WEB 2.0 AND ITS IMPLICATIONS FOR BUSINESS

WITH CASE STUDIES FROM GERMANY AND NEW ZEALAND

by

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List of Abbreviations

Ad	Advertisement
API	Application Programming Interface
Applet	Small application coded to function with a larger application
Apps	Applications
BERG	Business Expenditure on Research and Development
Blog	Weblog
CeBIT	Centrum der Büro- und Informationstechnik
	(German for 'Centre of Office and Information technology')
GDP	Gross Domestic Product
GERD	Country's Gross Expenditure on Research and Development
IBM Lab	IBM Development Laboratory Böblingen
IT	Information Technology
MTC	Mobile telephone company
OECD	Organisation for Economic Co-operation and Development
R&D	Research and Development
RIA	Rich Internet Application
RDF	Resource Description Framework
RSS 2.0	Really Simple Syndication
SaaS	Software-as-a-Service
SBN	Sustainable Business Network
SOA	Service Oriented Architecture
TIME	Telecommunications, Information Technology, Media and Entertainment

Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Victoria Tschirch

Abstract

In 2004 the phenomenon Web 2.0 becomes popular – a mindset change takes place in which 'You' – the Internet users – are voted person of the year 2006 by TIME magazine ("Collective intelligence - The vision", 2008; Grossman, 2006). It is not so much about the technology as it is about the people who use social networks to their advantage. Web 2.0 is a social Web that embraces technologies like AJAX; applications such as wikis, blogs and podcasts; concepts like the wisdoms of crowds, open source, tagging, Software–as-a-Service, the Long Tail, the Perpetual Beta, syndications and mashups; and furthermore is known for its intentional lack of traditional hierarchies by favouring folksonomies. For the economic world the question arises of how businesses can make use of such development that promises both innovation and collective intelligence.

This dissertation presents a connection between Web 2.0 and businesses first by explaining the Web 2.0 phenomenon and second by presenting available Web 2.0 tools and concepts in the business context, known as Enterprise 2.0.

Four case studies – two from Germany and two from New Zealand – show current adoptions of Enterprise 2.0, a term that might not last but some of whose issues might be placed under the category of social media or a mixture between artificial and collective intelligence in the future.

Assessment of relevant literature and interviews with practitioners reveal that serious efforts of employing Web 2.0 in a business context within the TIME segment – telecommunications, information technology, media and entertainment – are present and that quite a vast potential is yet unexplored. Moreover businesses bear much more responsibility in comparison to consumers in terms of maintaining a competitive status, keeping data safe and dealing with reputation issues of the organisation they work for. The approaches towards Web 2.0 in a business sphere need to be different from those of the social sphere, yet the underlying ideas and visions remain similar. Findings of the conducted research suggest that Enterprise 2.0 progress is seemingly slow in comparison to Web 2.0. In return, Enterprise 2.0 solutions are commonly more mature than the ones known from the social sphere.

1. Introduction

Thanks to academics and professionals, there will always be a plethora of terms to describe a development that is groundbreaking and promises a chain of reactions that improve our lives. After time, a single term predominates, representing an innovation, a mindset change or even a whole era. Web 2.0 is such a term.

Web 2.0 is a phenomenon in the overall evolution of the World Wide Web (Hodgkinson, 2007a; D. Mitchell, 2007; White, 2007; Yakovlev, 2007) that is sometimes considered to be a marketing phrase (Tarcsi, 2007; White, 2007), sometimes a version of the World Wide Web (Lane & Smith, 2008), often a mindset change or philosophy (Iliyev, Choi, & Kim, 2008; Schroth & Janner, 2007), or overall shares the same characteristics as the phrase 'social media' (Cook, 2008). All of the above perspectives have some relevance, although the phrase Web 2.0 itself is rather unfortunate as it erroneously suggests the existence of various versions of the World Wide Web. However, the term version is occasionally used throughout the dissertation in order to differentiate it from the traditional Web known from the 1990s.

In many ways, the phrase Web 2.0 is a hype-creating marketing label that encompasses social networking tools and concepts. As MIKROYANNIDIS notes:

> "Web 2.0 is increasingly gaining ground despite its unsophisticated nature or, more likely, because of it" (Mikroyannidis, 2007, p. 113).

At the same time Web 2.0 resembles a mindset change within the evolution of the Web because it provokes changes in attitude towards the use of this technology: These changes cause Internet users to connect more efficiently, to collaborate more easily and to overall share more input via the Internet. In other words, the simple design and functions of Web 2.0 tools and its openness facilitate increased participation and collaboration that benefits the network as a whole – it therefore enriches four factors in the ongoing evolution of the Web: simplicity, openness, collaboration and network effects.

Simplicity is a major advantage of Web 2.0 because it integrates non-Web-experts who can easily share and contribute information. In parts, however, Web 2.0's praised simplicity remains theory.

> "Simplicity is important so that common people, not just experts, can build and use the Web" (Lin, 2007, p. 101).

In practice, there is a lack of deep understanding of potential threats and a myriad of Web 2.0 tools that need to be selected wisely. As a consequence of such diversity forward and backward as well as a general compatibility efforts of software applications become yet even more important.

Openness is a crucial factor of Web 2.0 – without it, concepts like tagging, syndications and communities of trust would function to deliver collective knowledge.

> "The concepts of openness, cooperation, and 'mashing up' what we have to work with are what is fueling the Web 2.0 movement. The overall philosophy has changed from one of information silos and walled gardens to one of producing something really good and then sharing it" (Lane & Smith, 2008, p. 268).

Collaboration is enriched through the ease of sharing pictures, experiences, documents and other data, as well as the ability to communicate synchronously online. As a consequence of Web 2.0's advantages for collaboration, it is commonly placed in context with innovation and collective intelligence ("Enterprise 2.0 in Germany - Prevalence, opportunities and challenges", 2007; Gibson, 2008; Hodgkinson, 2007c).

> "It is all about collaboration, social networking, and realizing the opportunities of collective intelligence – the average minds of the many working together are greater than the expert minds of the few" (Gibson, 2008, p. 332).

"Enterprise 2.0 technologies are subject to *network effects"* (McAfee, 2006, p. 26). MCAFEE draws attention to the fact that an organisation that grows in size does not necessarily have to witness a loss in information resource efficiency – more people that author and tag are capable of building an intuitively structured information resource in which important information is unlikely to perish. In addition Cannon points out that "networks increase the speed and power of prejudices" (Cannon & Malone, 2007, p. 29), therefore netiquette is important.

> "In Web 2.0, managing combinations of online network effects is key to competitive success" (Shuen, 2008, p. 41).

Together, these four factors represent conditions that makes Web 2.0 attractive for business use, and that is therefore explored in the dissertation .

1.1 Aim of the Dissertation

Web 2.0, or Social Web as it is called, is developing with an enormous speed and, with the further association of ideas from the Semantic Web, for example, there are opportunities to benefit from collective intelligence. The status quo encourages users and academics to participate, research and test community platforms as well as to acquire knowledge on the concepts and functionalities of Web services to better understand the processes of collective intelligence.

The dissertation has several aims. The first aim is to explain Web 2.0's micro environment with its architecture, characteristics and applications. The second aim is to examine Web 2.0's macro environment with current examples of Web 2.0 implementations in organisations. More specifically, Web 2.0 in businesses is called Enterprise 2.0, and is not developing as fast as the Web 2.0 movement outside of the corporate community. However, the implementation of selected Enterprise 2.0 components or, as TAPSCOTT and WILLIAMS (2006) say, the way how businesses address peer production will be essential for the survival of some businesses in the long run and therefore are a focus of the research.

For the business world, the question thus arises of how businesses can make use of Web 2.0 developments that promise both innovation and collective intelligence. Thus the two research questions forming the basis of this study are:

1. *What is the significance of Web 2.0 as a social phenomenon and for businesses?*
2. *Are technologies and methods of Web 2.0's social sphere different from those of its business sphere and if yes, how do they differ?*

Literature on Web 2.0 is flourishing, especially with respect to publications throughout the years 2007 and 2008. However, certain areas of the topic, for example Web 2.0 related concepts and Web 2.0 potential for businesses, are still controversial so that discussions are kept alive and knowledge on Web 2.0 and Enterprise 2.0 continuously increases. The dissertation finds its third aim in delivering a notion for associating Web 2.0 tools with appropriate tasks so as to widen the scope of awareness for Web 2.0 potentials from a business perspective.

This dissertation relates mainly to two groups of readers. First, it will be of interest to thinkers and commentators in the fields of social media, social behaviour and knowledge management. Second, it is relevant for any executive and entrepreneur that is either interested in current trends regards Enterprise 2.0 or is seeking for answers of how to utilise Enterprise 2.0 components in the workplace.

1.2 Structure of the Dissertation

The dissertation has nine chapters. Chapter 1 introduces the topic of Web 2.0 and explains the purpose and structure of the dissertation. Chapters 2, 3 and 4 explain the Web 2.0 phenomenon from a social point of view. More specifically, Chapter 2 deals with a rather technological perspective on Web 2.0 by examining its architecture and security issues. Chapter 3 reviews Web 2.0 related concepts and Chapter 4 summarises the social media landscape as well as overviews common Web 2.0 applications or so called Web services. Chapter 5 provides insights into the potential of Web 2.0 by contextualising it with the Semantic Web, explaining existing and expected paradigm shifts, while also addressing accompanying issues. The chapter also acts as a transition to explaining the Web 2.0 phenomenon from a business point of view throughout the remaining chapters. Chapter 6 focuses on businesses by explaining and discussing Enterprise 2.0. Chapter 7 outlines the method of how interviews with professionals were conducted in order to explore the business point of view on the evolution of Web 2.0. Chapter 8 analyses the different interviews, distinguishing between two case studies from Germany and two from New Zealand, and discusses the key findings of the conducted interviews. Chapter 9 provides a conclusion on Web 2.0 with its implications for business, discusses the contribution and limitations of the research, and suggests areas for future research.

1.3 Definition of Web 2.0

The term Web 2.0 has already been described in a myriad of ways which explains the many synonyms like 'wisdom Web', 'people-centric Web', 'participative Web', 'read/write Web' and so on (Murugesan, 2007). However, a definite, universally accepted definition does not exist yet. Michael Sutton, a Hewlett-Packard security evangelist, was quoted by LAWTON saying that

> "Web 2.0 is basically a new way to use existing Internet technologies – such as XML and JavaScript – to enable participation, interaction, and collaboration among users, content providers, and businesses, rather than just the traditional viewing of static Web pages" (Lawton, 2007, p. 13).

It is not as easy as to say Web 2.0 is everything like wikis, blogs and podcasts – those are elements of social computing. It is much more than a vague compilation of popular social computing elements or buzzwords. Web 2.0 influences user behaviour regards the sharing of information and knowledge, browser and application usability and website designs. MURUGESAN gets to the heart of Web 2.0 when he says:

> "Web 2.0 is both a usage and a technology paradigm. It's a collection of technologies, business strategies, and social trends. Web 2.0 is more dynamic and interactive than its predecessor, Web 1.0, letting users both access content from a Web site and contribute to it" (2007, p. 34).

Hence, when researching Web 2.0 it can either be from a technological point of view or from a social behaviour point of view, although the literature generally combines the two perspectives in order to enable a proper explanation of the phenomenon with its causes and effects.

Picking a suitable definition on Web 2.0 is almost a question of taste and also depends on the observer's background and attitude towards Web 2.0. In the end Web 2.0 is undisputedly best understood through practice and utilisation. It deeply influences Internet users' approaches to how they organise themselves, how they keep in touch with other users, how they manage their commercial affairs and, last but not least, how they discover the answers they are seeking to find.

The attempt to define Web 2.0 in one's own words brings forth the following definition: *Web 2.0 envisions collective intelligence through open structures, advances Web usability through semantics and folksonomies and provides non-Web-experts with the tools to express themselves, self-manage and collaborate extensively online so that a snowball effect takes place in which the contribution of many benefits many.*

2. Web 2.0 Framework

This chapter focuses on the framework of Web 2.0. It is only by understanding the different aspects to Web 2.0 and their interrelatedness to each other, that the reasons for Web 2.0's consistent growth are comprehensible. The framework includes technological aspects that advance social dispersion and acceptance of Web 2.0 tools. Then again Web 2.0 tools and concepts become more and more interesting to businesses due to their potential to allow capitalising on a new generation of content, even knowledge.

The framework also inspires rethinking regards software architecture. From a social as well as business perspective, Web services suggest an alternative to the purchase of expensive software packages. Service-Oriented Architecture (SOA) proposes a concept that promises cost savings and simplified service maintenance from an IT perspective in this context.

Last but not least, security issues are discussed since they are based on framework aspects. Ironically some of Web 2.0's main advantages also constitute security problems to some extent.

Figure 1

Web 2.0 Framework

Technology Models	Social Models
Writable & recombinant web · Internet as ubiquitous platform · AJAX, Flash · Shift from desktop to Webtop · Open development platforms: SOA, mashups · Open Source	**Social networking** · Web as a ubiquituous resource · Me-Media · User pull by search and RSS · Network edge vs. centre · Participation, interaction, sharing · Use grows with use
Content + social input = structure · User generated · Emergent structure via tagging & folksonomies · Videos, music, animation · Intellectual property?	**Content as bait, not product** · Wait to be 'googled' · Network focus · Advertising · Software-as-a-Service · Architecture of exploitation?
Content Models	**Business Models**

Note. Source: Hodgkinson (2007c).

Figure 1 illustrates the Web 2.0 framework according to HODGKINSON (2007c) who states that Web 2.0 is an architecture of participation made up of four mosaic pieces, namely: Technology, social, content and business models.

Technology models involve efforts related to Internet accessibility, client-server-communication as well as the use and structure of the Web. Global connectivity and broadband provide for high Internet accessibility through personal computers or handheld devices like personal digital assistants and mobile phones. As a consequence the Internet becomes a ubiquitous platform that offers a multitude of rich (always-on) interactive applications (RIA) as HODGKINSON (2007c) points out.

To achieve a rich, desktop-style user experience that is often characterised by enhanced visualisation and less workload for the user, technologies like Flash and AJAX – that redefines client-server-communication – are adapted. For example, an online calendar integrates Google maps with the help of AJAX; user experience is enhanced because appointments with according address information can be graphically illustrated within the calendar without having to reload the entire Web page over and over again. This is possible because the communication between client and server is asynchronous and therefore allows different tasks to be resolved at the same time. Above example can also be referred to as mashup, meaning the syndication of information from different sources.

One major characteristic of Web 2.0 is the open source character that is present in publishing systems like blogs or wikis. Programming skills are not necessary and different data formats from freely available Web services can be transmitted and implemented in other platforms and devices. As a result, data is increasingly separated from one particular application (Friedman, 2008) contributing to a shift from desktop to Webtop applications. At home as well as at work desktop software is replaced by a Web browser and Web applications. For example, audiovisual entertainment on CDs and DVDs is replaced with YouTube, encyclopaedias with Wikipedia, Microsoft Office with OpenOffice.org and so on. Eventually, open standards and open source enable the decentralised approach to software development called SOA. It leverages the creation of interoperable Web services and more importantly creates a flexible Web structure (Hodgkinson, 2007c).

Relevant technologies allow Web 2.0's social character to flourish because they stimulate networking and interaction with ease. Following part explains the facets of social models.

Social models mainly deal with users' perception and in consequence their use of the Web – in the past the focus was on tasks and topics like buying and selling, booking a flight or banking, whereas today the 'personal' platform Web focuses on people and relationships. HODGKINSON therefore speaks of a shift from 'task media' to 'me-media'. 'Task media' offers users a worldwide resource of information that is pushed towards him or her in a supplier-push manner. 'Me-media' on the other hand uses the Web as a ubiquitous resource, generates content itself and most significantly stimulates a consistent exchange of information amongst peers within networks like Facebook, LinkedIn and Twine (Hodgkinson, 2007c). In this context, subscription formats like RSS 2.0 and Atom synergise relevant information in one news aggregator application to avoid time inefficiencies and information overload.

Another significant effect of 'me-media' is the shift in powers – rather than central control of PR professionals, media owners and politicians, the 'crowd' decentralises the way of how information and ideas are created, modified and distributed around the world from so called network edges as HODGKINSON (2007c) metaphorically describes. The more users contribute to a network, the more of use is it for every single network participant.

Furthermore commercial value of 'me-media' is impressive. 70 percent of a buying decision made by young people is supposed to be influenced by the commentary and advice of their network and friends; only 30 percent is influenced by the reaction to marketing and advertising of the respective vendor (Hodgkinson, 2007c).

The focus on people and relationships has transformed the social behaviour in the realms of Web 2.0 and along with it the perception of how users perceive user-generated content. Following part therefore deals with content models of Web 2.0.

Content models introduce a new generation of content. Content is not a final published condition but instead exposed to virtual instantaneous social interaction between interested observers. For example, blog entries provoke comments, wiki entries can be redefined and extended, audio and video can be remixed and so on. An ideal outcome is the optimisation of an idea or an increasingly detailed and balanced correspondence. In the worst case copyrights are violated, personal information is exploited and rumours are spread (Hodgkinson, 2007c).

HODGKINSON summarises following characteristics of content in the 'new media': Globally scalable, persistent, searchable, 'mashable' and serendipitous. In other words content is transparent to a wide audience that boosts or ignores content in terms of network effects; content remains accessible due to its integration in global information repositories; content is traceable based on indexing by search engines and tagging; content is adjustable and can be integrated in other media with minimal technical skills; and last but not least content can be unexpected dependent on unknown audiences (Hodgkinson, 2007c).

Structure emerges over time from tagging and folksonomies. Users themselves simplify the process of finding information based on the keywords they allocate to certain words, texts or entire Web pages. The more tagging takes place, the more structure is apparent. Popular examples are services such as the social bookmarking service Delicious and the image and video hosting platform Flickr.

However, cultures that are rich not only in sharing but also in remixing content provoke intellectual property issues because it is difficult to appoint a border between actual new content that is strongly based on previous content and heavily remixed content that in parts belongs to original intellectual property. Users don't always stick to copyright restrictions and evade payment to content creators. Therefore digital rights management technologies and awareness for this issue is important (Hodgkinson, 2007c).

Social networking and interaction has transformed content creation and availability not only in the social sphere but also at the workplace. Following part therefore deals with business models of Web 2.0.

