Alcatel·Lucent

New communication behaviours in a Web 2.0 world — Changes, challenges and opportunities in the era of the Information Revolution

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Executive summary

Social communication has changed. In the past two decades, technical devices have brought more collaboration, social interaction, personalization, active participation and communication itself than ever before. One of the main reasons for this has been the emergence and spread of broadband internet. However, associated technological advances, such as email, messaging, rich internet applications, content generation application, mash-ups and enterprise applications, have also played a major role.

This stage of internet evolution is known as Web 2.0. It is already having an effect, not only on societies and communities but also on businesses and established business models.

But most of all, perhaps, it is having an effect on users: on how they react to the promise of an evolved internet, on what they do with it – even on exactly who those users are. Together, these factors are creating a new type of user. He or she is User 2.0.

In this paper we look at the effects of Web 2.0 on the behaviours of online users. These effects include:

1. Shift of attitudes of internet users
2. Growth in broadband connection
3. Content being delivered free of charge
4. Online social networking as a new communication domain
5. Fragmentation of consumer markets
6. The internet as the main source and transmitter of knowledge
7. Internet privacy, online security and data ownership

Web 2.0 is affecting corporations too. For these businesses, the spread of broadband and online services brings new revenue opportunities. However, it also threatens current business models.

Internally, enterprises globally will increasingly make 2.0 'tools' part of their routine. Collaboration productivity tools, unified communications, virtual worlds and Web services are among the tools likely to be adopted. Their adoption will, in turn, drive the growth of a social networking enterprise software industry.

As new internet Web 2.0 services emerge, online advertising will grow in importance. There are a number of reasons for this. Firstly, an increasing number of users are spending an increasing amount of time on the internet. As new companies appear offering tools that make Web 2.0 even more attractive, this trend will accelerate. Advertisers will obviously want to reach this vast audience. And this change will not just involve private individuals: as corporate use of the internet increases, not only will advertising offer a way to reach such businesses, but it will also offer the corporates themselves a way to reach potential customers – both high-level clients and ordinary consumers.

Traditional advertising vehicles, like magazines and television, will probably continue to attract significant advertising budgets for some time to come. However, as audiences spend less of their free time watching TV and more online, internet advertising will grow quickly.

It's no surprise, then, that the global online advertising market is expected to double in size from 2008 to 2012[1]. And as it grows, the companies that helped to bring users to Web 2.0 will have a further role to play in its evolution. Providers of Web 2.0-based services will need to develop new advertising models based on users' behaviours and willingness to buy. Already ideas like 'personal CPM' (cost per thousand page impressions) and 'pay-per-sell' are attracting interest. It is by no means clear, however, that these models will eventually be widely employed. But whatever the payment model, it will rely heavily on information about the internet user and his or her behaviours. This information is available already: every internet user leaves a 'footprint' whenever they go online. The challenge for service providers and content providers is to mine this data and make use of it, and to do so in a publically acceptable way.

Technological evolution (mainly in the form of software applications and connectivity) will remain the main enabler of changes in communication behaviour over the next five years. The number of global internet users is likely to triple by 2012[2]. The average time spent in front of the computer will grow. The amount of data transmitted will multiply; within four years it is expected to be seven times the level of today[3]. To meet this demand, higher capacity networks will need to be deployed.

Mobile internet use will become a key driver of this trend. In fact the mobile Web is rapidly becoming the preferred method of internet access globally. The growth of Wireless Broadband Access (WBA) technologies, the migration of traditional telecom networks to internet networks and the availability of affordable and functional Wi-Fi and dual-mode Wi-Fi/mobile phones will all boost the usage of mobile broadband internet. However, this usage in turn will require more and better mobile devices.

This paper has a number of aims. It aims to explain how changes in communication and social behaviours are affecting consumer behaviours. It tries to find out what this means for the new internet environment we call Web 2.0. And it examines ways in which the opportunities arising from Web 2.0 might be monetized.

But this paper also has a much more fundamental aim. It is targeted at an audience that is starting to become aware of Web 2.0 and the issues it raises – an audience that wants to learn more about the changes Web 2.0 is bringing and the impact those changes could have.

Introduction

In the 18th century the Industrial Revolution introduced steam power and power machinery, changing agriculture, manufacturing and transportation forever. As the Industrial Revolution took hold it started a process of wealth and population growth, increasing international trade and urbanisation.

The Industrial Revolution affected everyone. As new machinery was introduced the need for a manual workforce declined. Many workers and farmers lost their jobs. However, there was now a need for a new breed of worker with different skills. Innovations and new ideas drove this process, a process which led to unprecedented economic growth and improved living standards, though not before it completely transformed, and even destroyed, the traditional habits and ways of life of many people.

Today, 250 years later, we are at the beginning of a similar revolutionary step. The rapid development of information technologies and the global internet are creating a new shift in society. Value is more and more being driven by knowledge and access to information. This is the start of the Information Revolution era.

Like the Industrial Revolution, the Information Revolution will, over time, affect everybody on the planet. It will bring new behaviours and value shifts. People's old habits will change or disappear as they adapt to a changing world. And every change will be driven by innovations – innovations which will change the way people think and understand.

The first steps in this development can already be seen. The dramatic evolution of technologies and the growth of broadband internet, along with a greater technical understanding of ordinary people are together starting to reshape social behaviours and introduce new communication behaviours.

The evolution process is constant. It is driving change at an extraordinary rate and is itself driven by innovations and new ideas and their implementation into our daily lives. On the internet, this change is called Web 2.0.

"We are not living through a technology revolution. We are living through a value revolution that is being driven by the inexorable march of innovation."

PAT RUSSO, ALCATEL-LUCENT

1. Global change in communication behaviours

Changes affecting the internet and the telecommunication industry are the result of changed communication behaviours, going back more than two decades. The spread of broadband internet and the development of Internet Protocol (IP) were the basis for the evolution of new software and technological devices. The result has been an evolutionary shift in the internet.

1.1 How are behaviours changing?

People's communication behaviours are clearly changing. But how? A number of trends or factors stand out:

- **Collaboration**[4]

People are starting to take a more active role in the development of information and knowledge. Traditional reference works, such as encyclopaedias, are no longer seen as the only sources of reliable information. Through collaboration – the collective development of information and knowledge – more people have more access to a greater fund of global knowledge than any formalized information source has previously been able to provide.

- **Social interaction**

The internet allowed people to develop and capitalize on their social circles (such as networking groups and sports clubs). It then allowed people to expand them.

- **Personalization**

People now want more personalized information. The changing radio industry is an example of this. In recent years there has been a growth in the number of small radio stations focusing on niche markets, like news, jazz, sport or Latin music, all enabled by the ability to disseminate: the internet gives access and communication, worldwide, to even the smallest of niches.

- **Active participation**

People are no longer passive receivers of information. They want to contribute and share their own perspectives.

- **Communication through technical devices**

Internet communication is slowly taking over from traditional phone-based voice communication and face-to-face communication. Restrictions to local or regional communities no longer apply: the internet has enabled easy global communication.

These social changes are being driven by wider socio-economic changes. Once the conduits for changing trends were the mass media (TV, radio and newspapers), the phone and personal social circles. The internet has not only taken over this role but advanced the pace of change, becoming a platform for high-speed innovation across an ever greater mass of people.

And the internet itself has changed radically in its short history. Once it was a network created by a few skillful developers. Most users were passive readers of unstructured content with access to very basic search functions and with limited options to influence that content. Today's internet is more user-focused; users drive the development of the network and can directly affect the quality of the content.

1.2 Technology – enabling the changes to happen

The growth in fixed and mobile broadband has created a richer multimedia communication environment. This has shifted the emphasis from personal communication and voice transmitted communication to a multimedia and multi-content way of communicating. The environment is the Web – and the Web is now becoming the market in its own right.

With a richer multimedia communication environment come new ways of communicating
Source:
Alcatel-Lucent
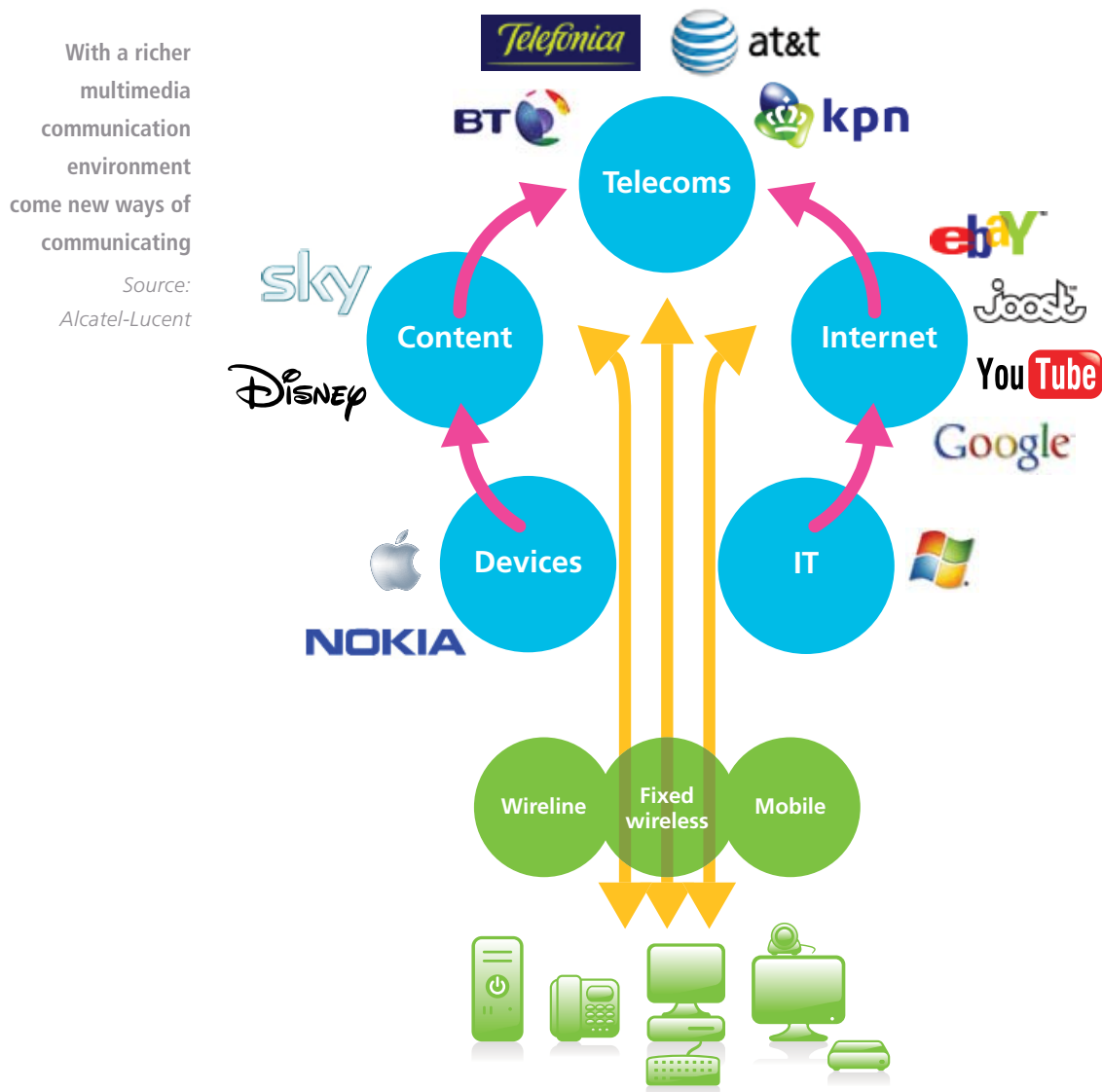
The evolution of broadband and IP has expanded the business of telecommunications service providers. Once solely concerned with the delivery of voice services, they are becoming truly multimedia companies, bringing together voice, data and content. Meanwhile, a parallel trend has emerged where traditionally internet companies (Skype is an example) are now in the voice business.

