figure 40 – Demographics of user activities

Online social gaming

Social gaming has become most pronounced in the Massively Multiplayer Online Role Playing Games market (MMORPG or MMOs). According to IDATE, more than 100 Massively Online Role Playing Games (for short: MMORPGs or MMOs) exist today worldwide.[173] Amongst these, there is World of Warcraft (WoW) in the US, Lineage in South Korea, Runescape in Europe and so on. By contrast to WoW, a MMORPG with a community around it, built for people who want to be entertained and have content created for them, SL is a community that has built a "game" around itself, giving people freedom to make their own content i.e. a social platform that people can use to create content, which in turn generates network effects.

Content creation in online social gaming

In the context of social gaming, user content creation is the degree of control given to the players over the avatars and the environment. This goes beyond avatars customisation i.e. players can create digital versions of themselves. The Sims was the first to heavily utilize player-created content. Over 80% of the content in use was created by the players.[174] Beyond customization, players have also built stories around screen shots captured in The Sims. Over 77,000 of these albums are posted and traded actively among players. The most popular album has been downloaded over 300,000 times. Secondlife and HiPiHi allow an extremely high degree of environment manipulation. Objects can be created, manipulated, and land can be altered ("terraformed"). Unlike other MMOGs, Second Life users create using built-in tools. 42% of Second Life users create objects from scratch using this built-in modelling system. These tools enable users to create iteratively and interactively in real-time, while sharing the act of creation with other users. The only statistics available on user creation in Secondlife show that, at the end of October 2003, users had created over 250,000 objects, over 75,000 objects with scripted behaviours, and over 300,000 pieces of clothing. Well over 95% of the objects in Second Life are user created.[175]

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[173] IDATE DigiWorld 2007

[174] David Becker, The Secret Behind the Sims" at http://news.com.com/2008-1082-254218.html interviewing Will Wright

[175] A series of Lindenlab whitepapers at: http://lindenlab.com/whitepapers/Escaping_Guilded_Cage_Ondrejka.pdf

The usage of online social gaming

Playing games online is attracting **a quarter of the total worldwide Internet population** (one in four Internet users visit an online gaming site). The average online gamer visits a gaming site 9 times a month.[176] Korea leads in usage with 50% of its online population, followed by China with 35%. According to a Park Associates survey, playing games is still a more popular online activity in the US than watching short video clips or visiting social networking websites.[177] More than a third of US adult Internet users play online games on a weekly basis, compared with 29% who watch short online videos and 19% who visit social networking sites with the same frequency.

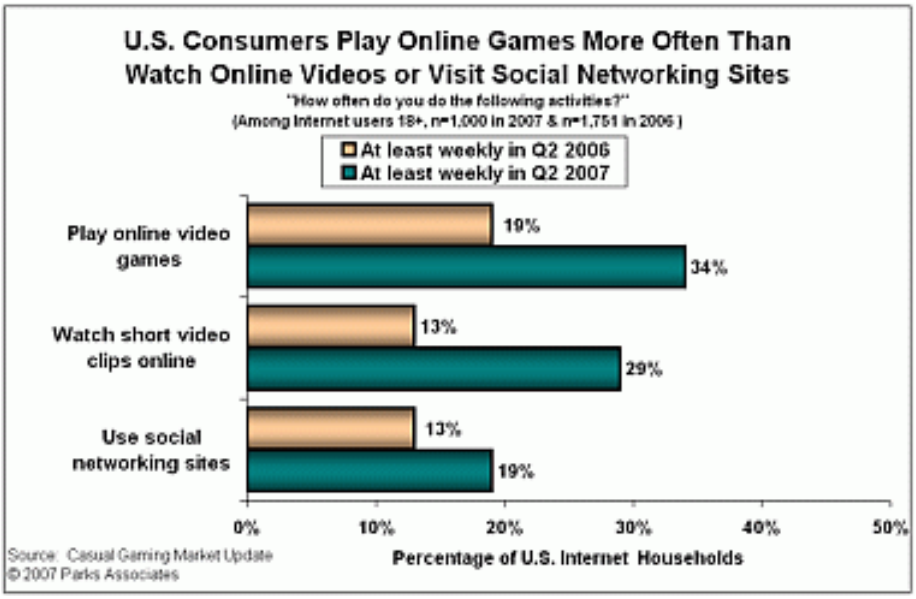

Figure 41 Playing online games (Source: Park Associates)

One in five Web users in Europe plays games online. Compared with this, almost 30% of UK broadband Internet users play online games.

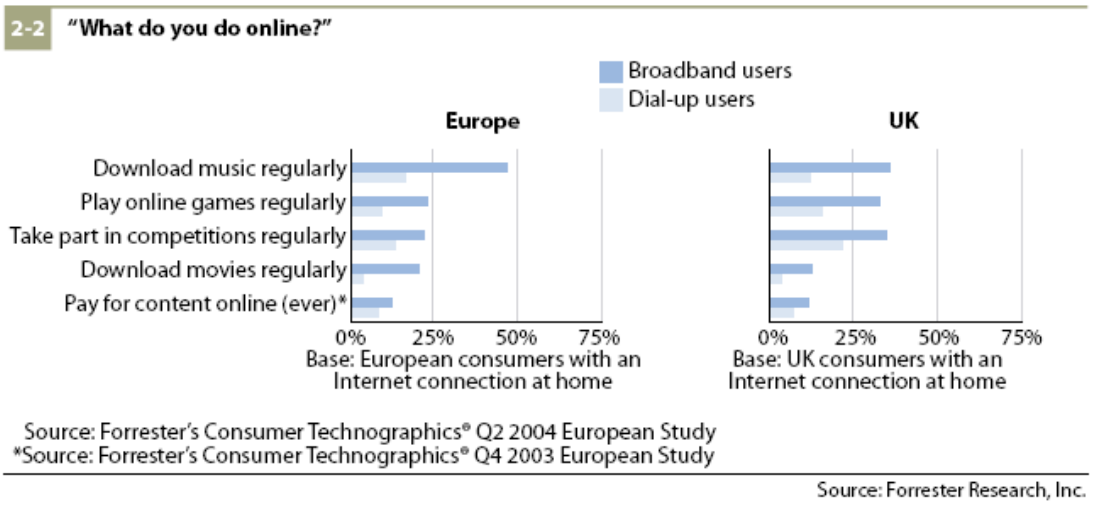

Figure 42 European online gamer (Source: Forrester)

[176] comSCore July 2007 http://www.comscore.com/press/release.asp?press=1521
[177] Park Associates survey June 2007 http://newsroom.parksassociates.com/article_display.cfm?article_id=4579

More than 10 million people are reported to have played MMOs worldwide in 2006 and the number is doubling every year.[178]

The different metrics reported make it difficult to compare across games: unique visitors, registered users, active users, subscribers, CCU (peak concurrent users/ACU active concurrent users) and so on. Players can have often multiple accounts; there are estimates that the average accountholder in subscription-based MMOs actually has two or more accounts. Moreover, there are a number of quasi-subscribers who play either for free or do not log in on a frequent basis (at any given time, 1/5th of the subscriber base will not have logged in during the last month).[179] Despite these problems, subscriber metrics is considered more accurate than registered users, which include, for instance, everyone who ever created an account, etc.

The definition of what constitutes an active user or subscriber can be also very different. For instance, WoW's paying customer definition "includes individuals who have paid a subscription fee or purchased a prepaid card to play World of Warcraft, as well as those who have purchased the installation box bundled with one free month access. Internet Game Room players who have accessed the game over the last seven days are also counted as customers. The above definition excludes all players who have free promotional subscriptions, expired or cancelled subscriptions, and expired pre-paid cards. Customers in licensees' territories are defined along the same rules". Second Life's LindenLab defines an "active resident" as each of those as representing "a uniquely named avatar with the right to log in to Second Life, trade currency and visit the community pages."

With the rise of non-subscription revenue and alternative business models (such as "free-to-play, free-to-download"), the industry is trying to adapt to different metrics altogether. Many MMOs, like Second Life, are not subscription-based so a direct comparison with subscription[180] MMOs cannot be made. Asian MMOs in particular are commonly reported in terms of concurrent users. Concurrency also has a number of problems, e.g. it follows weekly patterns and the trailing date lengths (i.e. users logged-in in a given period) vary. For example, *Second Life* uses 60 days, other companies use 30 days, and yet others in Korea use 7 days. Some other metrics can give an indication of user engagement, such as number of people logged on each given day and the hours spent, worldwide.