Business models are characterised by a multitude of advertising strategies and businesses that intentionally adopt content as bait. Users as well as companies generate content for free contributing to a growth in networks and a wider spectrum of data for search engines to be encountered. Hence, companies possibly profit of a higher chance to be 'googled' not only based on product search but also content search while content at best was generated for free in the first place. In other words, companies monetise network relationships: First, by exposing their company and therefore their products and services to a wider audience and second, attracted audiences can be sold to advertisers (Hodgkinson, 2007c).

On the other hand, the concept of 'content as bait' also raises concerns about an 'architecture of exploitation'. The quintessence is that in the end users might question their extensive free participation and might expect a payment or at least trade-off for their costs of relevant content creation. For example, the video sharing website YouTube engages selected popular content creators in the revenue they receive from advertisements next to the content (Gohring, 2007). This trend is likely to intensify just like the Web 2.0 related concept for businesses called Software-as-a-Service. Instead of selling software for permanent use, subscriptions allow low investments in which users pay for a particular time

It is important to understand that the presented models are interconnected with each other and do not resemble different perspectives on Web 2.0. Relevant technologies enable social behavioural changes that affect the overall generation and distribution of content within the World Wide Web; then again user-generated content can be potentially useful for businesses due to its commercial value.

Due to the purpose of the dissertation HODGKINSON'S framework is differently balanced. Technological aspects are discussed in further detail in this chapter because they constitute the basis of what follows. However, subsequent chapters clearly deal with the social and business sphere of Web 2.0 in order to find answers to the research questions while content aspects of the framework are addressed both in the social realm as well as the business realm.

Based on the research findings it is possible that social and business models do not represent subsets of Web 2.0 anymore but instead emerge to frameworks of their own – one is Web 2.0 and the other Enterprise 2.0.

2.1 Web 2.0 Technologies

AJAX is not a new technology and yet it is a central technology for driving the Web 2.0 movement. It combines different Web languages, standards and techniques as shown in Figure 2, stands for Asynchronous JavaScript and XML and was coined by Jesse James Garrett in 2005 (Lane & Smith, 2008). LANE and SMITH say:

> "[AJAX] describes a technique that lets web pages interact with servers in
> near real time using existing (and thus widely supported) technologies."
> (Lane & Smith, 2008, p. 269)

Figure 2

AJAX in Context

JavaScript   XMLHttpRequest

AJAX

DOM   (X)HTML

CSS   XML
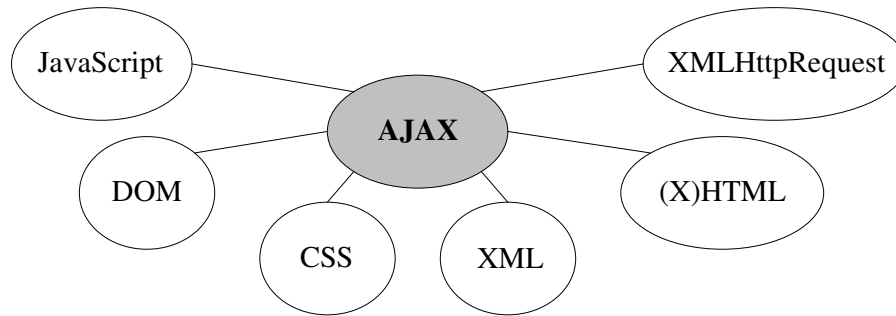
Note. Source: VOSSEN & HAGEMANN (2007, p. 46). AJAX brings technologies together.

The AJAX architecture is based on the following composition: (X)HTML, CSS, DOM, XML, XMLHttpRequest Objects and JavaScript: (X)HTML and CSS provide for a standard in terms of Web page structure and presentation; DOM stands for Document Object Model and is used for the dynamic presentation, interaction and manipulation of Web page structures; XML stands for eXtensible Markup Language and enables the reload, exchange and change of locally or externally saved data,; XMLHttpRequest Objects generate and transmit requests as well as enable asynchronous data transfer between client and server and last but not least Java Script combines all the above techniques in an AJAX engine (Friedman, 2008).

Basically, the AJAX concept improves interactivity and responsiveness of Web applications in comparison to the classic Web application model in which a client sends a request to a server that needs to be resolved first before a new request can be send. The AJAX engine handles more than one request at the same time – an asynchronous processing which is a major part of AJAX (Friedman, 2008).

The main advantage is that information between client and server can be exchanged behind the scenes without a page having to refresh over and over again (Lane & Smith, 2008). For example, a user refreshes his or her map in a browser, the Web page itself remains the same, only the data *within* the map refreshes.

However, a major drawback of AJAX, according to LANE and SMITH, is that it invalidates the 'Back' button of a browser. The reason is that if just a section of a page changes, then the 'new' page is not recorded in the browser history and therefore the Back button is condemned to skip certain pages. As a result bookmarking presents itself difficult as well, because the exact information of an AJAX page cannot be captured.

2.3 Service-Oriented Architecture (SOA)

Both individuals and businesses welcome IT structures that are flexible and whose components build a homogenous environment – compatibility problems and unintuitive hierarchies are the foes of any task that is supposed to get done electronically.

Moreover the development of favouring Webtop applications over desktop applications and the status quo of businesses suffering from a lack of interoperability due to the heterogeneity of their many implemented systems (Carter, 2007) create a situation in which users require a Web architecture to be flexible and user-friendly.

SOA is an approach towards flexible IT designs with less compatibility issues and more options of leaving out, exchanging or adding different components in order to increase software efficiency. HOWERTON says:

> "The days of writing complex middleware to integrate corporate systems is quickly coming to an end" (Howerton, 2007, p. 62).

Figure 3

SOA Analogy
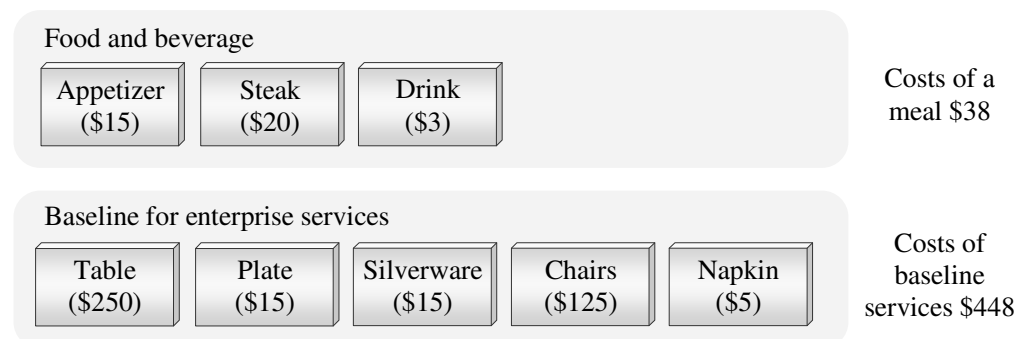
Note. Source: HOWERTON (2007, p. 63). The purchase of a meal is used as an analogy to understand SOA. When it comes to software, the goal is to write the code once and then use it everywhere, avoiding having to 'pay the entire bill' ($486) for each application, but rather paying for just each specific functionalities ($38).

Above figure illustrates an analogy to understand SOA. Enterprises obtain software solutions usually in a packaged form. Included are common functionalities such as the management of a set of users, authentication policies and error logging as well as specific functionalities such as an inventory or payroll system. In the long run however it seems superfluous to repeatedly purchase common functionalities with each new application (Howerton, 2007).

HOWERTON'S SOA analogy points out the dilemma of inflexible software package coding by means of a purchased meal. Instead of paying a restaurant for common baseline services like the utilisation of table, plate, silverware, chairs and napkins the customer is expected to pay for the specific service of consuming food and beverages. Likewise, software purchasers should be able to not constantly pay for common functionalities but for specific ones when purchasing software. HOWERTON summarises:

> "The basic concept behind SOA is to provide a basic set of services that each application can access […] Conceptually, the result is less code, lower cost [through fewer programming hours, less documentation and debugging issues], and increased standardization" (Howerton, 2007, p. 63).

The process of developing a corporate SOA includes an evaluation of all existing solutions in order to determine how they can be ideally connected. For that purpose functionalities are service-enabled so that they can be integrated and used by different software solutions (Howerton, 2007).

For example, three applications namely an e-commerce website, an inventory system and a payroll system use the common functionality of an authentication service in order to grant users access to a system. The SOA concept generates several benefits in this case based on the use of a single authentication mechanism rather than three: First, flaws in the authentication mechanism can be eliminated faster; second, user management is improved because user access is controlled centrally (Howerton, 2007).

However, there are also drawbacks. For instance, HOWERTON (2007) points out the significance of upfront enterprise planning. Once a company has created a functional architecture it is not necessarily willing to invest in a shift towards a SOA structure that requires additional planning, reprogramming and procurement. Another drawback is the scalability or availability of SOA that is subject to network communication outages and increased transaction time. In addition, the central control of common services bears risks that become apparent as soon as one enterprise service fails and hence potentially affects multiple other applications.

Nevertheless, HOWERTON (2007) forecasts a bright future for companies that adopt SOA because companies' architecture is simplified, operating costs are lowered and the average IT project turnaround time is reduced.

2.3 Security

The major security risk for Web 2.0 lies in the maintenance of secure data; that is, that data is kept safe, free from vulnerability as well as corruption and that data access is adequately controlled. Web 2.0 is a social phenomenon that encourages the process of connecting users and sharing data to be as easy as possible – ironically that constitutes a clash of concepts between the principles of data security and the principles of *simple* data sharing which is one of Web 2.0's major advantages.

Web 2.0 does not cause any genuinely new security threats, but it does make protection of threats more complex. This section examines security issues for Web 2.0 in two parts: First, security threats emerging from data exchange with Software-as-a-Service (SaaS) providers are examined (R. L. Mitchell, 2007); and second, new responsibility for businesses regards security is pointed out.

In general, businesses' technological vulnerabilities cause risks of exploitation from outsiders. More important, however, is to not underestimate security issues that emerge from within the company through employees and colleagues, who can cause harm either deliberately or through error (Kann, 2007).

An example for causing such harm through error is a recent political affair that illustrates the mistake of using private accounts when dealing with sensitive data. Sarah Palin, who was the Republican Party's vice-presidential candidate for the 2008 United States presidential election, used a private email account to conduct official state business. Unauthorised access to the account disclosed work-related data that should have never be dealt with through private online accounts in the first place (Stephey, 2008).

MITCHELL emphasises the need for administrators to establish clear policies with regard to security guidelines at the workplace and also the use of SaaS offerings like, for example, Google Apps and ThinkFree Office. User education about the risks is equally important (R. L. Mitchell, 2007). MITCHELL says:

> "Web 2.0 users open a box of security risks" (R. L. Mitchell, 2007, p. 32).

Security concerns ironically relate to the main advantages of SaaS offerings – simple use, flexible accessibility and viral dispersion. There is no need for downloading or installing applications, no incompatibility issues and most importantly trails of potentially sensitive data can be left on publicly accessible servers. Employees are tempted to use their private accounts to share data, which might seem simpler to them than tools provided by the company.

Problems start becoming apparent as soon as sensitive data is being mixed up with social-web tools. There is no guarantee of the data being properly secured on back-end servers. That means that even if the transmission of data through the Internet is secured with Secure Socket Layers (SSL), data might not be encrypted while resting on the providers' server (R. L. Mitchell, 2007).

Due to the immense security issues that SaaS providers do not have under control yet, MITCHELL (2007, p. 32) suggests the ban of "hosted application services and [to] provide users with viable alternatives, such as Web-accessible *in-house* collaboration platforms and virtual desktops using products such as Citrix's Presentation Server or VMware Desktop".

Businesses in general have a major responsibility – provoked by an externally caused technological and social pressure – to make wise decisions about the selection and usage of Web 2.0 tools for their business. Trivialisation of that matter is incongruous since social media determinately grows and the younger generations which start becoming experts in managing their personal lives with the help of Web 2.0 tools are sooner or later becoming part of the working force, bringing along alien habits and needs.

Whether Web 2.0 components are working their way legitimately through businesses' front doors *or*, as a sign of internally lacking application usability, through businesses' back doors depends on the executives and their attitude towards Web 2.0. In any case, businesses should be interested in the status of their employees' education about Web 2.0, even if they do not intend to implement Web 2.0 components.

In conclusion, Web 2.0 solutions should preferably be fostered in-house, since the risk of compromised data on externally accessible servers is yet too great. Educating employees and colleagues about Web 2.0 is important in order to make clear that business data should never be brought in connection with individually employed and business unapproved social web applications, even if their simple employment might be tempting – the chance of replicating sensitive data and facilitating unauthorised access is high. Security remains a challenge to begin with and Web 2.0 provides for a wider range of complexity.

3. Web 2.0 Related Concepts

Web 2.0 became popular to many users through applications like wikis, blogs and podcasts. In fact, Web 2.0 related concepts are responsible for the success of such applications because they simplify users' interaction with the Web.

Open source Web services enable users to use publishing platforms for free in order to create wiki or blog entries for instance. If Web services are not for free there is still the option of acquiring Software-as-a-Service. Instead of buying a 'complete' software license that necessitates a pricy upfront payment, the user can subscribe to a service. Sometimes Web services are labelled as Perpetual Beta signalising that they are in the state of perpetual improvement. It does not mean that a Web service is good or bad per se. It means that redesigns and bugs are possible, while on the other hand the Web service might be perfectly stable.

Other providers offer personalised Web pages with mashable applications – in other words different information sources are combined according to the needs of individual users. Further, syndication processes help users to manage their information more efficiently – information updates from subscribed services are syndicated in a single application which saves enormous time regards researching. Another advantage for users is the concept of tagging. It structures Web content and simplifies the search for particular information.

Finally, the concept of the Long Tail proposes that companies can profit by 'selling less of more' while users can benefit from an extensive range of niche products and customised choices.

Following sub-chapters discuss Web 2.0 related concepts in detail so that a holistic overview of the topic is created in which fundamental mechanisms of Web services, social networking and Enterprise 2.0 are anticipated.

3.1 Tagging

Tagging harnesses the technology XML and allows users to affix keywords or descriptive labels – also known as metadata or data about data – to content. The tag itself is usually a hyperlink that leads to associated content. The tagging concept makes filters almost redundant, since the network itself constitutes a filter (D. Tapscott & Williams, 2006). Other terminology that is related with tagging includes folksonomies, social bookmarking and tag clouds.

A folksonomy allows users to tag content according to their own preferred descriptors rather than using a pre-created bookmark from a prescriptive taxonomy (Hodgkinson, 2007c). Consequently, it resembles a product of collaborative tagging and bottom-up organised content on the Web. Limitations relative to taxonomy include redundancy, ambiguity in tag's meaning and therefore lack of semantics – for example, synonyms are not interrelated – and last but not least the categorisation scheme is not coherent due to decentralised controlled vocabulary. However, the more people take active part in a folksonomy, the more likely it is to become stable. In general, folksonomies offer great flexibility and adaptability in organising information (Mikroyannidis, 2007). A folksonomy's main advantage is that it reflects relationships and information structures that people actually use, instead of an up-front imposed categorisation scheme (McAfee, 2006).

Social bookmarking is based on the principle of tagging and means that any user of a community can link to a certain webpage by commonly self-selected keywords representing tags. The purpose is for users to organise relevant Web content and keep track of Web pages they want to remember. A list of bookmarks can be private or public and the social aspect emerges as soon as many people bookmark the same Web pages – relevance and structure becomes apparent over time. Well-known networks that popularise content in the Internet with the help of bookmarks, comments and ratings are Delicious (http://delicious.com), Digg (http://digg.com) and StumbleUpon (http://www.stumbleupon.com).

A tag cloud is a summation of many tags that have different font sizes according to their popularity level. Illustrations help users to simpler find topics or understand how much content is behind a certain keyword, for example. Figure 4 illustrates a tag cloud of Flickr suggesting that there is a vast amount of pictures that are about weddings in some form, whereas there are only a few pictures on the subject of Africa.

Figure 4

Flickr's all time most popular Tags

africa animals architecture art australia autumn baby band barcelona beach berlin bird birthday black blackandwhite blue boston bw california cameraphone camping canada canon car cat chicago china christmas church city clouds color concert cute dance day de dog england europe fall family festival film florida flower flowers food football france friends fun garden geotagged germany girl girls graffiti green halloween hawaii hiking holiday home house india ireland island italia italy japan july kids la lake landscape light live london macro may me mexico mountain mountains museum music nature new newyork newyorkcity night nikon nyc ocean old paris park party people photo photography photos portrait red river rock rome san sanfrancisco scotland sea seattle show sky snow spain spring street summer sun sunset taiwan texas thailand tokyo toronto tour travel tree trees trip uk urban usa vacation vancouver washington water wedding white winter yellow york zoo

Note. Source: http://www.flickr.com/photos/tags. Popular tags are listed alphabetically. The more often a tag is used the bigger it becomes visually. The illustrated tags are the most popular tags used in the social network Flickr as per December 2008. A tag cloud does not necessarily need to be organised alphabetically and the importance of a tag is commonly expressed through the font size but also through different colours.

3.2 Syndication

Syndication of data and information is significant for Web 2.0 content to remain useful. Content creation takes place with a staggering speed and vital syndication tools like Web feed aggregators and formats like Really Simple Syndication (RSS 2.0) and Atom give users control over the information load.

A Web feed is a notice providing users with frequently updated information. Web feed aggregators (Figure 5) are applications for the cumulated call of Web feeds from different sources. They automatically syndicate updated content from different sources either in a desktop application or browser so that users receive a quick overview of relevant information (Back & Gronau, 2008).

For example, a user regularly reads business updates on Forbes.com but also frequently reviews music articles on ARTISTdirect (http://www.artistdirect.com) as well as technology articles on PC World (http://www.pcworld.com), just to name a few. Instead of visiting every Web page separately, the user subscribes to according Web feeds that are updated in one single application or browser window.

Two common formats for the subscription to Web feeds are RSS 2.0 and Atom. Both formats change the "communication method from a search-and-discover to a notification model" (Stephens, 2008, p. 177). Format differences are mainly of technological nature. While RSS 2.0 is currently the favoured format for all Web feeds, BACK and GRONAU (2008) imply a possible stronger penetration of the Atom format in the future.