Hard on the heels of these changes has come the development of software solutions that have enabled changes in user behaviours. Content generation technologies such as Flash and Ajax have enabled much richer online experiences. And technologies have emerged enabling content search, mark-up and collaboration driven by RSS and XML formats (see Appendix D).

The ease with which Web software applications can be crafted adds to the pace of change of these new communication behaviours. More and more users can now create and publish their own content. And with the growth and spread of digital technologies over the last two decades has come a new generation of 'digital natives', more at ease with those technologies than any preceding generation.

With these software developments have come new types of internet portals, such as blogs, social networks and virtual lives. In many ways these are the true essence of the new generation of the internet and the major drivers of user communication behaviour changes (see Appendix A).

Web 1.0
"the mostly read-only Web"

250,000 sites

published content

user generated content

45 million global users

1996

Web 2.0
"the wildly read-write Web"

80,000,000 sites

collective intelligence

published content

user generated content

1 billion+ global users

2006
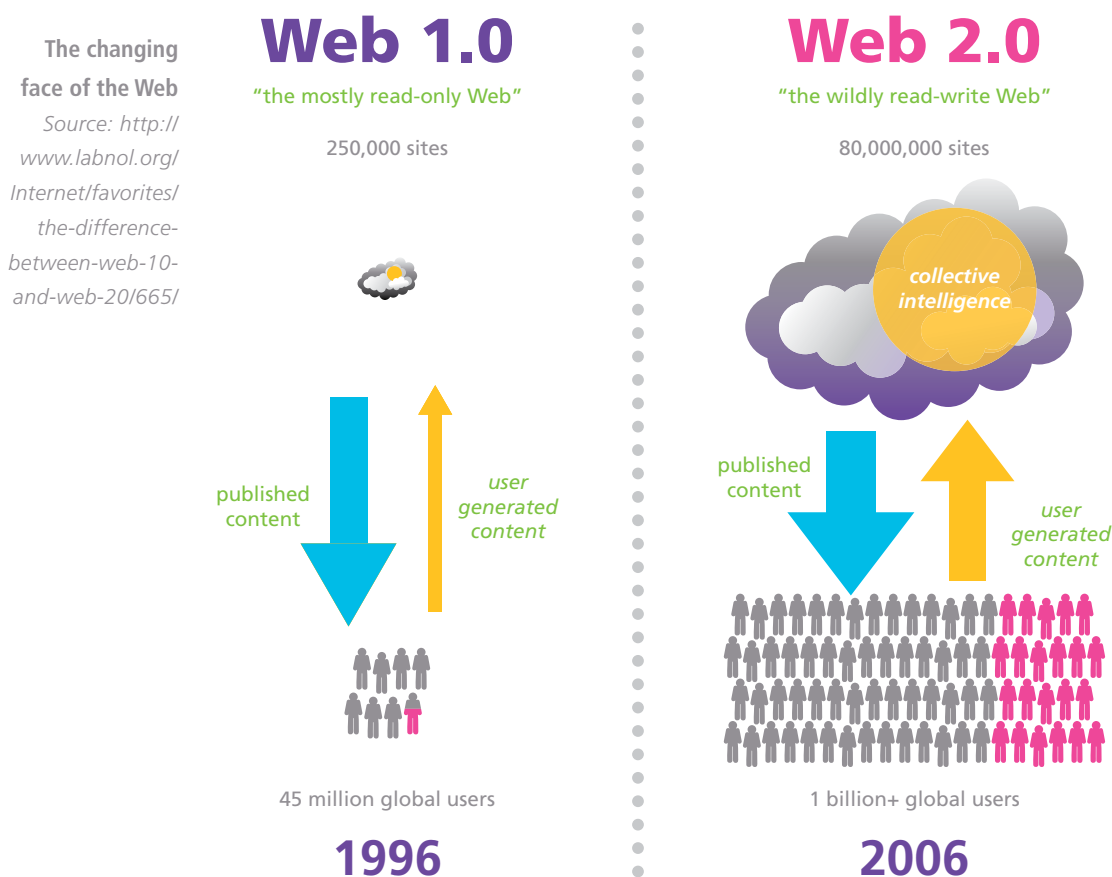
1.3 Web 2.0 – The Read/Write Web

We have established, then, that communication behaviours are changing. We have also shown that a number of new technologies are making this possible. For many people the combination of these two factors equals Web 2.0. But is it quite so simple?

In fact since Tim O'Reilly first used the term Web 2.0 in 2004 there have been many attempts to define exactly what it means. The current most comprehensive definition comes, not surprisingly, from O'Reilly himself. He says[5]: *"Web 2.0 is a set of social, economic and technology trends that collectively form the basis for the next generation of the internet – a more mature, distinct medium characterized by user participation, openness and network effects."*

New communication behaviours in a Web 2.0 world

Based on this definition the key changes brought by Web 2.0 are:

- Using the Web as an applications platform
- Democratizing the Web
- Employing new methods to distribute information

In the Web 2.0 era the power over content has been moved from the network and page administrators to the end-users – hence the term Read/Write Web. The Web is no longer a passive environment; it is one in which people actively contribute.

1.4 Evolution stages of the internet Web 2.0

As new technology comes into play, new possibilities emerge. The second generation internet gave the user the power to contribute content and further develop the environment in which the internet operates. At the same time a new process began: the process of linking content together and creating a real network, rather than just isolated Web pages and services. Google page rank – a breakthrough in search – is an early stage of the Web 2.0 era[6].

User involvement in content development began with users developing and sharing their own content on a given platform. They were able to use all the tools and options that the platform offered them, but not to change it. Examples of these first generation services include sites like blogger.com, wikipedia.org, or youtube.com.

Could a third stage of Web 2.0 allow users themselves to develop individual platforms in open software environments?

We are now in a second stage, where users can customize the platform (or parts of the platform, even if the core stays the same). This is done with tools like widgets (also called gadgets), mash-ups (software plug-ins), or RSS (feeds providing constantly updated information on topics of interest to the user). With these tools, users can change the core patterns of the platform based on how they would like to see it.

We can only guess what could happen next. For example, could a third stage of Web 2.0 allow users themselves to develop individual platforms in open software environments? Of course, in order to achieve this, the use of software tools would have to be greatly simplified. However, were this to happen we would be talking again about an evolutionary development of a new internet generation. The internet might become the core of computer operations, taking the place of operation systems as we know them today. We will explore this further when we look at Web 3.0.

2. The impact of change on internet users

Changes to the internet are clearly having a major effect on the Web environment. But most of all, perhaps, they are having an effect on users: on how they react to the promise of an evolved internet, on what they do with it – even on exactly who those users are. Together, these factors are creating a new type of user. He or she is User 2.0.

2.1 Attitudes of internet users

2.1.(i) Individuals as Users 2.0

An increasing number of individual users rely on the internet to fulfil their communication, entertainment or social needs[7]. Their online presence mirrors their offline activities such as hobbies, socializing with friends, studies or just having fun. As a result, groups of users are creating internet communities. Every user is usually a member of a number of internet communities.

Users have changed from passive receivers of content into active creators and contributors (see table). As we have noted, this is happening through blogs, social networks, wikis, mash-ups, virtual worlds, RSS, widgets and other tools.

Comparison of User 1.0 and User 2.0

USER 1.0	USER 2.0
Passively reading and searching for content	Actively creating and sharing content online
Dependent on the content creator; not able to express own opinion	Can express opinions and even change the content presented
Usually using dial-up or first generation broadband connection	Usually using broadband internet connection, or even optical fibre
Getting the Web as it is	Customizing Web pages and content
Email is the main communication tool	Peer-to-peer programs are the main communication tools
The computer is the main access point	Able to connect from various devices
Logging on to the internet for time-limited sessions	Often connected online all the time

Source:
Alcatel-Lucent

2.1.(ii) Corporations as a specific community of Users 2.0

Corporations are entering this environment, either as a specific community (of employees or business partners, say), or as creators of an internet environment (such as content, platforms or applications) for individual users.

This movement is often described as Enterprise 2.0. It was initially defined, by Andrew McAfee of Harvard Business School, as: *"The use of emergent social software platforms within companies, or between companies and their partners or customer"*[8]

Enterprises start driving new communication approaches for a number of reasons but they are usually internal and/or market driven.

Internal motivators can be:

- **Employees**
  Employees bring new communication behaviours and habits from the external environment to which enterprises need to adapt.

- **Knowledge management**
  The opportunity for better accessibility and management of corporate knowledge through collaboration.

- **Innovations management**
  The opportunity to drive innovations through collaboration and networking.

- **Costs**
  Technology costs can be reduced by capitalizing on open software applications and simplified data management tools.

- **External communication**
  The need to adapt to users with changed communication preferences.

Market driven motivators can be:

- New consumer preferences, such as consumers preferring online communication
- The need to find new forms of direct interaction with customers
- Marketing and sales opportunities
- The opportunity to develop new products or enhance existing products

Put simply, Enterprise 2.0 is a new approach to corporate activities that involves capitalizing on the developments brought by Web 2.0 and social networking in the corporate environment. Examples of this could be developing a shared knowledge in the workplace or more intense interaction and relationship-building between various teams and with the corporate customer.

