Study of the Impact of Enterprise 2.0 in Companies at Business Net Partners GmbH

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Masters Dissertation

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"View life as a continuous learning experience." - Denis Waitley

Study of the Impact of Enterprise 2.0 in Companies

Abstract

Web 2.0 technologies have been adopted by companies, creating the term Enterprise 2.0. This activity has been intensively studied but great part of the studies about the topic has not provided enough relevant insights about its impact.

In order to fill this gap, a study about the impact of Enterprise 2.0 technologies in companies was conducted together with Business Net Partners GmbH. After an extensive literature review and an analysis of diverse case studies about the topic, a survey was designed, implemented and distributed. From the conduction of the survey resulted information provided by 18 companies about the use and effects of Enterprise 2.0 technologies. Among the collected data were insights on why and how companies are adopting Enterprise 2.0 technologies, and which business activities they were benefiting more from them.

From the analysis of these results emerged that Enterprise 2.0 is more than a simple technology adoption, as it brings positive results in productivity, cultural changes and benefits in the human resources management. The type of impact might vary not only with the number of employees but also with the region where the company is headquartered. In terms of business activities, Innovation and New Product Development appeared as areas where companies are using and perceiving relevant benefits from Enterprise 2.0 tools. In order to better understand the impact of those benefits, companies need to effectively measure their impact by adopting more business-oriented metrics (e.g. time-to-market in innovation).

Estudo do Impacto da *Enterprise 2.0* em Empresas

Resumo

Tecnologias de *Web 2.0* têm vindo a ser adotadas por empresas, surgindo o termo *Enterprise 2.0*. Esta atividade tem sido intensamente estudada mas, em grande parte dos estudos sobre o tema, não existem dados muito objetivos sobre o seu verdadeiro impacto.

Para preencher esta lacuna, um estudo sobre o impacto das tecnologias *Enterprise 2.0* nas empresas foi realizado em conjunto com a Business Net Partenrs GmbH. Após uma extensa revisão de literatura e uma análise de diversos casos de estudos sobre o tema, foi desenhado, implementado e distribuído um inquérito. Foram recolhidas informações de 18 empresas sobre o uso e efeitos das tecnologias de *Enterprise 2.0*. Entre os dados recolhidos estão informações sobre as razões pelas quais as empresas estão a adotar tecnologias *Enterprise 2.0*, e quais as atividades de negócios que mais estão a beneficiar dessa adoção.

A partir da análise desses resultados foi possível perceber que *Enterprise 2.0* é mais que uma simples adoção de tecnologia, pois traz resultados positivos na productividade, mudanças culturais e benefícios na gestão de recursos humanos. O tipo de impacto pode variar, não só com o número de funcionários, mas também com a região onde a empresa está sediada. Em termos de atividades de negócio, Inovação e Desenvolvimento de Novos Produtos surgiram como áreas onde as empresas estão a utilizar e a recolher benefícios relevantes das ferramentas de *Enterprise 2.0*. A fim de melhor perceber o impacto desses benefícios, as empresas necessitam de medir de forma efetiva o impacto das suas iniciativas de *Enterprise 2.0*. Uma das formas de o fazer passará, por exemplo, pela adoção de métricas mais orientadas ao negócio (p. ex. tempo de desenvolvimento de um novo produto).

Acknowledges

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1   Introduction

The World Wide Web, or simply Web, is shaping the world. The Web is today part of our daily personal and professional lives. An example of this fact is the increasing number of companies conducting some of their business activities using Web 2.0 technologies as wikis, blogs or social networks, which became popular during the last decade. From the use of these technologies in a company environment emerged a phenomenon known today as Enterprise 2.0.

Despite the predominance of Enterprise 2.0 initiatives, it is still not totally clear if this is a technology fad or a business revolution. In order to better understand the phenomenon, many companies, experts, and researchers from varied fields have been studying its impact and results.

1.1   Presentation of Business Net Partners GmbH

Founded in 1996, Business Net Partners GmbH is a management consulting boutique with an entrepreneurial approach in four main fields of activity: Business Development, Benchmarking, IT Solutions & Enterprise 2.0 and Knowledge Management.

The company, headquartered in Heidelberg (Germany), has its roots in the Web and IT development and mixed its teams from early on with external senior experts and student developers. Thus the project could be better staffed according to the individual assignments. From the success of those collaborations emerged what is today the main pillar of Business Net Partner's success: its 3-tier approach (Figure 1). This innovative approach has delivered results and consists of a combination of people with different experience and backgrounds:

- Project managers, software engineers and professionals with profound experience and an entrepreneurial, consulting or software engineering background are the core of the project teams;

- Senior experts with experience as former top managers, consultants or professors ensure an on demand quality control;

- Start-ups, young software developers and junior consultants which bring the latest know-how as well as fresh approaches and ideas.
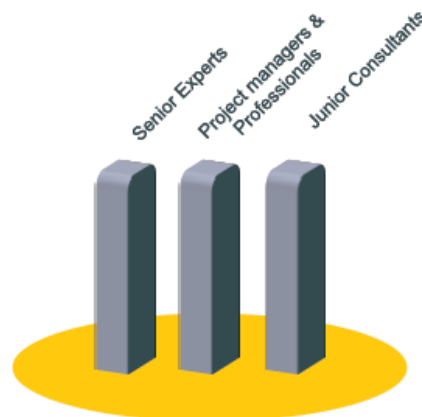
Figure 1 - The Business Net Partners 3-Tier Concept

Since its consulting years started over seven years ago, Business Net Partners has served successfully SMEs (Small and Medium Enterprises) and large corporations from different industries such as aviation, financial services IT or Engineering. Among its list of clients are companies as Lufthansa or BASF.

1.2 Project Description

For the dissertation project a topic influencing business activities of SMEs and large corporations was selected. Considering the increasing number of consulting solutions in the area of Enterprise 2.0, this was the recent trend chosen for the project. The existing case studies on this topic were mostly not providing enough relevant insights on, why and how companies are adopting Enterprise 2.0 technologies, and which business activities are benefiting more from it.

In order to fill these gaps, it was decided to conduct a study about impact of Enterprise 2.0 technologies in companies. During the preparation of the study, innovation and new product development were perceived as business activities where Enterprise 2.0 technologies are more relevant and important. The mentioned perception, aligned with Business Net Partners present and future consulting activities, led to a focus on Innovation and New Product Development activities for the study.

1.3 Goals of the Project

The findings of this project shall help to understand the diverse use and benefit from Enterprise 2.0, which is influencing many business clients. In order to do so, the goals for this project are:

- Perceive the increasing relevance of Web 2.0 and Enterprise 2.0 for companies;

- Discover the reasons behind the adoption and use of Enterprise 2.0 technologies as well as their impact in the organization and business activities;

- Collect insights about how companies are using Enterprise 2.0 technologies in their innovation and new product development activities;

- Increase the awareness of this topic and potential future cooperation with Business Net Partners.

1.4 Methodology

The methodology adopted for this project was composed of several stages in order to correspond to the goals of the project as well as to match the criteria for a scientific dissertation.

Firstly the terms Web 2.0 and Enterprise 2.0 had to be defined, in order to create a common understanding and to better identify the trends one is looking for. By analyzing studies about the use and effects of Enterprise 2.0, it was possible to understand the broadness of the topic. In order to work around this potential problem, it was important to focus the study on a specific business area or department. The measurable value Web 2.0 technologies were bringing to Innovation and New Product Development (NPD) led to the exploration of those areas in more detail.

Once this decision was made, the theoretical framework was extended to case-studies and literature findings connecting Enterprise 2.0 with Innovation and NPD. All the findings collected in the literature review were used to support an online survey design process. During this design process, the survey was constantly tested with potential participants and iterated until its final version. As soon as the design process was completed, the survey was distributed among the participating companies.

All the data collected from the online survey was later statistically analyzed. The key findings that emerged from that analysis were compared with other findings found on the literature. The results from this last analysis led to the conclusions of the study.

1.5   Thesis Outline

The present dissertation is divided into the following five main chapters.

Introduction:

In this section the subject of the dissertation was introduced. Firstly Business Net Partners GmbH, company partner for this dissertation, was presented, followed by an introduction of the project and its goals. The methodology used in the dissertation was later presented and described.

Literature Review

The sections in this chapter introduce Enterprise 2.0 concepts from a theoretical standpoint. On the first section, Web 2.0 and Enterprise 2.0 are defined; theories and models are presented as well as some findings about its impact in companies worldwide. Due to the extension of the subject and some findings, the impact of Enterprise 2.0 in Innovation and New Product Development is explored in more detail. In a second phase, the term innovation is defined; the evolution of innovation management systems is explained and the concepts open innovation and new product development process are introduced. Thirdly, literature findings about companies using Enterprise 2.0 for Innovation and New Product Development are presented.

Study of the Impact of Enterprise 2.0 in Companies

In this chapter, the study conducted in partnership with Business Net Partners is described in detail. The approach used within the study is firstly explained followed by a detailed presentation of the design process of the online survey as well as the method used to gather the necessary primary information for this study. After a statistical analysis of the data collected, the empirical findings of the study are presented.

Analysis and Discussion

In this particular section, the survey results (primary information) and the key findings collected on other studies (secondary information) are compared. The results of that comparison are then interpreted and consolidated, thriving to the conclusions of the study.

Conclusions and Future Research

The main conclusions drawn from the previous chapter will be presented, analyzed and reflected to what extent the initial aims have been accomplished and what concrete results were achieved with this study. Future research opportunities will be included in this chapter as well.

2   Literature Review

2.1   Enterprise 2.0

2.1.1   From Web 1.0 to Web 2.0

The term Web 2.0 was firstly defined by O'Reilly (2006) as "the business revolution in the computer industry caused by the move to the Internet as platform, and an attempt to understand the rules for success on that new platform". According to O'Reilly (2005) the key principles of this new era are:

- *The Web as a Platform:* Web 2.0 can be compared to a solar system, in which the set of principles and practices are tied together to a system of sites, related to the core and positioned at a varying distance around it (Kiron, Palmer, Phillips, & Kruschwitz, 2012; Mackeviciute & Iacubitchi, 2010);

- *Harnessing Collective Intelligence:* network effects from user contributions enable peer-production;

- *Data is the Next Intel Inside:* although the ambiguity about the ownership of the data collected by these new services, data have become the driving force of Web 2.0;

- *End of Software Cycle Release:* software is no longer a product running on desktops but instead a service delivered over the web;

- *Lightweight Programming Models:* models allowing the integration of services provided by others to get better harnessing;

- *Software Above the Level of a Single Device*: the number of different devices connected to the Web has been increasing. As a result software is delivered in more than a single device;

- *Rich User Experiences:* the successful companies will develop solutions by learning from their users. By using architectures of participation those companies are able to enrich their user experiences.

This new kind of technology, that emerged in 2004 and became popular on the Internet, is a group of web-based software tools allowing users to comment, collaborate, and edit information, allowing the creation of group-generated content. These new technologies were a contrast of Web 1.0 (Annex A) where information was passed to an inactive and receptive user (McAfee, 2006; Oberhelman, 2007; Tapscott & Williams, 2008).

2.1.2   Definition of Enterprise 2.0

Andrew McAfee (2006) coined the term Enterprise 2.0 to define "those platforms that companies can buy or build in order to make visible the practices and outputs of their knowledge workers". The term aimed to describe how Web 2.0 technologies could be used on organizations' intranets and extranets, and to describe the impact they would have in a business environment. Among those technologies and technology-based communities are

blogs, Facebook, Wikipedia, Twitter, wikis, prediction markets, Delicious or social networking software (McAfee, 2009).

McAfee (2006) was also the first author who attempted to define the components of Enterprise 2.0 technologies with the acronym SLATES (Search, Links, Authoring, Tags, and Extension) represented in Figure 2. Later in 2007, Dion Hinchcliffe, a wide-known blogger and IT Professional, expanded that concept to FLATNESS, adding more features into it.

Search – Discoverability of information drives reuse, leverage, and ROI.

Links – Using URIs to forge thousands of deep interconnections between enterprise content 24/7.

Authorship – Ensuring every worker has easy access to Enterprise 2.0 platforms.

Tags – Allowing natural, organic, on-the-fly organization of data from every point of view.

Extensions – Extend knowledge by mining patterns and user activity.

Signals – Make information consumption efficient by pushing out changes.

Figure 2 - SLATES Model (Hinchcliffe, 2007)

Search: Although features like intranet page layouts or navigation facilitate the access to information, users are increasingly ignoring those in favor of keyword searches (McAfee, 2006).

Links: Google was mainly responsible for the huge leap forward in the Internet search quality by taking advantage of the information contained in links between Web pages (McAfee, 2006). By measuring the number of links it is also possible to measure the relevance of the online content. In this kind of structure, the most relevant pages are ranked first accordingly to the frequency they were linked. Nevertheless, in an intranet context, that measure is less relevant, especially considering the relatively small size of the groups enabled to create links. In order to change this paradigm, organizations should enable more users to build links on Enterprise 2.0 tools.

Authoring: Internet blogs and Wikipedia have demonstrated that many people have a desire to author – to write for a broad audience (McAfee, 2006). Blogs allow individual authorship while wikis enable group authorship. Those two technologies have different types of content: on blogs the content is cumulative (individual posts and comments to posts are accumulated over time) but on wikis that content is iterative (people undo and redo each other's work). When authoring tools are deployed and used within a company, the intranet platform shifts from being the creation of a few to being the constantly updated, interlinked work of many (Mackeviciute & Iacubitchi, 2010).

Tags: Some sites on the Web, in order to aggregate large amounts of content, outsource the categorization process to their users by letting them attach tags – one-word descriptions (McAfee, 2006). Usually those sites – such as Flickr for photos or del.icio.us for Web site bookmarking – do not have an imposed or rigid up-front categorization scheme; they instead let one emerge over time as result of users' activity.

This categorization system emerging from tagging is called *folksonomy*. The system, as defined by Thomas Vander Wal (2007), is "the result of personal free tagging of information and objects for one's own retrieval" being the tagging action done in a social environment (shared and open to others).

Enterprise 2.0 tools also allow employees to organize the information and knowledge about their company's activities in a way that will increase their work efficiency. Employees use tags to keep track, organize and assign reminders to the information they have consulted. They are also allowed to view which sites were visited and tagged by their colleagues. As a result, visibility of patterns and process in knowledge work would increase (McAfee, 2006).

Extensions: computers can support extension to tags by automating some of the work of categorization and pattern matching (McAfee, 2006). Those algorithms analyze the patterns of user activity to give individual recommendations of similar content. Amazon was one of the first companies applying extensions by starting to give book recommendations based on users' previous activities (Mackeviciute & Iacubitchi, 2010)

Signals: one of the problems when adopting social software is the fact that, even using features to search and categorize information, users can easily feel overwhelmed. New content is added so often that checking for updates on all sites of interest is extremely time-consuming (McAfee, 2006). As a solution to avoid this kind of situations, the final element of the SLATES infrastructure is a technology feature to signal users when new content of interest appears. The form of those signals varies from e-mails alerts to RSS (Really Simple Syndication).

Dion Hinchcliffe (2007) pointed out that some platforms failed to make the cut to Enterprise 2.0 by not providing a tool where workers could communicate and collaborate. For the author Enterprise 2.0 "takes most of the potent ideas of Web 2.0, user generated content, peer production, and moves them into the workplace". On Hinchcliffe's opinion SLATES does not capture three essential aspects of Enterprise 2.0: social, emergent and freeform. In order to complete the initial model, Hinchcliffe (2007) added these three elements and network-oriented, creating the FLATNESSES model (Figure 3).
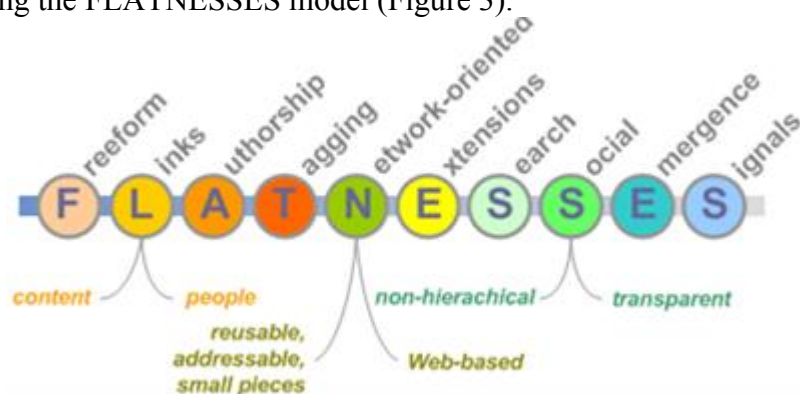
Figure 3 - FLATNESSES Model (Hinchcliffe, 2007)

Social: the social aspect of Enterprise 2.0 is directly related with its origins: Web 2.0 is also known as the "social Web". Enterprise 2.0 technologies explore this aspect by empowering collaboration and knowledge sharing between workers. These practices will contribute for a less hierarchical and more transparent organization (Hinchcliffe, 2007).

Emergent: Enterprise 2.0 technologies are in constant development and improvement (Mackeviciute & Iacubitchi, 2010). The platforms emerging from this kind of technology are constantly changing their structure built by distributed, autonomous and largely self-interested peers (McAfee, 2006).

Free-form: the adoption of Enterprise 2.0 platforms often starts with the deployment of simple free-form tools that later evolve to other platforms more adequate for specific situations. As an example, enterprise mash-ups enable for user-created Web applications the same as enterprise blogs and wikis do for user-created content and structure (Hinchcliffe, 2007).

Network oriented: in order to reflect this aspect of Enterprise 2.0, companies must not only deploy applications that are fundamentally delivered over a network, but enable the creation of content fully Web-oriented, addressable, and reusable (Hinchcliffe, 2007).

The term Enterprise 2.0 is often connected to other terms as Social Software or Social Media. Social Software "refers to various, loosely connected types of application that allow individuals to communicate with one another and to track discussion across the Web as they happen" (Tepper, 2003). In this definition it is possible to find some of the core concepts of Web 2.0 technologies: human behavior and participation of the individual (Back & Koch, 2011). Social Media is a term often used as a synonym for Social Software or to describe the communication channels opened by Social Software (Back & Koch, 2011). Twitter or Facebook are examples of applications opening communication channels, for example, between companies and costumers.

Over the last few years, the terminology around Enterprise 2.0 has been intensely under discussion. Some experts argued flaws in the concepts captured by Enterprise 2.0 and suggested "Social Business" as a more accurate term than Enterprise 2.0 (Berg, 2009; Boyd, 2010; Dawson, 2011; Pfeiffer, 2011). Social Business is defined as "an organization designed consciously around sociality and social tools, as a response to a changed world and the emergence of the social web, including social media, social networks, and a long list of other advances" (Boyd, 2010). Although terms like "Social Business" and "Social Enterprise" have been adopted by several software vendors (Terrar, 2012), these terms are often misunderstood as social entrepreneurship terms or as terminology with political connotations (Pfeiffer, 2011).

For the purpose of this dissertation, Enterprise 2.0 is the adoption and use of Web 2.0 technologies within a company as well as new business practices (e.g. business processes or cultural changes) coming along with these. The mentioned business practices are explored in the upcoming sections of this chapter.