By subscriber metrics, as of July 2006, there are over thirteen million active subscriptions to MMOG worldwide.[181] WoW has more than 50% of the MMOs market share. With the exception of There, all of the other top online virtual worlds are game-based (i.e. World of Warcraft, Lineage, Lineage II, RuneScape, Final Fantasy XI, EverQuest and EverQuest II.).

[178] IDATE Digiworld2007
[179] MMOG guru Raph Koster blog http://www.raphkoster.com/2006/06/01/measuring-mmos/
[180] Subscribers are defined as paying users of MMOGs, i.e. users with a monthly subscription or similar.
[181] www.mmogchart.com

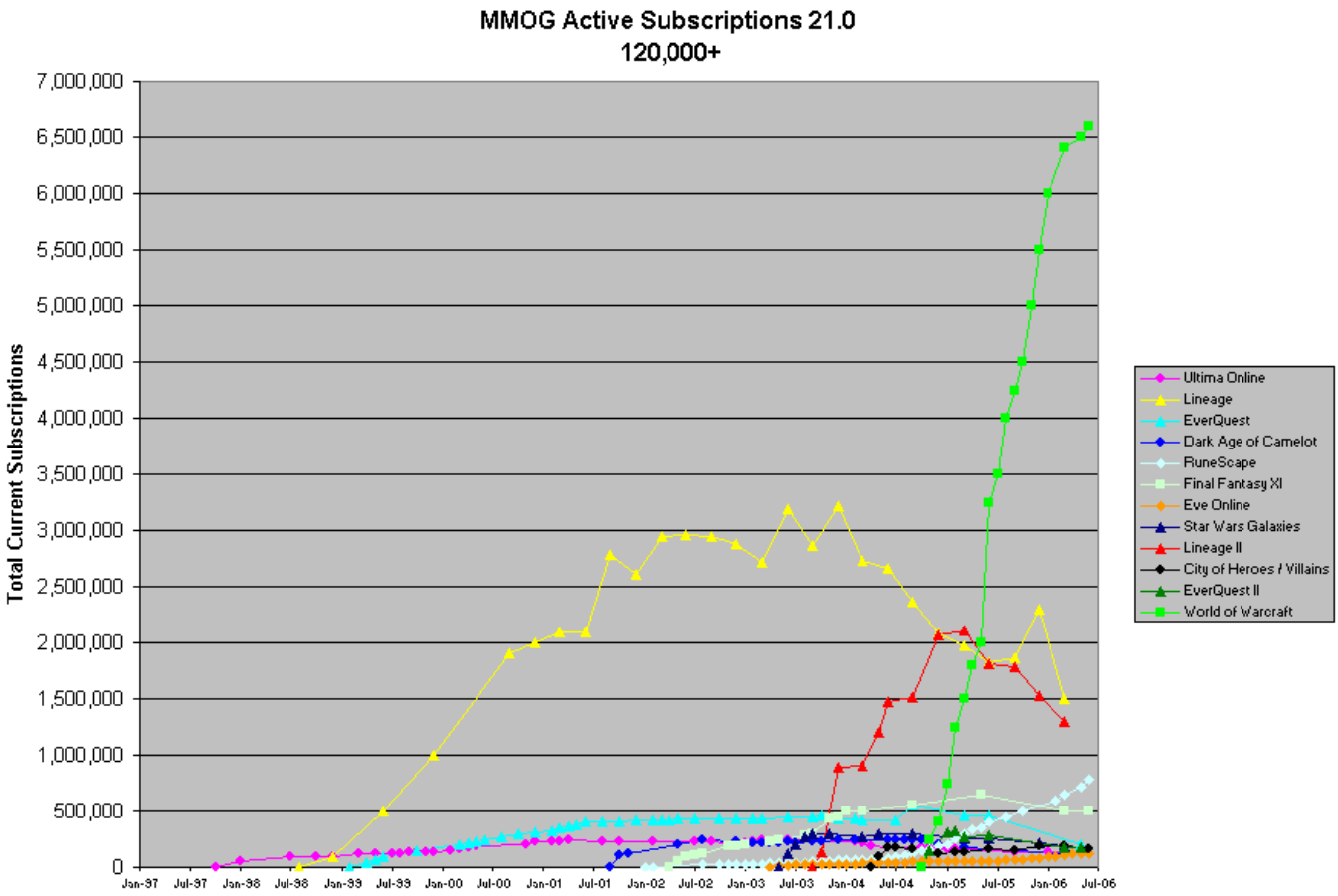

Figure 43 MMO active subscription Source: based on mmochart.com

Linden Labs, creator of **SecondLife** (SL), reports SL population in residents: there are more than 9 million total "residents" (including people with multiple SL identities) as of Aug 2007. Of these, unique residents represent approximately 67% of total residents. It is currently thought that 25% to 45% of unique users come from outside the US, mostly from Canada, the UK, Australia and Western Europe.[182]

By *peak concurrent* user (CCU) metrics, as of December 2006, SecondLife had 20,000 peak CCU, while the Asian site of World of Warcraft (The9) had more than 600,000 peak CCU. This puts **SecondLife at about 3% the size of WoW in Asia or at about 1% of the most successful Asian MMOs.**

The number of hours played per week ranges from 16-24 hours (typically 20 hours on the average). The distribution of hours of usage per week also shows that about 8-9% of respondents spent 40 hours or more per week, while 60.9% had spent at least 10 hours continuously in an MMO.[183]

LindenLab definition of an "active resident" is not what is commonly considered by most Web or online businesses as "active users," due to drop out rates and because individuals can

[182] CEO LindenLab presentation at: http://video.google.com/videoplay?docid=-5182759758975402950&q=%22second+life%22&pr=goog-sl in March 2006

[183] Idem footnote192

have as many as five different avatars, each of which would count as a "resident." According to internal metrics used by Linden Lab, as well as calculations by others in the industry, the real number of active, individual users who would log on on a recurring basis (users who sign up and return on an ongoing basis) in SecondLife would be more likely in the 200,000 to 230,000 range.[184] In August 2007, there were 1 million users logged on over the past 30 days (standard measure of Internet traffic) i.e. roughly **10%** of the total number of residents, out of which only a **third** (some 400,000) have logged on during the past week.[185] On an overall basis, active residents were in SL for 42.7 hours in June 2007. According to official LindenLab statistics, "approximately 10% of unique users have logged on for 40 hours or more."[186] Of the 400,000 man-hours logged in SecondLife each day, around 25% are spent creating items for the game world.[187]

SecondLife appears to have a rapidly growing base of 1.3 million "active residents", representing an increase of 46% in the number of active residents from January 2007. According to comScore,[188] **European usage** seems to be on the rise. In March 2007, 61% of active Second Life residents were from Europe (up 32% across Europe from January), compared to 19% from North America, and 13% from Asia Pacific. 70% of them are in Germany and 53% in France. According to LindenLab official data,[189] however, the actual population of Second Life is more than double ComScore data (1.3 million residents by comScore vs 3.2 million reported by LindenLab). Europe and America are much more evenly split in traffic according to Linden, while ComScore data is weighed towards European visitors by a factor of 2:1 (33% in Europe and the US by LindenLab). The fact that ComScore data tends to be obtained by surveying selected panels of Web users could explain at least partly the difference between Comscore data and the official data reported by LindenLab over the same period.