Common techniques for content subscription include RSS 2.0, Google Reader and My Yahoo whose logos are often promoted on content pages that offer subscriptions. While Internet service providers like Google and Yahoo aim to integrate Web feeds in a browser to their existing services, RSS 2.0 can be integrated in any RSS reader such as the Web feed aggregator FeedDemon (http://www. newsgator.com) that is installed on the desktop. Web feed aggregators integrated in browsers are, for example, Google's FeedBurner (http://www.feedburner.com), Bloglines (http://www.bloglines .com) and Pluck (http://www.pluck.com).

Figure 5

Web Feed Aggregator
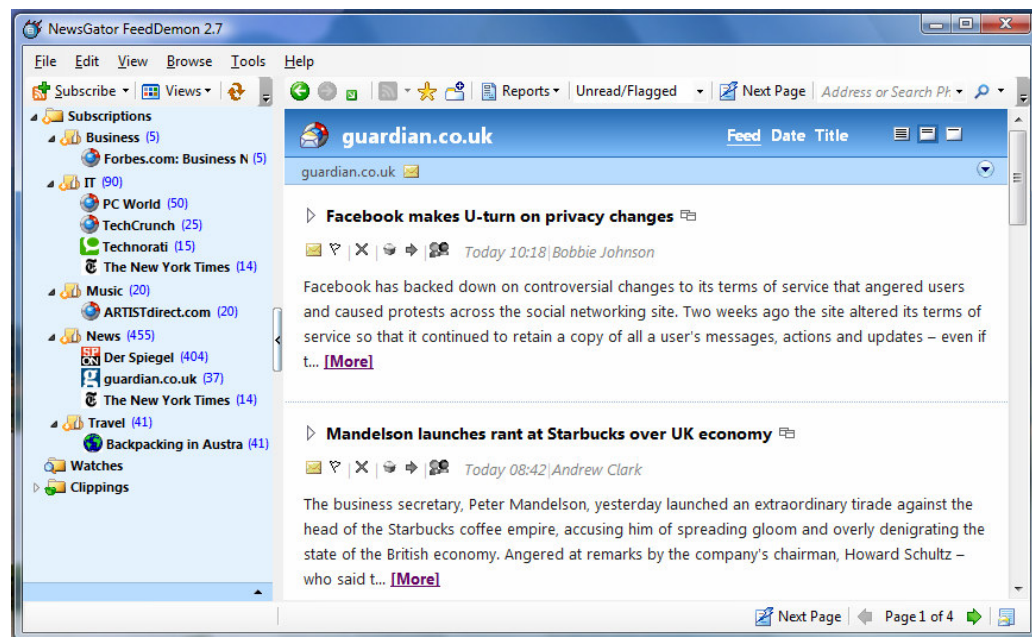
Note. FeedDemon is an application that aggregates Web feeds on a user's desktop instead in a browser. The left frame outlines information sources that have already been subscribed to. The right frame lists automatically updated Web feeds with the most recent on top. The user can then decide to follow up on a particularly interesting subject without having to visit different Web pages over and over again.

3.3 Mashups

Mashups similarly to the syndication process increase Web usability – personalised Web pages are customised and the combination of audio, visual and textual Web content is simplified. LAMONT (2008) points out that users often cut and paste data from one source to another due to the use of various information sources. Mashup software helps to overcome these barriers by unifying information from different sources in one browser window or application. She says:

> "A mashup presents information from two or more sources in a single interface, via a micro-integration that is usually at the presentation or data level." (Lamont, 2008, p. 16).

Actually designing mashups is not that easy and necessitates a good understanding of HTML, basic CSS and basic JavaScript. Nevertheless using remixable platforms like Delicious, Google Maps, Amazon.com and Flickr – a remix platform par excellence as YEE calls it – is a great enhancement towards Web usability (Yee, 2008).

A very common mashup is one between maps and data. For example, an event list can be geographically related to a Google Map and therefore combines different information sources via visualisation in one single interface. In other words, textual data from an event list (addresses) are marked on a map.

LAMONT further states that although SOA is not crucial for creating mashups it is greatly facilitated by it because SOA encourages flexible designs in which Web services and tools can be easily combined with each other.

3.4 Open Source

Open source is an approach to grant users free access to a product's source code so that it can be read, customised and redistributed. SourceForge.net is one the largest open source software development websites that offers over 200.000 open source software projects as per December 2008. Most of the projects remain niches and yet popular systems and applications such as the Linux operating system, the free audio software Audacity that assists in the creation of podcasts and the open source software package MediaWiki that organises Wikipedia's structure are present. One major shortcoming of open source is the lack of customer support.

3.5 Software-as-a-Service

SaaS is often referred to as on-demand software provider, application service provider or it is called software hosting model (Tarcsi, 2007), which all comes down to SaaS being a delivery model for on-demand software that is offered through a subscription model over the Internet. In other words, a customer does not purchase a software license, and hence does not own the software, but instead pays for a bundled package – "the cost of the infrastructure, the right to use the software, and all hosting, maintenance and support services" (Sun, Zhang, Chen, Zhang, & Liang, 2007, p. 558) – either on a monthly or per-use basis.
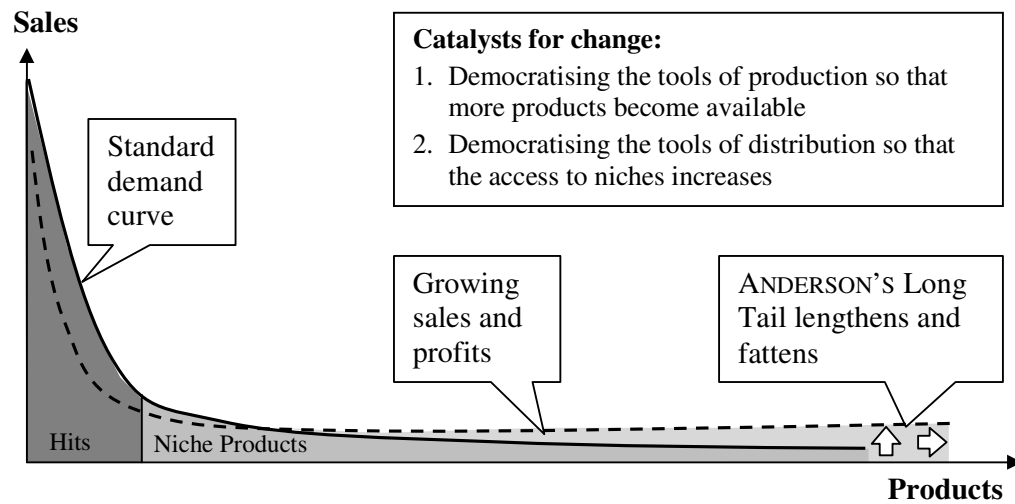
In particular for enterprises, SaaS providers offer software with business functionalities and solutions (Sun, Zhang, Chen, Zhang, & Liang, 2007). One of the most significant advantages for enterprises are the low entering fees in contrast to high fees for traditional systems whose software-licences are financed prior to their usage (Tarcsi, 2007).

3.6 The Long Tail

The Long Tail (Figure 6) is a phenomenon predominant in the digitalised world which rewards businesses who sell less quantity of one particular product and yet increase sales by making overall more products available – in short 'sell less of more'. In a mass media society blockbuster movies, music hits and bestseller books have ruled the way of doing business in the entertainment industry for a long time – that is to become obsessed with creating or discovering a mass-market product and cash the cow. In reality, audiences for top products are shrinking together with their economic force so that niche products become more and more attractive (Anderson, 2006).

Figure 6

The Long Tail

Sales

Catalysts for change:
1. Democratising the tools of production so that more products become available
2. Democratising the tools of distribution so that the access to niches increases

Standard demand curve

Growing sales and profits

ANDERSON'S Long Tail lengthens and fattens

Hits   Niche Products

Products

Note. Source: ANDERSON (2006); ELBERSE (2008). ANDERSON'S Long Tail transforms the demand curve through a wider range of niche products. ANDERSON (2006) speaks of the Long Tail as the future of business. ELBERSE (2008) on the other hand criticises the 'Long-Tail Theory' belonging to the school of thought that supports the blockbuster strategy that puts main attention to the few big sellers. The continuous line illustrates the consumers' demand for products. The products in the range of high demand are called hits. The products in the range of low demand are called niche products. The dotted line proposes a change in demand that is caused by an increased availability and accessibility of niche products. As a result the sale of hits decreases while the sale of niche products drastically increases. Whenever ANDERSON'S Long Tail applies businesses can potentially profit from overall increased sales.

The connection between ANDERSON'S Long Tail and Web 2.0 is the wider range and higher accessibility of niche products. ANDERSON predicts the Long Tail to lengthen and fatten. In general, technology is transforming mass markets into millions of niches as he further elaborates:

> "[if] the twentieth-century entertainment industry was about *hits*, the twenty-first will be equally about *niches*" (Anderson, 2006, p. 16).

ELBERSE disagrees with ANDERSON by claiming that relevant data in fact merely proves a longer and not fatter tail. This, she believes, is not sufficient to cause a mindset change in which bestselling products suffer the loss of businesses' attention (Elberse, 2008).

In an interview with McKinsey, Google's CEO Eric Schmidt pictures global brands, global businesses, global scandals and global celebrities which according to him prevent the vast majority to leave the head. He emphasises that businesses "need the head *and* the tail to make the model [the Long Tail or Power Law as he refers to it] work" (Manyika, 2008) and says:

"While you can have a long tail strategy, you better have a head, because that's where all the revenue is" (Manyika, 2008).

It is disputable whether today's hits do or do not reach the typical sales volumes from the past and whether in the future the Long Tail will become not only longer but also fatter. Nevertheless, from a political point of view, diversity is important and also from a business point of view it is worth considering 'to sell less of more' as long as resource management remains economic.

A higher volume of niche product offerings can benefit customer satisfaction and customer loyalty. Reasons are the exploitation of (mass) customisation and involvement principles. For example, Nike's 'iD shoes' represent significant niche products that can be mass customised (Schulz, 2007). Another example is eBay's community that attracts mainstream as well as niche product interested audiences, for whom it is simple to connect in the powerful network.

On the one hand a Web 2.0 environment leverages the emergence of hits – through its social character in which recommendations, tagging, bookmarking and general commentary provide for particular products to quickly gain distinct attention by means of network effects. On the other hand it is tougher to preserve hits – in other words to maintain profit gains in regards to hits. The reason is the open source character of Web 2.0 and vast amount of free content and downloads which make it easier than ever before to use, adjust and change software, tools and applications which is known as mashing.

As a result, the quantity of niche products rapidly increases and traditional providers of software package hits – for example, Microsoft Office and Adobe Photoshop – face a competition that is quite price flexible. Microsoft and Co. do not need to worry just yet because their products are in general far more mature and adequate for professional use. Nevertheless, the market of Web 2.0 software is increasing fast and community feedback and contributions drastically help to improve products and services.

In conclusion, the Long Tail is a typical phenomenon for the Web 2.0 environment. However, only a few businesses will actually profit by 'selling less of more'. Relevant increases in online sales within the overall niche product segment is preserved for those businesses that are innovative, possibly have a significant market share already, and offer high online usability character with meaningful filters that make an adequate response to a request in the everlasting growing pool of choice possible.

3.7 The Perpetual Beta

The phrase Perpetual Beta has become typical for the Web 2.0 environment in which products or services are known to be reshaped, redesigned and rethought and are consequently in a state of perpetual improvement. Gmail, a Google webmail service, has been a Perpetual Beta since its launch in 2004. Flickr, an image and video hosting online platform, has spent a couple of years as a Beta version (Figure 7).

Commonly a product or service is tested as an Alpha version in order to avoid any bugs and compatibility problems. Once the first known bugs and other problems have been fixed, a product or service is either released as an Alpha or Beta version, which indicates that further improvements are necessary. Users' feedbacks and developing demands serve as a basis for further adaptations.

The succeeding third letter of the Greek alphabet, Gamma, indicates yet remaining room for improvement. A genuinely final version of a product or service in Web 2.0 environments seems out of sight. Reasons for this include competitive pressures, persisting growing demands of users, protection against lawsuits and a constantly changing technological landscape that requires improvements on functionality, usability and compatibility.

Figure 7

BETA Version Examples

Perpetual BETA   Gmail BETA   Flickr BETA   Google Patent Search BETA

Note. Due to trademark rights and copyrights, the logos have been adjusted. The webmail service Gmail has been a Perpetual Beta since its public launch in 2004. The image and video hosting website Flickr has been a Beta version from its launch in 2004 until 2006, when it transformed to a GAMMA version. Google's search engine Google Patent Search is a Beta version since its launch in 2006.

From a juridical point of view the inclusion of the word Beta in the logo prevents lawsuits in which the complainant claims that a product or service in a Beta version has caused him harm. That would include any negatively affected existing software or operating system in general. The closing argument is that products or services in Beta version are by definition not guaranteed bug free and non-final, so that the employment of the product or service is at the users' own risk. Interestingly enough a Beta version can nevertheless also be perfectly stable and complete (Lane & Smith, 2008).

The image of Beta versions within the Web 2.0 environment, in which a vast amount of products and services are subject to community-based improvement, is different from the image of Beta versions within the traditional software licensing environment. For example, Microsoft is rigorously under pressure to fix bugs and problems of Beta versions of its products and to release a professional final version, whereas Web 2.0 lets Beta appear flexible, open to improvements and exciting. The reason is the collaborative thinking by which everyone is allowed to contribute and potentially helps to improve a product or service and therefore also feels to be part of the final result.

The upside of versioning in the sphere of free Web services is the simplicity of upgrading. There is no cumbersome need to use or re-install outdated licensed software that then has to be upgraded through patches, potentially adding up to an immense Megabyte package, as traditionally known from Microsoft, for example. A Perpetual Beta in its best form offers improvements that are presented while an application or service is initialised and then can be either accepted and added or disregarded according to the demands of the user, while necessary improvements are made without having to download a complete new version – unlike iTunes that still insists on offering entire version downloads rather than updates.

4. Web 2.0 Social Computing

This chapter introduces the Web 2.0 social media landscape in order to give an overview on existent companies that either provide consumers, enterprises or both with Web 2.0 tools. Furthermore wikis, blogs, podcasts and social networks are explained not least because they are the most popular keywords in connection with Web 2.0.

4.1 Web 2.0 Social Media Landscape

The breadth of the Web 2.0 social media landscape is best described by illustrating typical organisations. Figure 8 gives an overview on a small selection of Web 2.0 organisations.

Figure 8

Web 2.0 Landscape

Note. Source: HODGKINSON (2007b). On the very left typical Web 2.0 organisations within the Web 2.0 social sphere are illustrated, whereas on the very right organisations from the business sphere are predominant. Organisations in between are relevant for consumers as well as enterprises.

4.2 Wikis

Wikiwiki is a stative verb that originated in numerous Hawaiian contexts and means 'quick' or 'informal' in a simple sense. The essential concept of a Wiki describes an online collection of interlinked Web pages that is freely expandable. The result is a database where the information from each page can be easily modified by any (registered) user using a Web browser like Internet Explorer or Firefox without any further applets. Hence, any reader can become a potential author or editor.

The term *Wiki* is used in this dissertation to refer to the essential concept in contrast to the term *wiki* that is used to refer to a particular Web page or a collection of entries. Consequently MediaWiki or Socialtext are Wikis, since they resemble concepts and provide the tools to create a wiki. Wikipedia itself or an article on Wikipedia resembles a wiki – the concept is implemented in a certain way (Figure 9).

Online resources like O'Reilly Media and WikiMatrix give in-depth overviews on Wikis. MediaWiki provides a guideline of how to choose the right Wiki (Fish, 2004; Stafford & Webb, 2006) and Socialtext offers a database with numerous Wiki comparisons with an additional 'Wiki Choice Wizard' that searches for an adequate Wiki according to the personal needs of a user (http://www.wikimatrix.org/).

The first wiki was created by Ward Cunningham in 1994 who called it "the simplest online database that could possibly work" (Leuf & Cunningham, 2001, p. 15). He used the original wiki (http://c2.com/cgi/wiki), also known as Portland Pattern Repository, as a quick way to collaborate and discuss software development projects online. It is still active today. Later in 2001 he co-authored the book "The Wiki Way: Quick Collaboration on the Web" that documents the history of Wikis, explains how to use Wikis and presents some case studies of how businesses such as New York Times Digital and Motorola are using the Wiki concept for business purposes.

Figure 9

Typical wiki Page

Note. Source: MediaWiki (2008). A typical wiki page is a web page that has content, a discussion section and an 'edit function'. Furthermore, it is interlinked with other wiki pages. The 'search function' helps to find chosen entries and the 'log in function' makes sure that only registered members can contribute, share and manage content.

In practice, Wikipedia is likely to be the best-known example of a grand arsenal of wikis, offering more than 11.3 billion articles, in more than 260 languages and counting nearly 14 million users some of which consistently contribute to this dynamic online encyclopaedia ("List of Wikipedias", 2008). Rɪɢʙʏ puts Wikipedia's success on a par with Web 2.0's central tenet, 'the wisdom of crowds', a phrase popularised by a book of the same name by James Surowiecki.

> "This principle [the 'wisdom of crowds'] states that a large, distributed, and loosely associated network of individuals can accomplish more than a tightly managed hierarchical team" (Rigby, 2008, p. 164).

The open-source character of Wikipedia or wikis in general, that allow any user to edit, add, delete or replace an entry (provided the user is registered), has its advantages and disadvantages that are summarised in the following table.

Table 1

Advantages and Disadvantages of using wikis

Advantages	Disadvantages	Approach
♦Internet wiki · Free access, publishing · Online information database browser-accessible from anywhere, anytime · Ease of expanding information · Creation of relationships with experts or special interest groups · Manage information · The social aspect lets more people contribute more information	User control Maintenance Content quality control and accuracy	• User registration for track back • Automatically inform original authors of any changes, so they can review it • Recommendations by the publisher and other users • Status differentiation of entries according to the reputation of the authors • Tags for completeness, structure, copyright status, objectivity, trust
♠Intra-/Extranet wiki · Share personal information only with particular users · Conference documentation · Centrally organised project files and information · Less email communication	Protection efforts against 'trashing' or automated page creation	• Guidelines and tips for writing good articles • Close accounts that vandalise • Allow multiple publishing after a certain amount of time to avoid automated page creation

♦ Internet wiki refers to a wiki that can potentially be accessed by any user.
♠ Intra-/Extranet wiki refers to a wiki that is restricted in its access by either a private user group or a business.