In the Enterprise 2.0 corporate environment the method of spreading information and developing a shared knowledge among employees has changed. Elements learned from social networks are being adopted. An example of this is internal corporate blogs: these facilitate discussion and idea-sharing among employees (replacing emails). Another is the use of wikis as a way of spreading knowledge and information among employees (replacing un-editable documents and spreadsheets). This system gives employees the rights to improve the content and collaborate in the final decision-making process[9].

Mash-ups are evolving as an effective way to integrate multiple Web services. Thus, some enterprises are starting to turn to Web-based service providers to replace in-house functions. SaaS[10] could even replace traditional IT functions in the near future. However, Enterprise Web 2.0 means more than just SaaS. All the various technologies, products and sites grouped together as Web 2.0 have one thing in common: interactivity[11].

The original Web was based on simple client-server architecture, designed for electronic publishing. That worked well for internet-based books, magazines and mail-order catalogues, but

not as well for more complex applications. Web 2.0 is closer to the peer-to-peer architecture[12] of the underlying internet, designed for two-way communication.

Enterprises from similar fields tend to respond similarly to the opportunities and challenges brought by Web 2.0. Hence the development of such terms as Telco 2.0, Media 2.0 and Mobile 2.0.

2.2 Impacts on behaviours of online users

The major impacts are:
  i.   A shift of attitudes of internet users
  ii.   Growth in broadband connection
  iii. Content being delivered free of charge
  iv.   Online social networking as a new communication domain
  v.   Fragmentation of consumer markets
  vi.   The internet as the main source and transmitter of knowledge
  vii. Internet privacy, online security and data ownership

2.2.(i) Shift of attitudes of internet users

Today's internet users are more strongly engaged. In many cases, this means that they have switched from their traditional reader/consumer roles to those of active creators.

This takes the internet network into a new phase, one where a growing number of users are taking an active role in the development of content and applications. Global shared knowledge results from collaboration, where 'the knowledge of crowds' ensures that information is correct and up-to-date.

Consumers – internet users – are donating their free time to the development of online content and are sharing it free of charge, in such forms as blog posts, videos, podcasts and software applications. They are enjoying building new relationships online through social networks and virtual worlds. And they are updated about the news that interests them through RSS feed messages.

Internet users are less inclined to spend their free time watching TV and more likely to increase their time spent online[13]. They are increasingly likely to need 'always on' broadband and mobile broadband: internet connection almost everywhere and at any time.

This process is also termed 'democratization of the Web'. This means that everybody has the right to contribute and all opinions are taken as equal, regardless of the author's social status, academic education or occupation. A vast amount of knowledge is available online, much more in fact than has ever been collected in one place at one time[14]. For many users the internet is even becoming the main source and transmitter of knowledge.

The combination of the internet, Web 2.0 tools and a new philosophy is the starting point for this trend. It is, arguably, the first medium in history to enable the real-time engagement of its consumers.
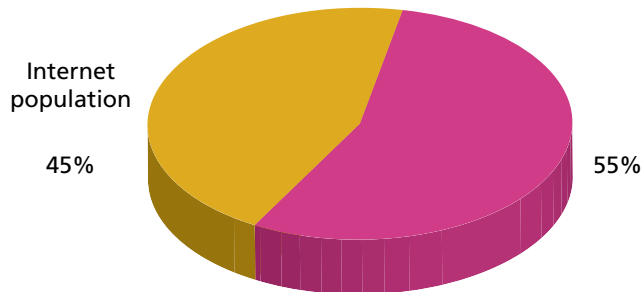
2.2.(ii) Growth in broadband connection

Worldwide spending on internet connections reached $160 billion in 2007 and will grow to over $251 billion in 2012[15, 16]. The total number of internet users globally is currently 1.24 billion. This figure is expected to rise to 3.1 billion in 2012[17, 18].
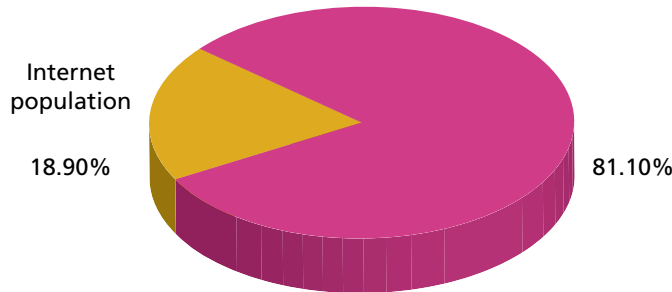
Internet population

18.90%

81.10%

Internet population

45%

55%

The broadband market is growing rapidly. The number of subscribers doubled from 2003 to 2007 and is likely to double again between 2008 and 2012, rising to 600 million. Revenues are growing at a similar rate. Although ARPU is slowly declining, this is compensated for by the growth in subscribers. ARPU will continue to decline, but after 2007 it will fall at a slower rate. Global broadband revenues in 2007 were €75 billion ($150 billion) and are expected to jump to €117 billion ($234 billion) in 2012. Most broadband internet connections are in developed countries, with 80 per cent of Europeans using the internet connecting through a broadband internet connection[19].

Subscribers (millions of users)   Revenues (€millions)
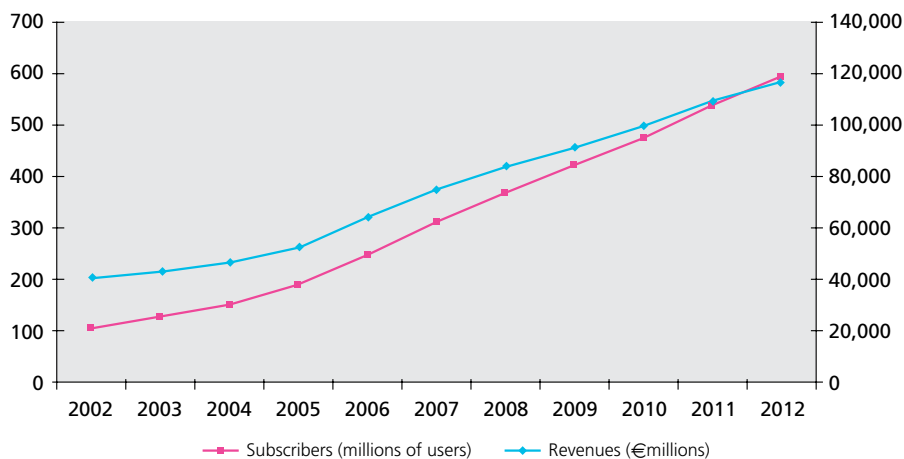
2.2.(iii) Content being delivered free of charge

Early adopters of Web 2.0 applications (content providers and peer-to-peer networks) made most of the content available to the end-user free of charge. This makes it difficult for other content providers entering the market to come up with sustainable business models, a process also known as 'commoditization of content'. Content providers are thus forced to change their business models. To make up for the lack of revenue from the content itself they are looking to alternative income streams: bundling the content with other services, for example, or bringing in advertising.

If content is free the question arises: who is actually paying for the internet? Aside from advertisements the main revenue streams are network connection fees. In fact some users actually confuse payment for the internet connection with payment for content, believing that paying for a connection gives them the right to download content free of charge and legally. The result could be a business model in which internet providers partner with content providers to develop common offerings for the end-user[20].

Apart from connection fees, the main source of internet revenue is advertising. Analysis indicates that more than 80 per cent of all revenues of social networks and other content delivering applications comes from this source. However, despite the tremendous growth of online advertising[21], the income from advertising alone won't be sufficient to make the industry profitable. Most of the spending will be split among a few players, with current leader Google and its concept of content advertisements earning over $16.6 billion during 2007[22]).

However, other possible sources of revenues are being examined. One is user payments, possibly in the form of gate-keeping fees. In this system the user pays for access to an application or premium content. Another is micropayments. Here, users buy small virtual items for virtual money, allowing them to increase their user experience in the service. Other revenue sources, albeit underdeveloped at the moment, include product affiliations, whereby various companies tie their products together, and corporate partnerships that capitalize the services of both partners. For example, a social networking site might deliver tailored content from a partner news site to registered users, thus expanding the user base of both sites[23].

Peer-to-peer networks and video-sharing services such as YouTube, however, have also uncovered a possibly sensitive area. A large proportion of the content shared in such instances may in fact be breaching intellectual property rights, something that could be regarded as a threat, in particular by the music and movie industries.

2.2.(iv) Online social networking as a new communication domain

Since the first social networking portals were created in 2005, the new medium has enjoyed tremendous growth, reaching an estimated 328 million online users in 2008. Growth is expected to continue at 20 per cent a year until 2012, when these portals will reach 565 million users[24, 25]. Led mainly by young users, 42 per cent of all internet users in developed countries regularly visit social networking sites[26, 27]. The share of users in developing countries is also growing strongly.

Social networking services are very effective ways to communicate among people, in many cases replacing email or mobile text messages. They also serve as a way to share content such as

videos, images and music. And they are a much more effective way for users to stay connected to, and updated about, the activities of huge numbers of other users on a richer scale than any one-to-one personal network.

Online social networking services are now starting to replace TV and many other media forms as places for young consumers to spend their free time, in part because 'always on' internet broadband connections allow them to have unlimited time online. In fact the average consumer in Europe spends 12 hours a week online and nearly a third spend upwards of 16 hours[28].

2.2.(v) Fragmentation of consumer markets

Consumer habits are shifting. There is now a higher level of individualism and differentiation. This in turn is eroding traditional approaches to market segmentation, as consumer groups become even more segmented[29].

Web 2.0 is strengthening this trend. Every internet user can pursue his or her specific interest online, be it finding books on very specific topics, or a niche musical taste, and find a network of like-minded people. In a small community this market group would lack critical mass. On the internet, all like-minded users can be part of it. The global reach of the internet gives these niche market segments a large collective population and can provide relevant business opportunities, not least because potential customers can be reached easily through the internet[30].

Further enhancing such business opportunities is the growing ability of ISPs and service providers in general to understand their customers in much more detail; they now have the ability to understand customer habits and behaviours and classify their users into very specific marketing/opportunity segments.