Active Second Life Residents Worldwide, by Region, March 2007 (thousands of unique users, % market share and % increase vs. two months prior)

	Active residents	% market share	% change vs. January 2007
Germany	209	16%	70%
France	104	8%	53%
UK	72	6%	24%
Europe	**777**	**61%**	**32%**
US	207	16%	92%
North America	**243**	**19%**	**103%**
Asia-Pacific	**167**	**13%**	**n/a**
Latin America	**77**	**6%**	**26%**
Middle East & Africa	**20**	**2%**	**n/a**
Total	**1,283**	**100%**	**46%**

Note: ages 15+ who logged on via the official software; home and work locations; excludes traffic from public computers (eg Internet cafes) and access from mobile phones or PDAs; numbers may not add up to 100% due to rounding
Source: comScore World Metrix as cited in press release, May 4, 2007

083652 www.eMarketer.com

Figure 44 Geographical distribution of Second Life residents (Source: comScore Metrix)

[184] According to Linden Lab CEO Philip "about **10%** of **newly created residents** are still logging (in) weekly, three months later....That percentage hasn't changed much with the much higher rate of new users."
[185] Second Life economy statistics http://secondlife.com/whatis/economy_stats.php
[186] http://blog.secondlife.com/2007/02/09/state-of-the-virtual-world-%e2%80%93-key-metrics-january-2007/
[187] Lindenlab
[188] http://www.comscore.com/press/release.asp?press=1425
[189] http://blog.secondlife.com/2007/05/10/april-2007-key-metrics-released/

In Second Life, 60% of its users build or create something in the world using the tools provided. 25% of hours are spent creating items for the game world (LindenLab).

Frequency of usage

Both the US and Canada have very high usage (over 50 hours per month). This could be explained by the fact that this is where Linden Lab is located and SL originated (initial take-up of accounts). In Europe, the Netherlands has the highest usage (52.4 hours in June).

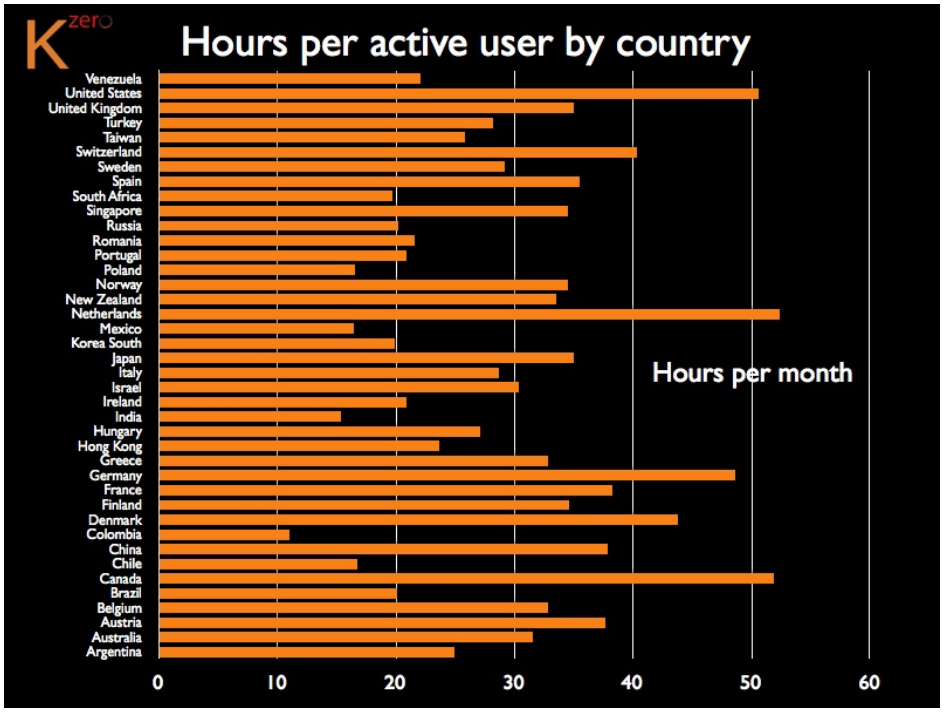

Figure 45 Geographical distribution of frequency of usage (Source: KZero)

Demographics

When looking at usage per active resident on a country and regional basis, some interesting patterns emerge.[190] By age, 25 years and older consumed 81.3% of the total user hours for June (25-34 age band accounts for 36% of hours in June, 35-44 for 27 %, while 45 + for 18%)

In China, 83% of gamers are male, and young men - particularly students - are heavily represented. 33% of gamers are aged between 19 and 22, and 32% are students. In Japan, those who play games include not just young men, but also women, the middle aged, and families. Japanese men spend the longest playing (more than an hour a day on average), while teenagers and women in their forties spend the shortest time (less than 15 minutes a day). In South Korea, the average male player is aged between 25 and 34, while the female players are aged between either 9 and 14 or 25 and 29.[191] Research[192] shows that the average age of the MMO user is about 26.57, and only about 25% of them are teenagers. Compared to MMOs

[190] Analysis of LindenLab data by K Zero
[191] See footnote 244
[192] Yee, N "The Demographics, Motivations and Derived Experiences of Users of Massively Multi-User Online Graphical Environments", 2006, Stanford University, http://www.nickyee.com/pubs/Yee%20-%20MMORPG%20Demographics%202006.pdf - Online survey data were collected from 30,000 users of (MMORPGs) over a three year period (2000-2003) to explore users' demographics.

which have a much younger audience profile, Second Life has an average resident age in the early thirties.

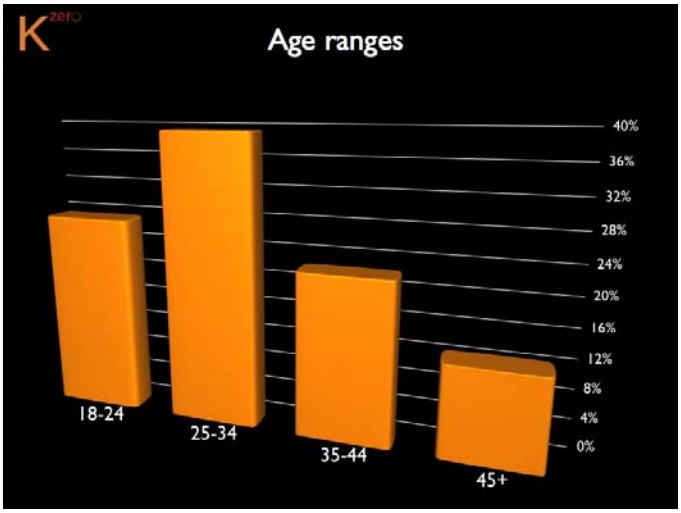

Figure 46 Age distribution Second Life residents
(Source: Kzero analysis based on LindenLan official statistics)

By comparison, the resident population of SL got older from May to June 2007 (45 year olds accounted for 12.2% in June 2007, up by 4.5% from May 2007, 34-44 year olds increased by 2.5% to 21.7%). 24-34 year olds accounted for 38.2% of total residents in June. By gender split, females account for approximately 45% of residents.

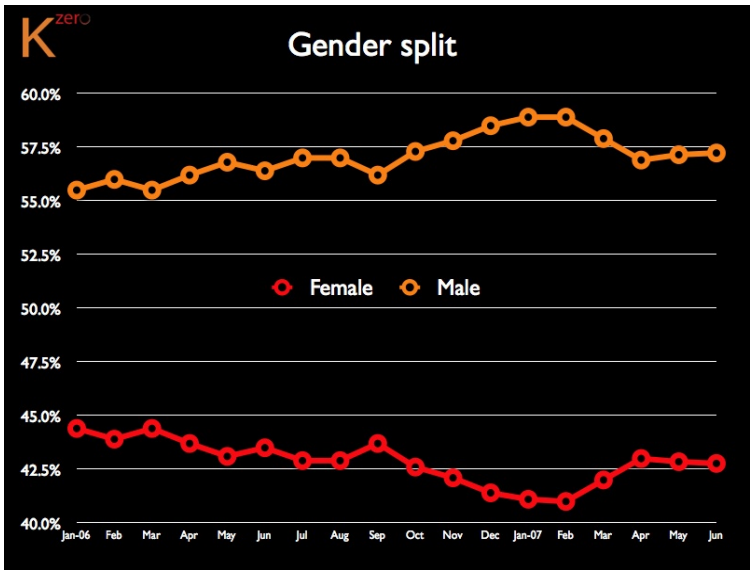

Figure 47 Gender statistics of Second Life
(Source: Kzero analysis based on LindenLan official statistics)

Social tagging

Tagging describes the act of adding keywords, also known as tags, to any type of digital resource. Tags serve to describe the item and enable a keyword-based classification (knowledge management). They can also be used to search for content. The types of content that can be tagged varies from: blogs (Technorati), books (Amazon), pictures (Flickr), podcasts (Odeo), videos (YouTube), to even tagging of tags. Tags are not only metadata, but also content. Tagging also allows social groups to form around similarities of interests and points of view,[193] hence the term *social tagging.*

Social tagging is one of the web2.0 success stories, tapping into the 'wisdom of crowds' - i.e it lets users connect with others, enabling social discovery and connections. Social tagging leads the way towards a semantic web, in bringing in a meaningful and personal search experience.