Advantages include a tremendously fast-growing online information database with potentially numerous authors and editors, the ease for users to be part of a wiki movement and the generally motivated and passionate users that care to keep especially self-authored entries accurate.

Disadvantages include a lack of information accuracy and hence decreased reliability towards the wiki publisher as a source, maintenance expenditures, protection efforts and a diminished control factor. The shift of control hands down a great deal of power from the publisher to the wiki users to provide for an ongoing useful and manageable source of information.

However, the possible disadvantages, which mostly consist of control aspects that do not apply in such severity to Intra-/Extranet wikis and can be restricted by different approaches as seen in table 1 are outweighed by the advantages for information sharing.

The accuracy issue of wikis has received particular media attention in 2005 when the journal Nature published a comparison between Wikipedia and Britannica Online Encyclopaedia,claiming "Jimmy Wales' Wikipedia comes close to Britannica in terms of the accuracy of its science entries, a Nature investigation finds" (Giles, 2005, p. 900). It made the traditional information giant Britannica comprehensibly upset who acted upon the study by publishing a report that argues Nature's study as fatally flawed ("Fatally flawed: Refuting the recent study on encyclopedic accuracy by the journal Nature", 2006).

RECTOR (2008, p. 19) supports the higher accuracy of Britannica in his comparison who he attributes "96 percent accuracy rate […], while Wikipedia has an 80 percent accuracy rate" and ROSENZWEIG says that "Wikipedia […] beats Encarta but not American National Biography Online in coverage and roughly matches Encarta in accuracy" (Rosenzweig, 2008, p. 129).

All in all, Wikipedia has substance and reaches a size that is difficult to be met by conventional encyclopaedias. It exemplifies that an open source system for sharing information can successfully work.

4.3 Blogs

A blog is a contraction of the term Weblog and describes a Web page that resembles an online personal journal, presenting one contribution followed by another in a continuous stream with the most recent at the top. Blogs are predominantly non-commercial and authors who publish a blog entry are called bloggers. Blogging refers to the blog style publishing and blogosphere is an umbrella term describing the entity of all blogs.

The major difference between a wiki and a blog is the content creation. While the content of wikis is iterative, the content in blogs is cumulative – that means that blog publisher can add new blog entries but alterations of the original content are considered as incongruous in the blogosphere. However, changes to original blog

entries are possible as long as additions are clearly marked as updates. The most distinct advantage of blogs is that they enable regular and simple communication on Web pages for nonprogrammers. RIGBY presents a simple premise:

"Blogging software makes Web publishing easy" (Rigby, 2008, p. 16).

The format appoints the most recent entry at the top and usually invites readers to write a comment after each entry. Furthermore an entry includes a title, a body, a timestamp and the author's name. The body mostly includes text and also, but not necessarily, pictures, videos and links that are relevant to the topic (Figure 10).

Figure 10

Typical Blog Page
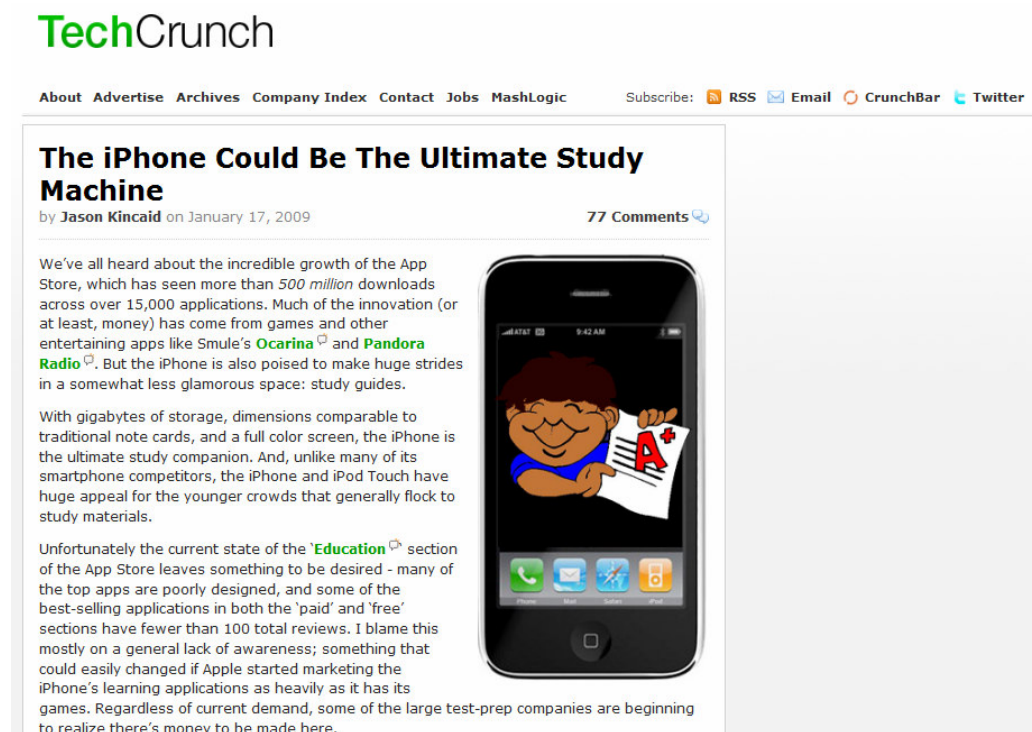
Note. Source: http://www.techcrunch.com/2009/01/17/the-iphone-could-be-the-ultimate-study-machine/. The blog TechCrunch – which top ranks the 'Top 100 blogs list' of the leading blog search engine Technorati – is dedicated to profile and review new Internet products and companies. The most recent entry is at the top. Furthermore the author's name or pseudonym, a timestamp, a 'comment function', a 'subscribe function' and other useful information is included. The idea is to share a thought, opinion and experiences with other readers. Furthermore users can subscribe to the content which will then be syndicated in news aggregators or integrated in other networks (as seen in the upper right corner).

It is unclear when the first blog was written but blogging is almost as old as the Internet itself and started throughout the 1990s.

In "Blogging: Serious Media or just a rant?", COLLINS (2006) discusses the value of blogging in respect to its appropriateness as a news channel. She reminds the viewer of the role of media as a 'fourth estate' which exposes, scrutinises and investigates the three other estates that govern a democracy – executive, legislature and judiciary. The dilemma of commercial media however is that it belongs to the most part to media conglomerates serving corporate interests.

Therefore mainstream media restrains itself by drive for profit and hence compromises the quality of news reporting, for example. Alternative media promises to prevent a decline of public debate, creating more room for diversity, lots of different voices and restoring media independence. In this connexion a small range of blogs fit in as a part of alternative media.

Bloggers who believe that their content is relevant to even a modest audience and do not mind advertising on their blog, might consider integrating Google's Adsense into their blog. Advertisements are matched according to the blog content and accumulate revenue through user ad-clicks (Spanbauer, 2007).

4.4 Podcasts

According to GEOGHEGAN and KLASS, podcasts are a disruptive technology that became mainstream by 2005. They give individuals the power to communicate to a wide audience without the necessity of a radio frequency license or fancy studio:

> "[A] podcast is audio or video content available on the Internet that can be automatically delivered to your computer or portable media player." (Geoghegan & Klass, 2007, p. 5).

A podcast aggregator or so called podcatcher, such as Apple's iTunes, resembles software that can automatically download podcasts as soon as they are available (Geoghegan & Klass, 2007).

RIST points out that podcasts can also increase profits provided that the message is delivered to potential customers. A MarketingSherpa (2008) survey of businesspeople that are involved in technology purchases shows that 78 percent have listened to a podcast at least once and 26 percent listen to podcasts regularly which does indeed make podcasts interesting for marketing purposes. For that matter RIST recommends Audacity (audacity.sourceforge.net) as a podcast recorder and Big Contact (http://www.bigcontact.com) as well as Liberated Syndication (http://www.libsyn.com) as podcast hosts that help to position a podcast so it can be found by the target audience.

4.5 Social Networks

BRYAN et al. (2007) differentiate between informal and formal social networks. The difference is that informal networks cannot be managed and therefore elude control, whereas formal networks stimulate interactions that are sponsored and encouraged by the organisation and therefore can be managed. In regards the significance of social networks, they say:

> "social networks, both within and outside of companies, increase the value of collaboration by reducing the search and coordination costs of connecting parties who have related knowledge and interests." (Bryan, Matson, & Weiss, 2007, p. 2)

Table 2

Social Networks

Social Network (owner)	Launch	Network users in m	Information
Facebook	2004	116 ♦	Social network that interconnects profiles of people. Launched by former Harvard university students.
MySpace (News Corporation)	2003	115 ♦	Fox Interactive Media – which itself is owned by News Corporation – ownes MySpace that is a well-known social network in the United States and favoured by music peers and musicians.
Bebo (AOL)	2005	25 ♦	Social networking website. Bebo is an acronym for 'Blog early, blog often'.
flickr	2004	n.a.	Image and video hosting online platform
YouTube (Google)	2005	n.a.	Video sharing website
Delicious (Yahoo)	2003	n.a.	Social bookmarking service
Digg	2004	n.a.	Social news website
Business Networks:			
LinkedIn	2003	30 ♠	LinkedIn is a widespread network for professionals throughout the world.
XING	2003	6.5 ♠	Xing is a network for professionals. The majority of users are German but the network is widespread throughout the world.

m   = number of network users in million
n.a. = data not available
♦   = unique visitors in million as per June 2007
♠   = number of accounts as per December 2008

Note. ♦Source: ARRINGTON (2008). ♠Source: http://www.linkedin.com; http://www.xing.com.

Table 2 presents a small selection of popular social as well as business networks. Interestingly both types of networks were extensively launched at the same times between the years 2003 and 2005.

Examples for informal social networks are Facebook, YouTube and Delicious that are intended for networking users' leisure time. In contrast business networks such as LinkedIn and Xing are formal social networks. Their purpose is to build one-on-one relationships with other professionals and to avoid a back a forth of communication along hierarchical chains.

> "Rather than forcing employees to go up and down hierarchical chains of command, formal networks create pathways for the natural exchange of information and knowledge" (Bryan, Matson, & Weiss, 2007, p. 6).

5. Potential of Web 2.0

This chapter highlights potentials of Web 2.0 by contrasting it to Web 1.0 and linking it to the Semantic Web. The purpose is to demonstrate how Web services, applications and concepts have transformed to be much more responsive to natural human behaviour that is characterised by interaction, commentary and organisation.

The paradigm shifts clarify what is possible with Web 2.0 in contrast to Web 1.0 and how individuals as well as professionals can improve their use of the Web. The Semantic Web might cause even more of such paradigm shifts towards an almost human-like interaction between person and the Web since it focuses on the meanings of things instead of data and keywords.

5.1 Paradigm Shifts

Web 2.0 is accompanied by several paradigm shifts that eventually cause people to spend more time on the Webtop than at the desktop. Webtop means an alternative place of work and entertainment where Web pages function like desktop applications and hardware gives ground to software. Music, movies, games and data storage devices are replaced by Web applications (Hodgkinson, 2007b) and even entire operating systems are accessible online, like for example WeptopOS (Tarcsi, 2007). Paradigm shifts involve a range of shifts in the transition from Web 1.0 to Web 2.0 that are summarised in table 3.

Table 3

Web 1.0 vs. Web 2.0

	Web 1.0 Characteristics	Web 2.0 Characteristics
Governance	Top down	Bottom up, decentralisation
Communications	People to machine	Machine to machine and people to people
Information Discovery	Search and browse	Publish and subscribe
Information Retrieval	Transactional based interactions	Relationship based interactions
Information Aggregation	Portals, commercial aggregators	Micro-aggregation
Marketing, Selling	Push, contextual → Goal of Mass adoption	Conversational, personal → Goal of Niche adoption
Content	Content consuming	Content creation
Content Control	Publishers, aggregators, institutional control	Content authors → Individual enabled
Content Structure	Documents, pages → Taxonomies	Tagged objects → Folksonomies
Applications	Closed, proprietary	Open, standards-based
Technologies	HTML	XML, AJAX
Rights	All rights reserved (c)	Some rights reserved (cc)
Business to consumer relationships	One-to-one customer relationships, traditional customer service	Customer community relationships, customer self service

Note. Source: HINCHCLIFFE (2008); STEPHENS (2008); WHITE (2007).

These shifts provide opportunities to reorganise information and knowledge, for individuals and enterprises alike. The reasons for this are the growing expectations of users who become used to free services, substantial enterprise requirements regarding functionality, implementation and security, as well as a highly competitive market for Web applications that drives service providers to optimise their products and services.

For example, right after Google had launched its first browser in 2008 with Google Chrome it was analysed in respect to its usefulness for enterprises. According to a Forrester Research analyst, Google Chrome is not yet a serious consideration to replace Internet Explorer from an enterprise perspective (Fontana, 2008). However, the point is that there are serious efforts to not only further develop existing applications on the Web but to contribute to a richer Web.

TAPSCOTT and WILLIAMS believe that software is just the tip of the iceberg in terms of peer production, featuring Linux and Wikipedia, for example. If thousands of people collaborate and are capable of creating something as substantial as an operating system and an encyclopaedia, other industries might also be affected. To address peer production as an alternative model of production can turn out to be a chance for business survival (D. Tapscott & Williams, 2006).

> "Peer production [...] can harness human skill, ingenuity, and
> intelligence more efficiently and effectively than traditional firms"
> (D. Tapscott & Williams, 2006, p. 66).

5.2 Semantic Web

The Semantic Web is significant to the potential of Web 2.0 because it might increase its power of functionalities and mainstream acceptance. Already today users are keen on finding relevant information faster through tags and bookmarks. The Semantic Web might help to further advance information structures, maybe it will even deliver direct answers to specific questions.

In an online presentation on YouTube, SPORNY gives an introduction to semantics by illustrating some basic ideas and principles. He advocates that semantics is related to syntax and while syntax proposes rules and principles of how to use a language and how to say something, semantics indicate the meaning of a language, hence what is said. SPORNY identifies parallels with the Internet – it is designed to communicate but it does not communicate the meaning of things per se. In other words computers do understand the syntax HTML but they do not understand the meanings of visited Web pages. The Semantic Web seeks to address this issue (Sporny, 2007).

MIKROYANNIDIS implies that questions that require a more complex approach than to search for a keyword can be answered more adequately in a World Wide Web that focuses on semantics. He says:

> "The Semantic Web [… expresses] Web content in machine-
> processable forms that software agents can maintain more efficiently,
> thus enhancing search precision and enabling logical reasoning"
> (Mikroyannidis, 2007, p. 113).

It becomes clear that a different Web architecture is necessary in order to deal with new requirements. In connection with this, BERNERS-LEE differentiates between a Document Web and a Data Web. The latter refers to the Semantic Web whose architecture is based on the Resource Description Framework (RDF). He says:

> "Whereas you present a document in HTML, you present data in
> RDF. RDF is to data as HTML is to documents. That has been
> defined for several years now." ("The Semantic Web of data", 2007).

The majority of the Web today is about documents whereas the Semantic Web is about data as BERNERS-LEE clarifies by illustrating semantic links as shown in Figure 11.

Figure 11

Semantic Links
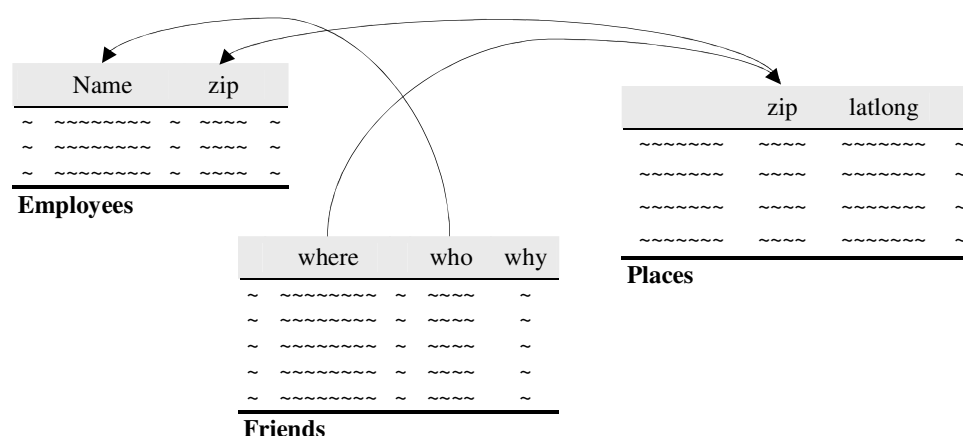
Note. Source: BERNERS-LEE (2000). BERNERS-LEE differentiates between Document Web and Data Web. The latter refers to the Semantic Web in which the focus is on data that can be interrelated to *different* classes and contexts. Therefore data from unlike directories and information resources – as for example address books, diaries or event lists – can be interconnected, rearranged and reused.

BERNERS-LEE (2000), with whom the World Wide Web began in 1989, raises the question of whether a killer application leads you to discover a technology. With regard to the Semantic Web, a killer application that promotes extensive public adoption might be realised through 'twine'. Twine (http://www.twine.com), which is one of the first Semantic Web applications, is an example of combining Social Web data with Semantic Web technologies (Mikroyannidis, 2007). This Radar Networks service was publicly previewed at the Web 2.0 Summit in San Francisco in 2007 and its purpose is to enable trusted communities to share, organise and find information smarter ("Radar Networks Announces Twine.com", 2007).

6. Enterprise 2.0

There are two very basic principles for businesses to be successful: First, potential customers need to be *aware* of the business' existence that is supposed to satisfy their needs; second, customers have to be willing to *pay* for the products or services offered by that business. In marketing, the well-known acronym AIDA comes into play. It stands for 'Attention', 'Interest', 'Desire' and 'Action', and describes the process of a successful business transaction. In the optimal case, the acronym can be extended by an 'S' standing for 'Satisfaction'.

Web 2.0 does not change these fundamentals. Its main advantage, however, is that it can function as a catalyst for business activities. Businesses that effectively employ Web 2.0 techniques and tools create a dynamic system that embraces the inner and outside walls of a company by providing employees, suppliers and customers with more value. This chapter presents an in-depth business '*value-how'* of Web 2.0 in businesses, known as Enterprise 2.0.