2.1.3   Enterprise 2.0 Tools

Over the last years, triggered by the success of Web 2.0 based social applications such as wikis and blogs, specific software such as my MySpace, Flickr and YouTube (Papanikolaou & Mavromoustakos, 2008) or more recently Facebook, LinkedIn and Twitter (Gibson, 2009), Enterprise 2.0 technologies have been adopted in business environments. Nowadays a wide variety of platforms used by companies worldwide integrate a large number of complex web-based tools as wikis, blogs, search or tagging (Büchner, Matthes, & Neubert, 2011). Niall Cook (2008) attempted to organize this wide variety of tools in four categories: Communication, Cooperation, Collaboration and Connection. With this new model, known as 4C model, the author categorizes the Enterprise 2.0 tools according to their level of formality and interaction (Figure 4).
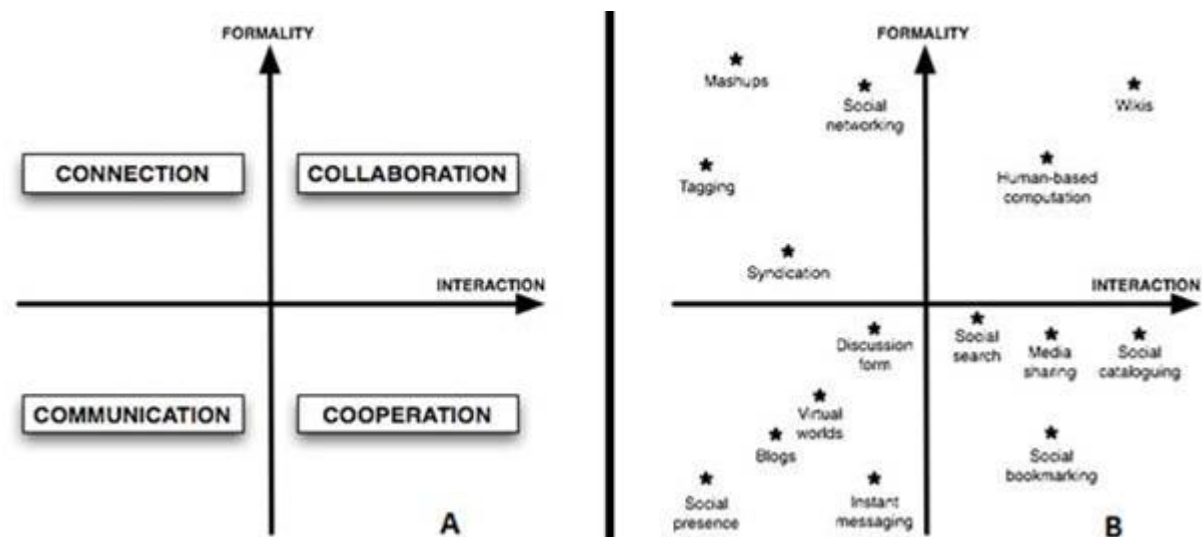
Figure 4 - The 4Cs matrix (A) and the 4Cs Social Software Technology Framework (B) (Cook, 2008)

2.1.3.1 Communication Tools

Cook (2008) defines this category of tools as the ones allowing people to converse with others, either by text, image, voice or video – or a combination of all these technologies. Tools as forums, blogs, instant messaging, social presence and virtual worlds are included by the author in this category.

Discussion Forums:

A discussion forum is a platform enabling people to initiate discussions to which other users can review and contribute to (Cook, 2008). The content of these discussions might vary but usually consists of questions, opinions, or responses to a specific event (e.g. the latest staff meeting). Generally all the responses are posted one after another in a single streamline for each topic, usually known as a thread.

Blogs:

Blog, a contraction for the term 'web log', is a website that contains dated entries in reverse order (from the most recent to the first) about a particular topic (Boulos, Maramba, & Wheeler, 2006). Considered the equivalent of journals in the digital world, blogs allow their authors (known as bloggers) to post messages periodically allowing readers to comment (Cook, 2008).

In the enterprise context, blogs are often used to communicate information to a large group of employees, and by project teams to periodically report their progress, creating knowledge repositories. Internal blogs usually support communication in three main activities: knowledge management, business intelligence and project management reporting (Cook, 2008).

Instant Messaging:

Software usually installed on each person's computer that allows one person to communicate with another (or with groups) over the Internet (Cook, 2008). Usually communication is text-based, but the integration of VoIP (Voice over Internet Protocol) technologies has also allowed real-time audio and video communication at no cost. One of the main benefits of this technology in enterprise context is the ability for each member of staff to hold multiple conversations (either one-to-one or many-to-many). In many organizations employees have been using Instant Messaging as a complement or replacement of email (Quan-Haase, Cothrel, & Wellman, 2005).

Social Presence:

Social Presence refers to a set of applications, built on the concept of instant messaging, that allows people to send updates to central locations from where they are distributed to all those who are willing to know what they are doing (Cook, 2008). Generally the updates can be sent and received via web, email, SMS or other PC and mobile applications. Facebook, Twitter, LinkedIn or Foursquare are examples of this type of applications.

Microblogs:

Microblogs are frequently described as smaller versions of weblogs with features for social networking and focused on mobility (Böhringer & Richter, 2009). Each user has a public microblog where they can post short updates (usually up to 140 characters), being those updates displayed in chronological order.

In the corporate environment, Microblogging is important when coordinating group activities in different task domains helping, in a company context, to essentially support team communication (Böhringer & Richter, 2009).

Virtual Worlds:

Virtual Worlds are technologies allowing people to meet and interact by a representation of themselves (an avatar) with others in a computer-based environment resembling the real world (Cook, 2008).

In a business environment these virtual worlds, commonly seen in gaming, are used in different activities as holding and conducting meetings, conducting training, or for simple socialization between colleagues (Cook, 2008).

2.1.3.2 Cooperation Tools

Software with sharing capabilities enables people to share content with others in structured and unstructured ways such as file sharing, social bookmarking and social cataloguing (Cook, 2008). The tools included in this group are primarily concerned with social software that supports informal work. That work, without pre-defined goals, retains each individual contributor authority over their own contribution, information is shared as needed and the software assembles data in order to show an overview to the user (Cook, 2008).

Media Sharing:

Companies and services as Facebook, Twitter, Youtube, Flickr or Instagram turned sharing photographs and videos one of the most popular uses of social software in the consumer space. Media Sharing is no longer limited to photographs and videos. All kind of files can be shared (Cook, 2008). The real power of file sharing emerges when those files are embedded in other applications as blog posts, web-pages or, more recently, micro-blogging or collaboration platforms. Other emergent services as Dropbox or Box allow file sharing via cloud computing services.

Companies are using file sharing to enrich their knowledge bases or, for example, when using video sharing for informal virtual learning (Cook, 2008). An important aspect is that everyone needs to be able to create, publish and share. All users must be also able to tag what they share with any keyword and extend the value of other documents through tagging, commenting and even voting. The technologies must then be able to extrapolate this information, identify patterns, relationships and common groupings of content and people, as well as provide methods (such as email notifications or RSS), allowing people to easily filter documents for themselves and for others (Mackeviciute & Iacubitchi, 2010).

Social Bookmarking:

Social Bookmarking services allow people to post links to web pages they found useful and interesting, either for their private reference or to share with others (Cook, 2008). Usually those services include user-generated non-hierarchical keyword categorization systems (called folksnomies) by allowing people to tag their bookmarks with freely chosen keywords.

The use of those tools in business is usually residual, having become popular as part of the knowledge management or collective intelligence strategies. They mainly contribute to enhance the collection of all kinds of employee-contributed corporate intelligence, from research information and consumer insight to product ideas or media coverage (Cook, 2008).

Social Cataloguing:

Social Cataloguing applications allow contributors to build databases of information on specific topics, which usually include the ability to infer recommendation through voting or network theory (Cook, 2008).

In a business environment, corporate data allow employees to have easy and fast access to related information (e.g. documents or contact details) when, for example, using the search engine (Cook, 2008).

2.1.3.3 Collaboration Tools

Collaboration tools are those tools encouraging people to collaborate with each other on defined problems directly and indirectly in both distributed and undistributed ways (Cook, 2008). Collaborative tools differ from cooperative tools due to an engagement of users in a coordinated effort to solve a problem, with shared commitment and goals. Wikis, probably the most widely used tool of this category (Mackeviciute & Iacubitchi, 2010), and Human-based computation are some examples of this kind of technologies.

Wikis:

A wiki, which means 'quick' in Hawaiian (Taft, 2006), is a website whose pages can be collaboratively created, edited and linked by anyone with the required level of access to do so (Cook, 2008). Nowadays the best example of a wiki in practice is 'Wikipedia – The Free Encyclopedia' (Boulos et al., 2006). The main difference between wikis and websites is the fact that on wikis the content is automatically created, modified and updated (Majchrzak, Wagner, & Yates, 2006). Another powerful characteristic of wikis is the ease of its use allowing even people with low technology knowledge to use them, empowering knowledge sharing across all the organization (Cook, 2008).

Companies use wikis as sources to obtain information and knowledge as well as for virtual collaboration (Boulos et al., 2006).

Human-based Computation:

Human-based computation technologies allow humans to contribute with solutions to specific problems as part of an evolutionary process. The solutions in turn inform the software, enabling it to provide better information to the next user (Cook, 2008). In contrast to established systems, it is the user, and not the computer, who solves a problem (Mackeviciute & Iacubitchi, 2010).

As an example, corporations are using software and techniques to hold brainstorms and exchange ideas amongst stakeholders as, for instance, employees, customers or partners. In a corporate environment these activities are particularly valuable as a method of collaboration and knowledge exchange by facilitating collective decision-making (Cook, 2008). Other organizations have created internal prediction markets used for business forecasting, applying the 'wisdom of crowds' concept (Surowiecki, 2004) to complement or replace existing decision-making processes (Cook, 2008).

2.1.3.4 Connection Tools

Connection Tools are networking technologies enabling people to create connections with and between both content and other people (Cook, 2008). Tools as Social Networking, Tagging, Syndication and Mashups may be included in this category.

Social Networking:

Social network technologies allow users to connect and learn about other members' skills, talents, knowledge or preferences.

In an enterprise environment, these technologies are particularly valuable when the organization needs to encourage knowledge sharing and connection with others, especially in organizations geographically dispersed or with functional boundaries (Cook, 2008).

Platforms as LinkedIn or Facebook, initially created for commercial purposes, have also been adopted by management and co-workers to help in the identification of experts inside the company (Bughin, 2008).

Tagging:

Tagging, feature deployed in several social software tools, allows users to create tags and see tags created by other colleagues (Mackeviciute & Iacubitchi, 2010). This tool is intended to make information easy to search, discover and navigate over time (Cook, 2008).

Syndication:

One of the main concerns around Enterprise 2.0 is information overload. Syndication systems filter the information according to the user needs and interests. An example of this kind of technologies is RSS, a method that allows the online subscription of news, blogs, podcasts or other information (Bughin, 2008). This enables users to stay updated to large amounts of information without having to visit an extensive list of websites every day (Ward, 2007). Nowadays several companies integrated RSS within their own platforms in order to help their internal teams to communicate more efficiently (Mackeviciute & Iacubitchi, 2010).

Mash-ups:

Mash-ups are defined as aggregations of contents from different online sources to create a new service. An example can include "pulling apartment listings from one site and displaying them on Google maps to create a map showing where the listings are located" (Bughin, 2008). The appearance of mash-up applications is connected with the increasingly companies' need to integrate data from numerous web sources, both from enterprise applications or external services (Cook, 2008; Rahm, Thor, & Aumueller, 2007)

Technology is constantly evolving and Enterprise 2.0 tools are no exception. After Cook's 4Cs model, several technologies and tools emerged and a lot more are going to emerge. Collaborative Software as Sharepoint, Yammer, Jive, Podio Huddle, Basecamp or Podio is a good example of this evolution. This type of software, which help people involved in a common task achieve goals (Johnson-Lenz & Johnson-Lenz, 1990), combines today several social software tools (e.g. blogs or wikis).

2.1.4 Enterprise 2.0 Tools in Companies

The impact of Web 2.0 in companies has been intensively studied during the last few years. The phenomenon of Enterprise 2.0 has been perceived as more than the adoption of Web 2.0 tools and technologies. Several authors (Ala-Mutka, 2008; Ala-Mutka et al., 2009; Bryant et al., 2010) argued that connected to the adoption is a set of values and new business practices. Osimo (2008) proposed open innovation, employee's involvement, meritocracy and many-to-many as values connected to Enterprise 2.0. Essentially Enterprise 2.0 refers to a set of deeper changes in business environments, in particular as an enabler of innovative business practices (results driven, employee-centered, open communication culture) or open innovation (Bryant et al., 2010).

Several models to categorize the use cases of Enterprise 2.0 technologies have been proposed (Berg, 2010; Negelmann, 2009; Thompson, 2010). Lee Bryant and Mike Thompson from

Headshift, one of the most recognized companies in the area that is now part of the Dachis Group (Bryant, 2012), have created a typology for use cases of Enterprise 2.0. In this typology the authors organized the use cases according to the sort of interpersonal tie facilitated, using a similar approach to the one taken by McAfee (2009), and the size of the system containing the relationship being supported (Bryant et al., 2010). McAfee (2009) created the Enterprise 2.0 Bull's-eye Model of Tie Strength (Figure 5) that allows managers to select the right technology for the right task in order to get the benefits of Enterprise 2.0 (Bader, 2010). From the perspective of the focal knowledge worker, the model contains four levels (represented by rings in Figure 5) of ties with colleagues, starting from the first level of strongly tied colleagues and continuing to the second and third levels (weak and potential ties) until the fourth level of none tied people (Bader, 2010). According to the author technologies as wikis, social network services or blogs have a huge potential to strengthen ties between knowledge workers allowing a faster access to non-redundant knowledge and information (Bader, 2010; McAfee, 2009)
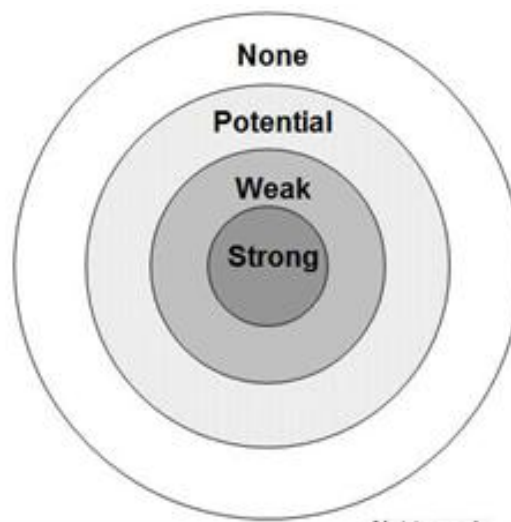
Figure 5 - Bull's-eye Model of Tie Strength (McAfee, 2009)

The framework of use cases (Figure 6) captures the most important and frequent use cases of Enterprise 2.0 technologies. However the model is a useful way to organize and explore other use cases, by highlighting the way in which technologies support the informal organization and the social networks that overlay more formal work structures.
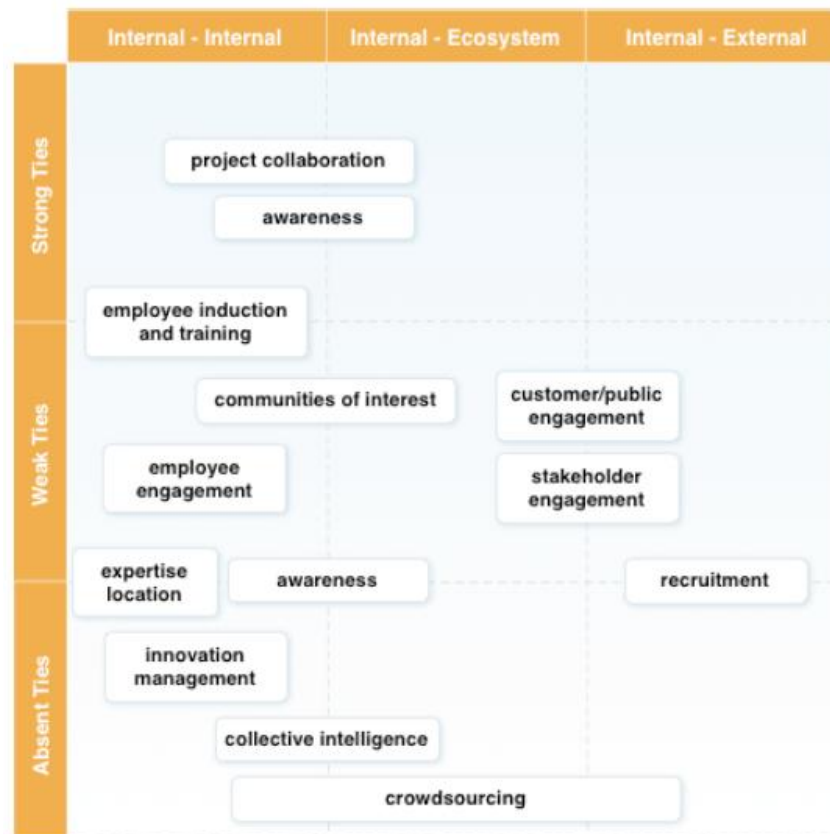
Figure 6 – Framework of Use Cases of Enterprise 2.0 (Bryant et al., 2010)

By analyzing this framework it becomes clear that Enterprise 2.0 tools facilitate not only person-to-person communication and collaboration within a company, but also between the company and its ecosystem of partners, clients and stakeholders or the company and the wider world (Bryant et al., 2010).

Despite the dissemination of Enterprise 2.0, the benefits of the technology adoption are not perceived by every company, as shown by the research and advisory firm Gartner who estimated a failure rate around 70 per cent for Enterprise 2.0 projects (Bughin, Byers, & Chui, 2011). Although these difficulties, the number of companies experiencing superior performance when using Web 2.0 technologies has been increasing over the last years (Bughin et al., 2011). A recent study, conducted by MIT and Deloitte, revealed that the relevance of the technologies is increasing with 52 per cent of the managers considering the technologies important or somewhat important today and 86 per cent in three years. Marketing, Innovation, Operations and Leadership are perceived as the areas where Enterprise 2.0 is creating significant value. Customer Relationships Management and Innovation for competitive differentiation are also considered the activities benefiting the most from the use of the technologies (Kiron et al., 2012). This importance is also recognized in the most recent study from Mckinsey (Bughin et al., 2011) where the exploit of new market opportunities is mentioned as one of the most relevant uses of the technologies.

Some of the benefits perceived by the companies are: increase in the speed to access knowledge; reductions in the communication costs; increase in the speed to access internal or external experts, partners or suppliers; increase in marketing effectiveness or increase of

customer satisfaction. Managers also mention leadership, clear vision and fit with organization's culture as critical factors leading to the adoption of Enterprise 2.0.

On the other hand, lack of management support, no strong business case and the excessive number of competing priorities are considered to be the three biggest barriers in the adoption of Enterprise 2.0 (Kiron et al., 2012).

Another interesting fact is that most companies are not measuring the adoption and use of Enterprise 2.0. Metrics might not be critical when companies are testing the technologies but, as the use of these technologies becomes more important, metrics will help managers to "assess, encourage and reward related behaviors" (Kiron et al., 2012).

