MASTER IN INFORMATION SYSTEMS MANAGEMENT

MASTERS FINAL WORK
DISSERTATION

CRITICAL SUCCESS FACTORS FOR ACTIVITY STREAMS' ADOPTION IN AN ENTERPRISE CONTEXT

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"All things are difficult before they are easy."

Thomas Fuller

ABSTRACT

Nowadays, internet is one of the main information sources. Connection between web users is the main goal provided by Social Networking Sites (SNS), such as Facebook, LinkedIn, MySpace, Google+ and Twitter, which assume the role of information sharing through their community users. Users can post a message or comment updates from friends or brands that they follow. Every message has a publishing mechanism called Activity Stream. Each stream is composed by an Actor, a verb and an action.

An organization is a consciously coordinated social entity, with a relatively identifiable boundary, that functions on a relatively continuous basis to achieve a common goal or a set of goals (Robbins, 1990). "Social entity" refers to an organization as a composition of people who interact with each other and with the outside world. Taking this into account, the challenge in this research project is to understand how social concepts and tools introduced by social networking sites can be implemented in an enterprise context with major relevance to the Activity Stream mechanism.

To support this research project, a survey was created. This survey aims to identify critical success factors to implement Activity Streams in an enterprise context. The survey was shared through social networking sites such as LinkedIn and Facebook, and through email. The target audience was Information Technology and communication professionals in Europe. The survey questions were based on a literature review about enterprise social networking platforms, Activity Streams and critical success factors to implement information systems in organizations.

The main goals of this survey are to verify the feasibility to implement the Activity Stream mechanism in organizations.

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RESUMO

A Internet e as tecnologias web são atualmente uma das principais fontes geradoras de informação. Neste contexto e num momento em que a conectividade entre os cibernautas é tema dominante, as redes sociais criadas através de *Social Networking Sites (SNS)* (como por exemplo: *Facebook*, *LinkedIn*, *MySpace*, *Google+*, *Twitter*) assumem cada vez mais o papel de veículo transmissor de informação a toda a comunidade de utilizadores. Os utilizadores acompanham as "atualizações" através da subscrição dos perfis de amigos e/ou páginas de interesse pessoal. As mensagens apresentadas nos *Social Networking Sites (SNS)* seguem um mecanismo de subscrição e publicação de atividades designado por *Activity Stream*.

A organização é uma "entidade social conscientemente coordenada, com uma fronteira relativamente identificável, que funciona numa base relativamente contínua para alcançar um objetivo e/ou objetivos comuns" (Robbins, 1990). Assim torna-se num desafio fundamental perceber qual a aplicabilidade dos conceitos "sociais" existentes na web numa perspetiva organizacional.

Para dar suporte a este projeto de investigação foi desenvolvido um inquérito com o objetivo de identificar os fatores críticos de sucesso associados à implementação de *Activity Streams* num contexto organizacional. O inquérito foi divulgado a profissionais nas área das Tecnologias da Informação e comunicação através das redes sociais como é o caso do *LinkedIn* e do *Facebook* e também por *e-mail*. As questões do inquérito baseiam-se na revisão bibliográfica efetuada acerca dos conceitos: *Enterprise Social Networking*, *Activity Streams* e Fatores Críticos de Sucesso na implementação de sistemas de informação organizacionais.

Os objetivos principais do inquérito são: verificar a viabilidade da implementação de mecanismos de *Activity Streams* e identificar os fatores críticos de sucesso para esta implementação.

GLOSSARY

Activity Stream – is a publish-and-subscribe notification mechanism and conversation space typically found in social networking. It lists activities or events relevant to a person, group, topic or everything in the environment. A participant subscribes to, or "follows" entities (e.g., other participants or business application objects) to track their related activities.

Enterprise 2.0 – is the use of emergent social software platforms by organizations to obtain their business goals (McAfee, 2009). This concept complements methods and mechanisms which are provided by organizations to improve their work and activities based on social tools.

Enterprise Social Software – is used to promote social connectivity inside enterprises. It's an important method for enhancing communication coordination and collaboration for business purposes.

Snowball Sampling Method – A sampling technique based on individual recommendation. A set of individuals is selected and then invited to suggest other individuals, to also be part of the research.

Social Networking Sites – provide open membership where people can congregate to share information. They are an example of a decentralized network that exhibits emergent behaviour. Facebook, LinkedIn, MySpace and Google+ are examples of social networking sites. Public Social Networks is an analogous concept.

Web 2.0 – introduces a more social, collaborative, interactive and responsive web. It is a change in the philosophy of web companies and web developers, but more than that, Web 2.0 is a change in the philosophy of society as a whole. Gartner IT Glossary refers that this concept as the evolution of the Web from a collection of hyperlinks in web pages to a platform for human collaboration and system development and delivery.

ACRONYMS

CRM – Customer Relationship Management

CSF – Critical Success Factors

ERP – Enterprise Resource Planning

ESN – Enterprise Social Networks

IS – Information Systems

IT – Information Technology

PSN – Public Social Networks

RSS – Rich Site Summary (often dubbed Really Simple Syndication)

SN – Social Networks

SNS – Social Networking Sites

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Chapter 1 –Introduction

Internet is one of the main information sources and connectivity between web users is an important characteristic of web technologies. Connectivity is provided by Social Networking Sites (SNS), such as Facebook, LinkedIn, MySpace, Google+, and Twitter which assume the role of information sharing under their community users. These platforms have revolutionized the web by implementing a new concept called *real-time web*. Real-time web is characterized by highly intensive streams of updates and news (Guy *et al*., 2012). These updated messages are called Activity Streams. Leading social media sites publish Activity Streams that include millions of activities per day, generated by millions of users who write their status updates, share links and photos, join groups, comment, and "like" others' activities". Each stream is composed by an Actor, a verb and an action.

After their prosperity on the web, social networking applications have also emerged within the enterprise promoting communication and information sharing between their employees. For this purpose it is useful to identify the generic categories of enterprise social networking applications. Turban and his team (Turban *et al*., 2011) identified six enterprise applications where social networks could be improve, such as: Communication, Collaboration and Innovation, Knowledge Management, Training and Learning, Management Activities and Problem Solving, and finally Information Dissemination and Sharing.

In this research project it was proposed to evaluate Activity Stream as a tool to support all of these applications. As Rob Koplowitz said in "The Forrester Wave: Activities Streams" conference: "Social activities streams are a bridge to enterprise social vision. They connect workers to each other and to information" (Koplowitz, 2012). Assuming social activities streams as a bridge for enterprise social vision, we need to understand the main critical factors to implement these platforms in enterprises.

1.1. Problem Statement

Social media developers and researchers have developed some studies in the Activity Streams area, namely about data streams' definition, Activity Streams in collaboration projects, search and aggregation of streams. However, there are no studies about success implementation of these mechanisms in organizations. In this research project it was identified the critical success factors to implement Activity Streams in an enterprise context. Literature review supports social concepts associated with Enterprise Social Networking with major relevance to Activity Stream as a social tool. Assuming these social tools as an Information System, it is necessary to identify the main critical success factors to implement this system in enterprises. To classify these factors it was developed a research questionnaire to share with information systems professionals and enterprise social networking users.