6.1 Discussing Enterprise 2.0

In the past, academic literature has defined and redefined the organisation multiple times. In the 1980s, PETER DRUCKER wrote about 'The New Organization' (1988), whereas a couple years later DON TAPSCOTT and ART CASTON called the fundamentally changing organisation 'The New Enterprise' (1992). Almost a decade later GILLIAN SYMON settled on the term 'The Network Organization' (2000) and most currently, DON TAPSCOTT together with ANTHONY WILLIAMS speak of 'the wiki workplace' (2006).

Basically, DRUCKER advocated that an organisation needed to be information-based rather than to function upon command-and-control. Almost three decades later, this requirement for economic success basically remains. However, never before were tools – as the social networking tools – available to support uncomplicated information and knowledge exchange. In many ways, the terms and phrases defining the organisation mentioned above reflect the incessant evolution of the organisation as a community that adapts to using new tools and concepts in the workplace. It also demonstrates that there are many kinds of approaches of how people can work together in an organisation supported by not so much the technology itself but by people who actively choose to use mature social networking tools that are suitable for businesses.

Enterprise 2.0 is yet another approach to unleash the power of human capital for an organisation by changing the nature of work. In a forward to COOK'S book, titled Enterprise 2.0, TAPSCOTT says:

> "The old notion that you have to attract, develop and retain the best and brightest inside your corporate boundaries is becoming obsolete. With costs of collaboration falling precipitously, companies can increasingly source ideas, innovations and uniquely qualified minds from a vast global pool of talent" (Cook, 2008, p. xiv).

With a separate conference on Enterprise 2.0, which will take place in Boston in June 2009, Web 2.0 promises to continue its move into the workplace. As the list of sponsors shows, the interest in Enterprise 2.0 is diverse – the multinational corporation Microsoft as well as the Web 2.0 file sharing provider Box.net are listed and therefore raise awareness of and a positive attitude towards Enterprise 2.0.

To fully understand Enterprise 2.0's significance it is important to point out shortcomings of traditional communication first and then examine how new approaches address these drawbacks within an enterprise.

MCAFEE emphasises the discontent of knowledge workers in regards to traditional communication channels and platforms by referencing DAVENPORT and Forrester Research. Channels refer to email and person-to-person instant messaging for example, whereas the term platform relates to intranets and information portals (McAfee, 2006).

In a study conducted by DAVENPORT:

> "26 percent [of 439 surveyed U.S.-based information and technology users] felt that e-mail was overused by their organizations; [...] 21 percent felt overwhelmed by the amount of e-mail received and sent [... and finally] 15 percent felt that e-mail diminished their work productivity" (Davenport, 2005, p. 126).

Forrester surveyed 2138 technology users at US companies and "only 44% of respondents agreed that it was easy to find what they were looking for on their intranet" (McAfee, 2006, p. 22). In addition, MCAFEE (2006) reports issues of capturing knowledge, a point reinforced by DAVENPORT:

> "[the] dream [...] that knowledge itself – typically unstructured, textual knowledge – could be easily captured, shared, and applied to knowledge work [... has not] been fully realized" (Davenport, 2005, p. 89).

New approaches do not capture knowledge itself but do focus on the practices and output of knowledge workers, and the way that the output of many becomes available to many. For instance, there is potential to facilitate the process of solving a problem, to find peers more simply, to identify key people faster and so on (McAfee, 2006).

MCAFEE proposes SLATES with six concepts for the Enterprise 2.0 paradigm that aim to address above mentioned issues. In 2007, SLATES was refined by HINCHCLIFFE, who proposed the mnemonic FLATNESSES. Figure 12 gives an overview of mnemonics on Enterprise 2.0.

Figure 12

Mnemonics on Enterprise 2.0
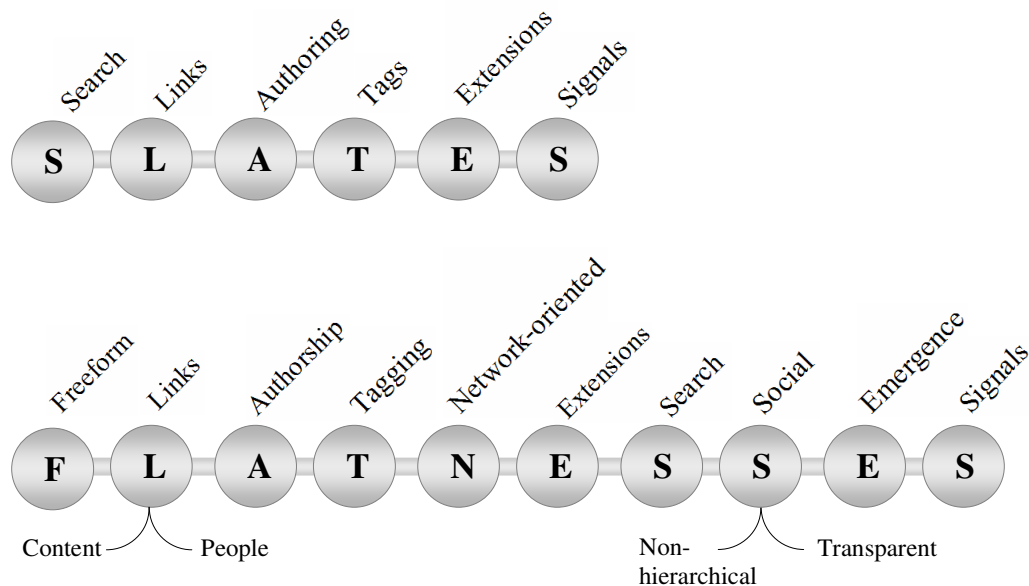
Note. Source: HINCHCLIFFE (2007); MCAFEE (2006). HINCHCLIFFE refines MCAFEE'S mnemonic SLATES to FLATNESSES.

MCAFEE'S SLATES stands for: 'Search', 'links', 'authoring', 'tags', 'extensions' and 'signals'. 'Search' proposes that users must be able to find what they are looking for. One way of finding a requested information is through 'links' – they structure online content and help relevant pages to become popular. 'Authoring' involves any little contribution from an edit or comment to a comprehensive paper that can be then tagged. 'Tags' categorise content and also help users tremendously
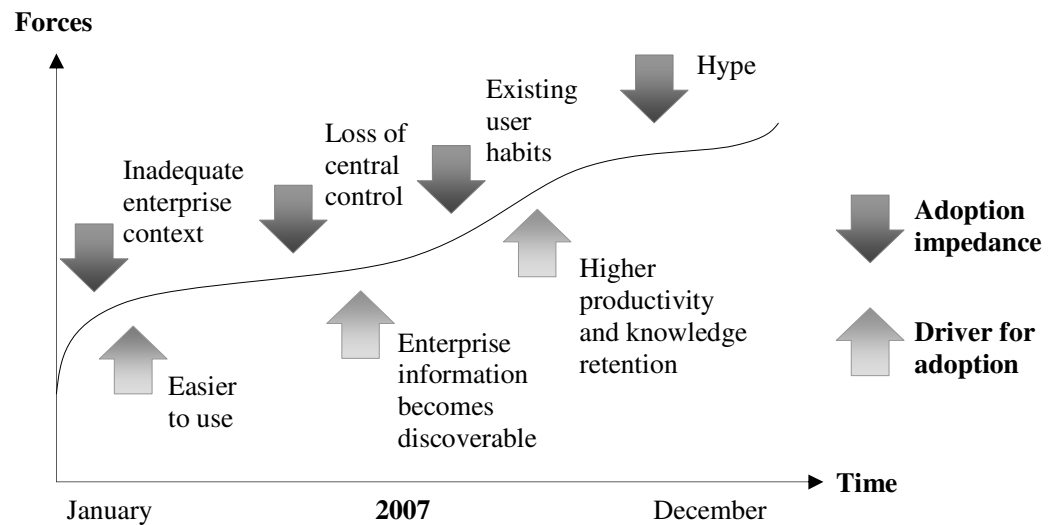
in finding what they are looking for since categories are not imposed upon users as known from traditional taxonomies but are build up as folksonomies that function commonly very intuitively. Also patterns become visible in knowledge work through tags – increased transparency provides for users to see who uses what kind of tags and has visited which kind of Intranet or Internet pages. To enhance the process of tagging 'extensions', like Amazon's 'If you like that, you will like this' recommendations, are useful. They automate categorisation and pattern matching to some extent. Last but not least 'signals' prevent users to feel overwhelmed by content. For this purpose users subscribe to news aggregators that inform them whenever any relevant information comes up in a bundled form, saving users' online time since they can avoid to visit every relevant information resource one by one (McAfee, 2006).

The six concepts of SLATES follow two ground rules according to MCAFEE that are typical for Enterprise 2.0 technologies. First, the concepts provide for easy use of offerings since nothing more than a Web browser is required. Second, the concepts enable flexible structures. Neither working processes, nor categorisation schemes for output are preconceived introducing a profound shift from traditional structures to dynamic and intuitive structures (McAfee, 2006).

Hincliffe's FLATNESSES stands for: 'Freeform', 'links', 'authorship', 'tagging', 'network-oriented', 'extensions', 'search', 'social', 'emergence' and 'signals'. It extends MCAFEE'S mnemonic by four further aspects: First, applications are fully Web-oriented (network-oriented); second, applications are free of unnecessary structure (freeform); third, Enterprise 2.0 relies on social interaction and fourth, applications are egalitarian (emergence). Following figure illustrates that the adoption of Enterprise 2.0 concepts is nevertheless dependent on various forces.

Figure 13

Forces influencing Enterprise 2.0 in 2007

Forces

Hype

Existing
user
habits

Loss of
central
control

Inadequate
enterprise
context

**Adoption
impedance**

Higher
productivity
and knowledge
retention

**Driver for
adoption**

Easier
to use

Enterprise
information
becomes
discoverable

Time

January   **2007**   December

Note. Source: HINCHCLIFFE (2006).

HINCHCLIFFE differs between forces that drive and impede Enterprise 2.0's adoption in the workplace. Some companies do not identify sufficient strategic context to adapt Enterprise 2.0 concepts, others fear a loss of central management control since employees and customers are involved in releasing and commenting on information, for example. Existing user habits as well as the categorisation of Enterprise 2.0 as hype also negatively influences its adoption process based on biases.

Drivers for Enterprise 2.0's adoption in the workplace are the appreciation of simplifying the use of enterprise tools, finding and discovering information faster and therefore improving productivity and knowledge retention.

6.2 Adoption Process of Enterprise 2.0 Characteristics

Overall, the process of adopting Enterprise 2.0 characteristics can be summarised in three steps. First, a company needs to identify whether Enterprise 2.0 concepts could be in any way beneficial to them. After all, companies that focus on governmental jobs or monopolies that mainly deal with intellectual property will not encounter many parallels between Enterprise 2.0's philosophy and the company's identity. Second, the choices of Enterprise 2.0 components need to be evaluated. Third, an implementation example can be assessed. The following sub-chapters represent a guideline for companies that are undecided about whether an Enterprise 2.0 approach is reasonable.

6.2.1 Identity

Companies need to understand the concepts and tools behind Web 2.0 in order to decide whether they are relevant for the company. For that matter, it is important to compare the core ideas of Web 2.0 with the company's characteristics. Internal factors on a normative, strategic and operational level are as significant to examine in connection with this as external factors like the degree of social interaction beyond business walls, competitive forces and regulations. The more similarities a company shares with Web 2.0, the more it should get involved with Web 2.0 and use it to its advantage. The following table proposes a qualitative guideline for any company that wishes to compare its own business purpose and ideas with the ideas of Web 2.0.

Table 4

Does Enterprise 2.0's Philosophy match with a Company's Identity?

	Company	Enterprise 2.0
Internal aspects	**Normative** • Vision • Business culture	• Enterprise 2.0's vision is collective intelligence • Enterprise 2.0's culture is shaped by collaboration
	Strategic • Strategies • Structures • Brand	• Niche (Long Tail) products and services increase • Flat communication structure • Self-service • Pull-concepts • Resources are consumed and can also be reused and remixed • Customisation • Open source character and browser-based software
	Operational • Goals • Operations	Major Enterprise 2.0 goals are to connect employees, partners and customers in order to share information and facilitate collaboration. Operations are managed decentralised.
External aspects	**Industry**	Industries that likely make use of Enterprise 2.0 belong to the TIME segment; social media, rather than traditional media, is in the spotlight.
	Regulations	Enterprise 2.0 is vaguely regulated. Issues with intellectual property rights and copyrights are present. The use of 'Some Rights Reserved' (cc) instead of 'All Rights Reserved' (c) is popular.

Note. The more similarities a particular company can discover for itself with the outlined philosophy of Enterprise 2.0, the better is the likelihood for Enterprise 2.0 to be of potential advantage for that company. A bank, for example, will encounter far less similarities than a creative design studio. The 'TIME' segment incorporates telecommunications, information technology, media and entertainment.

According to the

> "Cannon Codicil – nothing digital ever dies [… , for example] e-mails, like diamonds, are forever (Cannon & Malone, 2007, p. 30).

A company needs to know how much information they find necessary to be digitalised. Also, since Web 2.0 concepts encourage tacit knowledge to transform to explicit knowledge, a company needs to actively seek balance between beneficial information exchange and unfavourable exposure.

6.2.2 Choices for Enterprise 2.0 Components

Not all Web 2.0 tools and solutions known from the social sphere are adequate for the business sphere. According to a global survey conducted by McKinsey, the use of some Web 2.0 components is more popular than others in the business sphere (Bughin & Manyika, 2007). The following figure illustrates popularity levels of Web 2.0 components employed in businesses.

Figure 14

Enterprise 2.0 Components categorised by their Popularity
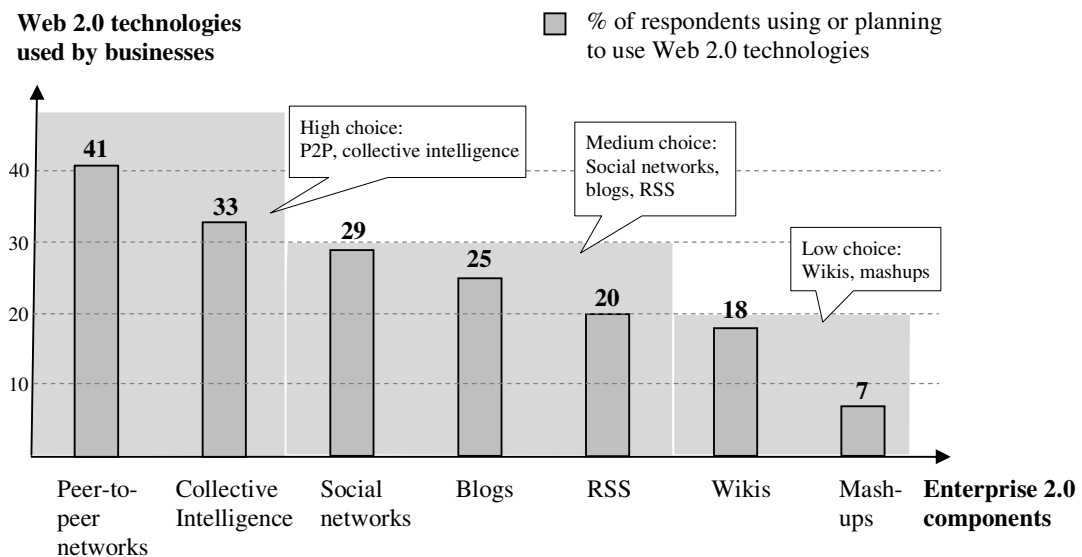
Note. Source: BUGHIN & MANYIKA (2007). The original McKinsey figure has been generalised to show a world-wide overview of the business use of Web 2.0 components. A mean value for each Web 2.0 technology was calculated whose business use has been originally explored in following regions: Asia-Pacific, China, Europe, India, Latin America, North America and 'Other developing markets'. Furthermore the choices of businesses using Web 2.0 technologies have been categorised in the three groups 'high choice', 'medium choice' and 'low choice' in order to emphasise their popularity.

6.2.3 Implementation

STEPHENS says:

> "[a] company's ability to manage information effectively over the life cycle, including sensing, collecting, organizing, processing, and maintaining information, is crucial to the long-term success in a global economy" (Stephens, 2008, p. 171).

Since Web 2.0 helps to manage information effectively, it should be of potential interest to businesses. The question arises of how to select and implement Web 2.0 components and how to transform existing structures and concepts once Web 2.0 is recognised as potentially beneficial to a business.

While online offices do not yet compare with Microsoft's collection in regard to tight integration and advanced functionality (Lasky, 2007), business networking and corporate blogging quickly emerge to become an integral part of business efforts. Online offices, or so called Internet productivity suites, posses document-creation features that largely mimic Microsoft's Office interface. ThinkFree, Zoho, Google's Docs & Spreadsheet service and gOffice are all such suites that differ in free space limitations and fee-based products (including business versions). The main advantages of Internet productivity suites are that individual use, although with limitations, is free of charge, downloads of corresponding applications are obsolete and additional features or fixes are updated in the background (Lasky, 2007). FreeThink and Co. are real options for individuals who wish to collaborate with documents online for free. However, Microsoft successfully defends its status for office applications, especially with its 2007 version that finally integrates online tools for collaboration.

7. Interview Method

The research questions of the dissertation are: What is the significance of Web 2.0 as a social phenomenon and for businesses? Are technologies and methods of Web 2.0's social sphere different from those of its business sphere and if yes, how do they differ?

The qualitative method of in-depth interviews was chosen to investigate how businesses think about Web 2.0, whether they employ Web 2.0 concepts and if they do so, how they leverage these Web 2.0 concepts. The interviews were conducted and analysed throughout September 2008 to December 2008.

The choice of conducting interviews for this study is based on the exploratory nature of the research. The use of social technology in the business sphere is still experimental and subject to fundamental change, adaptation and improvement throughout the next decade. As a consequence, academic literature on the *business* use of Web 2.0 has yet to achieve consensus. For this reason, it was decided to explore the business point of view in the evolution of social technology by questioning practitioners about what kind of companies utilise Web 2.0 concepts, for what kind of purpose, how, when and where in order to reach business goals either faster, simpler or both.