2.2 Innovation and New Product Development

In the present section the term innovation is firstly defined being then shortly described the evolution of innovation management systems. In the following sub-sections open innovation, the innovation management system being adopted more often by companies these days, and New Product Development (NPD), considered one of the most important activities of innovation, are defined and explored.
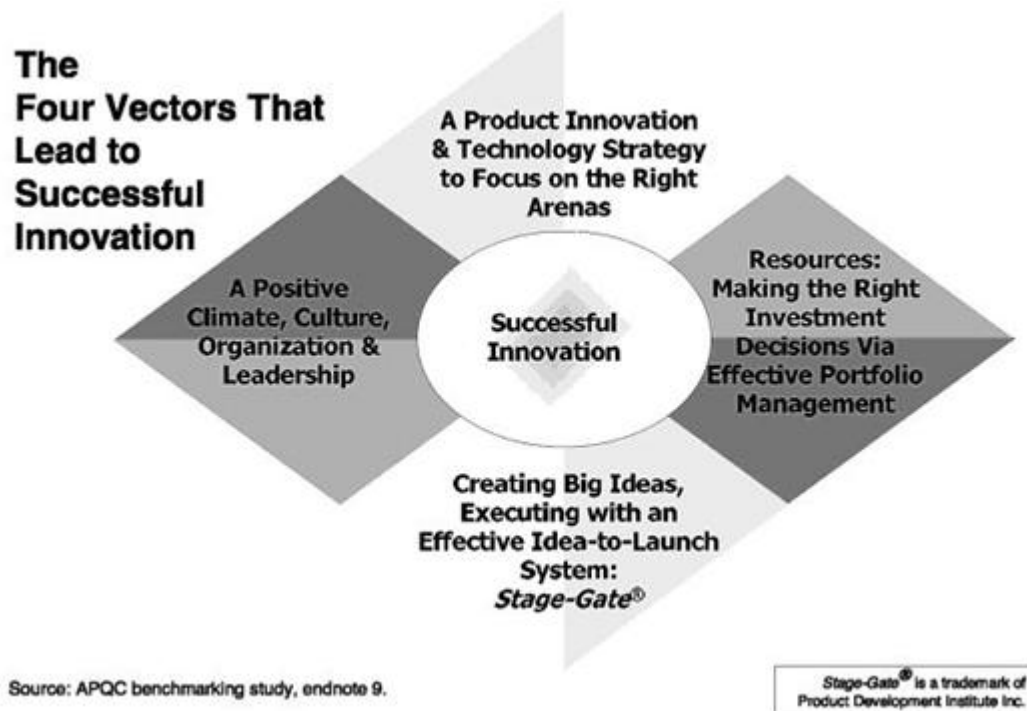
2.2.1 Innovation

Nowadays Innovation is central to corporate growth and prosperity (Ahmed & Shepherd, 2010) being considered a competitive advantage for any organization (Porter, 1998). Although it is commonly used, the term Innovation became an extensive and broad concept (Smith et al., 2008). However, despite its intangible nature, both organizations and academic community have been spending time and efforts to investigate and cultivate Innovation (Mackeviciute & Iacubitchi, 2010).

The term Innovation, which comes from the Latin *innovare* meaning "to make something new", is often confused with invention. Jim Utterback devoted his efforts to differentiate both terms. According to the author, invention may be defined as an original solution resulting from the synthesis of the realization of a personal or organizational need, combined with the ability of the organization to provide technical means to meet that need. On the other hand, the term innovation refers to an invention, which when introduced to the market, was able to generate significant economic effect to the organization itself (Mackeviciute & Iacubitchi, 2010).

Therefore, Innovation is essentially the result of the combination of different knowledge and expertise that exist within and outside the organization (Johnsen & Ford, 2000; Mackeviciute & Iacubitchi, 2010). Presently this knowledge and expertise transfer is supported by technologies enabling virtual integration of the innovation activities. This resulted in innovation sold as a commodity, giving some concrete shape the once abstract concept (Sharma, 2005).

Companies innovate by creating breakthrough products, services, and solutions (R.G. Cooper, 2011). For example, the pioneering products of Apple (iPod, iPhone and iPad) are excellent examples of this approach to innovation over the last decade. R. G. Cooper (2011) systematized this approach with the Innovation Diamond Model (Figure 7).

Figure 7- The Innovation Diamond Model (R.G. Cooper, 2011)

The model portrays the four vectors or dimensions of successful innovation. The first one is the existence of a product innovation and strategy that allows companies to focus their innovation efforts in the most strategic arenas with the best opportunities. Secondly, having the right climate, culture, leadership and organization to promote bolder innovation is vital to innovation success. Initiatives as collect ideas from all employees or reward innovators and successful development teams are some examples of setting the right innovation climate. Top management support for the innovation efforts is also extremely important to guarantee success. A third factor is the ability to create new ideas and successfully and quickly bring them to market. Last but not the least is the ability to select the "winners via effective portfolio management". Companies have to be capable of wisely selecting the most successful and disruptive innovation initiatives where they will invest their resources (R.G. Cooper, 2011).

Although considered by some authors a process (Tidd & Bessant, 2011), Innovation is defined as the activities of turning new ideas, concepts or methods into practice for the purpose of this dissertation.

2.2.2 Evolution of Innovation Management Systems

Diverse approaches for managing innovation emerged over the years, from the rudimentary efforts to grapple with technology to sophisticated and encapsulating systems (Ahmed & Shepherd, 2010). The present section attempts to summarize the evolution of those innovation management systems during the history.

Rothwell (1994) defined the first five generations of evolutionary systems development of innovation. In 2010 Ahmed and Sheperd adapted and extended those phases and identified the existence of a sixth approach (Figure 8).
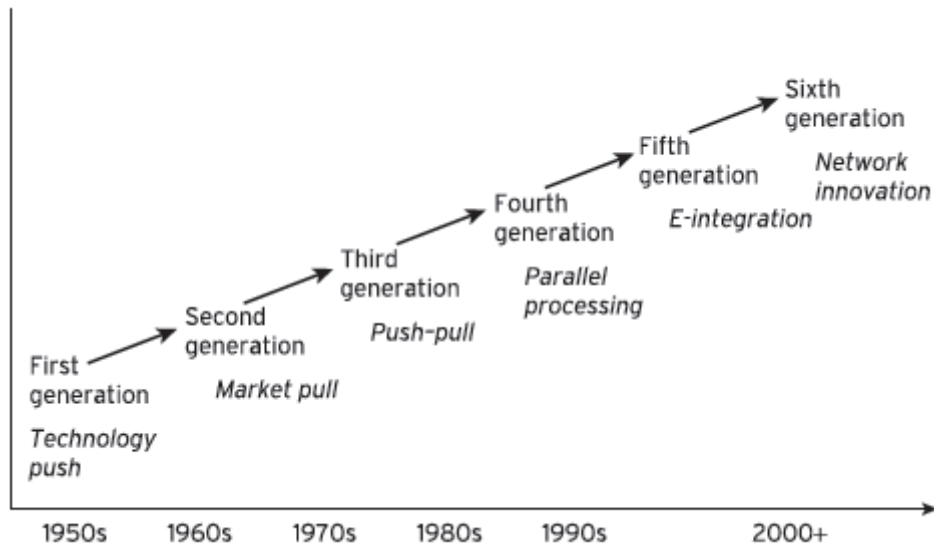
Figure 8 - Evolution of Innovation Process Management Systems (Ahmed & Shepherd, 2010)

The first generation, known as *technology-push* emerged in the 1950s, was driven by the economic growth achieved largely through rapid industrial expansion and new technologies of that period (Rothwell, 1994). This innovation approach believed that higher investments in R&D would result into more successful new products. This first generation barely gave attention to the market needs or the innovation process itself. Nowadays companies detaining technological know-how leadership in a certain market still use this kind of innovation process (Ahmed & Shepherd, 2010).

In the middle of the 1960s, manufacturing output continued to grow and general levels of prosperity remained high (Rothwell, 1994). All these phenomena lead to an increase of competitive pressure that made clear that technology-push process was failing (Ahmed & Shepherd, 2010). This resulted in the creation of a new innovation system called *market-pull* (or "need-pull"). In this model, the market becomes the primary source of ideas for R&D, which now has a passive or, in some cases, reactive role in the process. One of the primary dangers of following this model occurs when companies tend to neglect long-term R&D programs and adopt a technological philosophy based in increments. This kind of philosophy exposes companies to a risk of being outstripped by radical innovators (Ahmed & Shepherd, 2010).

The early to late of 1970s was a period marked by high rates of inflation and demand saturation. Over this period of scarcity, it became increasingly necessary to understand what was beyond successful innovation in order to reduce the innovation failure rate (Rothwell, 1994), so companies started to combine features from technology-push and market-pull models (Ahmed & Shepherd, 2010). This new model, which emerged in the mid-1980s, is usually referred as *push-pull* (or "coupling") model. The model (Figure 9), considered a best practice in some industries, is essentially a sequential process with feedback loops.
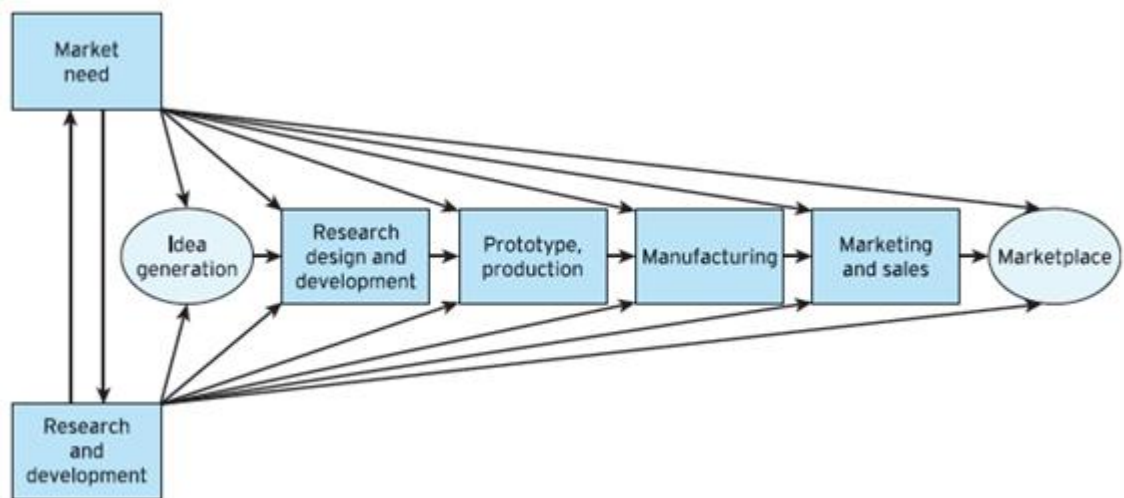
Figure 9 - Push-pull or "Coupling" model of Innovation (Ahmed & Shepherd, 2010)

The early 1980s was a period of economic recovery with companies concentrating on both core businesses and technologies. As markets became internationalized, competition intensified and product life cycles shortened, the speed of development became an important competitive weapon (Ahmed & Shepherd, 2010). Aware of this swift in the business, Japanese companies were pioneers of a new innovation model where several activities were conducted simultaneously rather than in sequence. This new approach is called the *parallel processing* system (Figure 10). Companies who early adopted it experienced a remarkable performance in world markets, especially because they were innovating more rapidly and efficiently when compared to companies adopting the previous models. The innovation of this new model is behind two striking features: integration and parallel development.
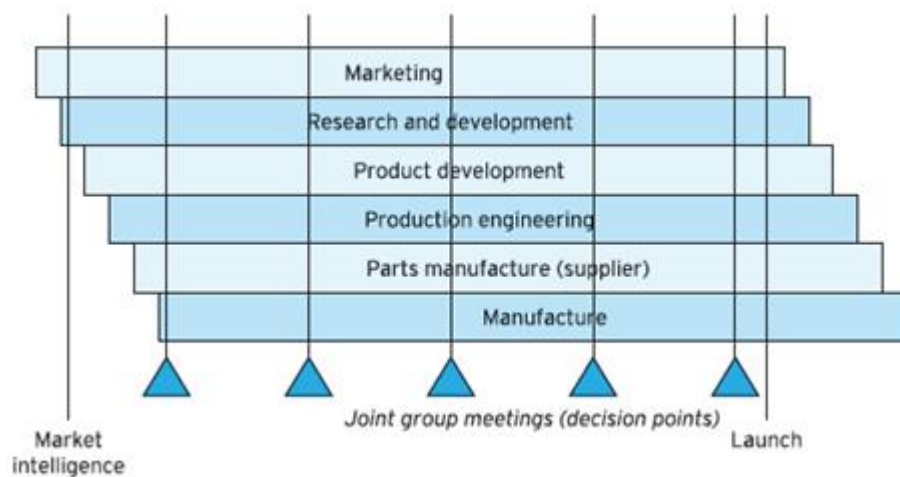
Figure 10 – Parallel Processing Innovation System (Ahmed & Shepherd, 2010)

Remarkably, companies were not only integrating their external partners (e.g. suppliers) in the new product development process. Simultaneously they were integrating the activities of the different functional parties working on the innovation in parallel rather than sequentially. Many other Western companies tried to adopt this fourth-generation process but found it

difficult to emulate, essentially due to different management approaches (Ahmed & Shepherd, 2010).

The developments in Information Technologies (IT) helped Western companies to solve these difficulties. The IT enabled them to induce integrated and concurrent product development (Ahmed & Shepherd, 2010). New electronic product development tools allowed efficient real-time handling of information across the whole system of innovation. This new approach, usually referred as *e-integrated*, is essentially a process of parallel information processing that enhances the traditional informal face-to-face interaction through electronic means. One of the most positives effects of this integration of technologies in the system is the potential of knowledge sharing and learning (Ahmed & Shepherd, 2010). The deployment of information technologies in the innovation process can add significant value when done with the intention to manage knowledge flows. The fifth generation is essentially a development of the interactive-parallel processing innovation model (fourth generation) in which the technology of technological change is itself changing (Rothwell, 1994).

In the late 1990s, speed to the market became an important challenge for most of the companies. The new century brought another element to this already complex challenge: costumers started to demand customized products to fulfill their unique needs (Ahmed & Shepherd, 2010). In order to embrace this new paradigm, companies had to create tighter internal linkages and access to additional resources and capabilities to increase their innovation speed and effectiveness.

This initiated a *network innovation* process that is nowadays known as Open Innovation. Open Innovation often viewed as a philosophy or a mindset for innovation management (Lindegaard, 2011), was defined by Chesbrough (2003) as the paradigm where companies use ideas and paths to market coming from internal or external sources in their innovation processes. Among those external sources are start-ups, universities, research labs, partners or suppliers. This new paradigm is further explored in the following sub-section.

2.2.3   Open Innovation

During several years large internal R&D labs represented a strategic asset and a competitive advantage against potential new entrants in the market. This led many companies to believe that extended R&D capabilities and complementary assets could outperform smaller rivals (Teece, 1986; Van De Vrande, de Jong, Vanhaverbeke, & De Rochemont, 2009). This process in which large firms discover, develop and commercialize technologies internally has been labeled the closed innovation model (Chesbrough, 2003). Open Innovation was introduced as a model with opposite principles to the closed innovation model. Companies using the closed innovation model generate, develop and commercialize ideas in their own boundaries. Companies using this innovation model believe that "successful innovation requires control" (Chesbrough, 2003).

However, in open innovation model, companies commercialize internal and external ideas by deploying outside or in-house pathways to the market. The main paradigm shift brought by Open Innovation is the fact that companies evolve from a R&D centered approach to a new one where an innovation ecosystem or network composed by several nodes (small start-ups, university research centers, etc) is created. The connections between each of these actors are held by trust, mutual self-interest and open communication (Ahmed & Shepherd, 2010).

Co-creation and crowdsourcing are both concepts often perceived as open innovation but, in fact, they are examples of tools or techniques used in open innovation activities (Lindegaard, 2011). Crowdsourcing, coined by Jeff Howe and Mark Robinson (Brabham, 2008), is viewed as the "act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call" (Howe, 2006). On the other hand, the term co-creation refers to the "process in which companies and active costumers share, combine, and renew each other's resources and capabilities to create value through new forms of interaction, service, and learning mechanisms" (Lindegaard, 2011). Companies as LEGO, Dell, Starbucks, Threadless, iShockphoto are some of the companies successfully using of these techniques (Brabham, 2008; Lindegaard, 2011)

Nowadays Open Innovation initiatives are widely being adopted by companies worldwide. Driving the adoption of Open Innovation are the benefits perceived by companies. Lindegaard (2011) identified the following four benefits of Open Innovation:

- Faster development and launch of new products and services, which leads to revenues, market share, and profits;

- Increase in diversity, enhancing the discovery of more business opportunities;

- Improvement of the success rate of new products or services due to a stronger innovation process;

- Risk diversification by sharing of both market and technological uncertainties of innovation.

Although Open Innovation has become widely used, its activities face several challenges and are not risk-free or easy to adopt. Among the challenges of open innovation are the breakdown of a "Not Invented Here" culture and effective intellectual property sharing among all the parts involved (Ahmed & Shepherd, 2010). A study conducted in 2008 interviewed 107 companies, equally European SMEs and large enterprises, also shows that loss of knowledge, higher coordination costs, loss of control and higher complexity are mentioned as frequent risks connected to open innovation activities. The same study showed that the difficulty in finding the right partner, imbalance between open innovation activities and daily business and insufficient time and financial resources are mentioned as internal barriers in the adoption and implementation of open innovation practices (Enkel, Gassmann, & Chesbrough, 2009). In order to overcome these risks and difficulties companies have to find the appropriate balance of open innovation activities, where the company or the institution uses every available tool to create successful products and services faster than their competition, fostering simultaneously the protection of intellectual property and building their own core competencies (Enkel et al., 2009).

2.2.4   New Product Development

The continuous need to innovate by launching new products or services is a reality for companies nowadays. Driving this current and future need for product innovation are technology advances, constant changing needs of customers, shortening of product life cycles and increased globalization (R.G. Cooper, 2011).

New Product Development (NPD) process, considered a sub-process of innovation (Trott, 2008), consists of a group of activities carried out by companies when developing and launching new products (Bhuiyan, 2011). Usually those activities start with the perception of a market opportunity and end with the production, sale and delivery of a product (Ulrich, Eppinger, & Goyal, 2011). NPD is primarily a multidisciplinary process that requires the perspectives from different disciplines as illustrated in the Figure 11.

Figure 11 - Perspectives from which to analyze the development of new products (Trott, 2008)

In order to clarify any possible misunderstanding it is vital to first define "product". The term "product" is connected to anything referred "as an external marketplace for sale, use, or consumption". In this definition are included physical products and services as well as combinations of both (R.G. Cooper, 2011). Booz, Allen and Hamilton define six types of new products: *new to the world*, usually products entirely new, *new product lines*, which refers to a product entering a new market, *additional lines*, supplements for an existing product or line of products, *improvements*, products bringing additional value to the existing ones, *re-positioning*, re-position of an existing product into a new market, and *cost reductions*, products offering the same performance with less costs (R.G. Cooper, 2011).