1.2. Research Hypotheses

Based on problem statement it was identified the following four research hypotheses which could be tested and verified by the survey answers:

- **H1.** It is possible to identify the critical success factors for implementing Activity Streams' mechanism in an enterprise context**.**

- **H2.** Activity Streams' mechanism helps and improves working activities.

- **H3.** Communication improvement between collaborators is a key factor to implement an Activity Streams project in organizations.

- **H4.** The IT department assumes the leadership for an Activity Streams implementation project in organizations.

1.3. Document Structure

This master thesis document is divided in the following chapters:

Chapter 1 – Introduction, illustrates the main goals of this research project including problem statement and research hypotheses. It is an overview of the project.

Chapter 2 – Literature Review, supports this research project presenting concepts and early studies about Enterprise Social Networking, Activity Streams and critical success factors for information systems implementation.

Chapter 3 – Data and Methodology, explains methodology implemented in this project and data to be analyzed

Chapter 4 – Results Analysis, analyzing survey answers based on literature review and previous studies to test and to validate research hypotheses.

Chapter 5 – Conclusions, demonstrates the main conclusions of this research project including its limitations and future work.

Chapter 2 – Literature Review

The literature review for this project was divided in two phases (Figure 1). The first phase aims to identify enterprise social networking tools that exist in the market, analyzing their tools and features, and their customers' case studies. In parallel a search was performed in academic libraries' journal articles, papers and case studies about the project keywords: enterprise social networking, Activity Streams, social networking sites, enterprise collaboration and micro blogging. The main goals in this phase were:

- To identify social networking tools and features;
- To identify enterprise areas and tasks which could be supported by social networking platforms;
- To understand Activity Streams mechanisms;
- To make an overview of previous Activity Streams' studies.

The second phase project was centered in the study of critical success factors in Information Systems. Since there are no specifically academic research based on critical success factors to enterprise social networking applications, the research was based on journal articles, papers and case studies about critical success factors in information systems' applications such as CRM, ERP and Enterprise Systems. In this phase, main factors were identified in information systems implementation projects.

These two phases provided the information to create a research survey.
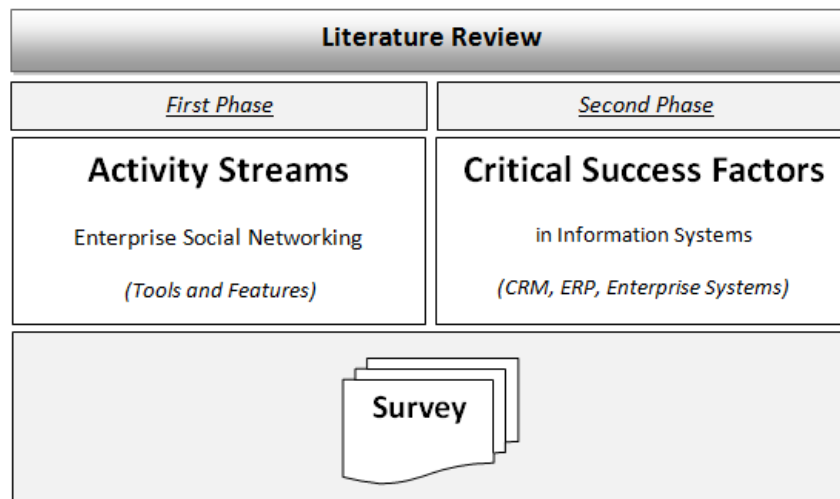
Figure 1 – Research design for literature review

2.1. Social Networks

The first concept to be studied in this project is the concept of "social network". Social networks are structured or non-structured connections between people/organizations, which interact by common values and objectives. This is based on the idea of people know how to interact with each other (Jalal, Zaidieh, 2012). Our society, friends and family are examples of social networks. Although this concept is not new, nowadays technology improves the connection process between people.

Due to technology advances, social networks on the Internet are becoming extremely popular and have begun to change the way we live and work. Based on these

technology progresses a new concept called Web 2.0 was created. O'Reilly (2003) introduced Web 2.0 as the business revolution in computer industry caused by the move to the Internet as platform, and an attempt to understand the rules for success on that new platform.

Social networking has become one of the most important communication tools among people (Jalal, Zaidieh, 2012). These tools are available on internet websites such as Facebook, Twitter, LinkedIn, MySpace, and Google+. Users share their interests and make available to the members of these networks various shared files, photos and videos, create blogs and send messages, and conduct real-time conversations. The connectivity between users is the main goal provided by these new web tools. Looking for enterprises as a social entity, the following step is to understand how these web social tools can be implemented in enterprise contexts.

2.2.   Enterprise Social Networks

Enterprise Social Networks (ESN) consists in a set of applications that promotes relationships between enterprise collaborators. According to Butler in his titled *Enterprise Social Networking and Collaboration* communication, collaboration and knowledge sharing are the reasons why an organization would use a social network (Butler *et al*., 2010).

The facilities within an ESN provide a more informal environment with various rich data structures for sharing knowledge (Butler *et al*., 2010). Altimeter defines ESN as: *"A set of technologies that creates business value by connecting the members of an organization through profiles, updates, and notifications"*. ESNs complement relationships between customers, business partners or employees. In this research project relationships between enterprise and their employees were analyzed. To understand how social mechanisms can be implemented in enterprise context, the elements provided by public social tools and the possibilities to adapt them in an

enterprise context were investigated. ESN concept is the result of applying technologies that emerged on the public Internet within the workplaces of organizations to facilitate and improve work-related communication and collaboration (Richter, 2013).

Charlene Li (2012) identified six similar elements of social network, between public and enterprise social networks. These elements are: people profiles, object profiles, updates and activity streams, notifications, relationships and permissions and privacy (Li, 2012). Table 1 resumes the matching elements between PSNs and ESNs.

Table 1 – PSN and ESN elements (Adapted: Altimeter Group)

	Public Social Network (PSN)	Enterprise Social Network (ESN)
People Profiles	Who you are, where you went to school, interests.	Similar to public networks, but also lists work-related associations and expertise (learns, projects, skills)
Object Profiles	Places and brands also have identifies and Activity Streams	Business objects (client accounts, documents, expense reports) also have Activity Streams associated with them.
Updates and Activity Streams	Created by the person. Can also include chats, video, group messaging and event planning.	Similar, created by people interacting with each other, as well as business objects and enterprise systems.
Notifications	People can completely control from whom they get updates.	Some update may be required because of work associations, updates from the CEO.
Relationships	Two-way relationships, as well as one-way follow/subscribe, always controlled by the person.	Similar, but relationships may be predetermined because of work associations (departments, team, project, location).
Permissions and Privacy	The nature of relationships dictate permissions, so greater care must be taken to make sure that private information stays within the right circles.	Employees understand that all updates can be seen by their employer; hence privacy becomes less of an issue. Permissions become a greater concern in terms of who has permission to see what information.