The following sections explain the employed method used in more detail, not least in order to allow replications of this research.

7.1 Sample

7.1.1 Selection Process of Countries

The way in which businesses make use of Web 2.0 depends on various factors that combine social, economical, technological and innovative aspects. The two countries used ion this study, Germany and New Zealand, were chosen precisely because they feature contrasts in regard to these aspects. The aim of their selection was to find out whether businesses tend to approach social technology differently – especially as to their views on Web 2.0 as well as to their use of Web 2.0 – based on the country in which they operate.

The Organisation for Economic Co-operation and Development (OECD) has been chosen as a point of reference for numerical data because its 30 member countries are considered to be developed countries, therefore providing information on developments that are relevant for the research topic. According to OECD:

> "Germany has traditionally been one of the OECD's top performers in science, technology and innovation […, whereas New Zealand's] innovation system has been shaped by the country's features: its relative geographic remoteness, small size, demanding physical topography, and focus on exploiting natural resources" (*OECD Science, Technology and Industry Outlook 2008*, pp. 121, 143).

In addition, Germany profits from a broad-based innovation strategy for the European Union that was initiated by the commission of the European communities in 2006 and which discloses efforts for growth and jobs as part of the Lisbon strategy ("Putting knowledge into practice: A broad-based innovation strategy for the EU", 2006).

More specifically, the Research and Development (R&D) indicator is a relevant criterion for selecting the two countries Germany and New Zealand. The OECD describes R&D as "a key indicator of government and private sector efforts to obtain competitive advantage in science and technology" (*OECD Factbook 2008: Economic, Environmental and Social Statistics*, 2007, p. 156). In other words, R&D captures investments for progress towards innovation and economic growth. It comprises, for example, the following two aggregates: What business enterprises expend on R&D (BERD) and an entire country's gross domestic expenditure on R&D (GERD), both as a percentage of GDP so that comparisons on a time and an international scale are possible.

The OECD's science and innovation profiles on Germany and New Zealand exhibit distinct differences in these aggregates. While Germany's BERD and GERD are slightly above OECD's average, New Zealand's BERD and GERD are gravely below that average (*OECD Science, Technology and Industry Outlook 2008*). The following figure summarises the differences in GERD. A remarkable difference besides the GERD value is that German businesses spend nearly 30 percent more on R&D than New Zealand businesses. This suggests a higher potential for progress and independence from governmental contributions, and also implies advantages regarding the development of Web 2.0 and Enterprise 2.0.

Figure 15

Germany's and New Zealand's Gross Domestic Expenditures on R&D
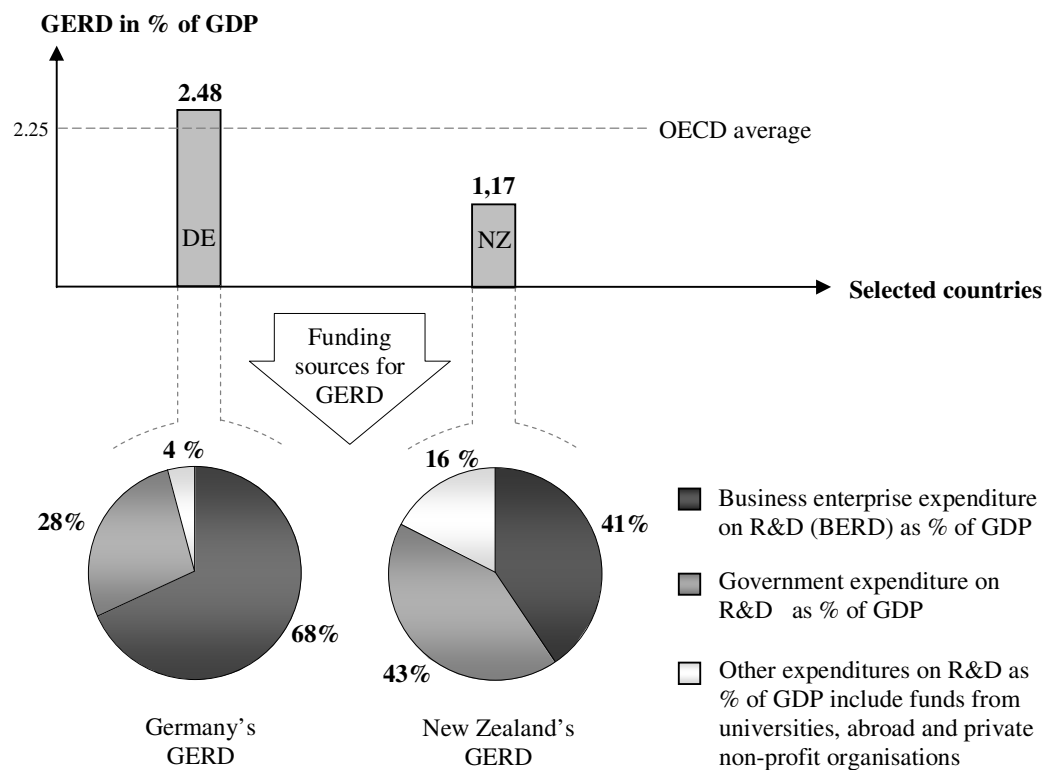
Note. The reference years for the numerical data are as follows: New Zealand: 2006 (*Research and Development in New Zealand*), Germany: 2005 (*Research and innovation in Germany 2007*), OECD's average of GERD: 2005 (*OECD Factbook 2008: Economic, Environmental and Social Statistics*, 2007). DE is the country code for Germany; NZ is the country code for New Zealand.

Overall, it is necessary to acknowledge that innovation that is not based on R&D may not be captured by the available quantitative data. Therefore New Zealand's industry, which is strongly supported by forestry, agriculture and the fishing sector, can be more innovative then is demonstrated (*OECD Science, Technology and Industry Outlook 2008*).

The Oxford Handbook of Innovation elaborates in detail on R&D issues and emphasises the pitfalls of the R&D indicator. SMITH says that there are "drawbacks at the levels of countries, industries and firms" (Smith, 2006, p. 158), so that the significance of the R&D indicator in regards comparing different countries has to be dealt with care. For the purpose of this research a focus on technological discrepancies is, however, appropriate.

In summary, Germany and New Zealand were selected because of their contrasting tendencies towards R&D investments, rather than on the basis of explicit quantitative data. Also, the researchers' native country is Germany, which facilitates an adequate sample and processing of interviews with German businesses. New Zealand on the other hand enables in-person interviews, being the researcher's residence during research.

7.1.2 Selection Process of Businesses

To facilitate the selection of businesses and organisations to study, the pool of choices was narrowed down to industrial sectors that are known to provide services over the Internet, focus on knowledge management and embrace information technology. This approach promised a higher chance of interviewing practitioners that are either experts in regards to Web 2.0 or have significant experience with Web 2.0 concepts. Subsequently, three divisions namely computer technology, telecommunication and online business networks were chosen as the basis for the interview-based research.

The relatively limited scope of dissertation research and the difficulty in conducting a mult-country study suggested four interviews from four businesses would be appropriate, two in each of the countries Germany and New Zealand. As a consequence the mode of interview administration – either face to face or telephone – was contingent on the geographical location and accessibility of the targeted interview partners.

To begin with, the approach of selecting businesses was to select potential interview partners first and then to evaluate whether the businesses they work for fit the research scheme. For that purpose it proved highly beneficial to obtain the full membership of the two business networks, XING (http://www.xing.com) and LinkedIn (http://www.linkedin.com), so that profiles of professionals could be examined and contacts established. Eventually, the use of the XING network resulted in two actual interviews – one with a German subsidiary of IBM and one with a German mobile telephone company.

Once these first two interviews had been concluded, the selection approach was turned around and potentially appropriate New Zealand businesses were identified, rather than specific interview partners. The reasoning for this was first, because an interview with a business network was considered to fit well with the research scheme well, and second, an interview with IBM generally promised further insights into the employment of Web 2.0 in the business environment. The two businesses selected turned out to be the SBN network in New Zealand and the New Zealand subsidiary of IBM. The focus on IBM in both countries can be explained through its history of awards and honours in the fields of technology development, innovation, accessibility and social responsibility.

7.2 Data Collection

As RICHARDSON (1965, p. 7) notes, "the interview is essentially a method of collecting information". In this sense, information was collected by building up guided conversations with practitioners from the selected sample of businesses, two in German language and two in English language.

The interviews were structured in three parts, and focused on the background of the company for which the interviewee works, the interviewee's expert view on social technology and Enterprise 2.0 and, last but not least, specific examples in practice that are interconnected with the use of Web 2.0 concepts and therefore Enterprise 2.0. Table 5 shows the interview guide, with typical interview questions used for each part of the interview.

Table 5

Semi-Structured Interview Guide

Interview Part	Interview Questions
I. Company Background	• What is the business purpose / development of the company? • Does the business operate nationally / internationally? • What is your position / are your responsibilities within the company?
II. Expert View	• What is your opinion on Web 2.0 / Enterprise 2.0? • Can you identify barriers for adopting Enterprise 2.0 concepts / technologies? • Would you speak of Web 2.0 and Enterprise 2.0 in terms of hype or potentially continuous phenomenon? • How do you relate to Enterprise 2.0 investments?
III. Examples	• What Enterprise 2.0 concepts / tools are utilised in the company? • Do your implemented Enterprise 2.0 concepts / tools constitute a competitive advantage? • Have you or the company come across any obstacles in the implementation process?

Note. The company refers to the company that employs the interviewed practitioner.

The interview process was intentionally semi-structured, so that the conduct of the interviews remained flexible. Questions asked in an individual interview did not necessarily match the wording of the interview questions show in Table 5. Neither did each interview necessarily include all of the presented questions, mainly due to time restraints. In some cases, specific follow-up questions were asked that are not captured in the guide. In addition, a conversational style of interviewing was used that encouraged rather descriptive talk that was rich with examples. Table 6 provides an overview of the interviews conducted in the study, including how the relevant company or interviewee was researched and selected.

Table 6

Overview on the conducted Interviews

Company	Research and Selection	Title of Position	Communication[3]	Time
Mobile telephone company: Germany[1]	- Internet research for Enterprise 2.0 experts - Interviewee was a speaker at the Enterprise 2.0 summit for the CeBIT [2], 2008	Senior Manager	- Initial contact via the business network Xing, later email - Interview conducted via telephone	40 Min.
IBM Böblingen Development Laboratory	- Internet research for a German subsidiary of IBM - Interviewee had worldwide responsibility for the IBM portal technology	Manager	- Initial contact via the business network Xing, later email - Interview conducted via telephone	35 Min.
Business Network: SBN (Sustainable Business Network)	- Internet research for a New Zealand business network - Interviewee is responsible for managing New Zealand's Northern Region affairs	Manager	- Initial contact via telephone - Interview conducted face to face	40 Min.
IBM Australia / New Zealand	- Internet research for a New Zealand subsidiary of IBM New Zealand - Interviewee is responsible for the innovation agenda in the Asia Pacific region	Manager	- Initial contact via telephone - Interview conducted via telephone	40 Min.

Note. [1]The German mobile telephone company does not wish to be identified. [2]CeBIT is the world's largest annual trade show for information and telecommunications technology. [3]The mode of administration (face to face, telephone) is contingent on the geographical location and accessibility of the interview partners.

All of the interviews were conducted over the phone, except the SBN interview which was conducted face to face. This led to different digital recording techniques. The telephone interviews were recorded by putting the cell phone on speakers and recording the conversation with the integrated microphone of a Lenovo ThinkPad T61. The face to face interview on the other hand was audio-recorded with the Olympus digital voice recorder WS-310M.

The process of transcription was a meticulous series of word by word writing that was greatly facilitated by Audacity, an open source audio software that visualises tone pitches. Transcription began at a relatively early stage in order to not only avoid data overflow at the end of the data collection period, but more importantly to sharpen the understanding of collected data and use it in subsequent interviews.

7.3 Data Analysis

The data analysis involved three stages: Reading the collected data, organising that data, and then arguing with the data.

Initially, the transcripts were read and re-read thoroughly without taking any notes or considering interpretation. Subsequent research on specific terms like names of organisations or services confirmed the quality of existing data and ensured the correct spelling of terms.

Subsequently, keywords or parts of sentences of relevance or interest to the research were highlighted and specific transcript parts were numerically labelled in accordance with the interview guide shown in Table 5. Transcript notes did not involve codes, not least in order to preserve the narrative flow (Bryman & Bell, 2003). Instead, notes were scribbled intuitively next to a text passage including words or phrases like 'network', 'strategic plan', 'status quo', 'service', 'goal', 'security' and so on.

Finally, the data were summarised and structured according to Web 2.0 / Enterprise 2.0 perspective, adoption and examples. The next chapter presents the four case studies and discusses the findings on Enterprise 2.0. Where, appropriate, quoytes form the interviews are used to illustrate particular points.

8. Interview Results

8.1 Case Studies: Germany

8.1.1 Mobile Telephone Company

The studied organisation is a subsidiary of one of the largest mobile telecommunication network companies in the world. It has always showed interest in Web 2.0 developments, recently expressed through a joint venture with one of the biggest social networks in the world.

The interview with the mobile telephone company, further referred to as MTC, resulted in a clear consideration of Web 2.0 as a mindset change with following two findings. First, there is no such thing as user management anymore, instead there are interconnected individuals. Second, information does not originate from a central hub anymore; employees interchange information with each other instead.

User management in its traditional form does not create a natural flow of users and applications because it concentrates on roles rather than on individuals themselves. Users are associated with a role that enables them to use numerous applications. However, once the employee leaves the company there is no information of any sort left behind and that is where Web 2.0 gains significance. In Web 2.0 environments employees are much more likely to orientate themselves, to integrate and most importantly to become an active part of the business community due to simple introduction procedures in internal processes as well as project recommendations that they receive from their peers. The focus here is on the individuals themselves rather than on roles, therefore employees' contributions last even after an employee has left the company.

The second change occurs in respect to information exchange and causes some loss of control over corporate messages from managers' point of view, who find it harder to adapt to an open communication structure. More specifically, top to bottom message forwarding is transformed to a state in which information input is released somewhere in a network and then over time can be categorised and linked by any network user according to its relevance.

MTC anticipates the need for rethinking work processes and communication in order to utilise the power of social capital. Social networking and Web 2.0 related concepts like tagging and social bookmarking are highly valued in this context. The interview partner says:

> "One of the most important tools that we currently feature was co-developed with another company in the past one and a half years – it is a combination of social search, social networking and social bookmarking that we call *Finder*."

The tool *Finder* is implemented on the basis of a corporate phonebook and comparable to a mashup of Google Search, Delicious and Xing. In other words, employees can directly connect to people as well as search keywords and other information more effectively while discovering relevant information faster through the bookmarking concept.

The prototype currently involves about a thousand people and constitutes a permanent Beta with constant assessments and improvements. A statistical system that records data on how users operate with the tool enormously facilitates the process of discovering popular functionalities with further potential and also shortcomings.

The general idea is to select a tool that a high number of people are already familiar with as well as constantly use and then to advance the tool with relevant concepts and functionalities. The main point is to build on implemented tools to assure user participation and interaction. The interview partner says:

> "Companies themselves need to develop similar or better tools than the ones available outside of companies' walls. At the same time we need to start discussing how internal tools can be synchronised with external tools."

In any case is the definition of clear boundaries in regards the usage of information vital. Even if concepts between social and business sphere bear striking similarities, the employees need to be enlightened that sensitive, work-related data should not be tagged or bookmarked with externally available Web services. Technical regulations often lead to people by-passing them so that communication and education on Web 2.0 is favoured as protection mechanism against issues related to an increasingly open-minded and sharing-friendly environment.

8.1.2 IBM Böblingen Development Laboratory

The IBM Böblingen Development Laboratory (IBM Lab), a subsidiary of IBM Germany, was founded in 1953 and is one of IBM's largest development laboratories in the world. The company bundles national activities for the globally operating IBM Corporation and has a distinct focus on innovative developments in the fields of hardware and software. One of its major contributions is within the realms of portal server software, information search and database performance management. In addition, the IBM Lab has a sound relationship with the academic community.

Together, the conducted interview and secondary research provide useful information on three issues: First, how social technology is used within the IBM Lab; second, what advantages IBM business products – which embrace Web 2.0 concepts – offer other businesses and last but not least how a resource centre with a variety of Web 2.0 applications can encourage innovation and the development of products and services. The case study sets a focus on *Lotus Sametime*, *WebSphere Portal* and *developerWorks* for that purpose.

Lotus Software was founded in 1982 and claimed fame through its killer-application Lotus 1-2-3 spreadsheet which facilitates the work with numbers. In 1995 IBM finalised the acquisition of Lotus Software, formerly known as Lotus Development Corporation, and henceforward comprehensively adopted Lotus Software in its business culture.

The IBM Lab greatly uses the Web 2.0 solution *Lotus Sametime*, for example, which immensely enhances daily work tasks through networking. The communication and collaboration platform provides services like instant messaging, email, telephony as well as Web conferencing and can easily be mashed up with a wide variety of software. Advantages are the ease of its implementation, prompt responses within the intra- or extranet, the establishment of communities of interests, less travelling costs regards meetings as well as a simple realisation of synchronised home offices.

Lotus Software products, of which some are truly regarded to as Web 2.0 solutions, are perfectly applicable to explain general Web 2.0 potentials for businesses, yet another example is of interest – the *WebSphere Portal* introduces Web 2.0 concepts to businesses.

The IBM product *WebSphere Portal*, whose development is decisively promoted by the IBM Lab, is an enterprise portal that enables companies to provide information and applications internally to staff as well as externally through the Internet to customers. In terms of Web 2.0 the *WebSphere Portal* integrates the two basic Web 2.0 technologies AJAX and REST and incorporates Web 2.0 concepts like Google Gadgets, inline editing, intuitive drag & drop functionality and flyouts. Web tools known from the consumer domain are hence safely made available in the business domain.

Wikis on the other hand find extensive deployment in d*eveloperWorks*, a resource for developers as well as IT professionals. Especially developer teams favour this platform for planning, creating and finalising projects over the Internet. The interview partner comments:

> "[Wikis enable] cooperative work that lets documents expeditiously overcome the level of a rough draft. Moreover, a large community enables contributions that offer up to date information."