The global reach of the internet gives niche market segments a large collective population and can provide relevant business opportunities

2.2.(vi) The internet as the main source and transmitter of knowledge

Through internet encyclopaedias such as Wikipedia and information-sharing Web elements such as blogs, videos and podcasts, not to mention search powerhouses like Google, the internet is becoming for many people the main source of information and knowledge development. Much of this knowledge is based on collaboration (which we referred to earlier as 'the knowledge of crowds').

The internet has also enabled global co-operation in R&D. Research teams worldwide are co-operating on similar tasks, taking advantage of each other's free computing capacity and thus increasing the capacity of the wider network, an approach similar to peer-to-peer networking[31].

2.2.(vii) Internet privacy, online security and data ownership

The massive spread of collaboration tools and social networking providers has a downside, however: it creates new opportunities for security attacks and data frauds. Hackers have found new ways to attack computers through applications and mash-ups uploaded on social networking portals. This approach is growing in popularity as users learn how to deal with email attacks. In the first half of 2007 Symantec research documented three times
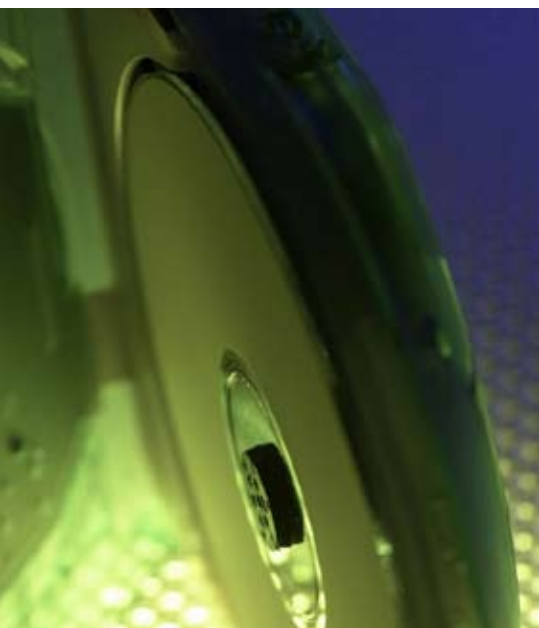
as many plug-in vulnerabilities as there were in the same period a year earlier. In total, 61 per cent of all vulnerabilities were related to specific Web applications[32]. It is expected that in the near future attacks will move from personal computers to mobile phones and mobile devices.

A second concern is individual privacy and the security of published information. Such information can be and is being misused for financial fraud, among other purposes.

The question of data ownership is also becoming a serious issue. At the moment it is unclear whether the true owner of any given form of data is the service provider or the individual user. This raises the question of who is allowed to edit such data and indeed who should take responsibility for the data's compliance with law and good practice.

This question also extends to ownership among users. Take images of other people, for example. Can one user share his or her own images of another user without their consent? This has not been clarified.

3. Show me the money!

Web 2.0 has already changed the core business of a number of corporations across various industries, bringing new revenue opportunities linked with the growth and spread of broadband and online services. And more companies from more business segments will join the broadband economy in the near future. This in turn will provide new revenue opportunities for companies providing access, applications and services.

As for where the monetizing opportunities will come in the next five years, the following areas are likely to dominate:

  i. Advertising, which will become much more personal and engaging
  ii. Data mining, from which it will be possible to derive real-time insights into people's behaviours and hence target services and adverts
  iii.Network capacity building
  iv. Enterprise 2.0 growth
  v. Web 2.0 going mobile

3.1   Advertising

New advertising platforms will be developed. They will use mobile phones, mobile messaging, mobile internet, contextual messages on social networking sites and personalized email messages as ways of approaching customers. And they will depend more and more heavily on automated tools and databases to allow accurate targeting of those customers. The global online advertising market is expected to reach $44.6 billion during 2008 and $73 billion by 2012[33].

To date, there have been two main approaches towards online advertising. In the **pay-per-click** model, advertisers pay an internet page owner only if the user clicks on their advertisement. This model, popularized by Google, is used by content-targeting advertisements.

In the **pay-per-view** model, advertisers pay for every appearance of the advertisement, whether the user has decided to click on the ad or not. This mainly applies to banner advertisements on Web pages.

In the near future new models may evolve. Social networking services[34] in particular are likely to find innovative ways to monetize the huge user base and knowledge about user behaviours that they have managed to collect in recent years. A new type of advertising, behavioural ads, will allow reaction to consumer behaviours in almost real-time and the targeting of the real needs and wishes of the consumer[35].

Then there are personal CPM[36] and pay-per-sell. Personal CPM is the value that advertisers would ascribe to someone who tells their own social circle about a product or service that would otherwise be advertised to them. The more valuable the social circle is to that particular advertiser and the greater the weight that a particular individual has within that social circle to influence behaviour and consumption, the more valuable that individual's Personal CPM would be to that particular advertiser.[37]

The idea behind **pay-per-sell** is that the advertiser pays for every purchase the customer makes and a share of the payment goes to internet page owners where the customer has come in

contact with the product. This derives from the real-world concept that to make a shopping decision customers need several experiences with a product.

To make such approaches effective the advertisers will need technological solutions (both software and hardware) from the telecommunication industry that are capable of storing the required data. They will also need help in understanding the customer better and new spaces in which to place adverts (video messages and email editors, for example).

3.2   Data mining

Every user of the internet today leaves a footprint detailing his or her activities. Specialists can now read and analyze that information and provide much more detailed data about user behaviours in the online world than would have been possible a few years ago. This is in part because of advances in technology but also because of the increased amount of information available on the internet and other digital formats. The rise of open source software in particular has made it is easier to pull together information from various incompatible sources such as different databases and internet user information.

In the next five years the importance of data mining will increase and will lead the sales and marketing activities of many companies in the online environment

The result is that there is a huge amount of information available about literally everyone – and a potential goldmine for those who have the tools and are able to collect this data. Businesses, for example, can use the data they have available about their customers to increase sales propositions, create and test new products in the online environment, or try out and improve their approaches to marketing communication.

Telecommunication service providers and vendors in particular are in a good position. They have relevant data about the behaviours of their customers and by correct mining they will be able to extract the knowledge needed. This can then be used to meet the information requirements of advertisers and content providers.

And data mining has another potential role: as a way of increasing internal efficiency and testing the success of new processes inside an organization.[38]

In the next five years the importance of data mining will increase and will lead the sales and marketing activities of many companies in the online environment. Deeper knowledge about the end-customer will become a major source of information and enabler for targeted advertising.

3.3   Network capacity building

Always-on connection and tremendously increased data flow[39] are putting pressure on service providers to offer faster connections and deploy new wireline and wireless networks capable of meeting demand. In short, faster and bigger capacity connections are essential. Internet traffic grew by 7.4 per cent a month in Europe during 2007, a growth rate that is slowing down but is still putting tremendous pressure on transmission capacities. Overall traffic in 2007 accounted for 281 exabytes (exa – 10^{18}) of data, 50 per cent more than the previous year. Video transmission took the biggest share of traffic growth and is likely to grow further. By 2011 the level will be close to two zettabytes (zetta – 10^{21})[40]. Meanwhile the unit price of transmission

is declining on an annual basis and will continue to do so. Jim Cicconi of AT&T expects that, without investment, the internet's current network architecture will reach the limits of its capacity by 2010. He predicts that $130 billion will be needed to bridge the gap. Traffic may in fact increase fifty-fold by 2015, following an unprecedented new wave of broadband traffic. This increase will be driven both by greater penetration and also by vastly increased take-up of such services as video streaming, virtual worlds and other services yet to emerge[41].

New and even faster broadband technologies will clearly be required. For wireless access the dominant technology might become mobile WiMax or extensions of current 3G systems. For wireline it will most probably be optical cable transmission. This will be more widely deployed around the world. Upload speed network capacities will need special attention, as upload is becoming more important, having previously been neglected.

A new generation of devices will have to be deployed to meet the potential of higher speed mobile internet network access[42]. It is expected that the devices will combine the functionalities of current technologies. Rather like the iPhone, the devices will combine functionalities for such services as voice, quality internet connection, multimedia and data storage and sharing, multimedia playing, and easy transfer of files or multimedia content to friends. However, a large group of consumers will still require only the traditional voice functions. Their need will be met by simplified devices.

3.4 Enterprise 2.0 growth

Analysis indicates that the business Web 2.0 technologies[43] market was valued at around $764 million in 2008 and will grow to more than $4.6 billion by 2013[44]. We firmly believe that corporations will overcome their fears of implementing Web 2.0 into enterprise technology and will make interactivity Web and peer-to-peer based software their main software applications.

The main benefits the corporations will gain are cost savings in such areas as IT development and software solutions, and improved knowledge sharing. Usage of Application Programming Interfaces (APIs)[45] and mash-ups integrated into their corporate software platform (so called 'productivity tools') will gain popularity. Companies will get better results from collaboration either among their own employees, or between employees and corporate partners.

Ease of adoption and use is another benefit for the corporation. Corporations will procure more software from open source environments, so software solutions providers will have to adapt. As software companies and individual software producers increasingly incorporate standard APIs into their applications, complex portfolios will become more readily available for corporate users to pick up and use. Many start-up companies are forming today to serve these future customer needs.

Virtual world applications might find a use in business processes too – as the equivalent of the B2B internet. Some corporations are already exploring the potential for virtual meetings, virtual training and virtual product shows with customers. In product development meanwhile, 3D computer-aided design is a well-developed concept that could find further opportunities in highly realistic virtual worlds.

Virtual worlds could also become a powerful platform for engaging customers in brand-focused co-operation activities. Co-creation is a potentially powerful innovation mechanism; some companies claim significant R&D productivity improvements by involving the market at large (and in particular the most engaged customers) in product creation. Virtual world members appear to be more than willing participants in this new method of innovation.[46]

Enterprise 2.0 growth seems assured. The latest McKinsey survey shows that 80 per cent of the companies globally that are interested in investing in Web 2.0 technologies and tools will be adopting Web services in their operations. Almost half of those companies are going to adopt collective intelligence and peer-to-peer networking tools over the next three years. Most plan to use the technologies to manage collaboration internally (75 per cent of survey respondents), to interface with customers (70 per cent) and to interface with suppliers and partners (70 per cent).

Corporations expect that these investments will not only bring access to new customers and new markets and help to provide better customer services, but that they will also improve internal knowledge management and product design and development[47].

3.5   Web 2.0 going mobile

The mobile Web is rapidly becoming the preferred method of internet access. The growth of Wireless Broadband Access (WBA) technologies such as 3G/UMTS/HSDPA, the migration of traditional telecom networks to internet networks, and the availability of affordable and functional Wi-Fi and dual mode Wi-Fi/mobile phones all boost VoIP over mobile broadband internet. In fact ultimately they blur the distinction between fixed and mobile services, since both are becoming IP-based[48].