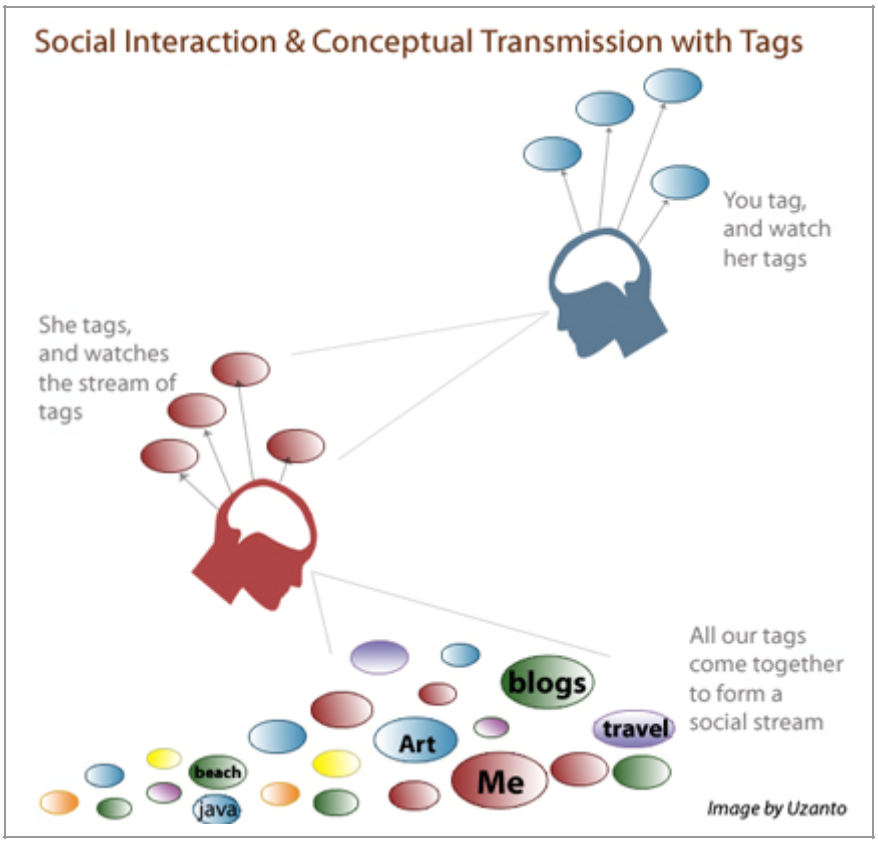

Figure 48 Why tagging?

Content creation in social tagging

Extensive analyses of tagging systems have been completed on data collected from sites like Del.icio.us[194] or Flickr.[195,196] A large number of photos are tagged which makes finding and using the images much easier.

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[193] Pew Internet & American Life 2007

[194] For instance, Scott A. Golder and Bernardo A. Huberman " The Structure of Collaborative Tagging Systems", Information Dynamics Lab, HP Labs at http://www.hpl.hp.com/research/idl/papers/tags/tags.pdf

[195] For instance "HT06, Tagging Paper, Taxonomy, Flickr" by Cameron Marlow, Mor Naaman (Yahoo Research), Danah Boyd (Yahoo Research and Berkeley), Marc Davis (Yahoo Research and Berkeley) at http://www.danah.org/papers/Hypertext2006.pdf ;

There has recently been a dramatic increase in the number of pictures tagged with geographical metadata (a method called geotagging or geocoding). Geotagging of photos brings a whole new level of context to images. Flickr's vision on the future of geotagging is "show me photos taken within the last 15 minutes within a kilometre of me."[197] 2 million photos were geotagged in Flickr in 2006 (more than 1.2 million photos were geotagged the next day after the feature was available in Flickr in 2006). In 2006, Flickr users have added, on average, over one million tags per week to the dataset.[198] Flickr allows users to drag photos on to a Yahoo map and mark them with a specific worldwide location. Zooomr is another photo sharing service that provides a geotagging tool (Google maps are used instead). As of August 2007, there are 2.6 million geotagged photos in Flickr (up from 1.6 million one year ago.[199]

In Febrary 2007, Technorati was tracking over 230 million blog posts using tags or categories.

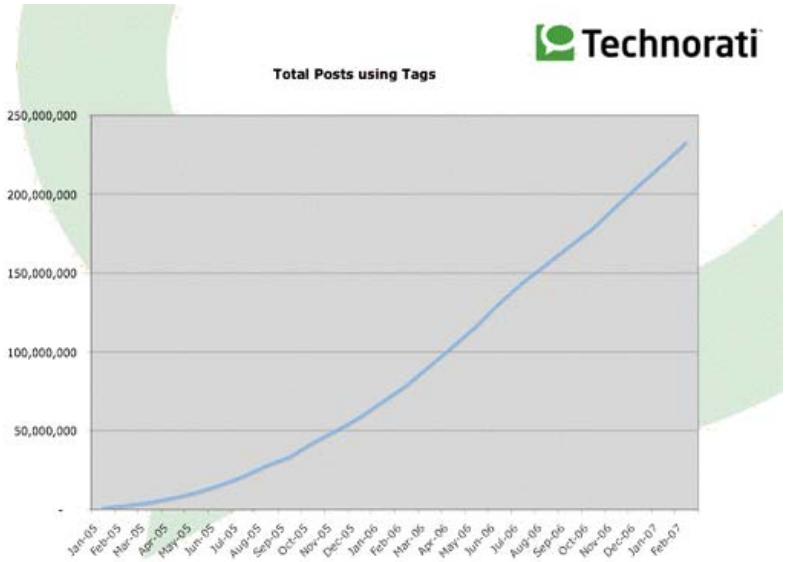

Figure 49 Blog posts using tags (Source: Technorati)

As of February 2007, about 35% of all posts Technorati tracks use tags.

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196 "Visualizing Tags over Time", Dubinko & al., Yahoo! Research at: http://www2006.org/programme/files/pdf/25.pdf

197 Interview with Flickr founder http://www.macworld.com/news/2007/03/09/flickr/index.php

198 Idem footnote196

199 Butterfield, S. , "Geotagging: One day later" at http://feeds.feedburner.com/~r/Flickrblog/~3/17553027/geotagging_one_.html