Considering NPD a multi-stage process and the importance in having a structured process resulted in several different models and frameworks proposed in the literature. During the last decades several authors have tried to develop a model that captures the relevant stages of the process (Booz & Hamilton, 1982; Ulrich et al., 2011; Wang & Lee, 2011). More recently companies as Procter & Gamble, Emerson or 3M have implemented robust innovation models as Stage-Gate model. This model is a conceptual and operational map for moving new product projects from idea to launch and beyond (R.G. Cooper, 2008). The model, in its simplest version, is composed by a series of stages, where the project team obtains information and does the required analysis, intercalated by series of gates, where go/kill decisions are made between stages as shown in the Figure 12.
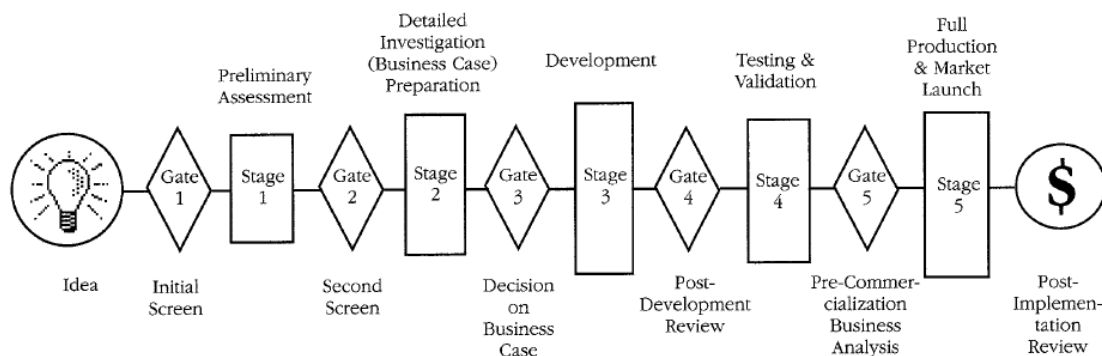
Figure 12 - Overview of the Standard Stage-Gate System (R.G. Cooper, 1990)

Over the years companies as GE or P&G have been customizing the standard model in order to incorporate open innovation. Some modifications in the standard model were made in order to enable the integration of the network of partners, alliances or costumers in the process from idea generation to launch (Robert G. Cooper, 2010).

The process starts with a discovery (or ideation) phase where essentially companies generate ideas, with both internal and external contribution, in order to meet market needs or problems to be solved. For example, companies scan, handle and screen ideas from inventors, start-ups, small entrepreneurial firms, partners or consumers likely to be used (Robert G. Cooper, 2010).

After passing through a first screening where the company decides to allocate some resources into the project, the idea is then scoped. During this stage information is gathered to determine business and technical feasibility. Among the activities of this stage are: determination of capabilities gap to seek partners or outsourced suppliers and co-operative work with costumers (Robert G. Cooper, 2010). Using the information gathered the project is then evaluated a second time (Gate 2).

On the second stage a business case is built, being this the stage where the project must be clearly defined (R.G. Cooper, 1990). In addition to activities as deeper market research studies or manufacturability analysis, firms embracing cooperation with partners develop the business case together with those while taking care of the legal and intellectual property strategy (Cooper, 1990, 2010). After this stage the fuzzy front end –ideation, scoping the project, defining the product, and building the business case – of NPD is completed (R.G. Cooper, 2008). The FFE in the product development is considered critical to the success of NPD (R.G. Cooper, 2008; Kim & Wilemon, 2002).

After an analysis on the business case (Gate 3), the project is validated and proceeds for the development (Stage 3) where the product or service is developed. Often companies look for help in solving technology and development problems from parties external to the company (e.g. suppliers, partners or independent technical). In this phase activities as search of external technology solutions or IP as well as outsourced development work can be performed (Cooper, 2010). In the following step, the product is reviewed (Gate 4), tested and validated (Stage 4).

After a pre-commercialization business analysis (Gate 5), where financial projections play a key role in the decision to move ahead (Cooper, 1990), the product is launched and commercialized (Stage 5). At this stage, companies can sell or out-license commercialized products as well as acquire already commercialize products to provide immediate sources of new growth for the company (Robert G. Cooper, 2010).

New Product Development (NPD) can be essentially defined as a very complex business process, which includes many diverse activities beginning with the perception of a market opportunity and ending in the production, sale and delivery of a new product/service.

2.1.5   Bridging Enterprise 2.0 with Innovation and New Process Development

As noticed in the previous sections, Information Technologies have been playing a key role in innovation activities. Today Web 2.0 technologies are a good example of that. Innovation is even considered one of the activities where companies can benefit more from the adoption of Enterprise 2.0 (Kiron et al., 2012; Platt, 2007).

Open Innovation brought new challenges and Enterprise 2.0 tools have been helping companies to cope them. Firms have been using collaborative software to foster collaboration among employees, partners and other stakeholders in idea generation and development of new products. Procter & Gamble (P&G), for instance, launched Connect & Develop, a web-platform that facilitates extranet communication with external business partners and serves as a link to external databases as well as a facilitator of communications within and between 'communities of practice' (Dodgson, Gann, & Salter, 2006). Other companies like Cisco or Xerox are, respectively, using Brightidea or Yammer to accelerate innovation (Brightidea, 2012; Yammer, 2012)

Starbucks, P&G, IBM, Google or Cisco have also been using the 'power of crowds' for innovation purposes (Ribiere & Tuggle, 2010), with Lego providing an excellent example. The company launched Cuusoo, a website where Lego fans submit and vote for new product ideas. An example of the value the website is creating is Minecraft Micro World. The product, suggested by a Lego fan, received 10,000 votes in 24hours, kicking the concept up to Lego management. The new product was later developed in collaboration with four fans and launched last summer (Kiron et al., 2012).

Although some questions about the real impact of Enterprise 2.0 some companies are experiencing remarkable improvements in their innovation activities. Since the launch of Connect & Development, P&G reduced R&D costs by more than 30 per cent and doubled its innovation rate (Bughin & Manyika, 2007). Similar results were achieved by CEMEX, one of the world's largest building materials suppliers and cement producers. The enterprise reduced its time-to-market in the development and launch of new products (Garcia, 2012).

Essentially Innovation and R&D management involve require complex processes in which collaboration and communication are extremely important. Web 2.0 tools empower collaboration; improve the effectiveness and efficiency of the group decision-making process and foster knowledge sharing among the actors (Turban, Liang, & Wu, 2011) , especially involved in the innovation activities. As a result firms innovate faster and better by reducing time-to-market and innovation failure rates.

# 3   Study of the Impact of Enterprise 2.0 in Companies

During the previous chapter it was already possible to identify some of the impact connected with the adoption of Enterprise 2.0 technologies. In the present chapter that impact is further explored with a detailed explanation of the survey conducted under this project.

3.1   Study Approach

Finished with the collection of secondary information about Enterprise 2.0 summarized in the second chapter, a use cases analysis was performed. This analysis aimed to verify the importance of these technologies for Innovation and New Product Development (NPD).

The analysis was centered in use cases from collaboration software providers, especially considering that several Enterprise 2.0 tools are usually integrated in those solutions. The group of providers analyzed was composed by IBM, Salesforce, Jive Software and Socialtext, the top vendors on the IT Pro Vendor Ranking 2011 (Wolfe, 2011), as well as Yammer, Microsoft Sharepoint, both now part of Microsoft group (Lardinois, 2012), and Huddle, used by 80 percent of companies from Fortune 500 (Taylor, 2012).

For the analysis more than 189 cases available on the websites of the mentioned providers were screened. For each case the business activity or department (e.g. Marketing, Innovation, Human Resources or Customer Relationship Management) where the adoption of the technologies created more value was identified. The results from that analysis were then statistically analyzed. The results from that analysis are summarized in the Figure 13.
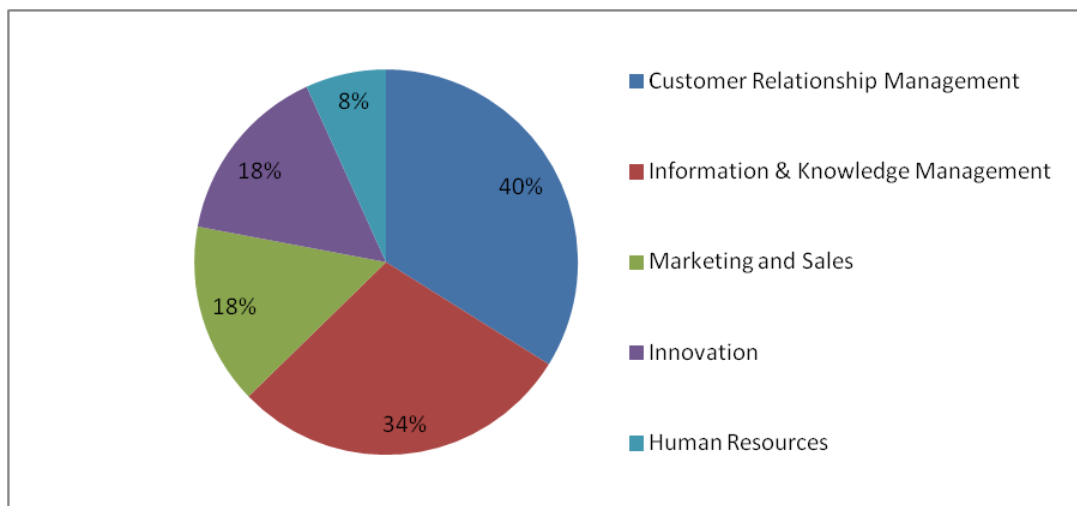
Figure 13 - Results from the Analysis of Cases

The results showed Customer Relationship Management, mentioned in a previous study as the area where social software has been more important (Kiron et al., 2012), and Information and Knowledge Management, also one of the most important aspects of Enterprise 2.0 (Section 1.3.4), as the two areas using and getting more value from Enterprise 2.0. In the third position appeared Marketing/Sales and Innovation with 18 per cent. The relevance of Enterprise 2.0 was even supported through the results presented in the theoretical framework. As illustrated in section 2.3, companies are, for example, experiencing reductions in their new product development times and R&D costs. Those results, in opposition to results as increases in the

speed when accessing to knowledge or customer satisfaction, have a direct impact on the business performance.

After this verification step, further information was needed. Therefore, information about the use and effects of Enterprise 2.0 was collected directly from companies (primary information) using a survey methodology. The collection of this new information aimed to get more insights about the adoption, use and effects of Enterprise 2.0 in the firms and on its activities.

For acquiring this type of information, the introduction of an online survey was chosen, considering the advantage of making the data collection and processing easier and faster when compared with personal or phone questionnaires.

The survey was designed and built on the online software tool Qualtrics undergoing several iterations, while being pre-tested with several potential participants. During those tests several conversations, via email and Skype, were conducted to evaluate the interest in the study and collect feedback from the user experience.

The design process, described in the section 3.3, was then followed by the data collection (section 3.5) that was later analyzed. From the analysis emerged the most important empirical findings presented on the section 6 of this chapter.

3.2   Structure of the Survey

The topics covered by the survey were divided into the four following groups:

1. Enterprise 2.0 at Your Company;

2. Innovation & New Product/Service Development;

3. Overall Impact – Metrics and Results;

4. General Information.

The first section of the survey explores the motivations behind the adoption of Enterprise 2.0, the top-management support and involvement in Enterprise 2.0, the technologies currently in use by the companies and the value created by them as well as the most important benefits perceived.

On the second group of questions, dimensions connected with Innovation and New Product Development (NPD) are further explored. Among them are the challenges for innovation, areas important to overcome those challenges, efforts undertaken for challenges and the tools supporting some of the Innovation and NPD activities.

On the third section, the overall impact of Enterprise 2.0 is being evaluated. The questions address KPIs (Key Performance Indicators) currently in use to measure Enterprise 2.0, KPIs the participants would like to use as well as hurdles, achievements and challenges the companies faced.

The final step is focusing on collecting demographic information about the participants. From a company perspective, questions about the country where the company is headquartered and the number of employees are included in this group. On the other hand, information about the participants' primary affiliation and age were also requested. These two kinds of information could be particularly useful to better know the sample or during the data analysis phase (section 3.5), by enabling the creation of subgroups when looking for patterns in the answers.

3.3 Design Process

The present subsection explores some important aspects behind the survey design process. Before getting into a detailed description of the process, it is important to clarify the following general aspects:

- **Target Group:** Business Net Partners' experience and some other studies (Kiron et al., 2012) have shown that Enterprise 2.0 initiatives and perception varies from company to company. In order to address that fact, this survey was ultimately designed to allow employees from any department to answer it. Furthermore, a focus on just one group of employees would have limited the access to companies, since existing contacts were available in various departments of different firms;

- **Terminology:** by examining the literature and after some conversations with potential participants was possible to identify the diverse terminology connected to Enterprise 2.0. Taking this fact and the potential heterogeneity of the target group under consideration, some key concepts were defined for the purposes of the study. That group of defined concepts, that included Web 2.0, Enterprise 2.0, Innovation and New Product Development, was included in the survey. In order to foster a better understanding, the term Enterprise 2.0 is often replaced by Web 2.0 when referring to technologies. Another important aspect of the terminology is the use of the term "service". Although the term "product", as described in the theoretical framework, is not limited to physical products, after some pre-tests, NPD was always referred as the development of new products/services;

- **Extension:** the right extension, especially by achieving a balance between answering time and insightful data, is one of the critical aspects when designing a survey. In order to guarantee a relevant number of answers, it was defined from the start that the online survey would have and upper limit of 25 questions to be answered in less than 20 minutes. The extension was also one of the aspects refined during the pre-test phase;

- **Organization of Enterprise 2.0 tools:** in order to simplify the comprehension of the tools usage, these were organized and defined in the following groups:

  - **Social Media:** communication channels usually used by companies for marketing, public relations or costumer support purposes. Among the examples of these tools are Facebook, LinkedIn, Twitter or Youtube;

  - **Collaborative Software:** corporate social networks, employee community forums or intranets that usually combine several social software capabilities (e.g. blogs or wikis). As examples are software solutions like Sharepoint, Yammer, Jive, Hudle, Basecamp or Podio;

  - **Social Software** other software solutions with specific social capabilities, such as instant messaging, VoIP, wikis, blogs RSS or social bookmarking**;**

  - **Other tools & techniques:** other tools and techniques not included in the previous groups. Among them are social cataloguing, collective intelligence, human-based computation, mashups or file-sharing services.

The particular aspects of each section of the final version of the survey (available on the Annex B) are further explored in the following subsections.

3.3.1 Enterprise 2.0 at Your Company

As mentioned above this first group of questions is focused on the general aspects on the adoption, use and effects of Enterprise 2.0 technologies. The questions selected are summarized on Table 1:

Number	Question
1.1	Why is your company interested in Enterprise 2.0 (E 2.0)?
1.2	How is your company using Web 2.0 technologies?
1.3	Is your company's top management using and supporting the use of Web 2.0 technologies?
1.4	Which of the following technologies are being used at your company?
1.5	How do you personally rate the value Enterprise 2.0 is bringing to your company in the following aspects?
1.6	In which stage is your company in Enterprise 2.0?
1.7	In which aspects does your company perceive value from adoption and use of Web 2.0?
1.8	Which are the most important benefits that you believe your company will get from those technologies?

Table 1 - Questions from the section "Enterprise 2.0 at Your Company"

In question 1.1, the reasons behind the interest and adoption of Enterprise 2.0 are explored. The multiple options presented on this question are essentially a combination of the general benefits collected in the literature review (Chapter 2) and insights collected by Business Net Partners (B-n-p) during its consulting activities.

The second and fourth questions of this section are focused on the use of Enterprise 2.0 technologies but the options were both built using different approaches. In the first case, in order to analyze the general use, the answering options are based on knowledge from B-n-p's consulting activities in combination with some of the use cases present in the matrix created by Delloite LPP (Miller et al., 2011). In the second question, the analysis is instead focused on the use of each of the Enterprise 2.0 tools.

The third question aimed to evaluate the level of involvement and support from top-management in Enterprise 2.0 activities, considered a critical success factor (Kiron et al., 2012).

The structures of the fifth and sixth questions are similar but the questions serve different purposes. The first one aims to find which aspects of Enterprise 2.0 are bringing value to companies while, on the other hand, the second aims to evaluate in which stage are companies in each of those aspects. Please note the fact that changes in business processes and culture, often mentioned as changes in companies associated with Enterprise 2.0 technologies, were added to the options together with the different groups of Enterprise 2.0 tools.

A last note for the last two questions of this section (1.7 and 1.8), which aimed to understand, respectively, the value brought in specific aspects of the business environment and the most important to companies. The options presented in both questions are mainly based on the findings literature presented on the section 2.1.4.

3.3.2 Innovation and New Product/Service Development

As previously mentioned this group of questions, presented on Table 2, is more focused on activities related with Innovation and NPD.

Number	Question
2.1	What are the key challenges for being more innovative in your industry?
2.2	Which of the following areas are important to overcome those challenges?
2.3	Are you using Web 2.0 tools to support the following activities?
2.4	Which efforts have been undertaken in the following areas?
2.5	Do you know success stories at your company or other companies with Enterprise 2.0 for innovation and/or new product/service development?

Table 2 - Questions from the section "Innovation & New Product/Service Development"

The first question of this group aimed to identify the key innovations challenges of the companies. In order to better identify potential patterns in those challenges, the answers where collected using a text field.

On the question 2.2, the importance of tools, technologies or cultural changes, aspects often connected to Enterprise 2.0 activities, is evaluated.

The third question explores the use of the Enterprise 2.0 tools in some activities. The construction of these use cases was based on the literature findings and some potential other new use cases explored by the Business Net Partners' team.

The efforts undertaken are explored on question 2.4. This question aims to understand how relevant, for example, the use of Enterprise 2.0 technologies is for those companies.

The very last question tries to evaluate the knowledge of companies about the success cases. Behind this question is the perception that companies do not perceive much value from Enterprise 2.0 due to a lack of knowledge of success cases.

3.3.3 Metrics and Results

Questions connected with the overall impact of Enterprise 2.0, especially with metrics and results, are presented in this section (Table 3).

Number	Question
3.1	Which KPIs is your company currently using to measure Enterprise 2.0 (E 2.0)?
3.2	Which KPIs would you like to use when measuring E 2.0?
3.3	What hurdles, challenges and achievements did your company go through with E 2.0?
3.4	Would you like to give us any further note or comment regarding E 2.0?

Table 3 - Questions from the section "Metrics and Results"

The first two questions explored KPIs, which as previously mentioned are fundamental to measure the impact of Enterprise 2.0 initiatives. The first question explored the KPIs currently in use, based on metrics used by companies (Kiron et al., 2012). The second one aimed to understand other metrics, which, although important for the participants, are not currently in place.

The last two questions aimed to cover aspects that might not be covered on previous questions, especially question 3.3, which aims to get some insights about hurdles, challenges and achievements with Enterprise 2.0.

3.3.4   General Information

This final group of questions (Table 4) explored information about the participants of the survey. As mentioned before this information could be later explored in the data analysis.

Number	Question
4.1	In which country is your company headquartered?
4.2	How many employees does your company have?
4.3	What is your primary functional affiliation?
4.4	How old are you?

Table 4 - Questions from the section "General Information"

3.4   Data Collection

For the present study more than 50 contacts in companies were contacted by email in December 2012. A total number of 18 complete responses to the online survey resulted from those approaches.