Mobile devices will be used for multimedia communications. In this case, sharing and collaboration between a collection of users is key to the adoption of Web 2.0 functions. Service providers will therefore need to upgrade their network to allow an 'always-on' experience. In addition, the capacity of the network will need to be developed to meet the growing demand for data transmission. Networks will also have to accommodate functionalities such as file sharing, multimedia content streaming such as videos, music and podcasts, and storage.

Content providers will have to update their content for mobile devices, adapting it to smaller screens and different ways of navigating within the site than on personal computers. Handset providers will have to adapt to these trends and provide handsets that can meet these demands.

All of which leads to a possible monetizing opportunity: transforming the triple play into the mobile triple play by offering calling, TV and internet on mobile as well as fixed line phones. Most mobile devices are already able to support two or all three parts of the triple play. However the quality and accessibility of mobile internet and TV is not yet fully developed. Therefore hybrid offerings (combining with internet and TV at home) will have to be developed.

Mobile triple play-type services will nevertheless grow in popularity, largely funded by advertisers. In 2008 mobile advertising will hit $1.3 billion (one third of which, at present, is mobile TV advertising[49]), rising to $7.6 billion in 2013.

However, the mobile industry will have to adapt. The current mobile content ecosystem does not meet the needs of the three main constituent groups of any content market: content providers, content customers and advertisers. Mobile users have problems finding and using relevant content because content providers have no clear idea of who the customers are and what content they want. And advertisers are often shut out of the mobile ecosystem completely.

To deal with this, the mobile ecosystem has to start supporting innovation and interoperability, to reduce complexity and to reduce avoidable costs. In addition it has to align with the needs of mobile users, application developers, content providers and advertisers and create mutually beneficial relationships among these groups[50].

4. Non–believers 2.0 – fears and criticisms

The number of users of the internet is growing. However, there remain those who believe that this current evolution will soon crash. They are comparing current growth to the dot.net bubble in 2000.

The main argument of these 'non-believers' is that Web 2.0 start-ups do not have any real income source: their business model is often based either on future predictions of tremendous growth in online advertisements or on a wish to be acquired by a strategic investor early on. They point to the over-valuation of start-up companies such as Facebook, which was valued at $15 billion by Microsoft.

The main reason for such doubts is that online advertising revenues, still the only working business model for these start-ups, are not growing quickly enough. By this argument either revenues will not be able to fulfil the needs of Web 2.0 companies or there will be so many players interested in showing advertisements that prices will plummet.

Andrew Keen, in his book *The Cult of the Amateur*[56], highlights other criticisms. The majority of internet content, he points out, comes from unknown sources, mainly amateurs who are providing content which, intentionally, or unintentionally, might not always be accurate. Literally everyone is able to change the content (on Wikipedia for example) and potentially manipulate people's minds. At the same time there is also a lot of pirated content being uploaded onto the internet, undermining intellectual property laws. The author calls this a 'culture that endorses piracy and plagiarism'.

There will be attempts from companies to replace some of the IT systems by 'mash-up' software. However, some IT experts think such applications will just make the systems crash and they will return to standard applications. Thus IT workers feel that, for now, their jobs are safe.

In response to this criticism, other authors argue that there is no bubble; all the movement is driven by innovations and the number of internet users, both of which have crossed over the critical mass line. Companies may not yet be producing profits, they say, but the costs of running such platforms have decreased tremendously during the last decade; it is in fact easier to enter the IT business today than at any other time.

The response to the fear of online manipulation is that the mass of users will simply not allow it. An example of this was when there was an attempt to manipulate the Wikipedia pages about the Holocaust by radical extremists. Within minutes – before official editors had even realized what had happened – internet users deleted the fake content and corrected the page.

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5. Beyond Web 2.0 – future evolution of the internet

The next evolutionary step will have two main features: Semantic Web, which means that the internet will be able to understand the meaning behind data, and strengthening of front-end user applications, which will allow users to take complete responsibility for Web platform creation in addition to content creation.

The objective of the so-called Semantic Web is to extract meaning from data[51]. It is an extension of the existing Web in which information is given well-defined meaning, enabling computers and people to collaborate together more effectively.[52]

In practice this means that when you request information about, say, Michael Jordan, the Web will be able to work out whether you are searching for the former NBA star, the Senior Web Developer at Houghton Mifflin Company, or any other Michael Jordan. And it will not only list Web pages with information about him but will also offer a short compilation of verified data found.

This evolution will force changes in internet architecture, software applications and hardware devices and, yet again, in user behaviours and attitudes. Today changes are already emerging in software application, with RDF and OWL[53] replacing formats such as Micro formats or XML. Hardware devices will have to cope with better internet connectivity and higher transmission speeds. Internet architecture, meanwhile, will evolve from the current peer-to-peer networks to become more end-device centric.

A number of recent beta applications are believed to already be carrying some of the next generation functionalities. Among them is Radar Networks (www.radarnetworks.com), which proposes a new network that helps you organize, share and discover information around your interests. Another is Mahalo (www.mahalo.com), described as the world's first human-powered search engine, or Ghost (g.ho.st), a virtual desktop application that enables users to work with their data from every device as if they were using their own computer.

Which brings us to Web 3.0. Or does it? Tim O'Reilly argues that the majority of services presented as 'the way to 3.0' are merely further development and strengthening of the Web 2.0 platform and that we can't expect the arrival of Web 3.0 any time soon. He suggests that Web 2.0 was built on the back of the 2001 internet bubble crash: the strongest ideas with most potential survived and enabled the structural change of the internet we see today. Web 3.0, he argues, will be a similar huge change. It won't just be a natural evolution from Web 2.0 as many of those currently announcing new 3.0 platforms think; it will change our understanding of internet reality[54].

The widely accepted opinion about the future evolution of Web 2.0 is expressed by Business Consultant Stowe Boyd. *"Personally, I feel the vague lineaments of something beyond Web 2.0, and they involve some fairly radical steps"* he says. *"Imagine a Web without browsers. Imagine breaking away completely from the document metaphor, or a true blurring of application and information. That's what Web 3.0 will be. But I bet we will call it something else."*

Appendix A: Web 2.0 elements

Various applications are both making Web 2.0 a reality and allowing end-users to live their 2.0 experience

A.1   Blogs[57]

Blogs are personal Web diaries, where users can offer their ideas, experiences and opinions on any topic. A typical blog combines text, images, links to other blogs, websites or sources. Sound or video can also be added.

Blogs can become either thematic or general. Thematic blogs focus on specific areas or issues (sport, technology development, travelling or politics, for example). General ones are more like a daily diary in which the diarist can write about almost anything.

During 2006 corporate blogs became popular. Written by C level representatives of corporations about the corporation and its latest developments or hot issues, they helped to build interaction with potential customers.

The difference between a blog and a standard personal web-page is that users can update the content easily, directly from a browser, and so typing a blog becomes as easy as writing a normal document on a computer. Technorati (see box) currently counts around 112 million blogs worldwide with many more being added every day.

The world's most popular blogs

Technorati, which describes itself as 'the recognized authority on what's happening on the World Live Web, right now' tracks the most respected blogs globally. Currently, the best regarded (and most linked to) is technology and new media blog **www.engadget.com**. It is followed by **www.gizmondo.com**, a gadget guide, and by **www.boingboing.net**, which focuses on cultural curiosities and interesting technologies.

A number of spaces contain many active bloggers and blogposts. The oldest and most visited are **Blogger.com**, **Blog.com** and **livejournal.com**, with millions of users and tens of thousands of new posts every day.

Additionally there are specialized blogs, such as the invitation-only **scienceblogs.com**, where scientists meet and share high quality content with the public. For every one blogger there are, on average, 750 posts. Or there are **Jaiku** and **Twitter**, specialized forms of micro-blogs where users share short stories. These attract a high number of log-ins and posts.

Fotolog (www.fotolog.com), is not about written stories; here, pictures are uploaded. Blogging has similarly become a popular part of social networks. For example there are many active bloggers at **Windows Live Space** (spaces.msn.com).

While blogs written in local languages can attract a lot of interest, in most countries, international sites are still the most popular.

Blogs are usually advertisement-funded services. This usually involves advertisement banners placed in the individual websites. There may also be content advertisements from Google or local providers.

A.2   Collective intelligence – Wikis

Knowledge in the Web 2.0 environment is built directly by the users. Some of the most popular tools for building shared knowledge are so-called wikis. These are websites that allow the user to freely add and upgrade content directly from the Web browser. Wikis are often used as a source of common knowledge by a certain group, allowing members so increase their own understanding and share their learnings.

When a critical mass of participation is reached within a site or system, we can say that collective intelligence has been achieved. That is, there are enough participants monitoring a site's content to ensure that only valuable information is included.[58]

Examples

The most successful example of shared knowledge development, **Wikipedia** is an internet encyclopaedia written completely by users. In six years it has grown to become a trusted source of information. It contains more than 8.7 million articles, created by 75,000 active contributors writing in more than 250 different languages.

Wikipedia is funded by user donations and is free of advertisements and commercial content.

Although it is an online store, **Amazon** has developed into a highly respected public forum in which its users write reviews and offer a nought-to-five-star evaluations for books, CDs, toys and many other products. Not only are Amazon's directories respected but the opinions of a number of reviewers have themselves become trusted.

However, the reviews and evaluation activities are not a core activity. Amazon is an internet store whose business model is based on the sale of goods.

A.3   Digital content management (media sharing websites)

Sharing of videos and personal images has become one of the most popular parts of the Web. End-users share videos and images – personal or professional – with other end-users. The videos are watched, enjoyed (or not), rated and discussed. Podcasts operate on a similar basis except that they involve sound-only files uploaded onto the internet.

Examples

You Tube (www.youtube.com) is the most popular video sharing site in the world. Its users share and watch their own, or downloaded, videos, rate them and comment on them.

Flickr (www.flickr.com) is a portal for uploading, sharing and storing pictures. They can be kept private or shared with other users. Pictures can be rated, commented on and ranked.

PodcastAlley (www.podcastalley.com) is a Web portal where users can search for and listen to podcasts uploaded on the internet.

The business model of these providers is mainly advertising-based. Most of these services have been bought by big global brands such as Google and Yahoo, allowing them to capitalize on the opportunity to link these services with their own.