For Public Social Networks (PSNs), object profiles could be places or brands. In the other hand, for enterprises this could be business objects such as client account, documents or other business information. Users of PSNs create these updates posting a message, photo, video or event planning. For ESNs, employees can create these updates too, as well as business objects and enterprise systems. People control all notifications in PSNs. In ESNs some updates may be mandatory according to the employee role.

PSNs define a two-way relationships as well as one-way follow/subscribe, always controlled by the user. Work associations (departments, teams, project, and location) may predetermine the relationships preferred in the enterprise social networks. Users from PSNs have rights to define the visibility of their profiles and updates. Updates from employees can be seen by their employers. Permissions become a greater concern in terms of who has permission to see what information. There are no best practices to implement social tools within organization. Enterprises should adapt these elements according to their needs and goals.

2.2.1. Applications of Enterprise Social Networks

According to (Turban *et al*., 2011) there are six major applications and related activities identified for social networking in enterprise context. The major categories provided by social networking applications are: Communication, Collaboration and Innovation, Knowledge Management, Training and Learning, Management Activities and Problem Solving and finally Information Dissemination and Sharing. All of these applications are related with various enterprise departments and activities. Figure 2 shows each application represented by gray rounded rectangle, and several activities which can be shared by many applications.

Activities in **Communication** application often involve responses and other feedback from recipients. Social tools promote communication when employees update their status or send a message to other partner (Richter, 2013). The usage of discussion forums and blogs could be a mechanism by which companies can obtain valuable input for product improvement and/or to measure new products viability (Smith *et al*., 2009).

Collaboration and Innovation involves groups of employees in problem solving and innovation. Collaboration should be promoted by creating communities facilitate

sharing knowledge around products, services, technologies and business issues by tapping unstructured data (Maan, 2012).
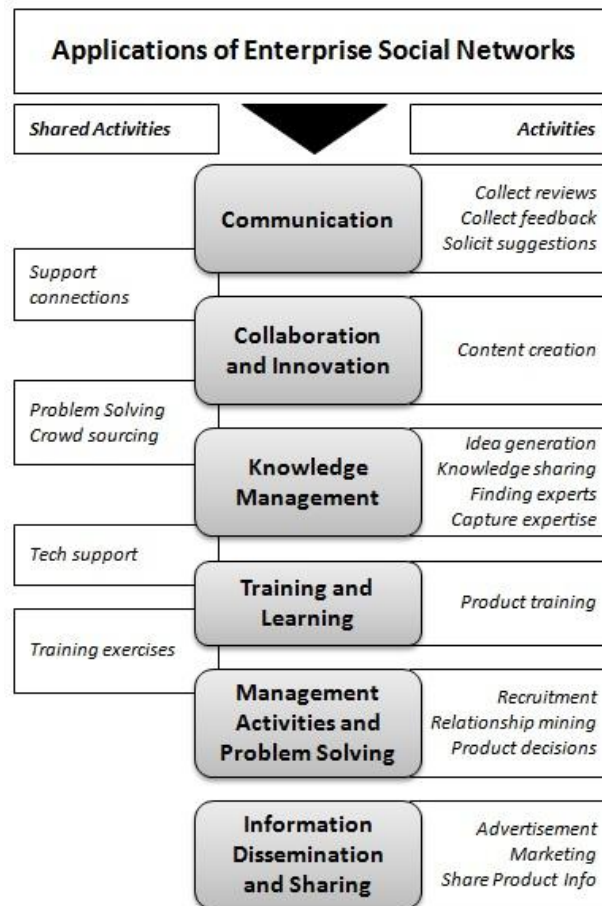
Applications of Enterprise Social Networks

Shared Activities		Activities
	Communication	Collect reviews / Collect feedback / Solicit suggestions
Support connections	**Collaboration and Innovation**	Content creation
Problem Solving / Crowd sourcing	**Knowledge Management**	Idea generation / Knowledge sharing / Finding experts / Capture expertise
Tech support	**Training and Learning**	Product training
Training exercises	**Management Activities and Problem Solving**	Recruitment / Relationship mining / Product decisions
	Information Dissemination and Sharing	Advertisement / Marketing / Share Product Info

Figure 2 – Applications of ESN Tools (Adapted from: Turban *et al*. 2011)

Many authors refer **Knowledge Management** as the main application for an ESN implementation (Lee, Yu, 2011; Riemer, Scifleet, 2012; Turban et al., 2011). Social tools such as wikis are an example of an application to create communities of expertise, as well as the identification of relevant information to share.

Companies can use social networking applications for **Training and Learning** purposes based on virtual worlds. Applications such as blogs, wikis and discussion boards could be used as e-learning systems (Lee et al., 2012).

Management Activities and Problem Solving applications support managerial decision making through analysis of the data collected in social networks. Finding and connecting people, teams and expertise, collaborating socially (Maan, 2012).

Applications for **Information Dissemination and Sharing** focus on the user of social networks to promote and disseminate information in order to target consumers, business partners or employees efficiently. These applications could be used as an alternative channel to email. Enterprises promote and share communication such as enterprise news, meetings, or publications in their own social networking application. Information provided by ESN platforms follows a publish/subscribe event mechanism called Activity Stream which is presented in the following sub-chapter.

Adopting ESN software also brings several benefits to organizations such as enhanced innovation, higher engagement, better decision-making, better communication and collaboration (Butler *et al.*, 2010; Koplowitz, 2010; Srinivasan, 2011; Turban *et al.*, 2011) . However, before these benefits can be realized, it is necessary to understand the size of the relevant group and its needs. It must then match these with the best tools available, or consider custom software to reap the benefits of ESN software. There are many software vendors promoting ESN tools. In the last six years, Gartner released annually a study called *Magic Quadrant for Social Software in the workplace* which the main goals are identify and evaluate relevant enterprise social software vendors. This report shows that ESN business is a competitive market that is increasingly gaining relevance in organizations management.