A preliminary analysis of these answers explored several aspects. The country distribution was one of them. As illustrated in the Figure 14, the sample collected has seven countries represented.
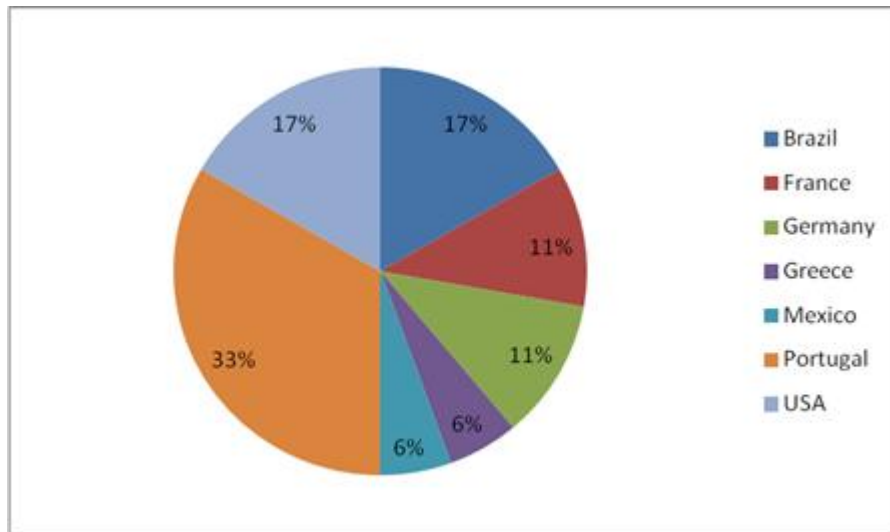
Figure 14 - Country Distribution of the Participating Companies

Considering this variety of proveniences, it was possible to notice two possible categories of companies: European companies and companies from the Americas. These two groups, based on the continent where the company is headquartered, had similar sizes (11 vs 7). Potential differences between these two groups were explored in the data analysis.

In order to have a representative sample for analysis other aspects were considered. The affiliations of the people involved in the leadership of Enterprise 2.0 are very diverse. Instead, during the survey distribution, the contact request mentioned the availability for the recipient to address the request to another person within the company, who might be the best person to answer the survey (e.g. IT or R&D). From this approach resulted the following distribution of participants represented in the Figure 15.
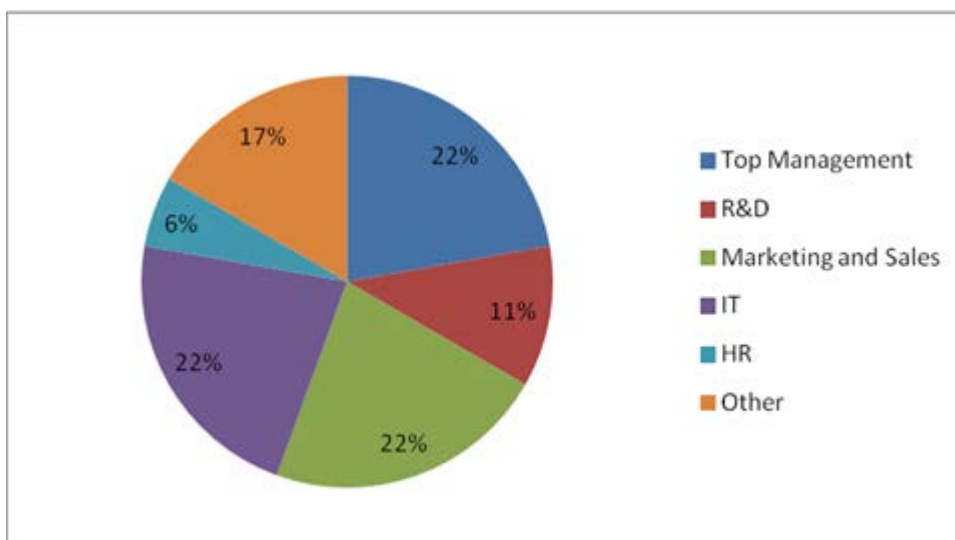
Figure 15 - Primary Affiliation of the Survey Participants

Regarding these aspects, the data collected was satisfactory especially when considering the time-spam of the collection process. The data analysis, described in the following section, was then initiated.

3.5   Data Analysis

Two different types compose the data of the survey: quantitative and qualitative.

A great part of the data gathered was quantitative. For the purposes of this study, this kind of data was analyzed using simple descriptive statistics, with histograms generated through frequency tables extracted directly from Qualtrics. A different approach was necessary in two particular questions of the survey (1.5 and 1.6), in which a scale from 0 to 5 was used. For these questions the average value was the basis of the analysis.

To analyze the qualitative data, the information was firstly generally analyzed to find patterns. If patterns were identified, the data was then grouped in different categories to build tables of frequencies.

The data analysis was not only limited to analyze the overall sample. Two different factors were used to create subgroups: number of employees and continent where the participating company was headquartered. The results of each subgroup were then compared with other subgroups created using the same factor. For example, results from small companies (less than 500 employees) were compared with medium-sized (from 500 up to 10,000 employees) and large companies (above 10,000 employees).

An import remark has to be done regarding the comparison of subgroups on the questions 1.5 and 1.6. The subgroups by company size (5 small, 5 medium and 8 large sized participating companies) and by region (11 European companies versus 7 from the Americas) have different sizes. Due to these differences on the sample sizes the average values cannot be correctly compared. In order to do comparisons correctly, it would be necessary to perform hypothesis tests (e.g. t-student test). But, considering the small sample sizes, the time-span for the analysis and the relevance of the questions involved, no comparisons were performed for these two questions.

3.6   Empirical Findings

The present section summarizes the principal empirical findings collected from the data analysis. In order to facilitate the analysis of these results, the section follows the same structure used for the survey.

3.6.1   Enterprise 2.0 at Your Company

The first question addressed the reasons behind the interest in Enterprise 2.0. From the results (Figure 1 – Annex C) emerged that potential increases in the efficiency of business processes (72%), effectiveness of daily operations (61%) and HR satisfaction, motivation or engagement (61%) are the greatest drivers of Enterprise 2.0 initiatives. However other aspects as reductions in time-to-market, failure rate in business activities (both with 28%) or increase in the innovation rate (33%) are also driving companies to Enterprise 2.0.

Other interesting figures are the differences between companies with different sizes (Figure 16) and from different regions (Figure 17). Large companies (green bars) and medium sized companies (red bars) are mainly looking for efficiency in their businesses processes when

adopting Enterprise 2.0. On the other hand, medium and small sized companies (blue bars) value aspects related with their employee's satisfaction, motivation and engagement.
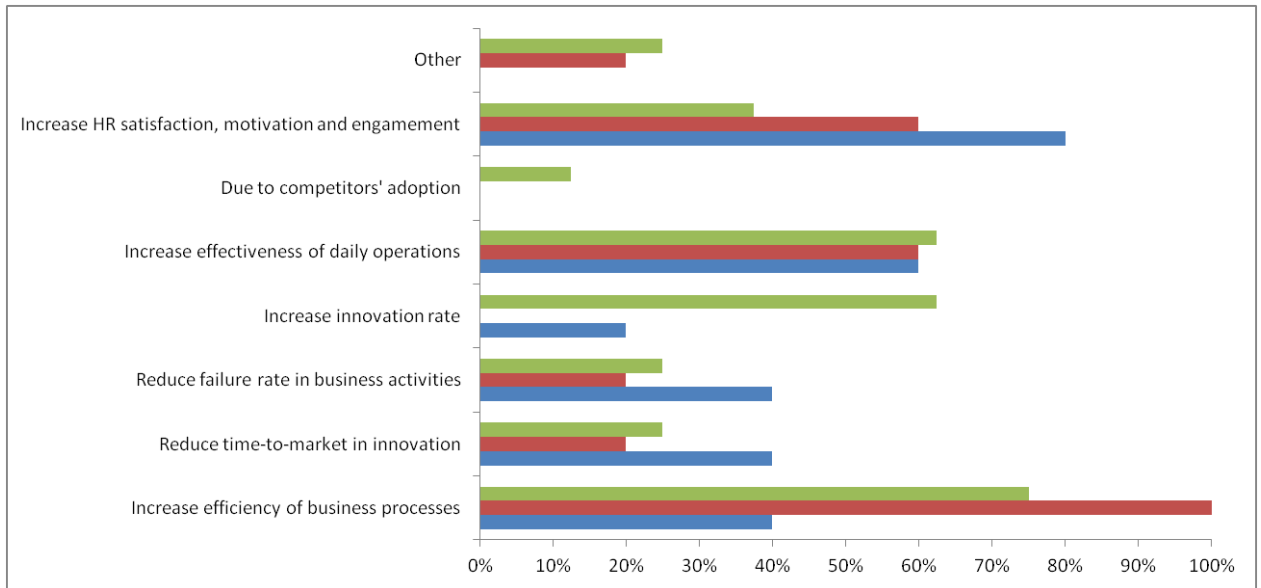
Figure 16 - Drivers of Enterprise 2.0 by Number of Employees
[Large = Green | Medium = Red | Small = Blue]

These particular results can indicate that Enterprise 2.0 technologies are potential solutions to solve some of the efficiencies commonly seen in large and midsized companies. On the other hand, small and midsized companies seem to expect to retain their talent with Enterprise 2.0, especially by increasing their employees' satisfaction, motivation and engagement.

Despite differences in the sample size for companies headquartered in Europe and the Americas (11 vs 7), it is possible to notice some differences between them (Figure 4). For instance, when adopting Enterprise 2.0, European companies (red bar) tend to be more driven by potential increases in benefits related with their employees (64% vs 72%) and efficiency of business processes (82% vs 57%) than their peers from the Americas. This last group (blue bar) values more other aspects such as potential increases in the effectiveness of daily operations (71% vs 55%) and innovation rate (43% vs 27%) when compared with their European peers.
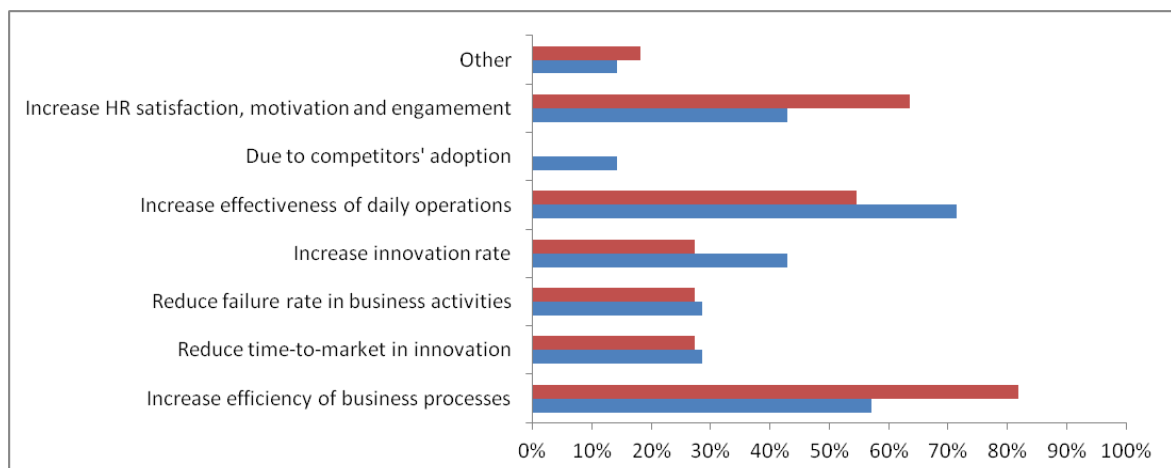
Figure 17 - Drivers of Enterprise 2.0 1 by Region
[Europe = Red | The Americas = Blue]

Regarding the types of uses of Web 2.0 technologies, some interesting findings emerged (Figure 2 – Annex C). Although most of the participating companies (62%) are using the technologies as part of a global initiative, half of the companies mentioned that small teams are using isolated tools from different vendors. Surprisingly only 28 per cent of the companies adopted the use of Web 2.0 technologies for external collaboration.

From the comparison between regions (Figure 18), it was possible to notice that 47 per cent of the American companies (red bars) reported the existence of intra-department initiatives, fact that was never mentioned by the European participants (in blue). Although this difference might be relevant, it is not easy to understand if it is not easy to find the motivations behind that. A possible hypothesis can be differences in the approach or a lack of knowledge about those initiatives.
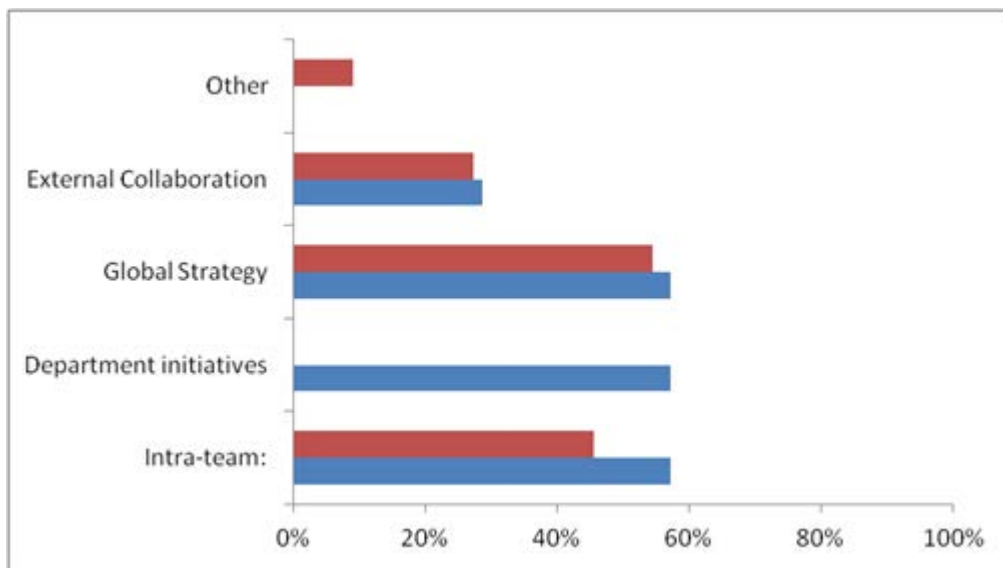

Figure 18 - Uses of Web 2.0 Technologies by Region
[Europe = Red | The Americas = Blue]

The top-management support, considered an important factor for the success of Enterprise 2.0, was also studied in the survey (Figure 3 – Annex C). A large majority of the participating companies (78%) mentioned that top management is using and supporting Enterprise 2.0 technologies. Potential comparisons between groups were not exploited due to the asymmetry of the group dimension (14 vs 4).

Another result is that all the participating firms with more than 5,000 employees (green bar) mentioned support and involvement from top management (Figure 19). The results, although surprising for the lack of differences between small and midsize corporations reported in a recent study (Kiron et al, 2012), showed expected evidences of top management support in big companies.
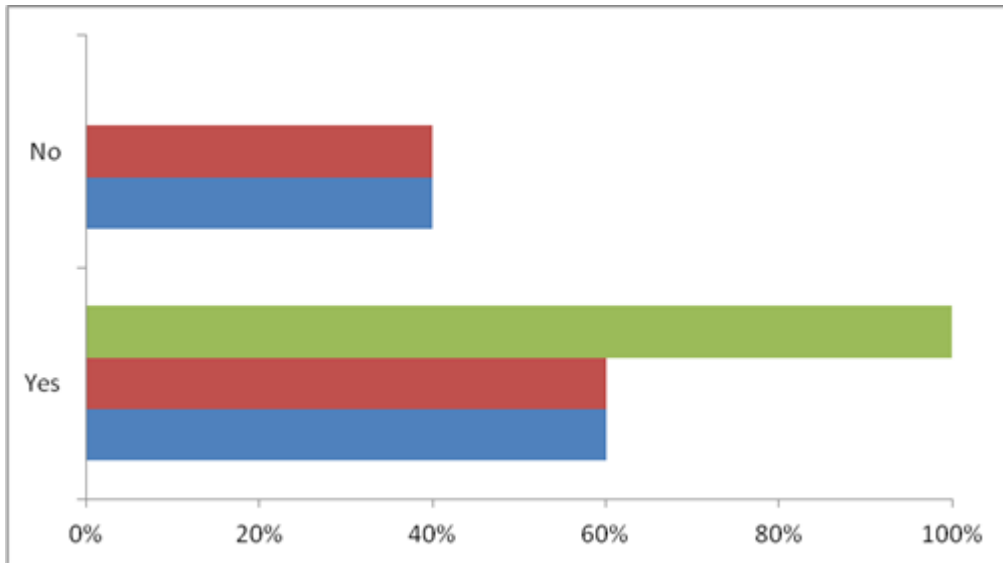
Figure 19 - Top Management Support and Involvement in Enterprise 2.0 by Region
[Large = Green | Medium = Red | Small = Blue]

In terms of Enterprise 2.0 tools (Figure 4 – Annex C), collaborative software is widespread within the companies (83%), being Sharepoint the solution more often cited. Other social software solutions as instant messaging, VoIP, wikis, blogs or podcasts are also intensively used in the business environment (78%). Half of the participating companies are using social media and also other tools such as Dropbox.

Among the participating companies, collaborative software tools are being used by 100 per cent of the participating large firms (in green bar) while the same percentage of the small corporations (in blue) uses social software solutions with specific capabilities (Figure 20).
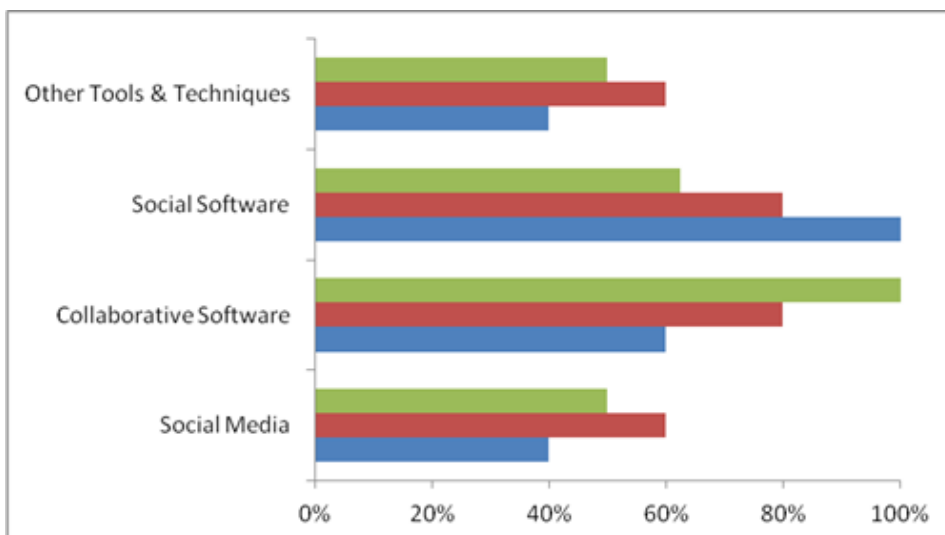

Figure 20 - Use of Enterprise 2.0 tools by Number of Employees
[Large = Green | Medium = Red | Small = Blue]

These two findings might be connected with the complexity of each type of company. Larger companies usually have to deal with more complex and collaborative activities than small companies. This fact leads large companies to adopt collaborative software solutions, which

combine several social software capabilities in one single platform. On the other hand, small companies have simplified processes that increase the range of potential available solutions.