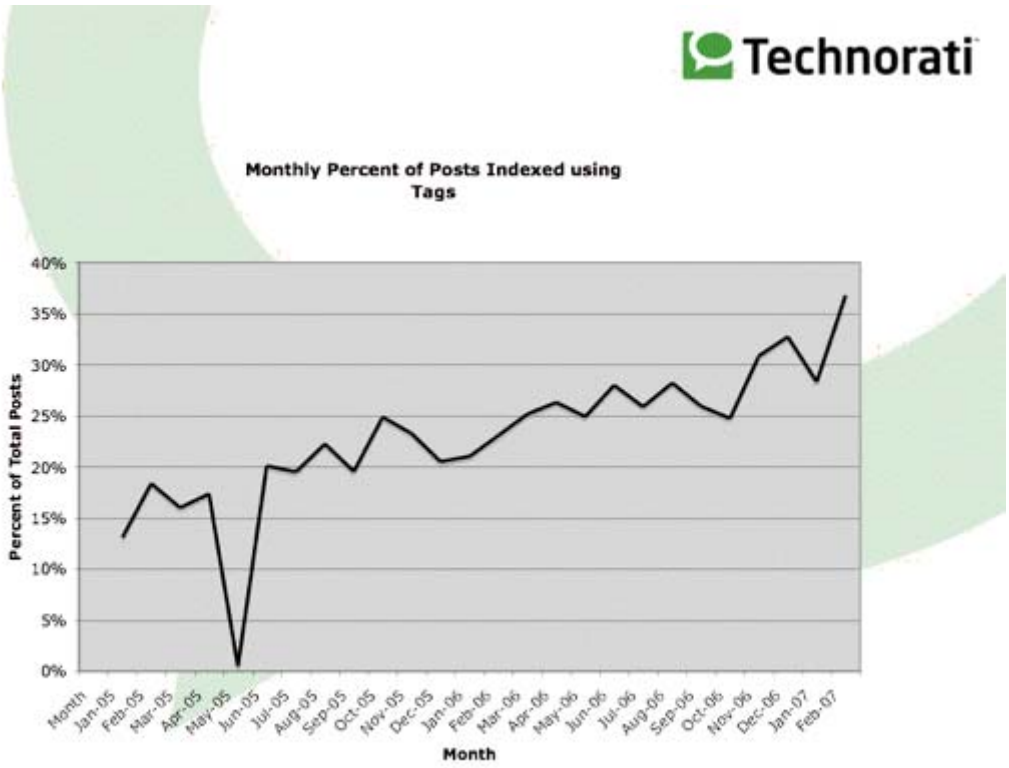

Figure 50 Growth in number of posts using tags (Source: Technorati)

Social tagging – the usage

The use of tagging comes in many forms. Photo sharing sites like Flickr allows users to add labels to pictures, and video sharing sites such as YouTube to tag videos, and Amazon uses tags to classify a product. Google's tagging feature is called "bookmark," though it applies the principles of tagging. Last.fm supports user-end tagging or labelling of artists, albums, and tracks to create a site-wide folksonomy of music. Users can browse via tags, and tag radio to allow users to play music that has been tagged a certain way.

The number of bloggers who are using tags is also increasing month on month. About 2.5 million blogs posted at least one tagged post in February 2007. According to Pew Internet & American Life, nearly **a third of US Internet users** have **tagged or categorized content** online such as photos, news stories or blog posts in 2006.[200] Some 19% of US Internet users watching video online have either rated an online video or posted comments after seeing a video online.[201] According to a report from Baidu,[202] only 2.3% of Internet users in China have ever used tags, and they mainly use tags in social bookmarking and blogs.

Frequency of use

Some 7% of US Internet users tag content online on a typical day,[203] 10% of US online users tag web pages or other content at least monthly and about 8% use a tagging service at least

[200] Pew Internet Feb 2007 http://www.pewinternet.org/pdfs/PIP_Tagging.pdf ; Pew survey asked not just about the activity of *tagging*, but also the activity of *categorization*
[201] Pew Internet & American Life Online Video 2007
[202] http://www.donews.com/Content/200703/776d0e495ec14d5b9203b6c1649d6148.shtm
[203] Idem footnote 200

monthly.[204] Tagging sites like flickr and del.icio.us have gained in popularity[205] with more than 2 million registered users.[206]

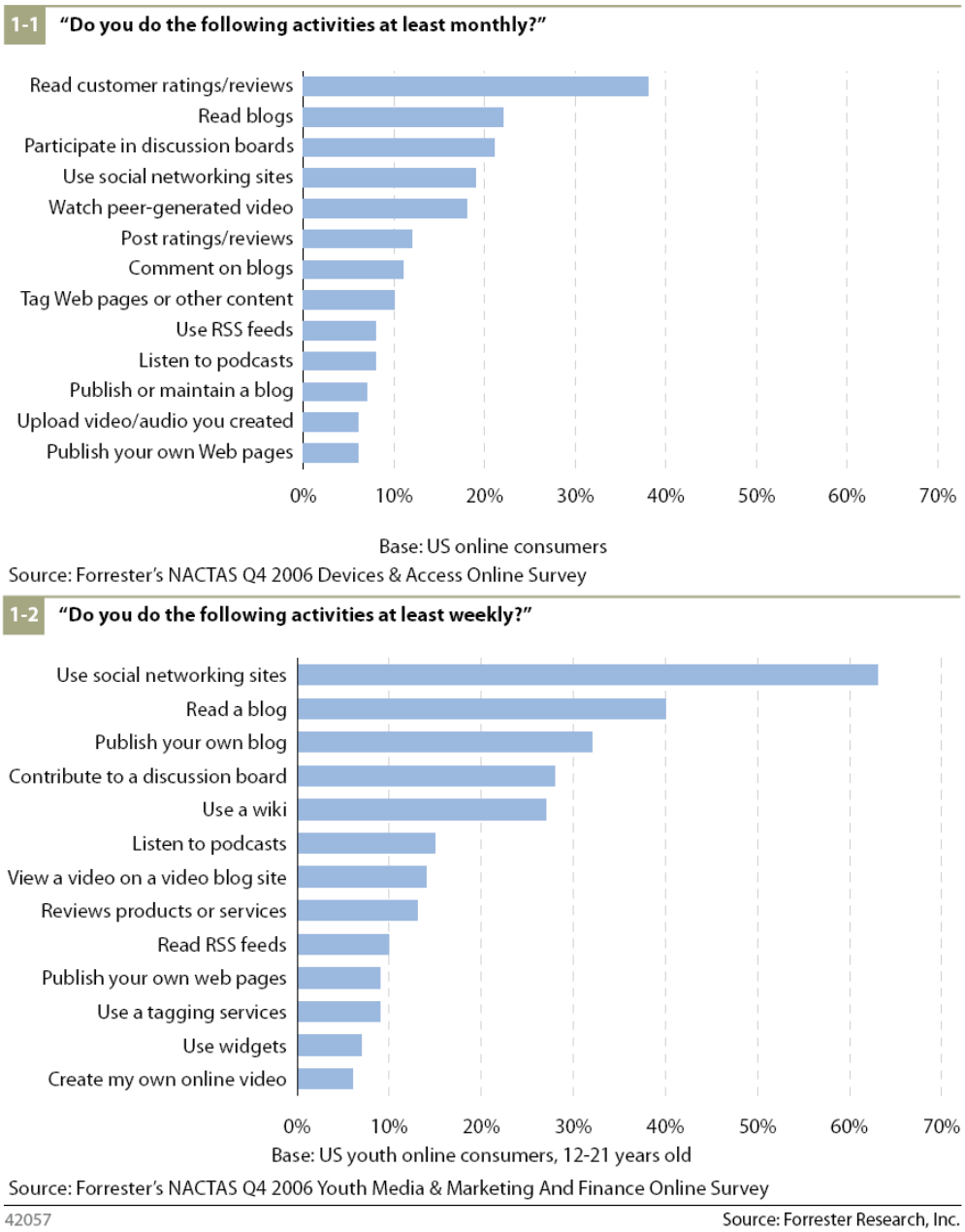

Figure 51 Frequency of use of social tagging services (Source: Forrester)

Demographics

According to Pew Internet,[207] women and men use tagging almost equally, and are more likely to be under 40. Taggers are considerably more likely to have broadband connections at home, rather than dial-up connections.

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[204] Forrester Research "Social Technographics"
[205] See for instance Hitwise
[206] For instance, http://blog.del.icio.us/blog/
[207] http://www.pewinternet.org/pdfs/PIP_Tagging.pdf

Demographics of Taggers	
28% of online Americans say they have tagged content like a photo, a news story or a blog post	
	Proportion of all Americans in the group who are taggers
Men	29%
Women	27%
Race/ethnicity	
White, non-Hispanic	26%
Black, non-Hispanic	36%
English-speaking Hispanic*	33%
Age	
18-29	32%
30-49	31%
50-64	23%
65+	18%
Educational attainment	
High school diploma	24%
Some college	28%
College degree +	31%
Household income	
<$30K	28%
$30K-$49,999	28%
$50K-$74,999	27%
$75,000+	36%
Internet connection at home	
Dial up	23%
Broadband	38%
Source: Pew Internet & American Life Project December 2006 tracking survey. N for internet users=1,623. Margin of error is ±3%).	