2.3.   Activity Streams

Activity Streams comes to us from the idea of "life stream", created by David Galernter and studied by Eric Freeman in his doctoral dissertation at Yale University. A lifestream is a time-ordered stream of documents that functions as a diary of your electronic life; every document you create or receive from other people are stored in your lifestream

(Freeman, 1997). The implementation of lifestream documents comes from the success of feeds such as RSS (Really Simple Syndication), a web feed format used to publish updated works (blog entries, news headlines, audio and video) in a standardized format. RSS is identified as the ancestor of Activity Stream mechanism: a Web feeds format is a technology enabler for Activity Stream protocol, which aims to syndicate activities across social Web applications (Soulier *et al*., 2012). RSS protocol consists in a message including three mandatory fields: title, link and description. In 2005, a group of people created a better-specified syndication format called Atom. Atom specification adds to RSS (title, link, summary) the author and when it was last changed (author, id, updated) to give a unique way to identity feed entry. Technically, Atom should be considered the more advanced syndication format comparing to RSS. This new format was designed for syndicating articles into web portals. Years later, social media developers defined a new paradigm in web feeds format called Activity Stream. Activity Stream approach shifts RSS-Atom focus from static content, documents and other temporary artifacts to the source of the energy, creativity and decision making, people-centric approach, where "activity" is at the beginning (Soulier *et al*., 2012). Activity Streams have been taken up in the social media development community as well, as both developers and users have been noticed the potential for using them within and especially across various kinds of social media services. In 2008, Chris Messina, Jyri Engestrom and other social media developers launched the *activitystrea.ms project*. The main goal of this project was to create standard specifications for social media services to implement shared protocols, allowing activity in one service. According to the activitystream.ms wiki: *"The activity in ActivityStreams is a description of an action that was performed (the verb) at some instant in time by someone or something (the actor) against some kind of person, place, or thing (the object). There may also be a target (like a photo album or wishlist) involved"*. Figure 3 presents a proposed Enterprise Activity Streams page.
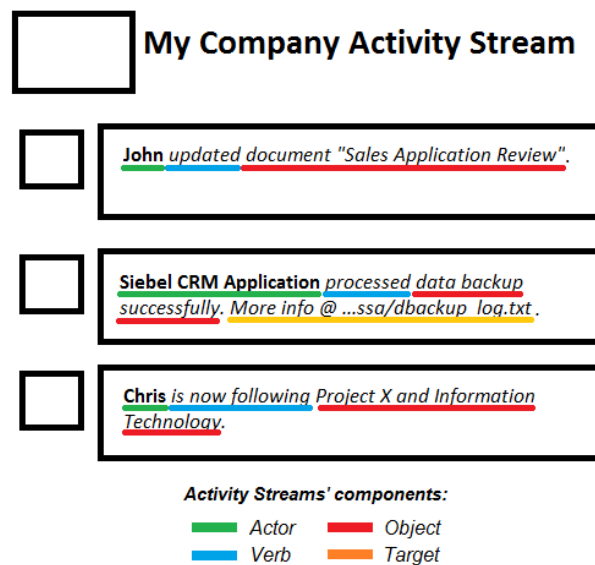
My Company Activity Stream

John *updated document "Sales Application Review".*

Siebel CRM Application *processed data backup successfully. More info @ ...ssa/dbackup_log.txt .*

Chris *is now following Project X and Information Technology.*

Activity Streams' components:

- Actor
- Verb
- Object
- Target

Figure 3 – Example of an Enterprise Activity Streams page (Based on UI Patterns: Activity Stream)

The Facebook News Feed is the best example to demonstrate an Activity Streams' mechanism. This tool occupies the central part of a user's Facebook homepage, showing friends' recent activities, including status updates, friend additions, group joining, page "liking", profile changes, photo sharing or tagging, and more (Guy, Ronen, 2011). These features provided by Activity Streams have also been implemented by ESN platforms. The basic ideas of the Activity Stream concept is to take existing streams of content, which represent all of the activities coming out of networks, web sites, applications, repositories, emails and tweets (Soulier *et al.*, 2012). Activity Streams provide a personalized, aggregated view of events, notifications and relevant action items across the range of enterprise systems, collaborative tools and social media (Guy *et al.*, 2012). The goal of the Activity Stream is to provide a standards-based capability enabled by an aggregation service, which can be linked into any enterprise application.

2.3.1. Applications and previous studies

There are many research studies about Activity Streams' implementation based on their capabilities to help in collaborative work, to search streams, to collect, aggregate and organize data streams. Activity Streams may help weave together business processes, collaborative tasks and social networking, while retaining decentralization and individuality (Soulier *et al*., 2012).

Chen *et al.* (2010) introduced new metaphors to represent a variety of **data streams**, such as *Drop*, *Stream*, *River* and *Ocean*. *Drop* is defined as the minimum unit of data streams, such as a message posted by a user, or a status change in social networking site (e.g., Facebook status update). A set of *drops* in timeline, which contains the messages, activities and actions of a user is called a Stream (e.g., Facebook Timeline). *River* is a set of streams from different users, which are formed by following or subscribing his/her followers/friends, and can be extended to followers' followers (e.g., Facebook News Feed). The whole set of all the data streams present in enterprise social networking site is called *Ocean*. These metaphors are useful to identify and categorize social networking tools. These concepts could be useful to distinguish and select data provided by enterprises applications.

Analyzing areas related to **collaborative work**, Hart-Daviddson *et al.* (2012) evaluated the features and benefits of Activity Streams for use by collaborative writing teams engaged in distributed work. They believe that activity streaming technology holds some promise for the coordinative needs of distributed writing teams based on five major tasks, such as: *to engage in multiple initiatives* (for each project or shared initiative, team members contribute to many Activity Streams); *to distribute coordination* (team members create, update and monitor project status*); to manage digital objects* (teams must manage associations among digital objects and projects in a shared repository); *to narrate project histories* (teams must be able to analyze and view project histories over time); and *to map member contributions* (team members must be

able to view their contributions in all projects). In this context, Activity Streams are continuously updated, shared records of project activity that include explicit references to project participants, shared objects, and actions performed over time (Hart-davidson *et al.*, 2012).

Guy *et al.* (2012) present a new application that uses faceted **search** approach to provide employees with advanced capabilities of search, navigation, attention management and other types of analytics on top of an enterprise Activity Stream called *Streamz.* This application was designed to help users consume a stream based on the following main goals: *attention management* (helps the user surface in their interesting activities), *search* (enables the user to find an activity based on a few parameters such as author or keywords), *navigation* (enables the user to easily move from one list of activities to another). Information searching is crucial in every enterprise process. To implement an enterprise Activity Stream, searching is one of the main concerns for ESN developers.

The flood of news updates within Activity Streams poses new challenges in terms of filtering and personalization (Guy, Ronen, 2011). In their study these authors used an enterprise Activity Stream that included status updates and news based on three dimensions: *people*, *terms* and *places*. Hong *et al.* (2010) studied the information overload as a growing threat to the productivity of knowledge' workers, who need to keep track of multiple streams of information from various sources. To resolve this question they developed a feed **aggregator** that helps readers to filter their feed item by four facets (topic, people, source and time) called *FeedWinnower.* Topic facet filters the user's feed using keywords common to similar topics. Bernstein *et al.* (2010) presented an approach to organizing a user's own feed into coherently clustered trending topics for more directed exploration. They created a Twitter client, called *Eddi* that groups tweets in a user's feed into topics which users can then browse for items of interest. Enterprise collaborators need to organize and aggregate related information. Although

social tools implement many entities for different data sources, streams aggregators can be customize.

Summarizing, in this literature review about Activity Streams the following aspects were identified:

- Activity Streams are emerging in enterprise social applications as a standard to publish real time and up-to-date messages.

- Data streams can be categorized based on their complexity.

- Activity Streams can help in collaborative work.

- Search and Aggregation methods are the main challenges to implement and Activity Streams' mechanism.