More important than the use of tools is the value perceived by the companies using them. Collaborative software was, in average, considered the group of tools bringing more value. Enterprise 2.0 tools were also mentioned as a driver of cultural changes and business processes improvements (Figure 21).
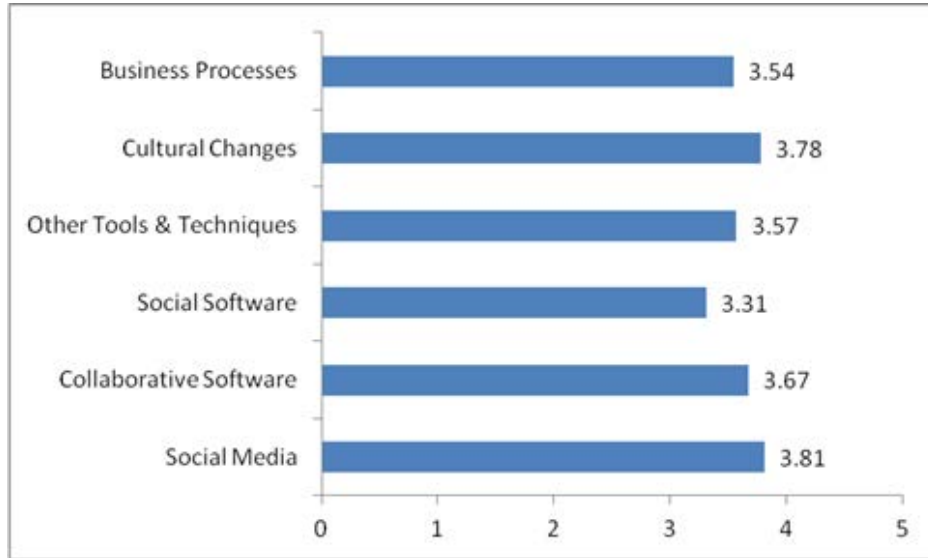
Figure 21 - Levels of Value from Enterprise 2.0 [No Value = 0 | High Value = 5]

In terms of stage of use, collaborative software and social media are the tools used more often and with a higher level of complexity of Enterprise 2.0. Business performance and cultural changes were also mentioned as aspects where the companies are perceive significant impact from Enterprise 2.0 (Figure 22).
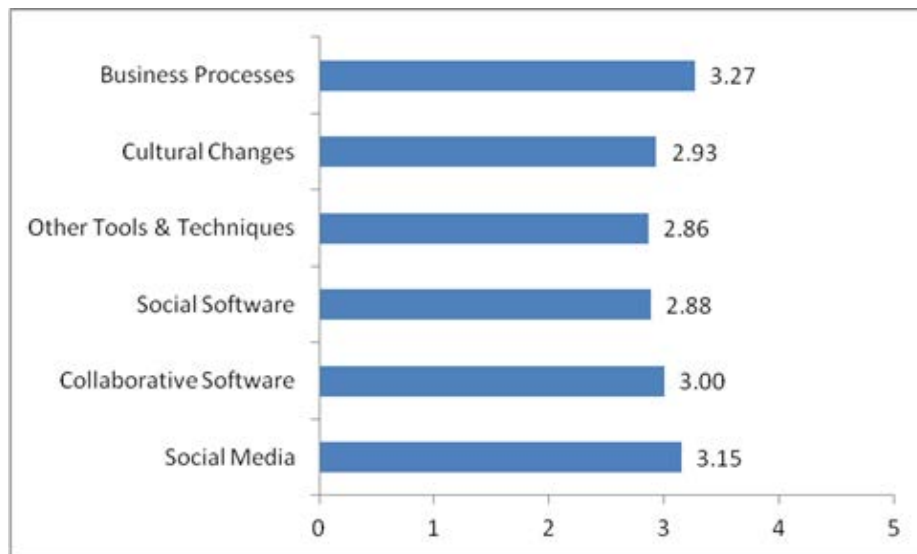

Figure 22 - Stages in Enterprise 2.0 [Not Adopted = 0 | Fully Advanced = 5]

Achieving better collaboration among employees (83%), increases in productivity (72%) and shared knowledge (61%) were aspects mentioned by the participants as a result from the adoption of Web 2.0 technologies (Figure 5 – Annex C). A relevant number of the

participating companies also perceived value from the technology adoption to attract young talented human resources (33%) and foster an innovative culture across the company (39%).

Despite the contribution of Web 2.0 technologies for better collaboration and productivity increases in companies from all sizes, this impact also varies according to the size of the company. All participating companies with more than 10,000 employees (represented in green bars) mentioned more often that technologies are empowering better collaboration among employees. In contrast, firms with less than 500 employees (represented in blue) perceive less value in knowledge shared across the company by using Web 2.0 technologies (Figure 23).
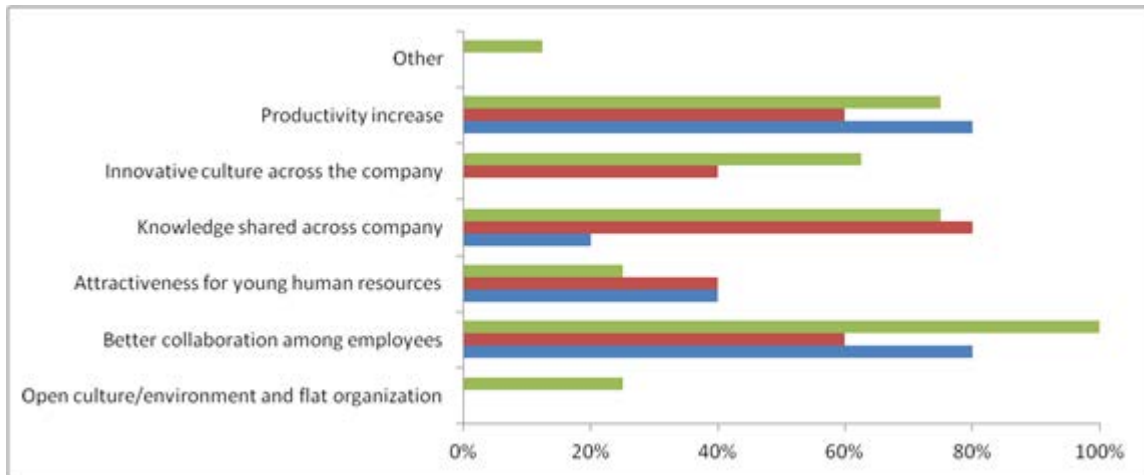
Figure 23 – Value Perceived from Enterprise 2.0 Technologies by Number of Employees
[Large = Green | Medium = Red | Small = Blue]

Although companies from different regions perceive similar advantages from Enterprise 2.0 technologies (Figure 24), companies from the Americas perceive more often the impact in the creation of an innovative culture than European firms.
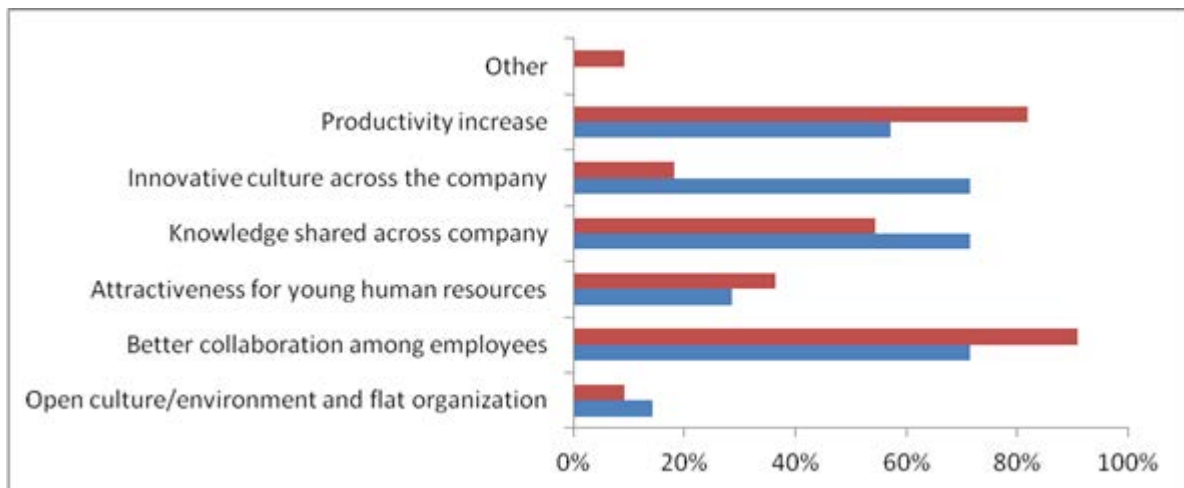
Figure 24 - Value Perceived from Enterprise 2.0 Technologies by Region
[Europe = Red | The Americas = Blue]

3.6.2 Innovation & New Product/Service Development

Time-to-market or long development cycles are among the innovation challenges mentioned by the participating companies (Figure 6 – Annex C). On the order hand, to face those challenges, companies selected top-management support (72%), financial support for new ideas/projects and for new tools and technologies (both with 56%) as key aspects (Figure 7 – Annex C).

An analysis by continent showed that American and European companies have different perspectives about the most important aspect to overcome their innovation challenges: the European firms mentioned top management support (82%) while enterprises from the Americas mentioned cultural changes (71%) (Figure 8 – Annex C). Another interesting fact is that firms headquartered in the Americas seem to be investing more in new tools and technologies (86% vs 45%) (Figure 9 – Annex C).

Regarding the use of Enterprise 2.0, different tools are being used to support connections with costumers, identify market needs, collect new ideas among employees, involve external parties in NPD or access databases from external parties to source for technology solutions (Figure 25).

#	Question	Social Media	Collaborative Software	Social Software	Other Tools & Techniques	
1	Connecting with costumers in order to identify market needs	10	4	4	7	25
2	Enabling people from all the company's sectors to suggest new ideas for products/services, processes or practices.	3	7	7	4	21
7	Crowdsourcing new product/services ideas	3	4	3	2	12
3	Involving external parties (e.g. suppliers, research centers or startups) in the product/service development process	1	4	4	5	14
4	Accessing to databases from external parties (e.g. suppliers, research centers or startups) to source for technology solutions	2	6	2	3	13
5	Other (Please specify).	0	0	1	0	1

Figure 25 - Use of Enterprise 2.0 Tools in Innovation and NPD

Companies are using social media channels and other tools as blogs when connecting with costumers to identify market needs; Social and collaborative software are the technologies more often used to generate and collect ideas from employees; When it comes to "crowdsource" new product/service ideas or involving external parties a wide variety of Web 2.0 technologies are exploited.

A significant number of the participating companies are undertaking efforts on innovation around areas as top management support, tools and technologies used (both with 61%) (Figure 10 – Annex C).

3.6.3 Overall Impact – Metrics and Results

Metrics as Key Performance Indicators (KPIs) are extremely important to measure the impact of Enterprise 2.0 tools. Although half of the participants mentioned the number of active users, time-to-market in innovation (35%) and number of employees registered (24%) are also KPIs being used by the companies for Enterprise 2.0 (Figure 11 – Annex C). Other metrics connected with productivity and efficiency improvements were also mentioned as being in

use by 50 per cent of the companies. Among those metrics are time spent in activities, reduction in time losses or number of document shared (Figure 12 – Annex C).

Although companies from different sizes tend to focus on the number of active users and improvements in productivity or efficiency, large and small companies, represented respectively in green and blue in Figure 26, tend to value metrics as time-to-market in innovation when measuring the impact of Enterprise 2.0
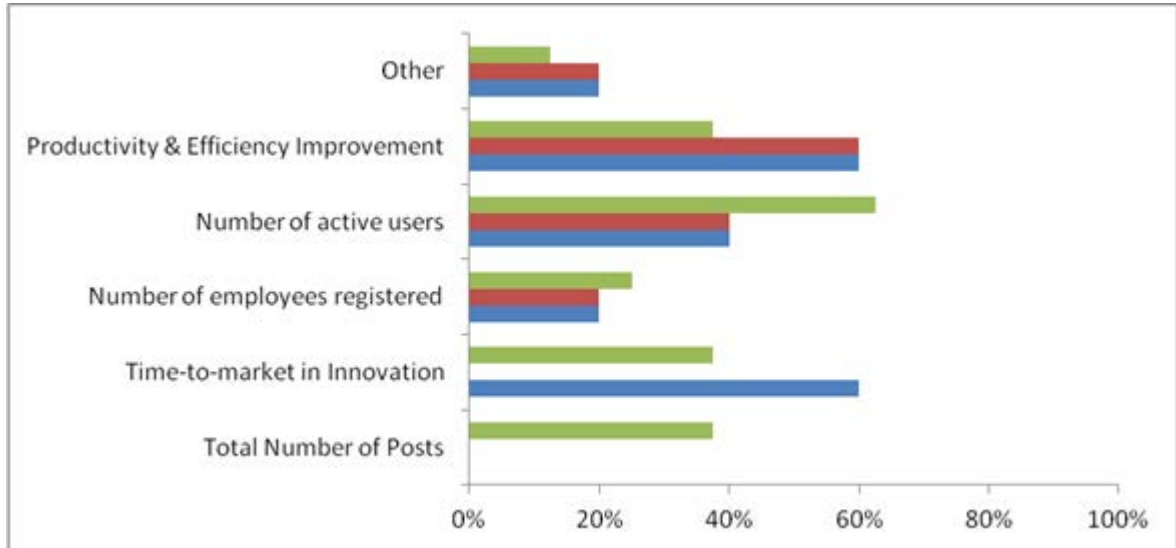
Figure 26 - Key Performance Indicators used for Enterprise 2.0 by Number of Employees
[Large = Green | Medium = Red | Small= Blue]

This focus on innovation metrics is also visible among the firms headquartered in the Americas. These companies measure time-to-market in innovation more often than their European peers (57% versus 20%) (Figure 13 – Annex C).

When analyzing the KPIs companies would like to use, return-on-investment (ROI) or the number of active users emerged as examples mentioned by the participating companies (Figure 14 – Annex C). On the same list were present metrics like innovation rate or time-to-market, which are more connected with innovation activities.

Concerning hurdles, challenges and achievements of Enterprise 2.0 mentioned there was employees' mentality, defining responsibilities for the initiatives and more information/knowledge shared (Figure 15 – Annex C).

4   Analysis and Discussion

The present chapter analyses the most relevant empirical findings from the survey. Those findings are interpreted and, in some cases, compared with the secondary information gathered during the literature review. During this process the empirical findings are consolidated and some preliminary conclusions are made. Those conclusions are further explored in the final chapter.

Regarding the drivers for an interest about Enterprise 2.0, after analyzing some of the recent studies about Enterprise 2.0 (Andriole, 2010; Bughin et al., 2011; Kiron et al., 2012; Miller et al., 2011) potential gains in productivity and efficiency could be expected. Those expectations were confirmed, as efficiency in business processes and daily operations appeared as the two more often mentioned drivers of interest in the survey.

Despite these expected results around efficiency and productivity, innovation or human resources were also mentioned as areas where Enterprise 2.0 could have an important role. The connections with both areas are also aligned with findings from the mentioned studies. An example is the presence of innovation and acquisition/retention of employees among the three most important activities of social software (Kiron et al., 2012).

This perception that Enterprise 2.0 is far beyond a simple technology adoption is also noticed when analyzing the value perceived by companies. The results showed that connected with Web 2.0 technologies are valuable changes in the company's culture and business processes.

The mentioned perception is also supported by the results, which showed that better collaboration, more knowledge shared and gains in productivity are the aspects where Web 2.0 is creating more value. These results are corroborated by the findings from other studies (Andriole, 2010; Miller et al., 2011) and tend to meet participants' expectations around Enterprise 2.0.

But the value of Enterprise 2.0 is not only perceived on business processes or collaboration. As expected by companies, the technology adoption is also helping them to attract young talents or to foster an innovative culture across the company.

These two last findings could be expected. Firstly, and regarding cultural changes, some other companies experienced similar results (e.g. CEMEX). This phenomenon can be seen as a consequence of an increase in collaboration and shared knowledge. By adopting Web 2.0 companies to foster those aspects, companies are, in parallel, contributing for a more connected organization. These new connections among employees/departments help to break silos and hierarchies within the company. As a result employees are empowered to actively contribute with new ideas for new products or business practices.

On the other hand, the value of Enterprise 2.0 to attract young talents could be anticipated given the importance in employees acquisition and retention (Kiron et al., 2012). This connection is probably intrinsically related to the way Enterprise 2.0 emerged: as the adoption by companies of Web 2.0 technologies, which became popular on the Web. Additionally, the Web became part of our daily lives, especially for the Generation Y. This new generation, who will represent the majority of the workforce in 10 years, is defined as tech savvy (Valiente, 2012) and avid users of Web 2.0 technologies like Facebook (Galloway, 2010). Taking these previous facts under consideration, the adoption of Web 2.0 technologies emerges as a critical factor to attract young talents. Not only because this new generation is

extremely connected to them but also probably because they also perceive this adoption as a signal that this is an interesting company to work for. As mentioned before Enterprise 2.0 might contribute for an organization where the hierarchies are less rigid being all the employees empowered to contribute with new ideas and suggestions.

Other relevant facts are the variations of the impact according to the company size. This could be anticipated considering the differences in the value brought by the technologies presented in a recent study from MIT and Deloitte (Kiron et al., 2012). All the large corporations are being able to have a better collaboration among their staff, a problem often faced by large and geographically spread companies. On the other hand, the relative reduced percentage (20%) of small firms having an impact on shared knowledge (when compared with larger companies) might be biased by the number of companies with less than 50 employees from this group (4 out of 5). Due to their reduced number of employees, this type of company might not perceive the advantages of the technology: the knowledge can easier circle and be transferred without new tools.

However the survey also showed differences between companies from Europe and the Americas. Although those differences, which might be biased by the sample size, between groups in terms of productivity, collaboration or shared knowledge were small (Figure 23) a significant variation emerged when it comes to innovative culture (71% vs 18%). The region where companies are headquartered seems to play a role on the impact of Enterprise 2.0, although the factor was never mentioned in other studies.

The survey results also showed that Enterprise 2.0 tools are becoming important in Innovation and NPD activities. Firstly, aspects connected with innovation and NPD were mentioned by a great part of the participant as drivers of their interest in Enterprise 2.0. Secondly the results showed that Enterprise 2.0 technologies are being used to support the activities explored in the survey. Essentially these findings verify the types of use mentioned in the literature review (Section 2.3) but, at the same time, highlight the diversity of different kinds of tools used in different activities. This last fact could be partially explained with the lack of software solutions integrating a great part of the functionalities needed for the activities.

This increasing importance is also forcing companies to start measuring the impact of Enterprise 2.0 technologies, as showed by the percentage (Figure 26) of companies using time-to-market as a KPI of Enterprise 2.0. The awareness of the potential impact of the technologies in Innovation and NPD is even re-enforced by the presence of innovation rate and time-to-market among the performance indicators companies would like to measure.

This orientation around these metrics is even more relevant when most companies are not measuring Enterprise 2.0 (Kiron et al., 2012) or using indicators related to the use of the technologies (e.g. number of employees posting), as showed by the survey results (Figure 11 – Annex C). This last type of metrics does not allow companies to measure the real impact of Enterprise 2.0. Companies should start using more business-oriented metrics (e.g. time-to-market in innovation) to effectively measure their initiatives.

5   Conclusions and Future Research

This project has explored the Enterprise 2.0 phenomenon and, from the analysis of the information collected, some relevant conclusions emerged.

Firstly it is relevant to mention that Enterprise 2.0 is clearly more than a technology adoption: connected with the adoption are changes in the company's culture and business processes.

On the other hand the impact of Enterprise 2.0 technologies tends to vary according to the size of the company and the region where a firm is headquartered (Europe versus the Americas) as explored in the previous chapter.