A.4   Social networks

Social networks are special applications that combine some of the elements mentioned above. Members of the networks choose who they wish to interact with. However, their choice is often based on one or more types of interdependency, such as values, friends and hobbies[59]. The groups are either general, where users share unsorted content, or focused on content reflecting a shared interest, a network of pet lovers, book lovers or wireless technology experts, for example.

> **Case study: social networking in Korea**
>
> Korea's **Cyworld** is a personalized community service. By tapping into consumers' needs to connect and express themselves, it has created a unique business model that does not rely on advertisements.
>
> Cyworld provides individuals with an online space called Mini Homepy (short for Homepage). They can then upload user-generated content, such as texts, photos and videos. Cyworld offers a simple platform and easy-to-use tools, as well as enabling users to create real relationships, but in cyber space, thanks to which it has successfully acquired and retained subscribers.
>
> The business model of the service is to generate revenues by selling digital items, such as an avatar or a form of decoration for the Mini Homepy, using a virtual currency (which can be exchanged for a real one). However, new business models, including advertising, are also being developed.
> Cyworld has 18 million users, almost a third of Korea's population, and is now expanding into China, Japan and USA.

A.5   Mash-ups

A mash-up is a Web application that combines data from more than one source into a single integrated tool. An example is the use of cartographic data from Google Maps to add location information to real estate data. This creates a new and distinct Web service that was not originally provided by either source[60]. At the moment the main portal allowing mash-ups is the social network Facebook. However, many others, including market leader MySpace, have announced that they are going to open their applications for external applications development.

A.6   Virtual worlds

A virtual world is an interactive simulated environment accessed by multiple users through an online interface. There are many different types of virtual worlds. However, all of them have six features in common: shared space, a graphical user interface, immediacy, interactivity, persistence, and socializing (or community)[61]. End-users live in the virtual worlds through 'avatars' – three dimensional representations of the user in the virtual world environment.

Virtual platforms can enable new consumer behaviours. For example, users play an active role in shaping their environment through 'co-creation'. Such virtual world dynamics could offer a way of finding out how people and businesses can interact to build economies based on user-generated content and services.[62]

A.7   Really Simple Syndication (RSS)[63]

RSS is perhaps the easiest of these items to define. The end-user receives a short message containing information with content he or she has previously defined. It is mostly used by internet news services such as news pages or blogs to notify users about articles that are newly published or that focus on selected topics of interest.

A.8   Tagging

Tags are one-word descriptors that can be assigned to bookmarks to help users organize and remember them. They are similar to keywords, but they are chosen by the user, and do not form a hierarchy. An author can assign as many tags to a bookmark as he or she likes and rename or delete them later, a much easier and more flexible process than fitting information into pre-defined categories or folders[64]. Tags can be added also to digital content: for example they can show a certain part of a photograph, or direct a user to a specific place in a podcast. Because they make it easier to locate the exact content a user is searching for tags can become a step towards the Semantic Web (see Chapter 5).

A.9   Peer-to-peer programs

Peer-to-peer programs involve the computer sharing part of its own transmission capacity, or certain content with other users in the same network. Often used for file sharing, communication, or data transmission, peer-to-peer programs have recently become popular among young users for sharing of content like music, or movies, or for communication using programs such as Windows Messenger or Skype[65].

> **Example: Skype Technologies**
>
> **Skype Technologies** was launched in 2003 as an alternative to classical landline and mobile phones. It enables users to make phone calls to each other, send messages or to chat online. Skype uses part of the connection capacity of every signed-in user to keep the system running.
>
> Skype's business model is based on generating revenues through premium services such as phone calls to and from landlines and mobile phones, cheap messaging, voicemail and call forwarding.

A.10   Widgets

Widgets (also called gadgets) are 'mini applications', simple bits of code dragged onto a desktop or pasted into a personal page, where they are constantly updated with any kind of information the user wants or approves. Widgets can be used to update Web pages with news sections downloaded from other sites, or simply to customize the user interface in whichever program the user is using. This is an important step in the development of Web 2.0: it means that users are taking ownership of the look of their interfaces[66].

Appendix B: Software technologies available to serve Web 2.0

Quality of service technologies

Service oriented architecture (SOA)
A software architecture model for building loosely coupled distributed systems. It typically refers to an intra-enterprise IT system and builds on Web services technologies and designs. A more recent set of standards has been adopted or proposed as a way to support the more complex requirements of these systems. These requirements include security, transactions and messaging. Collectively these are sometimes referred to as WS-.

XML
The Extensible Markup Language (XML) is a general-purpose mark-up language. It is classified as an extensible language because it allows its users to define their own tags. Its primary purpose is to facilitate the sharing of structured data across different information systems, particularly via the internet. It is used both to encode documents and to serialize data[67].

RSS
Really Simple Syndication (RSS) is an XML text-based data format containing a list of items, each typically with a title, summary, URL link and date (some additional data is optional). RSS, when published, is often referred to as a syndicated feed. Users subscribe to feeds using feed readers or aggregators that can be Web-based or desktop applications. Multiple versions of RSS exist.

Atom
A more recent XML-based data syndication format intended to provide greater structure and XML standards compliance than RSS.

Micro formats
A set of XHTML extensions for expressing greater semantic meaning within Web pages. Micro format standards exist for common concepts, including people, events and reviews.

Content generation technologies[68]

Flash[69]
Flash is the standard for delivering high-impact, rich Web content. Designs, animation and application user interfaces are deployed immediately across all browsers and platforms, attracting and engaging users with a rich Web experience. Flash is commonly used to create animation, advertisements and various Web page components, to integrate video into Web pages, and, more recently, to develop rich internet applications.

Ajax
Ajax is a set of techniques (which include Asynchronous JavaScript and XML) for creating richer and more responsive Web applications. It builds on standards and technologies that have matured over the Web's first decade, including XHTML and CSS, the Document Object Model (DOM), XML and XSLT, as well as JavaScript. Ajax techniques can reduce or eliminate the slow click-and-wait interactions that characterized earlier generations of Web applications.

Apollo
Apollo is an operational system-independent runtime that allows developers to build desktop applications by using both Flash and Ajax. It is still being developed by Adobe labs.

Appendix C: Examples of corporate involvement in Web 2.0

Internal communication and collaboration methods

Employee behaviours are changing. There is no longer a great difference between work and personal life and as a consequence an increasing amount of home and distance workers. This increases the need for virtual social interactions inside corporations. Web 2.0 offers an effective platform for facilitating these interactions. A corporation can now create its own platform to do all this or capitalize on existing social networks, such as Facebook, where various teams can have their own groups (for work planning and execution) and all groups together are part of the bigger corporate group.

Giving everybody in the organization the chance to participate and contribute their own knowledge could bring tangible benefits. For example, that collected knowledge could be turned into business ideas for a given area such as R&D, marketing or corporate strategy.

> ### NASA: driving research through a virtual world
>
> America's **NASA** has built a virtual 3D centre where people can meet and collaborate and, as a result, boost NASA's research efforts. NASA already connects 37,000 end-users from inside and outside the organization. This is bringing such benefits as better social relationships among the members, the introduction of new ideas coming in, and a decreased need for physical presence. NASA's virtual environment increases its effectiveness by making use of wikis, blogs, mash-ups and social information tagging.
>
> *(Kash: Agencies advance use of online social networking tools, GCN – Government Computer News; Nov 1st 2007, at www.gcn.com)*

External communication

Web 2.0 provides an opportunity to combine one of the traditional uses of the internet (offering or selling products to a customer) with a new approach. Rich internet Web services now allow corporations to transmit to customers not only product information but experience and emotions.

The features of Web 2.0-adapted corporate and product Web presentations are expanding. We can expect them eventually to include such features as free demo versions; free trials or promotional packages; the chance to connect with like-minded people, to share experiences of products or to rank products; all information stored in one place; and interactive applications that can attract and influence customer opinions and responses.

Field service applications

Field service is the sort area that has been crying out for Web 2.0 technologies. Web 2.0 can help to meet its need for a rich user experience, performance and high functionality, as well as the capability to deal with network interruptions.[70]

Customer relationship building

Corporations today have the opportunity to interact with their customers for many more purposes than just selling products. They could, for example, get the opinions of a target audience, build brand awareness or just get feedback directly from the market. By taking part in the social networking environment, a corporation can more easily communicate its own corporate culture and built up brand awareness among like-minded people in the network. It can do this directly, through its corporate Web pages, by participating in the social environment or through interactive elements in the Web portals used by its target audience.

> **Nike's approach to new consumers**
>
> **Nike+** is a social networking Web portal created for people who enjoy running and socializing with others who run. A small sensor in their shoes monitors their running performance. The results can be stored on an Apple iPod and then uploaded to the portal. This allows them to check their own progress or compare results with friends. At the same time they will get training advice and useful information. Thanks to Nike+ many reluctant athletes have started running regularly. And of course the portal also serves as a useful brand and recognition building tool.
>
> Nike also runs a 'Nike Running Club'. Three times a week the company organizes a guided run through Central Park in New York. Runners can join free of charge and get professional support and supervision. There are no conditions or payments. However, it has proved a very effective way to build loyalty. Although not required to do so, many runners wear Nike shirts and shoes, acting, in effect, like walking advertisements.
>
> Nike is gradually cutting back on its presence in traditional media and moving into digital media. Its advertisements now appear on YouTube and other media sharing portals, helping it to attract consumers by word of mouth.
>
> *(From: Story L.: The New Advertising Outlet: Your Life; The New York Times; Oct. 14th 2007; http://www.nytimes.com/)*

Application modernization[71]

The Web has been with us for ten years. However, the majority of business applications are still based on Client/Server or mainframe. These applications are expensive to maintain and support due to their architectural limitations. The lack of robust support for the rich user experience and complex functionality of the Web previously prevented such applications from leveraging its power. Now RIA (Rich Internet Applications) technologies have removed this barrier, making it possible to modernize these heavy and expensive desktop applications in ways that make them better able to work with the Web. Various integration initiatives as well as adoption of SOA make application modernization a natural next step.

Currency trading via the Web

In 2004, one of the top five banks in the world created a strategic initiative to offer a sophisticated currency trading service to customers over the Web. By leveraging Web 2.0 technologies, its Foreign Exchange (Forex) application is accessible anywhere from a standard browser while delivering the rich user experience of a typical trading desk. The application contains over 1000 screens and integrates with over 120 back-end systems. It is used by more than 10,000 corporate customers over the Web, significantly increasing customer satisfaction as well as reducing call centre volume by 70 per cent.