Figure 52 Taggers' profile (Source: Pew Internet & American Life 2007)

ANNEX 2- SYNTHESIS TABLES

Term	Source	Definition
Web2.0	O'Reilly[208]	A second-generation of Web-based communities and hosted services — such as social networking sites, wikis and folksonomies — that facilitate collaboration and sharing between users.
Social Computing	Wikipedia[209]	Referring to the use of social software, a growing trend in ICT usage of tools that support social interaction and communication.
	Forrester Research[210]	A social structure in which technology puts power in individuals and communities, not institutions.
	ACM[211]	Describing any type of computing application in which software serves as an intermediary or a focus for a social relation.
	Microsoft[212] and IBM's Social Computing Group[213]	Social Computing has been defined by Microsoft as being centred on "software that contributes to compelling and effective social interactions". At IBM Research, it's about "digital systems that provide a social context for our activities. The central hallmark of social computing is that it relies on the notion of social identity: that is, it is not just the data that matters, but who that data 'belongs to', and how the identity of the 'owner' of that data is related to other identities in the system. More generally, social computing systems are likely to contain components that support and represent social constructs such as identity, reputation, trust, accountability, presence, social roles, and ownership."

[208] http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html
[209] http://en.wikipedia.org/wiki/Social_computing
[210] C. Charron, J. Favier, and C. Li, "Social Computing: How Networks Erode Institutional Power, and What to Do about It," Forrester Customer Report, 2006
[211] Douglas Schuler, Volume 37 , Issue 1 (January 1994), Pages: 28 - 108 at http://portal.acm.org/citation.cfm?id=175222.175223
[212] http://research.microsoft.com/scg/
[213] http://www.research.ibm.com/SocialComputing/SCGFAQs.htm#WhatIsSocialComputing

User-generated content	Wikipedia[214]	Refers to various kinds of media content that are produced or primarily influenced by end-users, as opposed to traditional media producers, licensed broadcasters and production companies. It reflects the expansion of media production through new technologies that are accessible and affordable to the general public. These include digital video, blogging, podcasting, mobile phone photography and wikis. In addition to these technologies, user-generated content may also employ a combination of open source, free software, and flexible licensing or related agreements to further diminish the barriers to collaboration, skill-building and discovery.

Table 3: Selected definitions

[214] http://en.wikipedia.org/wiki/User_generated_content

Source	Data collection method	Population sample
EIAA Mediascope Europe 2007	random telephone interviews	Total 7,000 respondents with over 1,000 in the UK, Germany, France, Spain, Italy and the Nordics respectively and 500 respondents in Belgium and the Netherlands respectively. Interviews were conducted throughout September 2007.
Jupiter Research/ IPSOS Insight consumer survey in 2007		It involved 4,800 respondents in UK, France, Germany, Sweden, Spain and Italy.
IPSOS Mori 2006	Interviews were conducted face-to-face, at home	5,000 adults aged 15+, of which 2,214 use the Internet either at home, at work or elsewhere (in UK, France, Germany, Spain and Italy).
Novatris/ Harris Interactive NetObserver Europe 2007	Interviews	Conducted every 6 months since 1998 in France and 2000 in Europe, NetObserver® tracks the evolution of the behaviour and the perception of Internet users over the age of 15, wherever their place of connection (home, work, schools, universities, public places…) in 5 markets: France, Italy, Spain, Germany and the UK. The last study was taken between September and December 2006 with a global sample of more than 210,000 Internet users. The results of the study, being weighted by enumeration data in every market, are representative of the Internet user's population of each of the 5 studied markets.
Pew Internet Memo Video sharing 2008	telephone interviews conducted Oct - Dec 2007	2,054 adults living in the continental United States. Statistical results weighted to correct known demographic discrepancies. The margin of sampling error for the complete set of weighted data is ±2.4%.
Pew Internet Online video 2007	telephone interviews conducted between February - March 2007	Sample of 2,200 adults, 18 and older. The sample for this survey is a random digit sample of telephone numbers selected from telephone exchanges in the continental United States.
Arbitron/Edison Media Research Internet and Multimedia Study 2007	Telephone Interviews	1,855 respondents, conducted in January 2007; National Random Sample;
Park Associates	phone interviews	Amongst 1,000 Internet users in 2007 and 1,751 in 2006, +18 years old.

IPSOS Insight "The Face of the Web 2006"	Information is collected over the telephone or in person (face-to-face interviews).	Conducted in November and December 2006 in urban Brazil, Canada, urban China, France, Germany, urban India, Japan, urban Mexico, urban Russia, South Korea, the UK and the US; 6,500 respondents. Data collected among a representative sample of adults (18+ year olds) in each market. Approximately 500 completed interviews in 11 global markets and 1,000 completed interviews in the US were obtained. Sample characteristics were compared with actual population characteristics in each country to ensure representativeness.
Forrester Social Technographics 2007		4,475 US adults in December 2006 and 4,556 young people in October 2006
Forrester "Europeans have adopted social computing differently" 2007		7,377 online consumers +16 years old in UK, France, Germany, Italy, Spain, Netherlands, and Sweden.
Edelman Omnibus	Computer-assisted telephone interviewing and random-digit dialing	In Belgium (937 respondents), China (1,000 respondents in major urban areas), France (940), Germany (1,000), Italy(1000), Poland (1,038) , South Korea (1,000), the United Kingdom (1,002) and the United States (1,000).
M:Metrics Benchmark Survey (e.g. June 2007)	Survey questionnaire	Nationally representative mobile phone consumer sample. Data collected from each sample are statistically balanced and projected to the total national population of mobile phone subscribers.

Table 4 Examples of non-official statistics
(Source: EIAA Mediascope, Novatris, Jupiter Research, IPSOS Insight, Forrester, Edelman, Pew Internet and American Life, IPSOS Mori, Arbitron/Edison, Park Associates)

	Usage (% of Internet users)	Usage frequency (% of Internet users)
Visiting blogs	30% US Internet users visited blog sites in 2005 (April 2005, comScore); [215] 50% Korean Internet users use Internet for managing homepages and /or blogs (MIC 2006),[216] 24% Chinese Internet users visited a blog in 2006 (CNNIC 2006) [217] 60% of the French Internet users and 40% UK Internet users have visited a blog in 2006 (comScore 2006), [218]	2% Internet users visited a blog at least once a month in 2006 (Forrester, Dec 2006) France- 27% of Internet users visited a blog at least once a month in 2006 (Mediametrie 2006).[219]
Blogs Readership	74% of Japanese, 43% of South Koreans, and 39% of Chinese reading blogs (Edelman 2007); 23% of the Europeans (UK- 23%, F- 22%) read blogs (Edelman and Technorati 2007); 17% Europeans (UK- 14%, F- 27%) read blogs (IPSOS Mori 2006) 27% US Internet users read blogs Edelman and Technorati in 2007);[220] 39% according to Pew Internet [221]	Japan- 5 times in an average week; Koreans read blogs twice a week (twice the frequency registered in US). Four in ten Chinese read blogs at least once a week; US- 0.9 days/week; UK – 0.68 days/week; F- 0.62 days/week (Edelman and Technorati in 2007)[222]
Blog creation	About 8% of US Internet users keep a blog (Pew 2006);[223] 12% US Internet users have post comments on blogs (Pew 2004) Around 3% European Internet users actively write blogs (Forrester Nov 2006),[224] 3% of them post messages / contribute to blogs (IPSOS Mori 2006)	2% of European Internet users have written a blog in the past 3 months (Forrester, Dec2006). [225]

Table 5: **Blogging usage and user activity**

[215] comScore, April 2005
[216] MIC-NIDA, Survey on the Computer and Internet Usage, February 2006
[217] China Internet Network Information Center (CNNIC) (2006), Statistical Survey Report on the Internet Development in China, The 18th Survey Report www.cnnic.net.cn/download/2006/18threport-en.pdf July 2006
[218] comScore 2006
[219] http://lablog.la-bo.fr/2006/06/mediametrie_analyse_laudience.php
[220] Edelman Omnibus Blog 2007 "A corporate guide to global blogosphere"
[221] http://www.pewinternet.org/pdfs/PIP%20Bloggers%20Report%20July%2019%202006.pdf
[222] Idem footnote 220
[223] Idem as footnote 221
[224] Forrester Research study “Profiling European Bloggers”, Nov 2006
[225] Forrester Research, "A Day In The Life Of A New European Blogger" , Feb 2006

	Usage (% of Internet users)	Usage frequency (% of Internet users)
Subscribing to Podcasts	2% of US Internet users currently subscribe to podcasts via RSS in 2006.	
Listening/ Downloading podcasts	2% of the European online population has listened to podcast in 2006[226] (Forrester, 2006). 1% of online US households (out of some 5,000 online households) **regularly** download and listen to podcasts (about 7 million people) Forrester, 2006.[227] 12% US Internet users have a downloaded / listened a podcast (Pew,[228] Aug 2006 and Arbitron 2006 and 2007[229]).	1% of Internet users in US downloaded a podcast on a typical day [Nov2006]. More than 6% of US Internet users[230] (about 9 million web users) have downloaded podcasts in the past 30 days. 38% of active podcast downloaders say they were listening to radio less often. 72% of respondents who regularly download podcasts download an average of one to three podcasts per week. About 10% of all podcast downloaders could be characterized as "heavy users", downloading 8 or more podcasts a week.