Some questions based on this analysis and previous researches were included in the survey that supported this research project.

2.4. Critical Success Factors (CSF) in Information Systems

In information systems implementation research, there has been a lot of attention given to measuring the "success" of the implementation (DeLone, McLean, 1992). For this purpose, to identify which factors are critical for information systems implementation' success is a mandatory task for information systems' managers. The Critical Success Factors (CSF) approach has been popularized by Rockart and other researchers and is now being increasingly used by information systems' departments, and by consultants, as an aid to IS strategic planning (Esteves, 2004).

2.4.1. Definition

There are several definitions of Critical Success Factors (CSF). Rockart (1979) uses ideas from Daniel (1961) and Anthony *et al.* (1972) in defining the CSFs as "*the limited number of areas in which results, if they are satisfactory, will ensure successful*

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competitive performance for the organization". Other definition was created by Bruno and Leidecker (1984) who define CSFs as *"those characteristics, conditions or variables that, when properly sustained, maintained or managed can have a significant impact on the success of a firm competing in particular industry"*. Rockart (1979) concluded that *"the critical success factors are areas of activity that should receive constant and careful attention from management. The current status of performance in each area should be continually measured, and that information should be made available"*.

2.4.2. Benefits

Rockart (1979) identified a set of benefits for managers when applying the CSF approach. The manager's main role is to determine the main factors to focus management attention. These factors will receive careful and continuous management analysis. Managers need to develop good measures for each identified factor and to seek reports on each of the measures. This process allows a clear definition of the amount of information that must be collected by the organization. The identification of CSF is a continuous process. This suggests that the Information Systems should be in constant flux with the new reports being developed as needed by new CSF identified.

2.4.3. CSF proposed for the Activity Streams implementation

After developed a research work in CSFs area it was identified a set of references related with this subject. Based on this work it was identified a list of potential CSFs to adopt when an Activity Streams' project is implemented in organization context. Wong and Tein (2007) defined a group of twenty-three critical success factors in ERP systems based on their relevance in seventeen papers. The most referenced CSFs in papers were: Top Management commitment and Support; Use of a project management to manage implementation; clear goals; focus and scope (business plan and vision); User Training and Education; User Participation. Wong (2005) proposed a list of CSFs based on

eleven factors for implementing Knowledge Management Systems in Small Medium Enterprises. They are: management leadership and support; culture; IT; strategy and purpose; measurement; organizational infrastructure; processes and activities; motivational aids; resources; training and education and human resources management. These factors are a result of the systematic effort to identify the factors in a holistic, integrative a comprehensive manner based on previous studies. Sumner (2009) studied the implementation of enterprise-wide information systems projects using such packages as SAP, Peoplesoft and Oracle within seven case studies. Based on the risk of project failure, the above mentioned author defined the following in common critical success factors among studied projects: Identify and implement strategies to re-skill the existing IT workforce and acquire external expertise through vendors and consultants when needed; Utilize "business analysts," with both business knowledge and technology knowledge; Obtain top management support for the project and a commitment to establishing and supporting project leadership; Make a commitment to training end-users in custom report development. Zeiller and Schauer (2011) analyzed the adoption and implementation, the motivation of team members and their benefit, and success factors of the utilization of social media for team collaboration. For them, social media adoption strategies may either be initiated by the management (top-down) or started bottom-up by a small number of employees. In spite of the users had no training there was a contact person or a support team who provided help on how to use the new system. User acceptance was a crucial factor identified to support this new technologies implementation. Authors have identified a set of factors that promote users' motivations to use new social media application such as: necessary for the job, easy and intuitive use, no access barriers, contains relevant content, content is up-to-date, amount of content, working faster and easier, central information access and networking. After an analysis of several case studies Zeiller and Schauer (2011)

concluded that the social media implementations are shaped by the motivation of the users to use the new tool.

Nah *et al.* (2001) based their study in a literature review identifying that the following eleven factors were critical to the ERP implementation success: ERP teamwork and composition; change management program and culture; top management support; business plan and vision; business process reengineering; project management; monitoring and evaluation of performance; effective communication; software development, testing and troubleshooting; project champion and appropriate business and IT legacy systems.

Chow and Cao (2008) defined a research model based on twelve factors to apply in agile software projects[1]. Success of the agile software development is based on a set of five categories: Organizational factors; people factors; process factors; technical factors and project factors. Organizational factors include topics related to organization and management, such as management commitment, organizational environment and team environment. People factors support team capabilities and customers involvement. Project Management and Project Definition are tasks associated to Process Factors. Technical factors include agile software techniques and delivery strategy. Finally, project factors complement nature, type and schedule of the project.

Maan (2012) identified a set of key success factors that organizations have to consider and plan to maximize an enterprise social networking investment. First he considers that enterprise collaboration needs a plan to support enterprise-wise strategy and vision. Then it should be building success measure and metrics to support social collaboration initiative. These metrics should be aligned with business goals. Finally social collaboration tools should be integrated into critical enterprise applications and processes.

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[1] **Agile software project** is a set of software development methods that contains iterative and incremental development. Project contains a set of sprints marked by deliverables. Requirements are by each sprint.

Based on this literature review a CSF reference table for Activity Streams project implementation in organizations (Table 2) has been proposed to support this research project. This reference table contains thirty-six CSFs divided by ten areas. These CSFs are included in the survey questions which will be presented in the next chapter.

Table 2 – Proposed CSF reference table to implement in Enterprise Activity Streams' projects

CSFs		Reference
Management leadership and Support		(Sumner, 1999; Wong, Tein, 2007; Wong, 2005)
MS1	Promoting executive involvement to implement Activity Streams.	
MS2	Achieving the support of senior management for accomplishing project goals and objectives.	
MS3	Managers to promote their own vision of using Activity Streams.	
Strategy and Purpose		(Maan, 2012; Nah *et al*., 2001; Sumner, 1999; Wong, Tein, 2007; Wong, 2005; Zeiller, Schauer, 2011)
SP1	Defining clear and well-planned strategy to implement Activity Streams.	
SP2	Developing a business plan for this purpose.	
SP3	Aligning project goals and objectives with strategic business goals.	
Culture		(Wong, 2005)
C1	Implementing organizational culture based on social collaboration and sharing promoted in social networking sites.	
IT		(Sumner, 1999; Wong, 2005)
IT1	Obtaining IT top management support for the project.	
IT2	Obtaining professional development of the IT workforce.	
Effective Communication		(Wong, Tein, 2007; Wong, 2005)
EC1	Encouraging employees to share information.	
EC2	Empowering employees by giving them a "voice" within the company.	
EC3	Promoting better communication.	
Motivational factors for User acceptance		(Wong, 2005; Zeiller, Schauer, 2011)
MF1	Making Activity Streams tool a necessary platform for job.	
MF2	Making Activity Streams tool an easy and intuitive use platform.	
MF3	Making available relevant content inside Activity Streams' platform.	
MF4	Making available content updated real-time.	
MF5	Working faster when using Activity Streams' platforms.	
MF6	Working easier when using Activity Streams' platforms.	
MF7	Making Activity Streams tool a centralized information platform.	
MF8	Defining new ways of information dissemination on Activity Streams' platform.	
MF9	Networking with partners.	
Processes and Activities		(Chow, Cao, 2008; Turban *et al*., 2011; Wong, 2005; Zeiller, Schauer, 2011)
PA1	Making available integration in daily work-flow.	
PA2	Management supporting.	
PA3	Problem solving.	
PA4	Knowledge management.	
PA5	Providing Innovation.	
PA6	Promoting Information sharing.	