Call centre consolidation[72]

Call centres are another area ripe for Web 2.0 solutions. Most call centres run on heavy desktop applications that require features and functionality beyond that which Web 1.0 can deliver. Web 2.0 not only makes it possible to run such applications over the Web, but also makes it possible for end-user self-service, which could dramatically reduce call volumes.

Appendix D: Environment for Web 2.0

The environment in which Web 2.0 operates is created both by organizations that have a direct impact on the development of Web 2.0 and by technologies that deliver the online experience for users.

However, the Web 2.0 would not exist without an environment in which users can have their online experiences. This environment consists of software applications, internet connection points, technologies, hardware and other elements. Together they enable Web 2.0 to fulfil its own mission of human interaction.

This environment has its own ecosystem. This ecosystem consists mainly of content creators such as Yahoo, Google and Facebook; technology providers such as Orange, Microsoft, Alcatel-Lucent, Cisco, Nokia and Ericsson; consultants and system integrators such as Alcatel-Lucent and Cisco; and other influencers such as national telecommunication market regulators and local moral authorities. These groups include sub-categories, described below.

The enabling environment for Web 2.0

Source: Alcatel-Lucent
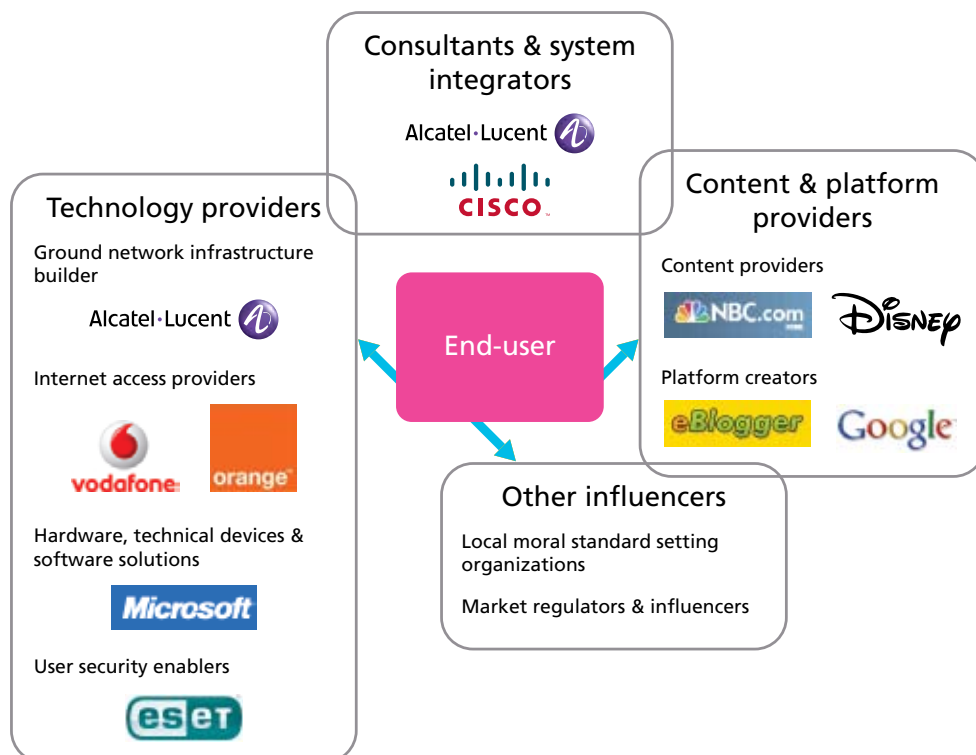
Content and platform providers

Companies in the sector are the main interfaces with the end-user. They create a platform – the user interface with a preliminary set of functions available to the end-user – and content – applications which the user can use, watch, hear or read.

Platform providers are influential. They determine the future direction of Web 2.0 developments; they address and forecast new trends and changing user behaviours; and they provide solutions to suit these developments, trends and behaviours.

Content providers

These participants provide and place content into the user interface. There are currently two main content providers: media and other users. Both traditional and new media contribute by making archive content (newspapers, archives or old movies, say) available online. Users contribute through the provision of text, sound and image (such as pictures, videos, articles and podcasts).

Platform creators

Companies in this group create the platform that stores all the content and allows users to view it. They include companies running social networks such as MySpace, LinkedIn and Facebook; search firms such as Google and Yahoo; virtual worlds such as SecondLife and World of Warcraft; digital content storage spaces such as YouTube and Flickr; and others such as blog sites or collective intelligence spaces.

Within the 'others' category we can also put dramatic innovations about to gain critical mass, or hybrid applications of platforms already described. The sort of small, innovative company that makes a success of such approaches usually ends up being integrated with a bigger player, or indeed becomes one itself.

Technology providers

Companies in this sector give end-users tools for connecting to the online environment and working there effectively – tools, in short, that enable them to live the online experience.

Internet access providers

Internet access providers are main enablers, in the sense that they provide end-users with the opportunity to connect to the whole network and capitalize on the benefits the network provides them.

Internet access providers create the technical background for the existence of Web 2.0 by increasing the footprint of connection points globally. They also improve the quality and accessibility of connections for end-users and set up new technical standards with the aim of developing faster and more reliable connections (see Appendix B).

Ground network infrastructure builders

Telecommunication service providers would not be able to provide quality access to the internet, were there not a basic backbone communication infrastructure distributed across countries via cable, wireless or satellite.

The capacity and connectivity of this basic technology infrastructure is one of the main drivers of Web 2.0's success. In some cases internet access providers will take over the role of building the main basic infrastructure, thus allowing them more easily to capitalize on emerging business opportunities.

Hardware, technical devices and software producers

These companies enable the individual end-users to connect to the internet and create content there. Hardware and technical device producers provide the tools that allow a user to connect. Software producers provide access and the ability to create and change content, which is then uploaded to the internet.

User security enablers

Viruses, data fraud, personal data misuse and identity fraud are big concerns for all the groups mentioned above – and of course for their customers. User security enablers therefore play a unique role in the development of Web 2.0: their products have to build the trust of the end-users in the security of the system, be that anti-virus prevention, secure data transfer, or control over content stored online. This makes security enablers in the online environment more than just software providers; they are unique elements working both with the end-user and with content platform providers.

Consultants and system integrators

This group ties together all the other groups, thereby enhancing the experience of the end-user. Members of this group provide systems design, technology development and consultancy, helping both users and organizations to get the most out of their virtual experience.

Consultants and system integrators can support content and platform providers as well as technology providers. They do this by working with tools that ensure not only that the applications run but that they are stable as well as profitable.

Other influencers

Local moral standard-setting organizations

Web 2.0 would not be possible without its users. Thus local moral standards defined by moral authorities, such as the church, local politicians or teachers, can be influential. Some of these authorities might declare Web 2.0 applications a threat to its users and use their powers to stop those users accessing some or all internet-based applications. At the moment, this tends to apply mainly to social networking: there are already examples from some UK schools, which are denying access on school computers to certain sites such as Facebook and advising parents to do the same, based on concerns about its use. However, it is also possible that these authorities could become driving forces for the further development of Web 2.0, or even further evolution of the system.

Market regulators and influencers

And finally we should mention the influence of market regulators on the creation of the Web 2.0 environment. They might be extremely strong in some countries, where, for example, access to certain content is completely denied to inhabitants. However, in almost every country certain content is regulated, denied completely, or only accessible under certain conditions and registrations (such as adult-only content).

About the authors

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Simon is currently Director, Demand Creation, Business Strategy and Marketing, Europe North West Marketing. Prior to this he was Head of Customer Marketing within Lucent Technologies Europe with overall responsibility for driving new market and strategic opportunities, specifically in the area of converged technologies and applications.

Simon joined Lucent Technologies in 1998 and has held various management posts in the areas of Market Development, Strategy and Product Management. Before this he was with Ericsson where his key responsibility centred around leading the development of applications which could break new ground in the emerging UK wireless marketplace. Before joining Ericsson, Simon spent four years working for IBM Network Systems in Italy as a Senior Development Manager in the area of Network Management. He started his career in 1987 working for GEC Telecom as a Software Engineer.

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Before joining Alcatel-Lucent in 2007, Juraj held several leadership roles in the world biggest student-run organization, AIESEC, managing and leading its international internship programs in national branches in the Slovak Republic, Finland and Colombia. He also has experience in the fields of training and development and sales management.

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Notes

1   From: http://business.timesonline.co.uk/tol/business/industry_sectors/media/article2988002.ece and Alcatel-Lucent estimates

2   Internet World Stats organization, November 2007 and Alcatel-Lucent estimates

3   From IDC and EMS research reported in Data explosion to result in zettabytes by 2011 (http://it-online.co.za/content/view/240334/142/)

4   Mass collaboration was first described as 'the wisdom of the crowd' by James Surowiecky, the New York Times columnist. (Surowicky J.: The Wisdom of Crowds, Why the Many are Smarter Than the Few; 320 pages, Abacus, 2005; ISBN: 0349116059

5   Musser J., O'Reilly T. and collective, Web 2.0 Principles and Best practices, O'Reilly Media Inc., 2007, ISBN-10: 0-596-52769-1, page 10

6   From Tom O'Reilly key note, in Mathews D.: Internet Is the Platform, Web 2.0 Founder Says; PCmag.com; Apr 24th 2008; http://www.pcmag.com/print_article2/0,1217,a per cent253D226869,00.asp

7   For example, membership of social networking services is expected to more than double between 2006 and 2008, from 145 million to 328 million. (Source Datamonitor: The Outlook for Social Networks (Market Focus))

8   Hinchcliffe D., The state of Enterprise 2.0, Oct. 22nd 2007 at http://blogs.zdnet.com/Hinchcliffe

9   Kash W. Agencies advance use of online social networking tools, Nov 1st 2007, at www.gcn.com

10 SaaS (Software as a Service) is a software application delivery model where a software vendor develops a Web-native software application and hosts and operates (either independently or through a third party) the application for use by its customers over the internet.

11 Wei C.: What Does Web 2.0 Mean to Enterprises?; Aug 11th 2006; www.coachwei.com/blog/_archives/2006/8/11/2222946.html

12 A peer-to-peer (or P2P) computer network uses diverse connectivity between participants in a network and the cumulative bandwidth of network participants rather than conventional centralized resources where a relatively low number of servers provide the core value to a service or application (Wikipedia).