Table 6: Summary of podcast usage

	Usage (% of internet users)	Usage frequency (% of internet users)
Using Wikipedia	36% US Internet users consult Wikipedia sites[231] (Pew, 2007). 36% of the Japanese[232] Internet users, 40% of the UK[233] and German Internet users and 33% of the French[234] Internet users consult wikipedia sites (comScore Aug/June 2007).	8% USA adults [on a typical day (Pew, 2007].
Contributing to wikipedia	Only 4.56% of all visits to the Wikipedia sites result in **content editing.**[235]	1.5% of Wikipedia users contribute 5 times or more and 0.5% of them 100 times or more in a given month.

Table 7 – Summary of Wikipedia usage statistics

[226] Forrester Research Report, March 2006, "European Podcast Consumer"
[227] http://www.forrester.com/Research/Document/Excerpt/0,7211,38761,00.html
[228] http://www.pewinternet.org/pdfs/PIP_Podcasting.pdf from a nationally-representative telephone survey of 2,928 adults. The portion of the survey that covered podcast downloading was administered to 972 internet users.
[229] http://www.edisonresearch.com/home/archives/Internet%26Multimedia%202006%20Summary%20Final.pdf
[230] *The Economics of Podcasting*"by Nielsen Analytics, part of VNU's Media Measurement & Information Group.
[231] Pew Internet& American Life project report "Wikipedia users" at: http://www.pewinternet.org/pdfs/PIP_Wikipedia07.pdf
[232] comScore August 2007 http://www.comscore.com/press/release.asp?press=1561
[233] comScore June 2007 http://www.comscore.com/press/release.asp?press=1553
[234] comScore June 2007 http://www.comscore.com/press/release.asp?press=1534
[235] Hitwise April 2007

	Usage (% of internet users)	Usage frequency (% of internet users)
Visiting SNsites	20% of Internet users worldwide have visited a SN site in 2006 (IPSOS Insight, 2006).[236] 3.5% US mobile subscribers, 2.5% in UK, 1.7% in France visited a SN site via their mobile (M:Metrics June 2007).	20% Internet users visited a SN site in the past month (IPSOS 2006). More than 10% of Europeans visit social networks weekly and more than two-fifths of them visit daily (Jupiter Research / IPSOS Insight 2007); Social networking websites are visited at least once a month by nearly **a quarter** of online Europeans and online forums have seen a 30% increase in use year-on-year. 32% of 16-24 year old Internet users visit social networking sites at least once a month (EIAA mediascope 2006).[237] Spain, UK and Germany lead in the use of online forums with 36%, 32% and 31% respectively interacting with those sites at least once a month. >50% Korean Internet users have visited in the last month (IPSOS, 2006).
Contributing to SN sites (e.g. creating online profiles)	55% of US online teens created a personal profile online (Pew 2007)	

Table 8 – Summary of statistics social networking usage (online communities)

	Usage (% of Internet users)	Usage frequency (% of Internet users)
Uploading photos	20% of all Internet users have posted photos online[238] (Pew 2004); Some 26% of US internet users "have shared their own artwork, photos, stories, or videos on the internet." [239](Pew 2005). In August 2006, 37% of Internet users upload photos to a website so you can share them with others online (Pew 2006).	More than a third of Internet users in US and Europe have uploaded photos in the last 6 months; 50% of the Chinese and 10% of the Japanese (Universal McCann 2006 and 2007).

Table 9: Summary of statistics on photo sharing usage

[236] A survey by Ipsos Insight. "The Face of the Web 2006" survey was conducted in November and December 2006 in urban Brazil, Canada, urban China, France, Germany, urban India, Japan, urban Mexico, urban Russia, South Korea, the UK and the US.

[237] The EIAA Mediascope Europe 2006 study at: http://www.eiaa.net/Ftp/casestudiesppt/EIAA%20Silver%20Surfers%20-%20Executive%20Summary%20FINAL%2023.7.07.pdf , involved 7,036 random telephone interviews in Sept 2006 with over 1,000 respondents in the UK, Germany, France, Spain, Italy and the Nordics respectively and 500 respondents in Belgium and the Netherlands respectively.

[238] Pew Internet & American Life Project report " Content Creation Online", 2004, at: http://www.pewinternet.org/PPF/r/113/report_display.asp

[239] Pew Internet & American Life survey Dec 2005

	Usage (% of Internet users)	Usage frequency (% of Internet users)
Visiting Video sharing sites	In France, 35% of Internet users visited a video sharing website in Jan 2007, compared to 33% in 2006 and some 28% in 2005[240] (Mediametrie). 17% of Internet users in Japan have visited a video sharing website in 2006 (gooResearch survey 2006).[241]	
Watching / streaming video	57% of US Internet users watch or download video (Pew, 2007);[242] nearly 30% of US Internet users watch video from YouTube. 70% of US and European Internet users in UK, France and Germany are streaming video (comScore 2007). 25% of European Internet users consume digital video content regularly (INDICARE 2006).	19% US Internet users have watched some form of video in a typical day (Pew, July 2007). The average online video viewer consumes more than 2 video streams per day (comScore 2007).
Sharing videos online	10% global Internet users share videos online (about 10% in US, below 10% in Europe) (Universal McCann 2006).	
Uploading videos on a video sharing website	0.16% of visits to YouTube are from those creative people uploading their videos, 0.05% visits to Google Video include uploaded videos and 0.16% of Flickr visits are people posting photos (Hitwise, April 2007). Some 9% Japanese uploaded video in 2007 (11% in 2006) (gooResearch survey 2007).	

Table 10 – Summary of statistics online video usage

[240] Mediametrie survey "" http://www.mediametrie.fr/news.php?rubrique=net&news_id=207

[241] http://japan.internet.com/research/20060516/1.html ; 1,011 internet users from all over the country completed an online questionnaire; 57.5% of the sample were female, 24.2% in their twenties, 43.9% in their thirties, 23.0% in their forties, and 8.9% in their fifties.

[242] Pew Internet & American Life Project survey "Online video 2007" at: http://www.pewinternet.org/pdfs/PIP_Online_Video_2007.pdf

	Usage (% of Internet users)	Usage frequency (% of Internet users)
Visit / Playing online social gaming sites (Secondlife)	25% of the global Internet users visit online gaming site (comScore 2007). 20% European Internet users played online games in 2005[243] (Forrester 2005). 50% Internet users in Korea, 35% internet users in China and Japan play online games[244] (Zenith Media 2007)	34 % of US Internet users play online games on a weekly basis (Park Associates 2007). The average world online gamer visits a gaming site 9 times a month (comScore July 2007); 20 hours on the average played per week in a MMO. 10% of unique users have logged in for 40 hours or more(Second Life Blog); 10% of active residents are still logging after 3 months [Lindenlab, Nov 2006]
Creating content in virtual worlds (SecondLife)	60% of Second Life users build something in the world using the tools provided. 25% of active SL user time is spent creating content for the game world (LindenLab).	