PA7	Making available integration with core enterprise applications such as CRM, ERP, sales information system.	
PA8	Improving collaboration.	
PA9	Improving efficiency through better coordination.	
Training and Education		(Sumner, 1999; Wong, 2005; Zeiller, Schauer, 2011)
TE1	Improving effective user training and user support.	
TE2	Promoting workshops.	
Resources		(Wong, 2005)
R1	Emphasizing financial support for technological investment.	
R2	Defining Human Resources Plan to coordinate and manage the implementation process of Activity Streams.	
Measurement		(Wong, 2005)
M1	Collecting data that gives useful information about a particular situation or activity to be measured.	
M2	Collecting data that demonstrates the value and worthiness of an Activity Streams initiative.	

Chapter 3 – Data and Methodology

After analyzing different research methodologies such as case studies, interviews and surveys, the survey method was the selected option. Actually, there are many case studies about enterprise social networking implementations, but there is not an academic relevance in these cases. All of them are based in social networking vendors' capabilities and tools which give them only commercial relevance.

Survey research is used to answer questions that have been raised, to solve problems that have been observed, to assess needs and set goals, to determine whether or not specific objectives have been met, to establish baselines against which future comparisons can be made, to analyze trends across time, and generally to describe what exists, in what amount, and in what context (Issac & Michael, 1997).

Pinsonneault and Kraemer (1993) defined a survey as information gathering about the characteristics, actions, or opinions of a large group of people. Salant & Dillman (1994) referred that surveys can also be used to assess needs, evaluate demand, and examine impact. That said, a survey is a powerful tool to detect and analyze the critical success

factors on implementing enterprise social networking and activity streams solutions in organizations.

3.1.   Research Methodology

Based on the literature review, a set of CSFs to implement IS in enterprises were identified. During this phase it was identified a set of research hypotheses.

A survey was made to validate these research hypotheses. This survey contains questions based on ESN applications and features with major relevance to the Activity Streams mechanism. The survey includes these CSFs to be quantified by survey's respondents, through a Likert scale. It was used the Snowball Sampling method. According to Isaías *et al.* (2012) this consists in a repetitive process in which a set of individuals is selected to participate in the research project and then invited to suggest other individuals, to also be part of the research. As stated Snowball sampling was used to distribute the survey, through the following channels:

- Social Networking Sites (Posts, Groups in Facebook and LinkedIn);

- Email (Send an email to specified mailing list).

The main recipients for this mail were identified as:

- Employees from organizations which have ESN tools implemented;

- Employees from IT organizations in Portugal and Europe;

- Professionals of Social Media and Social Networking platforms;

- Users of Social Networking platforms;

- Individuals invited by other individuals to answer the survey.

3.2.   Survey Structure

The survey was divided in two sets of questions. The first set contains *Introduction and Personal Questions*, while the second set presents questions based on ESN and Activity

Streams Platforms. Figure 4 presents the survey structure based on these two sets of questions and their areas.
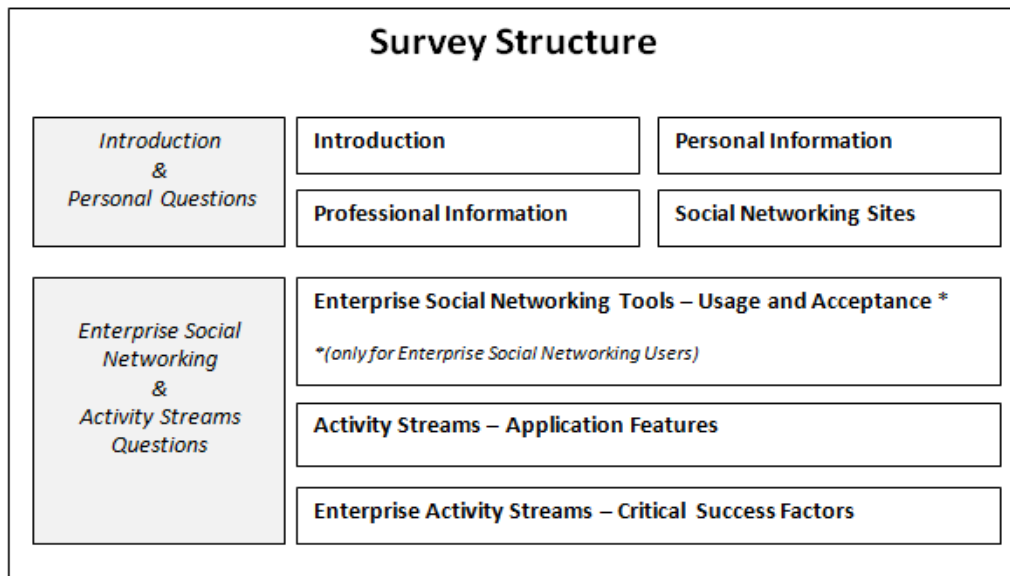
Figure 4 – Structure implemented in the survey that supports this research project.

Regarding to **Introduction**, this presents the reason and main goals of this survey. It was created to introduce the social networking and Activity Streams concepts to survey's respondents. **Personal Information**, gather respondent short details such as age, gender and country. **Professional Information**, gather short details about respondent professional situation such as professional experience (in years), industry and job functions. SNS includes questions based on social networking sites knowledge. Respondents are questioned about their usage and knowledge of a social networking top ten most popular social networking sites (February – 2013). The last questions in this area ask respondents if there is any ESN tool available in their enterprise. After answering this question, respondents are taken to a second set of questions called *Enterprise Social Networking and Activity Streams' questions*. If respondents answer "Yes" they are submitted to **Enterprise Social Networking Usage and Acceptance**. Otherwise respondents are submitted to **Activity Streams – Application Features**. In **Enterprise Social Networking Usage and Acceptance** there are a set of questions

based on respondents experience as an enterprise social networking user and how can these tools supports daily activity working. Respondents are asked to qualified social tools implemented in their organizations too. **In Activity Streams – Applications Features** there are a set of questions based on literature review about Activity Streams' features such as methods of search and aggregate streams, alerts and data sources of stream messages. **Enterprise Activity Streams – Critical Success Factors** contains a set of critical success factors to implement information systems in organizations. These factors were identified in literature review. The goal of this area is to identify the main CSFs on the implementation of Activity Streams in an enterprise context based on respondents experience and opinion.