13 For the first time ever, 16-24 year olds are now accessing the internet more frequently than they are watching TV: 82 per cent of this younger demographic use the internet between five and seven days each week, while only 77 per cent watch as regularly (a decrease of five per cent since 2006) (from: Shifting traditions, Internet rivaling TV in media consumption stakes, EIAA, 2007)

14 For example the Encyclopaedia Brittanica has, over a few hundred years, created about 120,000 articles. The English version of the free online encyclopaedia Wikipedia passed the 2.3 million mark in only five years.

15 From: Broadband revenues hits $113 billion at http://www.Internetnews.com/xSP/article.php/3628096; Alcatel-Lucent estimates

16 This statistic counts revenues coming from various internet connection types, such as dial-up, as well as broadband connection.

17 Internet World Stats organization, November 2007, Alcatel-Lucent estimates

18 The current internet population equates to approximately 18.9 per cent of the global population. Internet penetration in the majority of developed countries has reached more than 60 per cent of the total population. Since 2000 the amount of internet users grew by 144 per cent globally, with growth led mainly by emerging market countries such as China, India and Brazil. Based on an average growth of 20 per cent in users per year, the internet population will reach 3.1 billion users in 2012, representing 45 per cent of the predicted global population.

19 From: Shifting traditions, Internet rivaling TV in media consumption stakes, EIAA, 2007

20 There are already many examples of internet providers developing content platforms (such as Orangeportal.co.uk, or T-City) and trying to bundle internet access, content and some of their other services (such as digital TV, movies on demand, legal music and others). A standard triple play model includes a phone line, internet connection and digital TV. This is a reaction to increasing competition and price pressure from other service providers. Voice is also decreasing as a share of service providers' revenues – from 83 per cent in 2006 to expected 76 per cent in 2010 (Pyramid Research).

21 The online advertising market is expected to reach $44.6 billion in 2008 and grow to $73 billion. in 2012 (source: http://business.timesonline.co.uk/tol/business/industry_sectors/media/article2988002.ece; Alcatel-Lucent estimates)

22 Google press release

23 Stutzman F.; Selling Social Networks; 10.2.2006; From: http://chimprawk.blogspot.com/2006/10/selling-social-networks.html

24 Members hold an active account on a social networking service.

25 From: The Outlook for Social Networks (Market Focus), Datamonitor, Published 09/2007, pages:2, 4

26 From: Shifting traditions: Internet rivaling TV in media consumption stakes, EIAA, 2007

27 It is expected that by 2011, 84 per cent of young internet users between 12 and 17 in US will visit a social networking site at least once a month. (Source: Barlas P., MySpace Not A Winning Ad Space, Investor's Business Daily, April 9th, 2008)

28 From: Shifting traditions: Internet rivaling TV in media consumption stakes, EIAA, 2007

29 Based on: Carter M.; Are you in the mood?; The Guardian; 10.7.2000 Thornhill J.; The new consumer is always right; Financial Times; 21.8.2000

30 For example, if for a local radio station the critical mass of listeners is 30,000 consumers, a radio station focusing on techno music might find its critical mass audience in a big city like London. In Swindon, with 130,000 inhabitants, however techno lovers are a small niche segment. Broadcasting to techno lovers on internet radio, however, eliminates this difference as people can be reached wherever they live, at no additional cost.

31 For example, computer capacity in Australia used during their night by European research centres during their day – and vice versa.

32 Based on Bell S., Letting the riff-raff in, CIO New Zealand, Oct. 18th 2007, at http://cio.co.nz/cio.nsf/tech/8917B75 300FBA159CC25737600243F20?Opendocument&HighLight=2,Letting,the,riff-raff,in

33 From: http://business.timesonline.co.uk/tol/business/industry_sectors/media/article2988002.ece and Alcatel-Lucent estimates

34 Social networking services are still struggling to define a profitable business model and to attract a bigger share of online advertising. Mainly thanks to their huge, regular user bases and the amount of time users spend visiting their portals, the revenues of these services (the vast majority of which come from advertising) are expected to reach $1.43 billion in 2008 and grow to $2.43 billion in 2012 (The Outlook for Social Networks (Market Focus); Datamonitor; 09/2007). However, more innovative approaches to advertising could help them to outstrip these expectations.

35 For example, the Facebook application 'FriendsFinder' suggests, based on your existing network, people whom you may know and want to add as your 'friends'. This application has a fairly high success rate. If this is possible with personal networks, one can expect advertisers to find the way to adapt it to consumer products.

36 CPM means Cost per Thousand (M here is the Roman numeral for 1000)

37 From: Hannan, Seeking Aplha; Advertisers Contemplate the Personal CPM; March 24; http://seekingaplha.com/article/69639-advertisers-contemplate-the-personal-cpm

38 Based on: Ayeres I: Super crunchers: How anything can be predicted, John Murrays, 2007

39 For example, a day's worth of YouTube video streams uses about as much bandwith as the entire internet used back in 2000. (source: Westminster eForum).

40 From IDC and EMS research in: Data explosion to result in zettabytes by 2011; http://it-online.co.za/content/view/240334/142/

41 From: Donoghue A; Internet gridlock to occur in just two years; ZDNet UK, Apr. 21st 2008; www.zdnet.com.au

42 4G is an abbreviation for Fourth Generation Communications System, a term used to describe the next step in wireless communications. A 4G system will be able to provide a comprehensive IP solution where voice, data and streamed multimedia can be given to users on an 'anytime, anywhere' basis, and at higher data rates than previous generations (http://en.wikipedia.org/wiki/4G). 4G technologies include: LTE, UMB, 802.20,Wimax and HSPA+ (What Does the Future of 4G Wireless Have In Store?; www.3g.co.uk)

43 Web 2.0 technologies analyzed: blogs, mash-ups, podcasting, RSS, social networking, widgets and wikis

44 Based on Forrester's research study, Global Enterprise Web 2.0 Market Forecast: 2007 To 2013 in Lynch C.G.; Forrester: Consolidated Web 2.0 Market to Reach $4.6 Billion by 2013; Apr 21st. 2008; www.cio.com

45 An application programming interface (API) is a set of declarations of the functions (or procedures) that an operating system, library or service provides to support requests made by computer programs (www.wikipedia.org)

46 Bughin J., Van Dijk M., Schellekens M., Second Life: Will Virtual Worlds become 'real'?; McKinsey;

47 From: 2007 McKinsey survey on Internet Technologies, McKinsey Quarterly.

48 MacManus R., Understanding Mobile 2.0, Read/Write Web at http://www.readwriteweb.com/archives/understanding_mobile_2.php

49 Based on Juniper Research data. In: Quintana Pearce J.: Mobile TV To Be the Biggest As Revenue Generator By 2010: Report; 15.4.2008; http://www.washingtonpost.com

50 MacManus R., Understanding Mobile 2.0, Read/Write Web at http://www.readwriteweb.com/archives/understanding_mobile_2.php

51 From: Jaokar A., Beyond Web 2.0: The social Web or the semantic Web? and the rise of the Umbrella social networks, October 26, 2007 in: Open Gardens Blog, http://opengardensblog.futuretext.com/,

52 From: Berners-Lee T., Hendler J., Lassila O., The Semantic Web – A new form of Web content that is meaningful to computers will unleash a revolution of new possibilities, In Scientific American, May 2001 issue, http://www.sciam.com/article.cfm?articleID=00048144-10D2-1C70-84A9809EC588EF21

53 RDF: Resource Description Framework; OWL: Web Ontology Language

54 From: http://radar.oreilly.com/archives/2007/10/todays-web-30-nonsense-blogsto.html

55 In Boyd S., Jason Calacanis on Web 3.0, /message, October 4th 2007, in: http://www.stoweboyd.com/message/2007/10/jason-calacanis.html

56 Keen A.; The Cult of Amateur: How today's internet is killing our culture; Doubleday Business; 240 pages, ISBN: 978-0385520805

57 Built based on Wikipedia (http://en.wikipedia.org/wiki/Blogs) and Jensen M. Emerging Alternatives – A Brief History of Weblogs, Issue 5, 2007 at http://cjrarchives.org/issues/2003/5/blog-jensen.asp?printerfriendly=yes

58 Elements of Web 2.0 Style-Content, Blog of Collective Intelligence, November 25, 2006 at: http://www.community-intelligence.com/blogs/public/

59 Based on Wikipedia, http://en.wikipedia.org/wiki/Social_network

60 From Wikipedia; http://en.wikipedia.org/wiki/Mashup_ per cent28web_application_hybrid per cent29

61 At: http://www.virtualworldsreview.com/info/whatis.shtml

62 Bughin J., Van Dijk M., Schellekens M., Second Life: Will Virtual Worlds become 'real'?; McKinsey;

63 Prepared based on http://www.faganfinder.com/search/rss.php#what and O'Reilly T., Web 2.0 – Principles and Best Practices, O'Reilly Media 2007, ISBN-10:0-596-52769-1

64 Prepared based on http://del.icio.us/help/tags

65 Prepared based on http://en.wikipedia.org/wiki/Peer-to-peer

66 Braiker B., The Year of the Widget Newsweek, Oct. 15, 2007, at:http://www.newsweek.com/id/44320/output/print

67 From http://en.wikipedia.org/wiki/XML

68 Unless otherwise indicated, the source for the definition is: O'Reilly T.: Web 2.0 Principles and Best Practices, O'Reilly Media Inc., 2007, pages 90-93, ISBN-13: 978-0-596-52769-3

69 From http://en.wikipedia.org/wiki/Adobe_Flash and http://www.macromedia.com/software/flash/about/

70 Wei C.; What Does Web 2.0 Mean to Enterprises?; Blog – Direct from Web 2.0; August 11th, 2006; at: http://www.coachwei.com/blog/_archives/2006/8/11/2222946.html

71 See reference 70

72 See reference 70

Acronyms

3D	Three dimensional
3G	Third generation service
API	Application Programming Interface
ARPU	Average revenue per user
B2B	Business-to-business
CPM	Cost per thousand (M signifies the Roman numeral 'thousand')
CSS	Cascading style sheet
HSDPA	High-speed Downlink Packet Access
IP	Internet Protocol
P2P	Peer-to-peer
R&D	Research and development
RIA	Rich internet applications
RSS	Really Simple Syndication
SaaS	Software as a Service
SOA	Service Oriented Architecture
WBA	Wireless Broadband Access
UMTS	Universal Mobile Telecommunication System
XML	Extensible Markup Language
XSLT	Extensible Stylesheet Language Transformations