During the course of the project the relevance of Enterprise 2.0 technologies in Innovation and New Product Development was also demonstrated. Being those two of the most important activities in any firm, it is possible to notice the important role Enterprise 2.0 technologies are having in the company performance.

Another important conclusion is the need to effectively measure the impact of Enterprise 2.0 initiatives, being the adoption of more business-oriented metrics (e.g. time-to-market in innovation) a potential solution.

Concerning future research, the study findings anticipate new interesting research paths. Firstly the differences in the impact between companies with different sizes, especially in medium-sized companies, should be further explored. This fact might be connected to the company's dynamic or with the way the technology adoption occurred but only a deeper analysis could corroborate these hypotheses. The same detailed analysis is necessary to compare companies headquartered in Europe and the Americas. The differences reported between the two groups can be connected to different approaches for Enterprise 2.0 or cultural differences in the business practices.

These analyses would explore potential differences and similarities between the two groups in practices connected to Enterprise 2.0. From that analysis, the key factors behind the success or failure of each group would be identified, according to the results achieved in their Enterprise 2.0 initiatives.

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ANNEX A: Web 1.0 vs Web 2.0

```
        Web 1.0                     Web 2.0
      DoubleClick      -->      Google AdSense
           Ofoto       -->      Flickr
          Akamai       -->      BitTorrent
         mp3.com       -->      Napster
  Britannica Online    -->      Wikipedia
  personal websites    -->      blogging
            evite      -->      upcoming.org and EVDB
domain name speculation -->     search engine optimization
       page views      -->      cost per click
   screen scraping     -->      web services
       publishing      -->      participation
content management systems -->  wikis
 directories (taxonomy) -->     tagging ("folksonomy")
      stickiness       -->      syndication
```

Figure 1 – Comparison between Web 1.0 and Web 2.0 (O'Reilly, 2005)

ANNEX B: Survey

Definitions:

For the purposes of this survey, especially considering the current perception of the topic, we defined the following concepts as:

Web 2.0: web-based technologies where users are allowed to interact and collaborate with each other as well as create user-generated content in a virtual community;

Enterprise 2.0: adoption and use of Web 2.0 technologies within a company as well as new business practices (e.g. business processes or cultural changes) coming along with those. All those liberate the workforce from the constraints of legacy communication and productivity tools like email by making accessible the collective intelligence of many.

We organized the technologies/tools in the following categories:

- **Social Media** - communication channels usually used by companies for marketing, PR or CRM purposes
  e.g. Facebook, LinkedIn, Twitter, Youtube...
- **Collaborative Software** - corporate social networks, employee or community forums or intranets that usually combine several social software capabilities (e.g. blogs or wikis)
  e.g. Sharepoint, Yammer, Jive, Podio Hudle, Basecamp, Podio...
- **Social Software** - software with specific social capabilities
  e.g. Instant messaging, VoIP, wikis, blogs, RSS, social bookmarking...
- **Other tools & techniques**
  e.g. social cataloguing, collective intelligence, human-based computation, mashups, file-sharing services...

Innovation: turn new ideas, concepts or methods into practice

New Product/Service Development: very complex business process which includes many diverse activities beginning with the perception of a market opportunity and ending in the production, sale and delivery of a new product/service.

1. Web 2.0 at Your Company:

1.1 - Why is your company interested in Enterprise 2.0 (E 2.0)?

☐ Increase **efficiency of business processes**

☐ Reduce **time-to-market in innovation**

☐ Reduce **failure rate** in business activities

☐ Increase **innovation rate**

☐ Increase **effectiveness of daily operations**

☐ Due to **competitors' adoption of E 2.0**

☐ Increase **HR satisfaction, motivation and engagement**

☐ Other (Please specify)

☐ Not interested in E 2.0 (Please specify)

Innovation: turn new ideas, concepts or methods into practice

New Product/Service Development: very complex business process which includes many diverse activities beginning with the perception of a market opportunity and ending in the production, sale and delivery of a new product/service.

1.2 - How is your company using Web 2.0 technologies?
Please select all the options describing your companies' current use.

☐ **Intra-team:** small teams use isolated several tools from different vendors

☐ **Department initiatives:** several tools are used within a specific Department

☐ **Global Strategy:** the installation is part of a central initiative usually managed by the IT Department

☐ **External Collaboration:** the tools are used not only internally but also to collaborate with external parties (e.g. distributors, suppliers, clients, research centers or startups)

☐ **Other** (Please specify)
```

```

1.3 - Is your company's top management using and supporting the use of Web 2.0 technologies?

☐ Yes

☐ No

1.4 - Which of the following technologies are being used at your company?
Please select all the options currently in use on your company.

☐ **Social Media** (e.g. Facebook, LinkedIn, Twitter, Youtube, ...)

☐ **Collaborative Software** (e.g. Sharepoint, Yammer, Jive, Podio, Huddle, Basecamp, Podio, ...)
Please specify
```

```

☐ **Social Software** (e.g. Instant messaging, VoIP wikis, blogs, podcasts, ...)

☐ **Other Tools & Techniques** (e.g. Social cataloguing, collective intelligence, mashups, file-sharing services, ...)
Please specify
```

```

☐ **Don't know / Not applicable**

1.5 - How do you personally rate the value Enterprise 2.0 is bringing to your company in the following aspects?
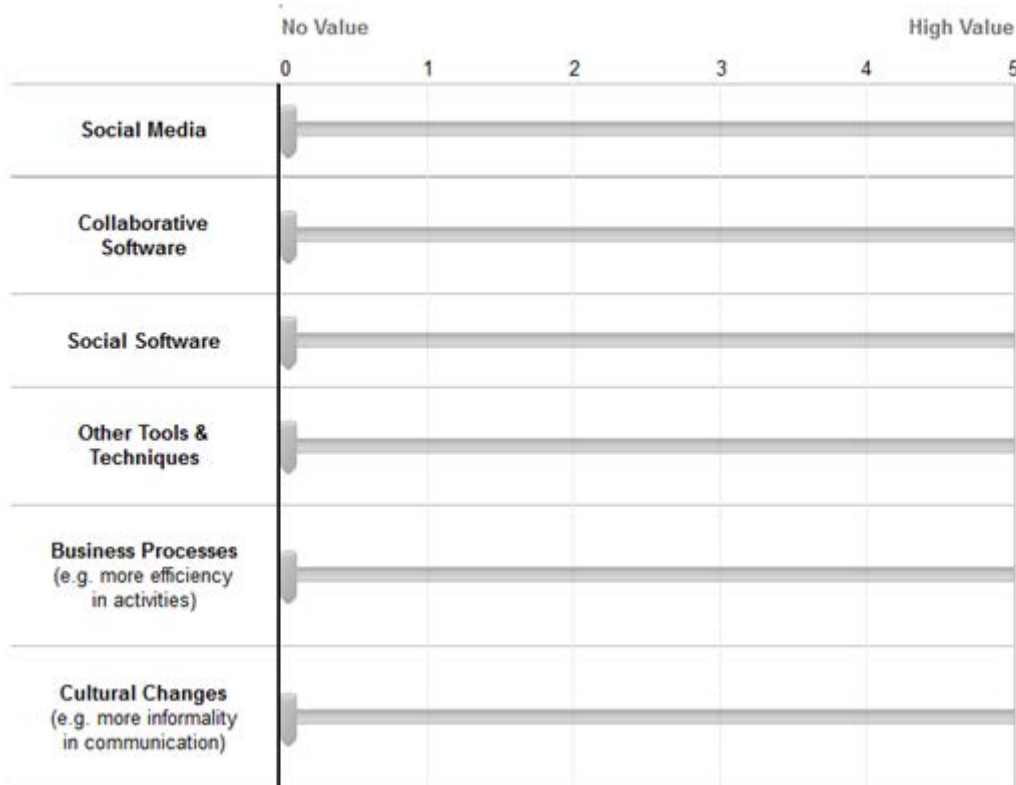
1.6 - In which stage is your company in Enterprise 2.0?
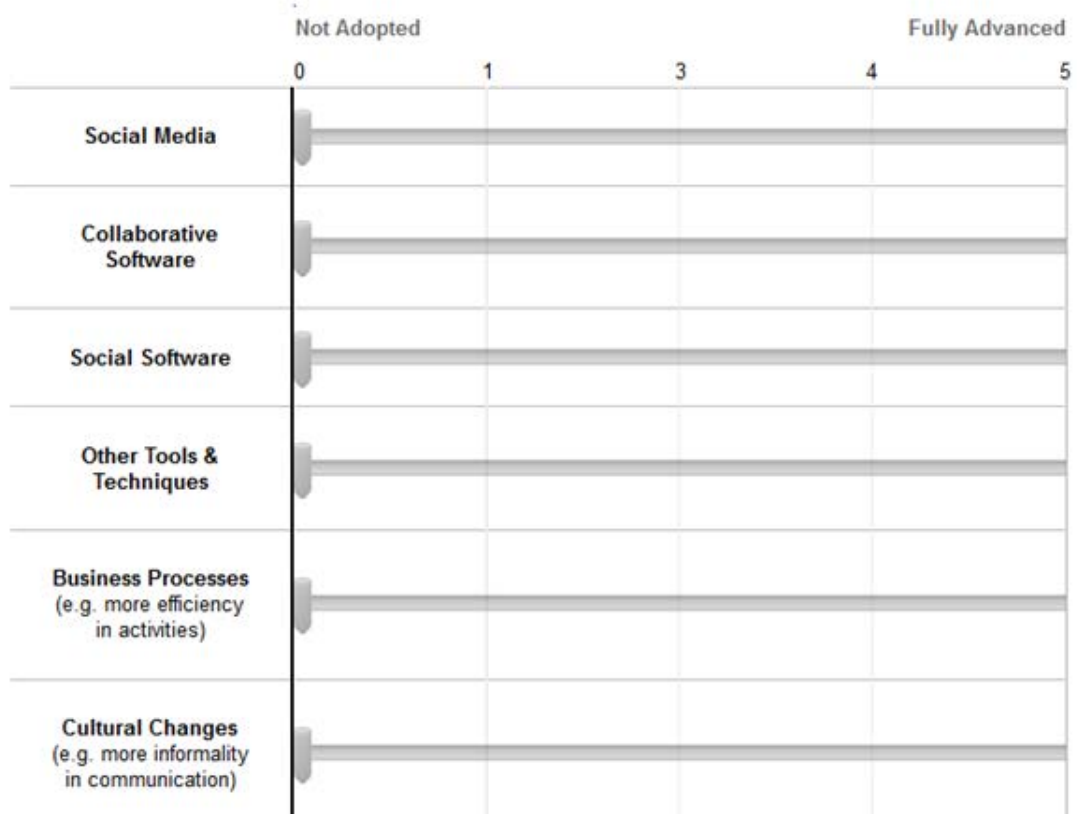
1.7 - In which aspects is your company perceiving value from adoption and use of Web 2.0?
Please select among the following aspects the ones that apply to your company.

☐ Creation of an **open culture/environment** and **flat organization** by **breaking silos** and **reducing the importance of hierarchies**

☐ **Better collaboration among employees**, even in some cases by **facilitating cross-boundary collaboration**

☐ **Attractiveness for young human resources**

☐ **Knowledge shared across company**

☐ Creation of an **innovative culture** across the company, by empowering everyone to contribute with **new ideas and solutions**

☐ **Productivity increase** (e.g. less time spent in email communication or faster decision making)

☐ Other (Please specify)

[   ]

1.8 - Which are the most important benefits that you believe your company will get from those technologies?
Please drag & drop the following options from according with their importance:

Increases in Efficiency and Effectiveness	1
Changes in the company's culture (e.g. more informality)	2
Technology Improvement (e.g. better IT Solutions)	3
Other (Please specify) [ ]	4

2. Innovation & New Process/Service Development

On this section we are changing the focus to Innovation & New Process/Service Development. Remember our definitions:

- **Innovation:** turn new ideas, concepts or methods into practice
- **New Product/Service Development:** very complex business process which includes many diverse activities beginning with the perception of a market opportunity and ending in the production, sale and delivery of a new product/service.

2.1 - What are the key challenges for being more innovative in your industry?

2.2 - Which of the following areas are important to overcome those challenges?

- ☐ Top Management Support
- ☐ Financial Support for New Ideas and Projects
- ☐ Tools & Technologies
- ☐ Cultural Changes
- ☐ Others
  Please specify

2.3 - Are you using Web 2.0 tools to support the following activities?

	Social Media	Collaborative Software	Social Software	Other Tools & Techniques	Not Applicable
Connecting with costumers in order to identify market needs	☐	☐	☐	☐	☐
Enabling people from all the company's sectors to suggest new ideas for products/services, processes or practices.	☐	☐	☐	☐	☐
Crowdsourcing new product/services ideas	☐	☐	☐	☐	☐
Involving external parties (e.g. suppliers, research centers or startups) in the product/service development process	☐	☐	☐	☐	☐
Accessing to databases from external parties (e.g. suppliers, research centers or startups) to source for technology solutions	☐	☐	☐	☐	☐
Other (Please specify).	☐	☐	☐	☐	☐

2.4 - Which efforts and measures have been undertaking in the following areas?

☐ **Top Management Support** (eg. involvement of CEO in brainstorming sessions)

☐ **Financial Support for New Ideas and Projects** (eg. new budget for a new innovation program)

☐ **Tools & Technologies** (eg. acquisition of a crowdsourcing platform software)

☐ **Cultural Changes** (eg. promotion of an informal culture)

☐ **Others**

☐ **Don't know / Not applicable**

2.5 - Do you know success stories at your company or other companies with Enterprise 2.0 for innovation and/or new product/service development?
Please specify at least one case and what was achieved

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3. Overall Impact - Metrics & Results

3.1 - Which KPIs is your company currently using to measure Enterprise 2.0 (E 2.0)?

☐ Number of employees registered

☐ Number of active users

☐ Total number of posts

☐ Productivity & Efficiency Improvement

☐ Change in the failure rate

☐ Time-to-market in innovation

☐ Other

Note: KPI - Key Performance Indicator

3.2 - Which KPIs would you like to use when measuring E 2.0?

3.3 - What hurdles, challenges and achievements did your company go through with E 2.0?
Remember that we organized Web 2.0 technologies as:

- Social Media (e.g. Facebook, LinkedIn, Twitter, Youtube, ...)
- Collaborative Software (e.g. Sharepoint, Yammer, Jive, Podio, Huddle, Basecamp, Podio, ...)
- Social Software (e.g. Instant messaging, wikis, blogs, RSS, social bookmarking, ...)
- Other tools & techniques (e.g. social cataloguing, collective intelligence, mashups, file-sharing services, ...)

3.4 - Would you like to give us any further note or comment regarding E 2.0?

4. General and Demographic Information

4.1 - In which country is your company headquartered?

Afghanistan ▼

4.2 - How many employees does your company have?

Over 100,000 ▼

4.3 - What is your primary functional affiliation?

○ Top Management

○ Research & Development

○ Communication or PR

○ Marketing or Sales

○ IT

○ HR

○ Other (please specify)

4.4 - How old are you?

Prefer not to answer ▾

If you are interested in receiving the aggregated results, please just leave us your email address below

If you and your company are interested in having your cases being highlighted, I would like to get in touch with you for an interview. Please just leave us your email address below:

The End
Please click on the botton below to submit your answers
Thank you for your cooperation!

If you are interested in receiving the aggregated results, please just leave us your email address below

If you and your company are interested in having your cases being highlighted, I would like to get in touch with you for an interview. Please just leave us your email address below:

The End
Please click on the botton below to submit your answers
Thank you for your cooperation!
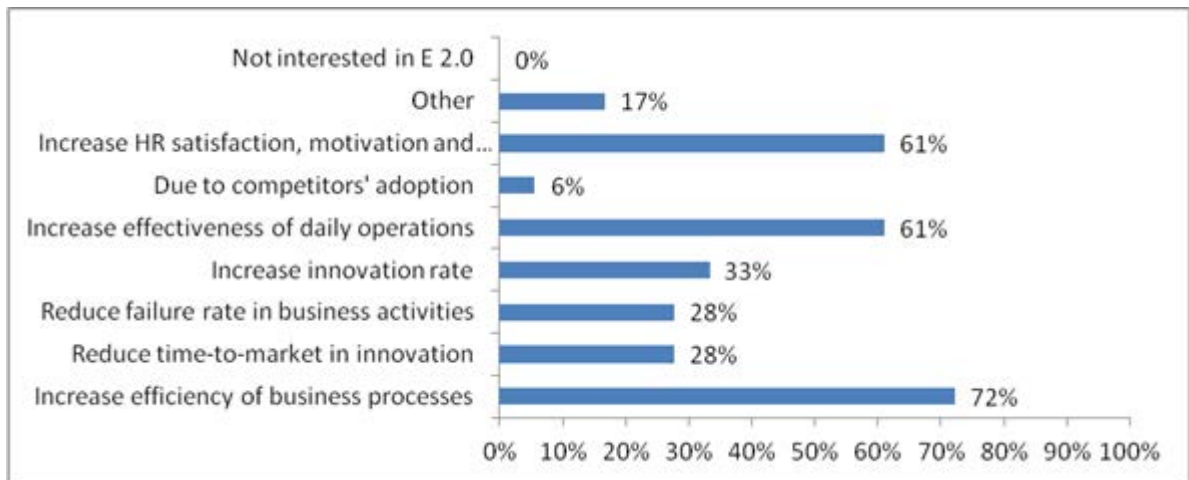
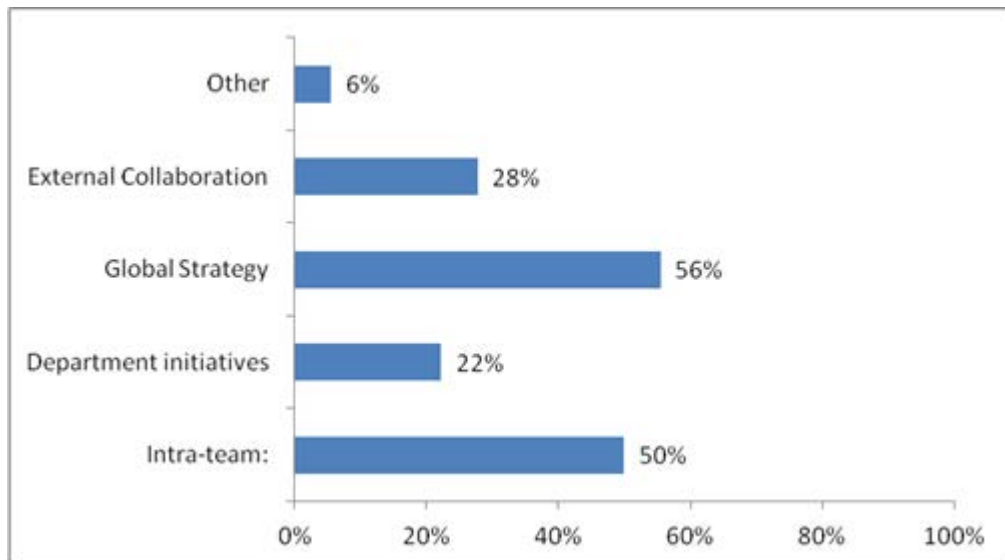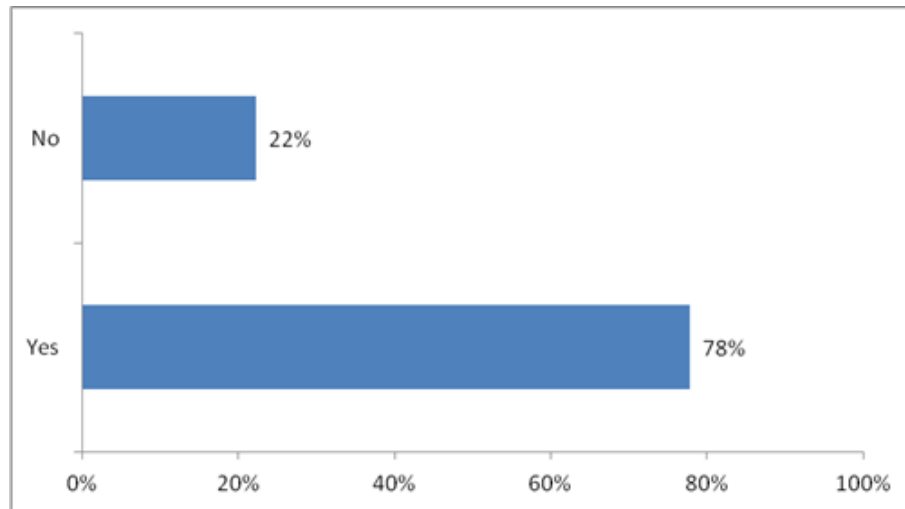## ANNEX C: Survey Results