The survey structure is detailed on Appendix A. The survey was made in Qualtrics, a web based survey's engine. It has started on 27th April 2013 and it was closed on 14th August 2013. During this period were collected 360 incomplete responses. The survey questions used to support this research project are available on Appendix B.

3.3. Survey tests

A pilot survey must first be conducted to test the instrument and the survey procedures before the final survey is released (Levy and Lemeshow, 1999). Survey questions can be evaluated using focus group discussions, cognitive interviews to determine how well respondents understand the questions and how they formulate their responses (Fowler, 1995). Surveys can also be evaluated by measuring the consistency of responses to given questions over time. To test this survey a focus group of ten respondents was created to answer and analyze its first version. Then a Focus group was formed, with IT professionals, social networking users and a PhD student. These tests were developed in the final environment platform, Qualtrics. The results of the survey tests are available on Appendix B. A *Prezi* presentation was created, containing ESN and Activity Streams concepts to give a knowledge base to the respondents who are not familiar with these

topics. This presentation is referred in the survey and it was tested by surveys' focus group testers. The *Prezi* presentation about ESN and Activity Streams concepts is available on Appendix C.

Based on the survey tests, the following strengths and weaknesses (Table 3) in the survey could be identified:

Table 3 – Strengths and Weaknesses identified in survey tests

Strengths	Weaknesses
▪ The survey is simple, intuitive and understandable ▪ The survey can be relevant to supporting this research study ▪ The *Prezi* presentation is useful to understand social networking concepts ▪ The scales are properly implemented	▪ There are many understandable questions identified ▪ Extensive questions can discouraging users to continue survey ▪ There is no Portuguese version ▪ There are no graphical information to present enterprise social networking concepts

Malfunctions identified by testers were solved during test phase. An effort was made to improve the first two weaknesses. A review of understandable questions was made. Then extensive questions were aggregated by related topics. The last two weaknesses were identified as having non priority. The Portuguese version of this survey was not recommended because it was going to be distributed through many countries and English is the universal language in Western countries where the survey was distributed. There were many difficulties to transform theories and concepts in graphical information. In spite of this, an image of an enterprise social networking dashboard was created to include in the *Prezi* presentation.

Chapter 4 – Results Analysis

The survey's analysis is divided into two areas based on the survey's structure. The first part of the survey was to identify the personal information details of the respondents.

Then the questions related with this research project subject were analyzed. These questions were used to test and validate research hypotheses identified previously.

The first set of questions in this survey illustrates respondents' personal and professional information details.

Analyzing the responses, it was identified that 64% of survey respondents are men and 39% of the respondents are 25 or more and 34 years old or less (Figure 5).
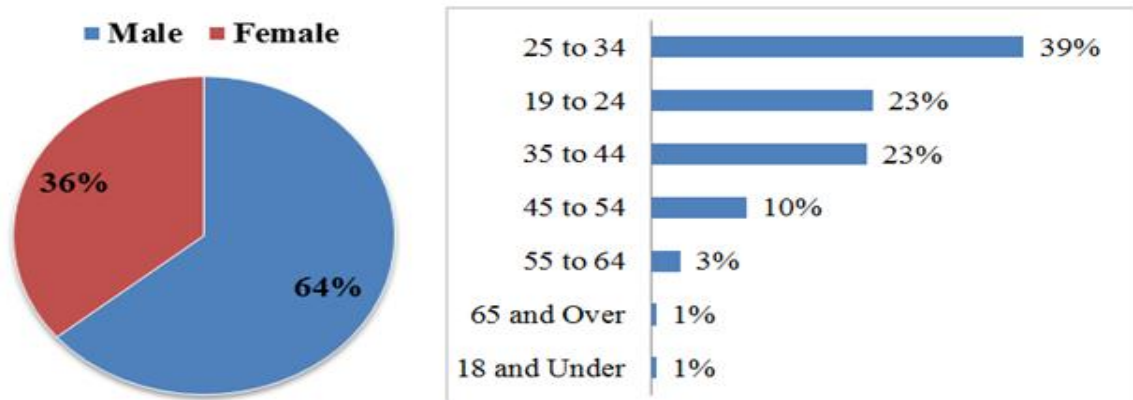
Figure 5 – Respondents by gender (left image) and age (right image).

With regard to the country of the respondents, 71% are from Portugal and 23% have 5 or more and 9 or less years of work experience (Figure 6).
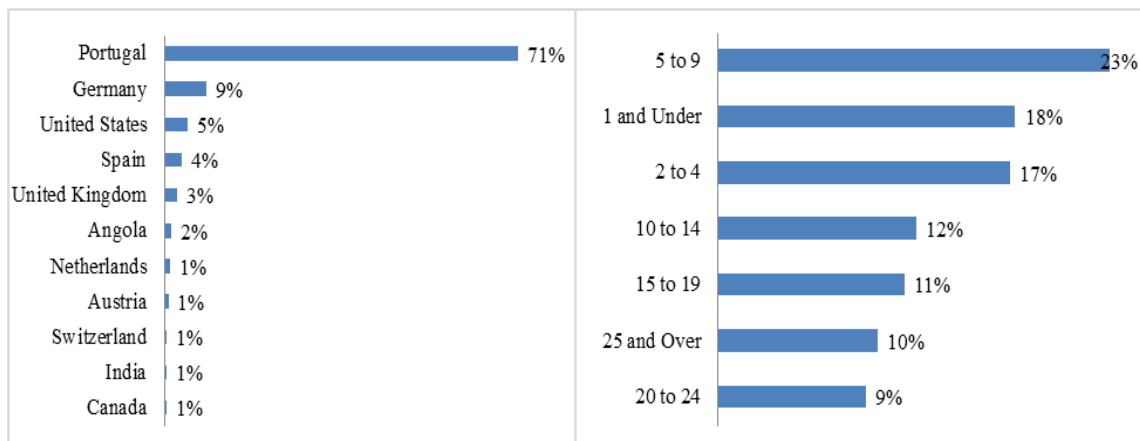
Figure 6 – Respondents by country (left graphic) and by working experience (in years) (right graphic).

Finally, in relation to the enterprise industry, the Information Technology area is the leader (28% of respondents) and regarding job function, Information Technology is also the leader (16% of the respondents) (Figure 7).
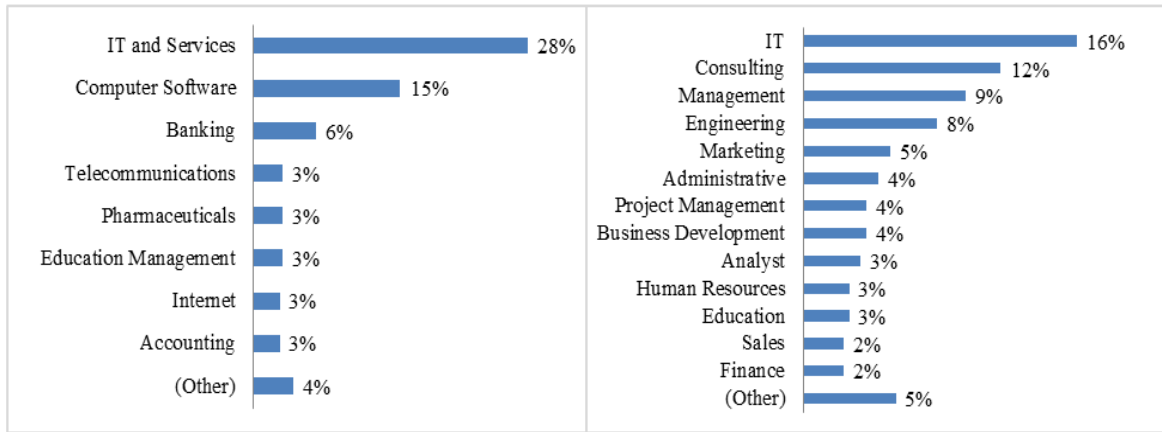
Figure 7 – Respondents by enterprise's industry (left image) and by job functions (right image).