Research shows that IBM has introduced innovative Web 2.0 concepts long before 2004, the year in which the social phenomenon received its name. *Lotus Sametime*, which was awarded the 2008 North American Enterprise Product of the Year, was originally launched in 1998 (Topolski, 2008). *DeveloperWorks* was launched in 1999 (Gonzalez, 1999) and the *WebSphere Portal* has been around for 8 years since its launch in 2000.

8.2 Case Studies: New Zealand

8.2.1 Business Network: SBN

The Sustainable Business Network (SBN) was founded in 2002 as a non-profit organisation in order to establish a community of sustainable businesses in New Zealand. Basically, the network is a merger of two groups that encountered similar interests in the field of sustainability. The groups are called Auckland Environmental Business Network and Business for Social Responsibility. Presently, SBN holds about 800 members.

The subject of business sustainability encompasses a variety of facets according to SBN that makes not only environmental awareness but also partnership responsibilities and long-term economic growth part of the discussion. A SBN report, for example, on a particular business can integrate environmental, social as well as strategic and operational concerns that are accompanied by advice.

Financially, SBN attracts income through membership fees – that are adjusted according to the subscriber's business turnover – business contributions and central as well as local government sponsorships. Since the network is registered as charitable trust, the revenue is used to essentially ensure that the network maintains easy access, a meaningful quality of services, a high level of sharing knowledge and also to cover salaries. Due to its non-profit character SBN does not consider itself as competitor to other business networks like XING or LinkedIn.

Two SBN services already feature or intend to feature Web 2.0 characteristics which are the 'Green List' – in the future to be found at http://www.greenlist.co.nz – and the 'Get Sustainable Challenge' which is subject to SBN members.

The Beta version of the 'Green List' represents a directory for sustainable products and services in New Zealand. Yet only accessible to members, the searchable database encourages the sharing of business and product information and also customer feedback. Customers themselves are hence given a voice to either share satisfaction or disappointment about products classified as sustainable. As a consequence genuinely sustainable products and services are destined to crystallise and businesses are given the opportunity to use customer feedback to their advantage. The 'Green List' applies tools for information sharing, community features and feedback options, all of which are part of the Web 2.0 mindset.

The 'Get Sustainable Challenge' involves the process of assessing and guiding businesses to become more sustainable. Ultimately, annual Awards are granted – either with a regional or national focus – that recognise business efforts accompanied by prestige. Future plans envision an *online* accessible 'Get Sustainable Challenge' self-assessment tool which can be used by the targeted group of smaller businesses that do not want to pay a fee for face-to-face business assessments. Businesses are asked a series of questions that are then computer analysed; an automatically generated report provides results on how sustainable they are on a scale from 1-10 for a range of business operations like supply chain and energy management. The ability to give customised advice on the basis of individual analysis *on demand* and the high level of online *interactivity* are characteristic for Web 2.0.

All in all, SBN welcomes new technologies and Web 2.0 related concepts do fit the organisation. There is no hierarchy within the organisation in terms of discussion. That gives SBN a flat structure, making the organisation more likely to originate innovation than organisations with hierarchical structures. Additional factors like a strong stimulus for sharing information on sustainability, openness to intellectual property and inter-relatedness with other organisations make SBN prone to adopt Web 2.0 tools. In connection with the sharing concept of Web 2.0, the interview partner says:

> "People doing the work know best what works and what does not work. Not all of the ideas are good ones but [flat hierarchies] encourage a flow of ideas [that often increase staff's] job satisfaction."

On the other hand SBN points out behavioural changes caused by technological innovations. For example, the email Web service has become essential to business communication despite disadvantages like asynchronous communication and sensitivity to misunderstandings. Telephone calls are often much more appropriate and yet substituted by emails. In the end, intelligent choices should dominate convenient choices and the 'right' use of new technologies needs to be actively considered. The 'right' use incorporates the appropriate choice and use of technologies in this connexion.

8.2.2 IBM Australia and New Zealand

IBM Australia and New Zealand are one company that specifically encourages innovation through collaboration with its programme ThinkPlace. In regards to Web 2.0, the interview partner reflected that while it may be a hype, nevertheless

> "businesses have not yet understood fully the business benefits of it [Web 2.0]".

The interview gives further indication to consider Web 2.0 as a mindset change since it represents a rethinking of how the Web is used, both internally as well as externally but also of how clients are advised to use the Web. Three Enterprise 2.0 subtopics are covered throughout the interview: The paradox of sharing in a business culture that is characterised by confidentiality agreements, the education process of approaching employees with Web 2.0 concepts and last but not least the experiment of neglecting emails as a means of business communication service.

One of the first things people learn when they join IBM is that they must make sure to keep things confidential and this culture of 'I'd rather not share anything, just to be safe' complicates the implementation process and successful use of Web 2.0 components. However IBM manages to use the advantages of Web 2.0 collaboration. For example, one of the global social software research groups designed an interface that is set over the top of the current enterprise directory which is used to look people up or find out who people are. As a result tagging is enabled based on people offering much richer information about a person since connections and associated tags are visible. Network updates inform about an edit on social bookmarking or blogging sites, for example and the directory transforms from a static information resource to a dynamic information discovery tool. The interview partner suggested that:

> "People are quite comfortable when they learn what tagging is and it makes sense to them why they would do that."

In order to encourage tagging and the use of wikis that are widely used within IBM in order to store information, quite a lot of promotion takes place that raises awareness for Web 2.0 concepts and that educates employees. In an organisation as big and busy as IBM there is to some extent reliance on people to learn themselves, yet active approaches are evaluated as essential for Web 2.0 to become successful in business environments. The Blue IQ Ambassador programme and ThinkPlace initiatives pass on knowledge either through communities of interest or face to face, whereby the latter is generally considered more affective in the first instance. In the

end IBM groups work together in order to diminish one predominant barrier of adopting some of the Web 2.0 type concepts in businesses – that is, a great part of the business population does not understand what the concepts and changes are to begin with.

Generally the email system is overused because employees strive to keep information confidential. One IBM employee shows that email communication does not need to be overwhelming anymore. Luis Suarez performed a drastic change by initiating an experiment in February 2008 (Appendix B) in which he decided to cut down sharply on his daily work-related emails and utilises social networking tools instead (Suarez, 2008).

Last but not least IBM will probably include alternative boutique offerings that small sized businesses are more likely to afford than expensive software packages. As the interview partner commented:

> "There is a huge amount of potential for IBM to work with small and medium sized businesses in how they use Web 2.0 or Web 2.0 concepts."

8.3 Key Findings

The key findings are organised in three parts: First, the case studies are compared and contrasted; second, reasons are presented that explain no substantial connection between the selected countries and the expertise of Web 2.0; last but not least, business approaches and effects are summarised.

The interviewed experts in the field of knowledge management and information technology do not necessarily utilise the term Enterprise 2.0. Instead they explain how Web 2.0 related concepts and tools can be applied in the workplace. Their perspectives on Web 2.0 are overall positive. Especially networking functionalities are continuously advanced and improved. IBM Germany as well as IBM Australia and New Zealand successfully interact with *Lotus Software* in this context, while MTC increases networking potentials through its tool *Finder*. SBN also values synchronous and effective communication and emphasises the shortcomings of asynchronous email communication that is prone to misunderstandings.

Promotion to actively raise awareness and education on Web 2.0 is particularly valued by IBM Australia and New Zealand that still encounters strong resistance in regards to social software especially from the staff's side. The Blue IQ Ambassador programme is a global social software enablement programme that drives adoption of IBM software on the one hand and also promotes internal use of social software at IBM on the other hand. Ambassadors encourage the workforce to learn more about IBM, to work more collaboratively and also across outside of their team. MTC does not seem to impose strong promotion of Web 2.0, yet strategically observes and reacts on viral effects of popular functionalities that are captured by statistical systems. SBN is open-minded about Web 2.0 promotion but does not place emphasis on it just yet.

One of Web 2.0's major features, to share information, is difficult to cope with for companies that impose strict confidentiality agreements on their staff. On the one hand promotion of Web 2.0 concepts and tools takes place. On the other hand staff is insecure about how to share which kind of information. All of the case studies pointed out that there is no ideal way of avoiding a clash between a sharing culture and in some cases fatal distribution of sensitive data in staff's minds. However, discussions about advising staff against using social software platforms that are accessible by practically anyone on the Internet and instead encouraging the use of in-house social software is a step towards the right direction.

Web 2.0 is not supposed to restructure companies from the ground. Both IBM subsidiaries and MTC emphasised the option of advancing existing tools rather than exchanging functional systems. For example, the *WebSphere Portal* enables integration of old as well as new tools, *Lotus Connections* might be sold in parts in the future to make it more affordable to small businesses but also to give companies a choice to buy selected functionalities and last but not least MTC advanced its corporate phonebook with search options, bookmarking and networking features instead of replacing the entire phonebook that the staff is already familiar with. SBN does not work with wikis or blogs but likes the idea of implementing a wiki in order to offer a structured resource that can be build on and that avoids repeated feedback on similar questions and issues. The concept of tagging and bookmarking for the 'Green List' is highly recommended. In addition to the planned customer feedback option regards the listed sustainable products and services, popular listings can be tagged and bookmarked for further distinction of convincing sustainable offers.

Another rethinking triggered by Web 2.0 is the changing perception of an office. A contemporary office is compact and enables staff to easily telework. All they need is Internet connection, a browser and the sign in to respective networks and applications. Face-to-face communication is still regarded to as significant but a lot of work can be pursued through the use of social software.

Altogether, the interviews demonstrate five distinct key findings:

1. Networking increases while email communication is slowly decreasing.
2. Web 2.0's adoption is driven by promotion and improvements based on (statistical) observations.
3. There is a clash between a culture of sharing and confidentiality agreements.
4. The advancement of *existing* tools and implementation of customised solutions is recommended.
5. The office becomes compact and flexible.

The initial anticipation was that the adoption of Web 2.0 tools and concepts depends on factors that combine social, economical, technological and innovative aspects. In some countries innovative technologies are employed more than in others and also funding capabilities of either the companies themselves or the government were thought to play a crucial role in the adoption of Web 2.0. For that purpose Germany and New Zealand were selected in order to create samples of two companies in each country.

It became apparent that the choice of three subsidiaries of global companies and a non-profit organisation cannot provide enough information on the countries' involvement in the successful adoption of Web 2.0. The companies are privately financed or through shares on a global scale which makes it impossible for the size of the dissertation to discover substantial connections between the selected countries and their effects on Web 2.0. Instead the focus should have been on differentiating between multinational companies, small and medium sized businesses and optionally non-profit organisations – ideally in a bigger scale – to discover possible effects of information technology budgets and development teams on the adoption of Web 2.0 tools and concepts. In conclusion, the geographic location of the businesses did not give any relevant information on Web 2.0 adoption.

The case studies clearly highlight advantages of adopting Web 2.0 concepts and tools. These advantages include collaborative innovation, enhanced business efficiency, improved resource management and increased flexibility. Table 7 gives an overview on the approaches that were discovered in the case studies as well as their effects and advantages.

Table 7

Business Approaches and Effects

Approaches	Effects	Advantages
• Social networking • Flat communication structures • Telework • On demand concepts • Communities of interest • Removing barriers of communication • Decreasing email communication	• Simplified collaboration • Interconnection of content, employees and clients • Staff feedback and discussions are livelier • Efficient work regardless of the time or physical location • Improved resource management	• Collaborative innovation • Uniqueness • Cost reductions

Note. Interrelationship between business approaches and Web 2.0: Social networking and communities of interest are significantly practiced in Web 2.0 culture, while flat communication structures are viable for its proper development; telework itself is vastly facilitated through Web 2.0 applications and on demand concepts match Web 2.0 environments.

9. Conclusion

This conclusion combines the status quo of theory on Web 2.0 and Enterprise 2.0 with the main findings of the case studies to specify implications for businesses in the light of Web evolution. The chapter concludes with a discussion of the contribution of the study, its limitations and areas for future research.

The focus of the dissertation is centred on the following research questions: What is the significance of Web 2.0 as a social phenomenon and for businesses? Are technologies and methods of Web 2.0's social sphere different from those of its business sphere and if yes, how do they differ?

The majority of theory refers to Web 2.0 as a mindset change in Web evolution which causes users to express themselves, share, organise and collaborate much easier online. Moreover, Web 2.0 confronts users with a much higher quantity of information they can interact with and the 'wisdom of crowds' provide a basis for collective intelligence. Web 2.0's main characteristic, the social factor, is reason for the synonym Social Web.

The significance of Web 2.0 as a social phenomenon is that many users can benefit from the contributions of a multitude of users. One of the main benefits is that non-Web-experts can not only easily extract information from the Web but also can easily add any data and information to the Web or mash applications up for personalised use. The simplicity is caused by an increase of visualisation, sense mechanisms that draw relations between what users like in order to conclude with automated recommendations and efforts to mimic intuitive user behaviour like to drag and drop things. Other benefits include users that identify peers and like-minded people faster, organise themselves better through interconnections with other users' personal information, enhance search, usability and relations between content through tagging and build consumer communities whose comments and ratings on existing products and services can be trusted. In addition, there is a trend towards generating revenue with self-authored, relevant content through customised advertising, for example.

Applying Web 2.0 concepts to business environments leads to the term Enterprise 2.0 which is an approach of how people work together in an organisation that aims to leverage collective knowledge by interconnecting people and information inside as well as outside corporate boundaries and by boosting the awareness of relevant information.

The significance of Enterprise 2.0 as a business phenomenon is that the source of ideas and contributions are not limited to corporate boundaries but instead can potentially originate from anywhere in the World Wide Web, that information resources become alive through users' tagging behaviour which prevents a forest of precious but unrelated data doomed to be ignored and that the focus on individuals rather than on roles provides information that is still accessible even after an employee has left the company.

On the one hand the "Internet has unleashed an amazing force – the power of human networks. [On the other hand,] '[e]verybody's talking, and nobody's listening', says one apostle of Web openness who's having second thoughts." (Cannon & Malone, 2007, p. 23).

Along with 'information overload' – a phrase coined by TOFFLER in his 1970 published book *Future Shock* – comes 'cognitive overload' which contributes to stress individuals in the midst of the information revolution. According to Gloria Mark 'cognitive overload' describes the concept of switching contexts, very rapidly at best, busting the myth that tasks can be done simultaneously (Cannon & Malone, 2007)

9.1 Contribution of the Study

On the one hand the study contributes to academic literature by identifying the status quo of different concepts and tools related to Web 2.0 and on the other hand it raises awareness of Enterprise 2.0 by illustrating current examples and different adoption possibilities in the corporate world.

The dissertation explains why Web 2.0 is not only a Marketing buzz word but embraces concepts some of which are determined to bring radical change in the way people and things are organised and how knowledge can be retrieved – so for example the concept of tagging that will advance in the realms of the Semantic Web.

Certain areas of the Web 2.0 discussion are still controversial like, for example, the Long Tail, security issues of particularly confidential data and how to successfully implement Enterprise 2.0 components in hardly sharing cultures but a trend is clearly indicated: The Web 2.0 phenomenon is growing immensely and even though it progresses much slower in a business context, businesses are very much interested in how to leverage collective intelligence to enhance innovation so that education and experimentation around that subject is increasing.

By reading the dissertation it becomes clear what kind of Web 2.0 tools are associated with which kind of tasks and also that Web 2.0 is not supposed to fit any organisation but instead contributes to the success of organisations with similar characteristics such as flat communication structures and pull-concepts.

9.2 Limitations of the Study

The implied research methods incorporate examinations on relevant existing literature and a qualitative approach to conduct and analyse four semi-structured interviews. While there is a literature on Web 2.0, the impact of Web 2.0 in business environments is largely unexplored, with the exception of a few experts that contribute to the academic literature as pioneers. Therefore, to conduct interviews was essential to get first hand insights into the adoption of Web 2.0 in businesses.

However, the sample size of interviews bears limitations. For the research results to be representative to a broader population, not only more research in diverse industries and businesses is necessary to significantly add to the existing body of knowledge but also quantitative research is essential to discover whether findings are statistically significant or due to chance.

To thoroughly choose countries for Web 2.0 research is significant since economic and cultural factors are crucial for its development and employment. However, a research categorisation by country turned out to be less relevant as regards examinations on Web 2.0 successes as well as Web 2.0 deficiencies in a business context. Instead, a research categorisation by industry, business size – multinational vs. small and medium sized businesses, for example – and different business levels, including the normative, strategic and operational level, seems more appropriate.

Potential limitations of qualitative research were taken in consideration ex ante. Consequently, informants were chosen meticulously, attention was paid to similar and adequate levels of rapport, interviews were digitally audio-recorded and transcribed to remain faithful to original content and avoid misinterpretations or speculations and, last but not least, continuous reflection on the research questions was performed.

Nevertheless, research limitations are almost inevitable, which is exemplified already by the mere choice of companies that as expected employ Web 2.0 components. Also, an alternative company in place of one of the IBM subsidiaries would have given an additional perspective.

Other limitations include the inequality of how the interviews were conducted – one interview was in person, three interviews were over the telephone – and the incompleteness of questions asked as outlined in the interview guideline due to either inadequateness or time constraints.

9.3 Areas for Future Research

While the popularity of the name Web 2.0 might fade, the research undertaken indicates unexploited potentials of social media. In the future, Web 2.0 adoptions are likely incorporate an increasing amount of business-matched solutions with Enterprise 2.0 slowly but surely gaining purchase. Along with multinational corporations and their subsidiaries, small and medium sized businesses are expected to implement sophisticated Web 2.0 components and integrate Web 2.0 related concepts on a strategic level. Also, using the 'right' Web 2.0 components and concepts in a business environment necessitates learning and an understanding of the various components and their effects.

Areas of future research include qualitative as well as quantitative studies in respect to how current Web 2.0 tools are developing, how consensus on Web 2.0 concepts is reached and also on how Enterprise 2.0 components are implemented in organisations. In this context, it is necessary to observe how cultures with little sharing behaviour can adopt Enterprise 2.0 concepts.

Since Web 2.0 and the Semantic Web are likely to share concepts and technologies in the future, this as well constitutes a dynamic area of research.

Another interesting aspect is the replacement of traditional communication channels like emails with social networking tools like Skype, twine or LinkedIn – progress in regards to the Suarez experiment, for example, could be followed up.