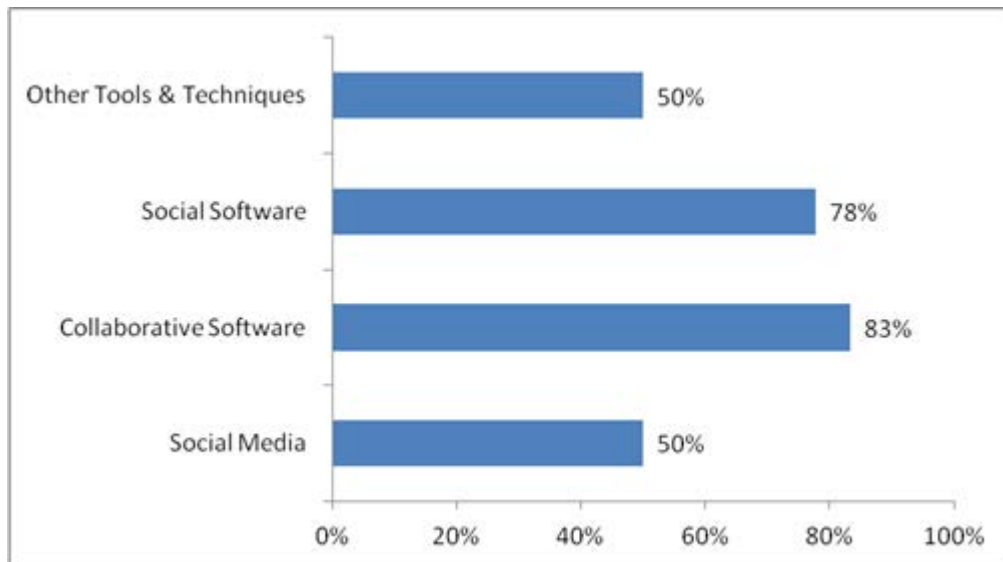**Figure 1** - Drivers of Enterprise 2.0

Figure 2 – Types of Uses of Enterprise 2.0 technologies

Figure 3 – Top Management Support and Involvement

Figure 4 – Use of Enterprise 2.0 Tools

Figure 5 – Value Perceived from Enterprise 2.0 Technologies

| Text Response |
| --- |
| Implementing new ideas cost efficiently Finding and hiring the right talents Getting high attention thus the concepts is seen/ used by enough customers |
| The new technology (in Mexico) takes a while to be on the market, change the cultural behavior in Mexico about new products online and find a company (IT) that can support all of our new strategy |
| Design and customer satisfaction |
| scale, time to market |
| Efficiency ROI |
| Change is the new routine Always on Beta mode |
| 1) Speed up time-to-market for new products; 2) Liason with external companies (e.g. full supplier integration); 3) Governmental regulation is different from country to country affecting TTM and product specifications 4) New technologies need to be tested during a long time. |
| New product development; 2.0 services integration |
| Having the right customer interface. Fixing things quickly and learn from other technician's mistakes. |
| Knowledge management & development Cross-boundary collaboration |
| New product development characterized by long development cycles |
| In a manufacturing company like this case, the training of employees is essential for the team to track technological developments |
| Innovation and Productivity. |
| Na |
| Being closer to the big industrial clients needs and being able to adapt to with continuous innovation to the business enviroment and tecnologies. |
| to give people a voice / a space to share ideas AND to promote /incentivise those ideas and concepts AND (more importantly) to give them time and resources to develop |
| Better sales processes; Better engagement of clients in the company's front-end platforms |

Figure 6 – Challenges of Innovation
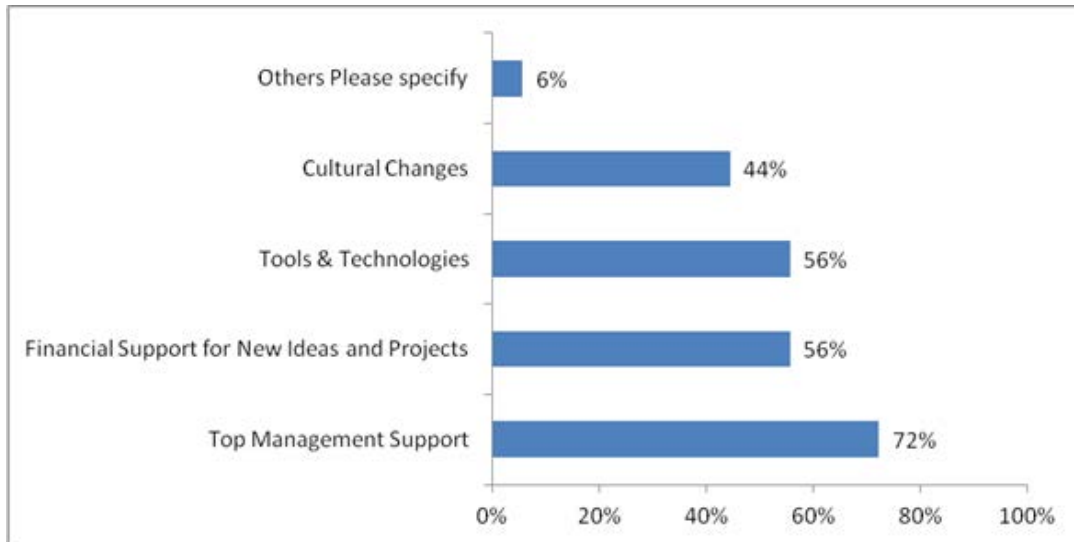
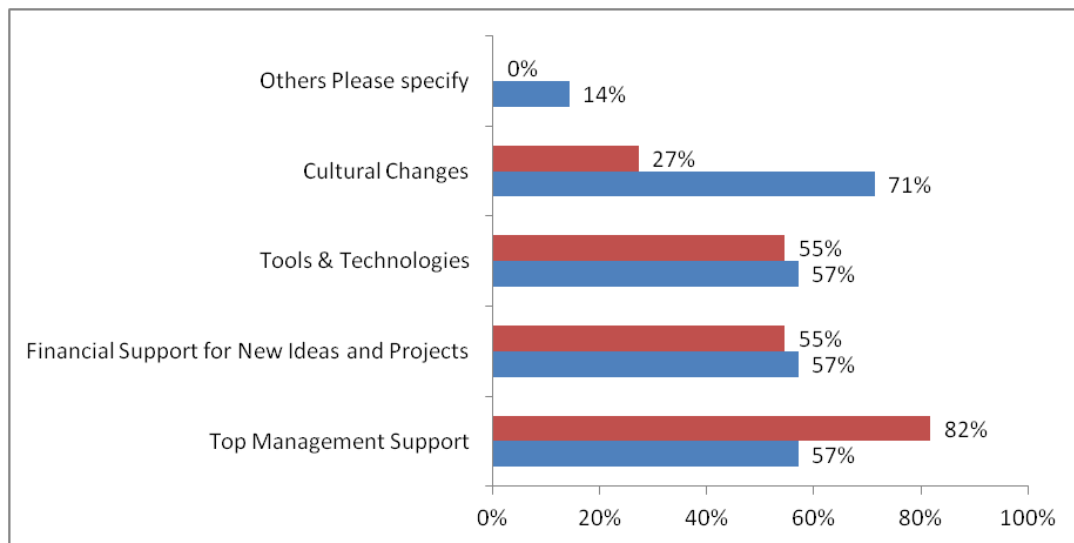**Figure 7–** Key Aspects to Overcome Innovation Challenges
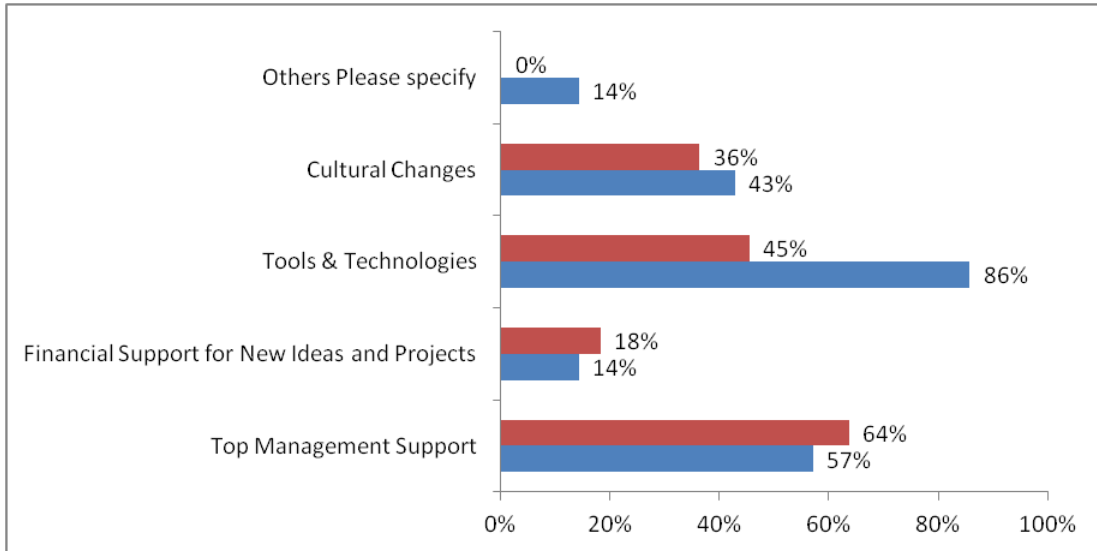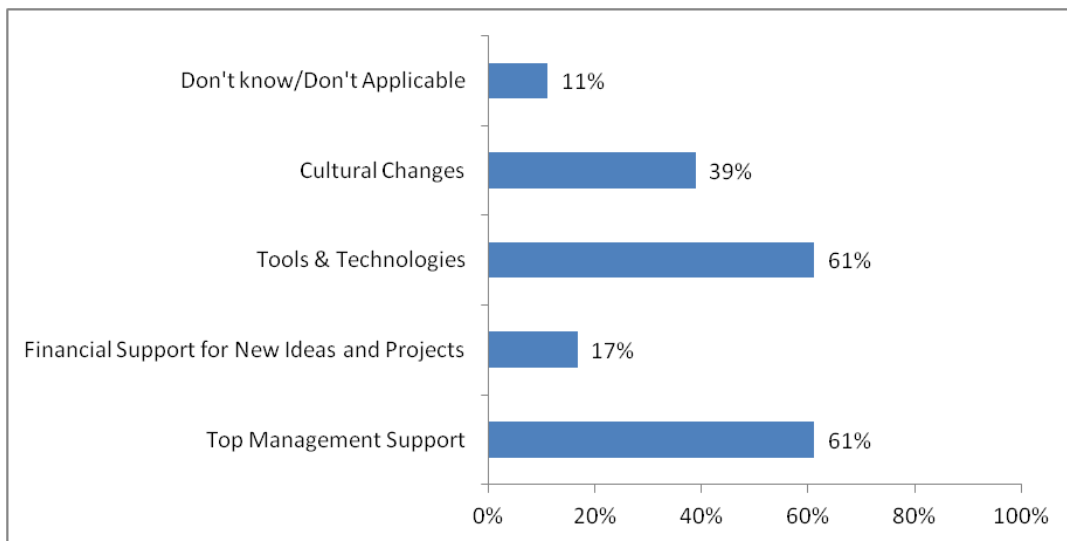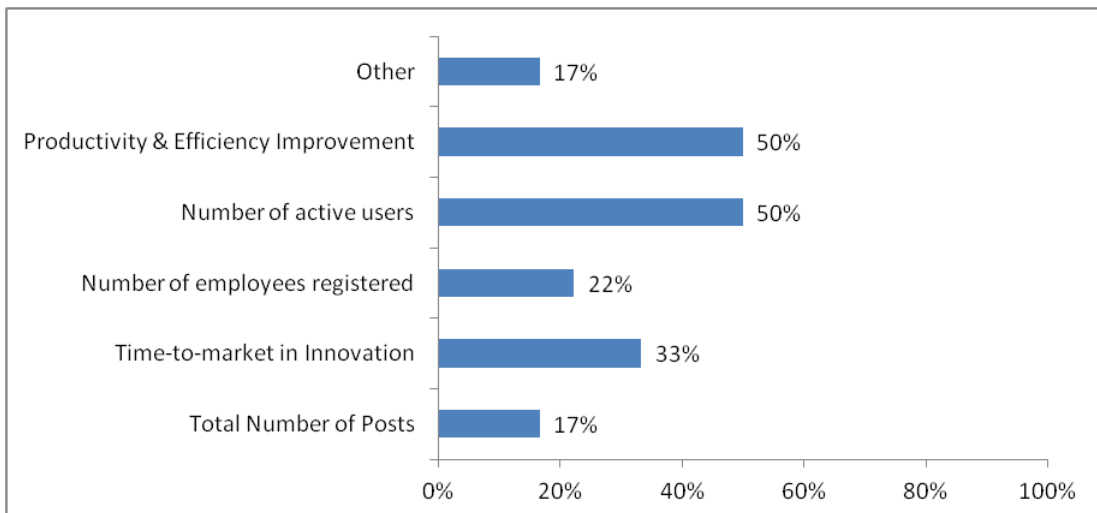

Figure 8 – Aspects to Overcome Innovation Challenges by Region
[Europe = Red | The Americas = Blue]

58

Figure 9 – Efforts to Overcome Innovation Challenges by Region
[Europe = Red | The Americas = Blue]

Figure 10 – Efforts to Overcome Innovation Challenges

Figure 11 – Key Performance Indicators used for Enterprise 2.0

Productivity & Efficiency Improvement
qualitative, examples
Acitivies time spent
Zero Email Achieved
quantified time losses first identified & resolved
Number of documents changes and shared

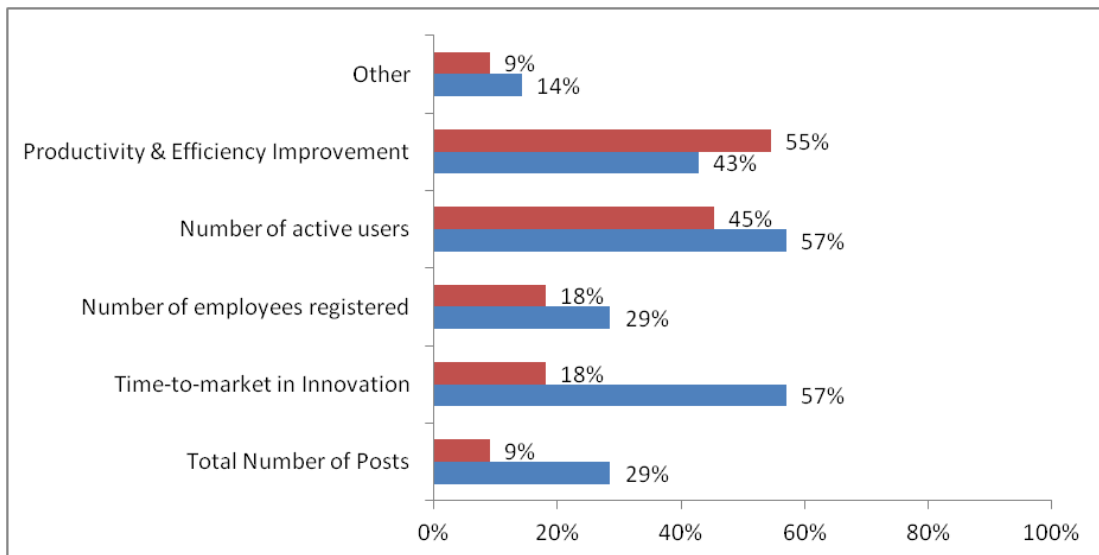**Figure 12 –** List of Key Performance Indicators used for Enterprise 2.0

Figure 13 – Key Performance Indicators used for Enterprise 2.0 by Region
[Europe = Red | The Americas = Blue]

Text Response
Number of active users and posts
Number of sales per product
number of innovations delivered, employee engagement score
ROI
We are already on 2.o since 2010
Number of new features from beta customers
How many customers reached, how much active customer input, concrete cases where someone learned from someone elses mistake
Efficiency gains in time from the employees
Currently KPIs are measured in an ad-hoc way given the informal use of some tools. Idea management is the area where KPIs are more fine-tuned. Further KPIs will need to be deeply tied to the specific goals of a company/business unit and to more formal implementations of social software
In my business I think that the most important indicators are analyzed in this moment.
Number of documents active / changed in last month / and with more one shared groups
Number of active users and time-to-market in innovation
ROI
Open Rates of newsletters Pageviews Fans in FB

Figure 14 - List of Key Performance Indicators which companies would like use

Text Response
Limited budget and time for adaption Many choices Insecurity, what tools we need in the future and if we ca build upon it
When we changed to our new office with all the E2.0 model, to a few people it took a little time to get used to the new environment and tools. But with some e-learning tools and face to face meetings at the end everyone embraced the new 2.0 environment
Collaborative software
Peoples mindset and trust is key
Do not have information available on this.
LinkedIn . business development Social Software and other tools . sharing information, improvements and stakeholders validation
Challenge is to maintain social media content and news content on the portal. Company needs to be responsive anytime, and does neet to know what to answer in critical situations
Implementation of a structure of responsibilities for the management of documents on a shared platform; cultural change to avoid mistakes with the use of such shared platforms
Achievements: increasing knowledge sharing, internal collaboration, improving content findability, better working processes with external partners, better visibility on ideas generated and implemented Hurdles and challenges: unstable economic & business environment, changes in the top management structure, resistance of some colleagues and departments
The instant messanging I think between employees increase productivity when used correctly
Collaboration Software
Instant messaging
Being able to use Social Media internally, with productivity and, at the same time, using it as marketing tool.

Figure 15 – List of Hurdles, Challenges and Achievements of Enterprise 2.0

#	Answer	1	2	3	4	
1	Changes in the company's culture (e.g. more informality)	1	6	9	2	18
3	Technology Improvement (e.g. better IT Solutions)	1	7	7	3	18
4	Other (Please specify)	1	4	0	13	18
5	Increases in Efficiency and Effectiveness	15	1	2	0	18
	Total	18	18	18	18	-

Figure 16 – Matrix of the most important benefits from Enterprise 2.0