Table 11 – Summary of statistics online social gaming usage

	Usage (% of Internet users)	Usage frequency (% of Internet users)
Visiting tagging sites		About 8% of US Internet users use a tagging service at least monthly (Forrester 2007).
Categorizing content / Tagging	30% US Internet users have tagged or categorized content online such as photos, news stories or blog posts (Pew Tagging 2007); 19% of video viewers say they have either rated an online video or posted comments after seeing a video online (Pew Online Video 2007). 2.3% of internet users in China have ever used tags (Baidu).	On a typical day online, 7% of internet users say they tag or categorize online content (Pew 2007). 10% of US online users tag web pages or other content at least monthly and about 8% use a tagging service at least monthly (Forrester 2007).

Table 12 – Summary of statistics social tagging usage

[243] Forrester European Technographics survey 2005
[244] http://www.zenithoptimedia.com/home/Fastforward_4_Newsletter_Jun_2007.pdf

Summary Assessment Table across all social computing applications

	Usage (% Internet users)
Producing content	0.16% visits to YouTube are from those creative people uploading their videos, 0.05% visits to Google Video include uploaded videos and 0.16% of Flickr visits are people posting photos (Hitwise, April 2007).[245]
	2/10 of 1% of visitors to Flickr are actually uploading photos (Hitwise, April 2007).
	37% US Internet users (up from 20% in 2004) of US Internet users posted photos online (Pew 2006).
	8% of US Internet users (one in 12) have uploaded a video file online (Pew, July 2007).
	9% of Japanese uploaded video (gooResearch 2007).
	13% of US Internet users are creators (published a webpage, a blog or uploaded video to video sharing sites) (Forrester 2006).
	36% of US Internet users contributed with web content in some way, either by "having their own blog; having their own webpage; working on a blog or webpage for work or a group; or sharing self-created content such as a story, artwork, or video" (Pew survey for 2005).
	4.59% of visits in Wikipedia are edits (HitWise April 2007).
	8% of US Internet users keep a blog (Pew 2006).
	13% of US internet users create blogs (PEW 2007).
	3% of Internet users in Europe create their own blogs (2006 IPSOS MORI survey of users in UK, France, Germany, Italy and Spain and Forrester 2006)
	55% of US online teens created a personal profile online (Pew 2007).
	60% of Second Life users built something in the world (25% user time spent on creating content).
Sharing content	26% of US Internet users shared something online that they created themselves, such as their own artwork, photos, stories or videos (Pew Internet & Life Project, 2006).
Tagging / categorising content	30% of US Internet users have tagged or categorised content online such as photos, news stories and blogs (Pew 2007); 19% of video viewers say they have either rated an online video or posted comments after seeing a video online (Pew 2007).
	15% US Internet users are collectors (tagged a website or used RSS)(Forrester 2007).
Providing comments	7-11% of Internet users post reviews about product/services (IPSO MORI).
	30% of US Internet users Americans rated a product, service or person using an online rating system (Pew, 2005).
	19% US internet users are critics (comment on blogs, post reviews).
	3% Europeans comments on blogs (IPSOS Mori 2006).

[245] See site below http://www.hitwise.com/downloads/reports/Hitwise_US_Measuring_Web_2.0_Consumer_Participation_June_2007.pdf

Using content	between 19% and 33% of US Internet users are either/or Joiners and spectators (19+33%) Forrester.
	17% of Internet users in Europe have read blogs on the Internet (IPSOS MORI 2006); 23% read blogs in 2007 (Edelman and Technorati 2007).
	27% US Internet users read blogs (Edelman and Technorati 2007): 39% according to Pew Internet 2006.
	75% of the Japanese, 43% of the Koreans and 39% of the Chinese read blogs.
	30% US Internet users visited blog sites (comScore 2005).
	24% Chinese users visited a blog in 2006 (CNNIC 2006).
	60% French users and 40% UK visited blog in 2006 (comScore 2006).
	In the US, a majority of adult Internet users (57%) watch or download some type of online video content, and 19% have done so on a typical day [1]. (Pew 2007).
	40% have written or read reviews of products/services.
	2% of the European online population have listened to podcasts in the past three months (Forrester, 2006).
	1% of US online households regularly download and listen to podcasts (Forrester 2006).
	12% US Internet users downloaded a podcasts (Pew and Edison 2006).
	36% US Internet users consult Wikipedia (Pew Internet 2007).
	36% of Japanese Internet users, 40% in UK and Germany, and 33% French consult Wikipedia sites (comScore 2007).
	35% French online visited a video sharing site (Mediametrie 2006).
	17% Japanese visited a video sharing website (gooResearch 2006).
	70% of US and European users streamed Video Online in May 2007 (Pew 2007).
	57% of US Internet users watch or download video (Pew 2007).
	25% of European Internet users consume digital video content regularly (INDICARE 2006).
	20% Internet users worldwide visited a social networking site in 2006 (IPSOS insight 2006); 30% in the US, 25% in Europe, 50% in Asia (Universal McCann).
	25% of Europeans visit SN sites at least once a month (EIAA Mediascope 2006).
	50% Koreans visited a SN site in the last month (IPSOS 2006).
	8% of US Internet users used a tagging service (Forrester 2007).
	2.3% Chinese ever used a tagging service (Baidu 2006).
	25% of global Internet users visit online games (comScore 2007).
	20% Europeans, played online games (Forrester 2005).
	50% Koreans, 35% Chinese and Japanese played online games (Zenith Media 2007).

Table 13 – User participation patterns in social computing

Mobile Social Computing Statistics

Watching video

	US	EU	FR	DE	IT	ES	UK
November 2007	4.2%	5.1%	5.0%	2.5%	6.0%	7.7%	5.1%
December 2007	4.5%	5.3%	5.1%	2.4%	6.4%	7.7%	5.4%
January 2008	4.6%	5.5%	5.3%	2.8%	6.7%	8.1%	5.6%

Table 14 Watching video (in % of mobile subscribers; author's compilation, based on M: Metrics data; sample of mobile subscribers may differ)

Sent/received photos or videos

	US	EU	FR	DE	IT	ES	UK
November 2007	20.5%	27.5%	24.3%	21.7%	31.3%	31.7%	29.7%
December 2007	21.4%	28.2%	25.2%	22.1%	32.8%	31.8%	30.5%
January 2008	21.9%	28.4%	25.5%	22.1%	33.2%	31.7%	30.6%

Table 15 Uploading video mobile video (in % of mobile subscribers; author's compilation, based on M: Metrics; sample of mobile subscribers may differ)

Accessing social networking sites

	US	EU	FR	DE	IT	ES	UK
November 2007	3.6%	2.2%	1.7%	1.4%	1.9%	2.4%	3.6%
December 2007	3.9%	2.5%	2.1%	1.2%	2.2%	2.6%	4.3%
January 2008	4.2%	2.6%	2.2%	1.1%	2.3%	2.5%	4.7%

Table 16 Accessing SNS (in % of mobile subscribers; author's compilation, based on M: Metrics sample of mobile subscribers may differ)

European Commission

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Abstract

Over the last few years, the take-up of social computing applications has been impressive. These digital applications are defined as those that enable interaction, collaboration and sharing between users. They include applications for blogging, podcasting, collaborative content (e.g. Wikipedia), social networking e.g. MySpace, Facebook, multimedia sharing (e.g. Flickr, YouTube), social tagging (e.g. Deli.cio.us) and social gaming (e.g. Second Life).

The importance of social computing has been acknowledged by European policy makers. It is considered to be a potentially disruptive Information Society development, in which users play an increasingly influential role in the way products and services are shaped and used. This may have important social and economic impacts on all aspects of society. There is, however, little scientific evidence on the take-up and impact of social computing applications. The objective of this report is to provide a systematic empirical assessment of the creation, use and adoption of specific social computing application areas: blogging, podcasting, collaborative content, social networking multimedia sharing, social tagging and social gaming. In addition, the report offers a definition of social computing in order to clarify what is meant, in the face of many different angles, and points to the new area of mobile social computing. The dynamics of user participation in social computing are also discussed. Finally, extensive empirical data is presented in the Annex to this report.

Research into social computing presents numerous challenges. Social computing is a moving target, with rapidly evolving technologies, markets and user behaviours, all of which have emerged and developed over just a few years. The measurement issue is a crucial, in particular in the context of policy implications. While the report attempts to make a critical analysis of best publicly-available data and statistical sources on social computing, which may increase the validity of the finding, there is a strong need for better, systematic measurements and internationally comparable data.

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