In a wider context, the continuous convergence of technology, science and culture is of interest. CANNON calls attention to GARREAU, an American reporter at *The Washington Post* and author of the book *Radical Evolution* (Cannon & Malone, 2007). The central theme of this book is the impact of technology on people's behaviour and overall lives. As the advancements in the fields of information and nanotechnologies, genetics and robotic continue to augment, the need for relevant future research on behavioural change caused and manipulated by technological innovation will become increasingly important.

References

Anderson, C. (2006). *The Long Tail: Why the future of business is selling less of more*. New York: Hyperion.

Arrington, M. (2008). Modeling the real market value of social networks [Electronic Version]. *TechCrunch*. Retrieved 05 September 2008 from http://www.techcrunch.com/2008/06/23/modeling-the-real-market-value-of-social-networks/.

Back, A., & Gronau, N. (2008). *Web 2.0 in der Unternehmenspraxis: Grundlagen, Fallstudien und Trends zum Einsatz von Social Software*. München: Oldenbourg Verlag.

Berners-Lee, T. (2000). Semantic Web - XML2000.   Retrieved 22 October 2008, from http://www.w3.org/2000/Talks/1206-xml2k-tbl/

Bryan, L. L., Matson, E., & Weiss, L. M. (2007). Harnessing the power of informal employee networks: Formalizing a company's ad hoc peer groups can spur collaboration und unlock value [Electronic Version]. *The McKinsey Quarterly*, 1-10. Retrieved 23.11.08 from http://www.mckinseyquarterly.com/Harnessing_the_power_of_informal_employee_networks_2051.

Bryman, A., & Bell, E. (2003). *Business research methods*. New York: Oxford University Press.

Bughin, J., & Manyika, J. (2007). How businesses are using Web 2.0: A McKinsey global survey [Electronic Version]. *The McKinsey Quarterly*. Retrieved 14.09.08 from http://www.mckinseyquarterly.com/marketing/digital_marketing/how_businesses_are_using_web_20_a_mckinsey_global_survey_1913.

Cannon, C. M., & Malone, M. S. (2007). Surviving the Information Age. *National Journal, 39*(26), 22-31.

Carter, S. (2007). *The new language of business - SOA and Web 2.0*. Upper Saddle River, NY: IBM Press.

Collective intelligence - The vision. (2008).   Retrieved 18.05.2008, 2008, from http://nz.youtube.com/watch?v=IQe8dWTbE2U

Collins, C. (Writer) (2006). Blogging: Serious Media or just a rant? [videorecording]. In B. Pederick (Producer). Australia: VEA, Inc.

Cook, N. (2008). *Enterprise 2.0: How social software will change the future of work*. Hampshire, England: Gower Publishing Ltd.

Davenport, T. H. (2005). *Thinking for a Living - How to Get Better Performance and Results from Knowledge Workers*. Boston: Harvard Business Press.

Drucker, P. (1988). The coming of the new organization. *Harvard Business Review, LXVI*(January-February), 45-53.

Elberse, A. (2008). Should you invest in the Long Tail? *Harvard Business Review, 86*(7/8), 88-96.

Enterprise 2.0 in Germany - Prevalence, opportunities and challenges. (2007). A study commissioned by CoreMedia, carried out by Berlecon research.

Fatally flawed: Refuting the recent study on encyclopedic accuracy by the journal Nature [Electronic (2006). Version] from http://corporate.britannica.com/britannica_nature_response.pdf.

Fish, S. (2004). Which open source Wiki works for you? [Electronic Version]. Retrieved 30 September 2008 from http://www.onlamp.com/pub/a/onlamp/2004/11/04/which_wiki.html.

Fontana, J. (2008). How will Google's Chrome shine in the enterprise? *Network World, 25*(35), 13.

Friedman, V. (2008). *Praxisbuch Web 2.0 - Moderne Webseiten programmieren und gestalten*. Bonn: Galileo Press.

Geoghegan, M. W., & Klass, D. (2007). *Podcast solutions: The Complete guide to audio and video podcasting* (2nd ed.). New York: Apress.

Gibson, B. (2008). Web 2.0. In Y. Y. S. Harper (Ed.), *Web Accessibility* (pp. 331-343). London: Springer.

Giles, J. (2005). Internet encyclopaedias go head to head. *Nature, 438*(15), 900-901.

Gohring, N. (2007). YouTube starts paying. *New Zealand PC World Magazine, June 2007,* 19.

Gonzalez, T. (1999). IBM woos developers with new site [Electronic Version]. *CNN.com*. Retrieved 01 December 2008.

Grossman, L. (2006). Person of the year: You. *TIME, 168*(26), 38.

Hinchcliffe, D. (2006). Enterprise 2.0: Ten Predictions for 2007 [Electronic Version]. *ZDNet*. Retrieved 15 November 2008 from http://blogs.zdnet.com/Hinchcliffe/?p=76.

Hinchcliffe, D. (2007). The state of Enterprise 2.0 [Electronic Version]. *ZDNet*. Retrieved 15 November 2008 from http://blogs.zdnet.com/Hinchcliffe/?p=143.

Hinchcliffe, D. (2008). Dion Hinchcliffe's Web 2.0 blog [Electronic Version]. Retrieved 05 September 2008 from http://web2.socialcomputingmagazine.com/.

Hodgkinson, S. (2007a). *Does your enterprise need Web 2.0?* : Ovum Report.

Hodgkinson, S. (2007b). *Web 2.0 and the Public Sector*: Ovum Report.

Hodgkinson, S. (2007c). *What is Web 2.0?* : Ovum Report.

Howerton, J. T. (2007, May/June). Service-oriented architecture and Web 2.0. *IT Professional, IEEE, 9,* 62-64.

Iliyev, D., Choi, K. H., & Kim, K. J. (2008). Dangers of applying Web 2.0 technologies in E-commerce solutions (2008 International Conference on Information Science and Security). *IEEE Computer Society*, 17-25.

Kann, P. v. (2007, December 11). Secure your site. *.net, 171,* 38-47.

Lamont, J. (2008). Mashup essentials. *KM World*(June), 16-24.

Lane, J., & Smith, S. (2008). *Foundation: Website creation with CSS, XHTML, and JavaScript*: Friends of Ed.

Lasky, M. (2007). Your Online Office. *NZ PC World*(March), 22-25.

Lawton, G. (2007, October). Web 2.0 creates security challenges. *Computer, IEEE,* 13-16.

Leuf, B., & Cunningham, W. (2001). *The Wiki Way: Quick Collaboration on the Web*. Boston: Addison-Wesley.

Lin, K.-J. (2007). Building Web 2.0. *Computer, IEEE*(May), 101-102.

List of Wikipedias. (2008).   Retrieved 30 September, 2008, from http://meta.wikimedia.org/wiki/List_of_Wikipedias

Manyika, J. (2008). Google's view on the future of business: An interview with CEO Eric Schmidt [Video-recorded Interview]: The McKinsey Quarterly.

McAfee, A. P. (2006). Enterprise 2.0: The dawn of emergent collaboration. *MIT Sloan Management Review, 47*(3), 20-28.

MediaWiki. (2008).   Retrieved 30 September, 2008, from http://www.mediawiki.org/wiki/MediaWiki

Mikroyannidis. (2007, November). Toward a Social Semantic Web. *Computer, IEEE, 40,* 113-115.

Mitchell, D. (2007). *Web 2.0 or Bubble 2.0?* : Ovum Report.

Mitchell, R. L. (2007, March 26). Web 2.0 users open a box of securtiy risks. *Computerworld, IEEE, 41,* 32.

Murugesan, S. (2007, July/August). Understanding Web 2.0. *IT Professional, IEEE, 9,* 34-41.

OECD Factbook 2008: Economic, Environmental and Social Statistics. (2007).): OECD.

OECD Science, Technology and Industry Outlook 2008. (2008).): OECD.

Putting knowledge into practice: A broad-based innovation strategy for the EU, (2006).

Radar Networks Announces Twine.com. (2007). *Business Wire*.

Rector, L. H. (2008). Comparison of Wikipedia and other encyclopedias for accuracy, breadth, and depth in historical articles. *Reference Services Review, 36*(1), 7-22.

Research and Development in New Zealand. (2006).): Ministry of Research, Science and Technology.

Research and innovation in Germany 2007. (2007).): Federal Ministry of Education and Research.

Richardson, S. A. (1965). *Interviewing: Its forms and functions*. New York: Basic Books.

Rigby, B. (2008). *Mobilizing Generation 2.0: A practical guide to using Web 2.0 technologies to recruit, organize, and engage youth*. San Francisco: Jossey-Bass.

Rist, O. (2008). Podcasting for profit: From recording to distribution, how to get your message to potential customers. *PC Magazine, August 2008,* 80.

Rosenzweig, R. (2008). Can history be open source? Wikipedia and the future of the past. *The Journal of American History*.

Schroth, C., & Janner, T. (2007, May/June). Web 2.0 and SOA: Converging concepts enabling the internet of services, IEEE. *IT Professional, 9,* 36-41.

Schulz, N. (2007). Mass conformity is dead - Long live mass customization. *The American, 1*(2), 72-73.

The Semantic Web of data. (2007). [Video]: Upland Productions produced in collaboration with Technology Review.

Shuen, A. (2008). *Web 2.0: A Strategy Guide*. Beijing, Cambridge, Farnham, Köln, Paris, Sebastopol, Taipei, Tokyo: O'Reilly Media, Inc.

Smith, K. (2006). Measuring Innovation. In J. Fagerberg, D. C. Mowery & R. R. Nelson (Eds.), *The Oxford Handbook of Innovation* (pp. 148-179). Oxford: Oxford University Press.

Spanbauer, S. (2007). Take your blog to the next level. *NZ PC World, March 2007,* 77.

Sporny, M. (2007). Intro to the Semantic Web [Online Presentation]: YouTube.

Stafford, T., & Webb, M. (2006). What is a Wiki (and how to use one for your projects) [Electronic Version]. Retrieved 30 September 2008 from http://www.oreillynet.com/pub/a/network/2006/07/07/what-is-a-wiki.html.

Stephens, R. T. (2008). Knowledge management strategy for Web 2.0 integration. In M. D. Lytras, M. Russ, R. Maier & A. Naeve (Eds.), *Knowledge management strategies: A handbook of applied technologies* (pp. 170-193). New York: IGI Publishing.

Stephey, M. J. (2008). Sarah Palin's E-Mail Hacked [Electronic Version]. *TIME*. Retrieved 15 October 2008 from http://www.time.com/time/politics/article/0,8599,1842097,00.html.

Suarez, L. (2008). I freed myself from e-mail's grip [Electronic Version]. *New York Times*. Retrieved 20th December 2008 from http://www.nytimes.com/2008/06/29/jobs/29pre.html?fta=y.

Sun, W., Zhang, K., Chen, S.-K., Zhang, X., & Liang, H. (2007). Software as a Service: An integration perspective. In B. Krämer, K.-J. Lin & P. Narasimhan (Eds.), *Service-Oriented Computing - ICSOC 2007: Fifth International Conference, Vienna, Austria, September 17-20, 2007, Proceedings.* (pp. 558-569). Berlin: Springer.

Symon, G. (2000). Information and communication technologies and the network organization: A critical analysis. *Journal of Occupational and Organizational Psychology, 73*, 389-414.

Tapscott, D., & Caston, A. (1992). *Paradigm shift: The new promise of information technology*. New York: McGraw-Hill, Inc.

Tapscott, D., & Williams, A. D. (2006). *Wikinomics - How mass collaboration changes everything*. London: Penguin Books Ltd.

Tarcsi, Á. (2007). *The Web 2.0 business model and a Web 2.0 enterprise: Google*. Paper presented at the International Symposium on Logistics and Industrial Informatics in Wildau, Germany: LINDI.

Topolski, E. (2008). Lotus Sametime celebrates 10th anniversary with industry accolades [Electronic Version]. *CNNMoney.com*. Retrieved 01 December 2008 from http://money.cnn.com/news/newsfeeds/articles/marketwire/0372235.htm.

Vossen, G., & Hagemann, S. (2007). *Unleashing Web 2.0 - From Concepts to Creativity*. Boston: Elsevier.

White, B. (2007). The implications of Web 2.0 on Web information systems. In J. Filipe, J. Cordeiro & V. Pedrosa (Eds.), *WEBIST 2005/2006* (pp. 3-7). Berlin: Springer.

Yakovlev, I. V. (2007). Web 2.0: Is it evolutionary or revolutionary? *IT Pro*(November/December 2007), 43-45.

Yee, R. (2008). *Pro Web 2.0 mashups: Remixing data and web services*. New York: Springer.

Appendix A

Figure 16

OECD Member Countries
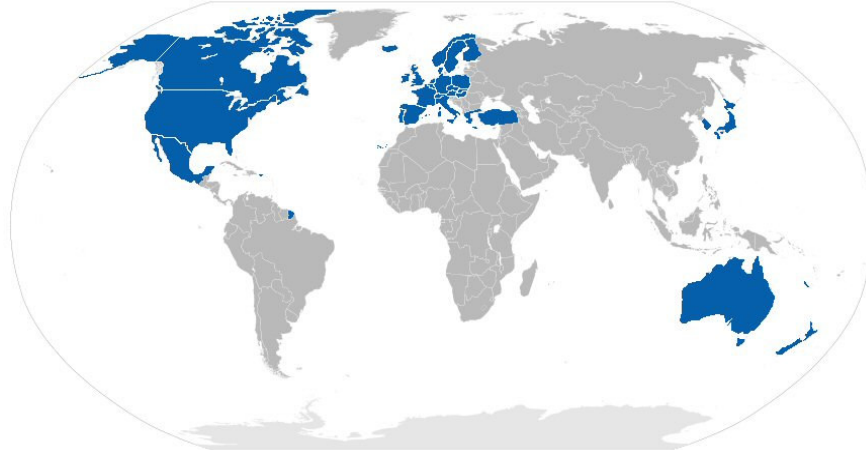
Note. OECD monitors, analyses, forecasts and publishes statistics as well as economic and social data. The Source for the blank world map is Wikimedia Commons. The colouring was carried out according to the 30 member countries of OECD: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom and the United States.

Appendix B

Figure 17

Suarez Experiment – Fighting Emails at Work

February																			2008																									December

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Monday	15	15	6	7	8	5	5	22	2	9	4	7	7	5	4	2	2	4	6	5	17	13	9	3	3	4	2	3	1	3	4	6	8	3	12	6	4	7	8	7	4	5	6	4	3	0
Tuesday	9	8	13	9	7	10	10	1	15	11	12	4	7	13	7	9	7	2	5	5	4	15	8	4	5	6	4	6	5	5	4	4	3	2	7	7	5	9	14	5	1	5	13	4	9	3
Wednesday	9	8	9	9	12	11	11	3	13	12	14	10	8	7	5	7	7	4	8	3	4	7	9	2	3	8	6	12	7	3	4	3	10	5	4	8	6	9	10	3	11	10	4	4	10	0
Thursday	6	4	6	10	4	11	12	5	3	14	5	4	7	10	5	4	7	10	11	3	4	3	6	12	6	8	10	12	3	1	5	5	2	2	14	7	3	8	7	4	20	5	6	5	5	0
Friday	6	5	5	4	4	4	9	3	5	14	2	2	6	5	5	5	6	11	4	8	1	9	2	12	5	4	2	3	5	8	3	10	7	1	7	3	6	4	10	1	7	1	8	6	8	0
Total	**45**	**40**	**39**	**39**	**35**	**41**	**47**	**34**	**38**	**60**	**37**	**27**	**35**	**40**	**26**	**27**	**29**	**31**	**34**	**24**	**30**	**47**	**34**	**33**	**22**	**30**	**24**	**36**	**21**	**20**	**20**	**28**	**30**	**13**	**44**	**31**	**24**	**37**	**49**	**20**	**43**	**26**	**37**	**23**	**35**	**3**

Suarez Experiment – Fighting e-mails at Work

Number of Incoming e-mails (y-axis)

Number of Weeks (February-December 2008) (x-axis)
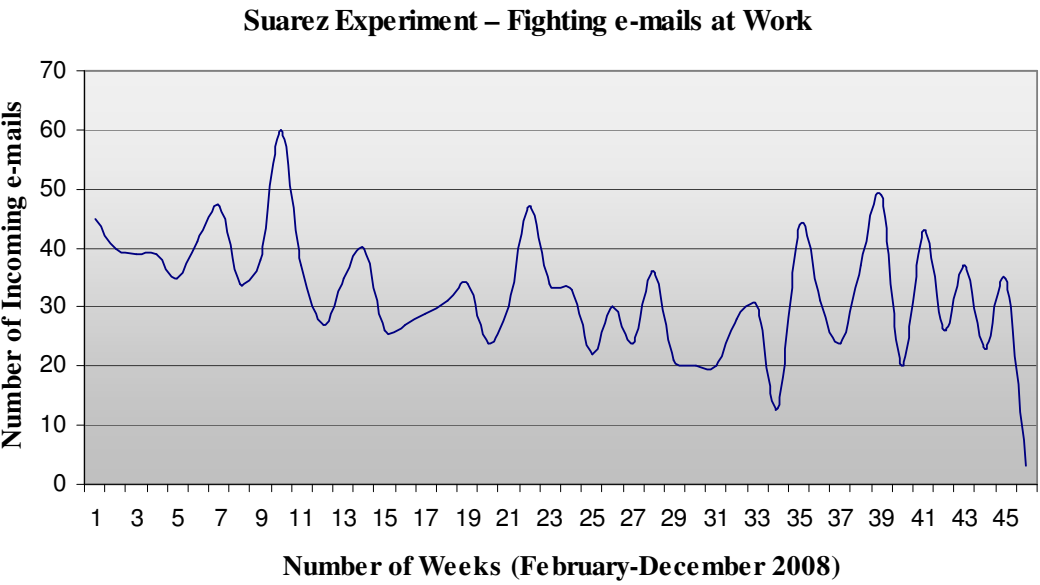
Note. Source for numerical data: http://www.flickr.com/photos/lsr/3148603804/sizes/o/. Progress report by Suarez who cuts down his daily work related emails since February 2008 and utilises social networking tools instead (2008). The total in the table above refers to the total of incoming emails per five working days.