The majority of the respondents use SNSs for their personal communications (89%) but only 47% of the respondents use social networking platforms in their organizations. Facebook, Twitter and LinkedIn are the best known and the most used social networking sites by survey's respondents (Figure 8).
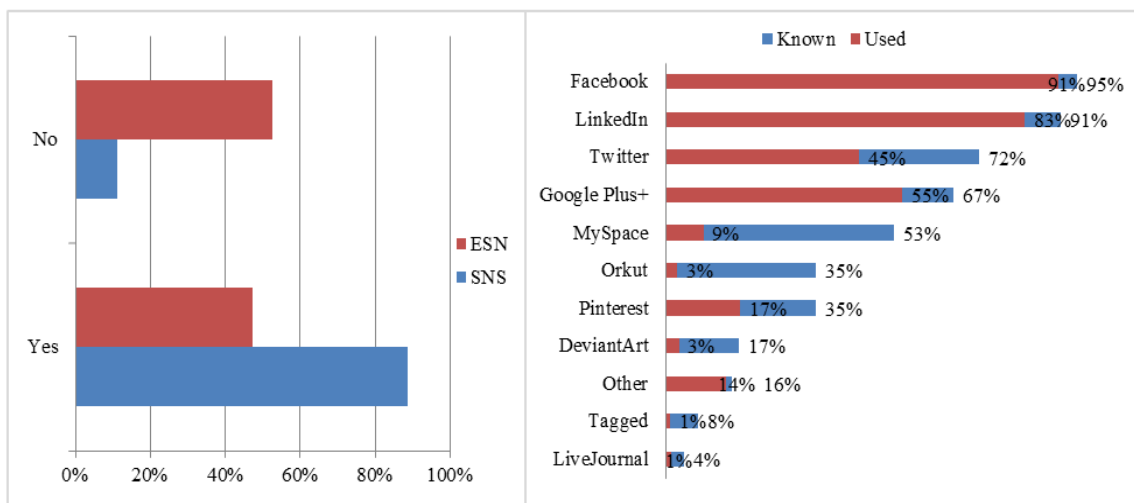
Figure 8 – SNS users *versus* ESN users (left graphic); most known and most used SNS (right graphic).

According to the literature review, there are four main characteristics which define ESN tools such as: *Reliability*, *Usefulness*, *Effectiveness* and platform *Ease of Use* (Hart-davidson et al., 2012; Turban et al., 2011). ESN users were invited to evaluate those characteristics. Figure 9 shows the results obtained through the survey.
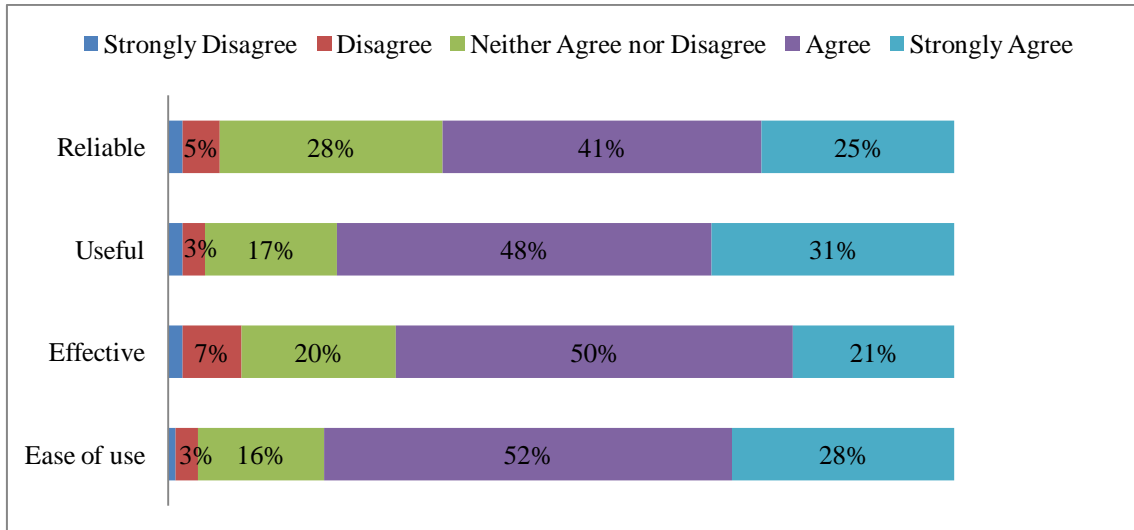
Figure 9 – Characteristics of an ESN platform.

The first analysis demonstrates that the majority of the respondents *"Agree"* with the identified characteristics. The descriptive statistics for each characteristic have been measured in order to understand which the most significant ones are. Table 4 illustrates the results. A Likert scale item is transformed in a rank value to estimate the following statistic parameters. In this case *Strongly Disagree* corresponds to 1, *Disagree* is 2, *Neither Agree nor Disagree* is 3, *Agree* is 4 and *Strongly Agree* is 5.

Table 4 – ESN characteristics: descriptive statistics

Statistic\Variable	Ease of use	Effective	Useful	Reliable
Valid cases	106	106	106	106
Mean	4.04	3.79	4.03	3.81
Std. error of mean	0.08	0.09	0.09	0.09
Variance	0.65	0.83	0.77	0.86
Std. Deviation	0.80	0.91	0.88	0.93
Variation Coefficient	0.20	0.24	0.22	0.24
rel. V.coefficient(%)	1.93	2.34	2.12	2.36

Although the results are not totally clear, *"ease of use"* is the most important characteristic for ESN users. *Mean value* give the leadership for this characteristic. The second characteristic that is relevant for ESN users is *"Useful"*.

One of the questions presented in the survey was related to the main objectives of an ESN Tool. Responses were compared with literature review and with the aim subject of this research work. This question used a rank scale to arrange answers by the respondents' preference (1 – top priority to 5 – less priority).

Figure 10 shows that there are two objectives which that had a similar classification in most of the ranks: *Reach out to ask questions* and *Read real time updated information*. On the other hand, the objective *Reach out to answer questions* is the one with highest percentage in rank 2, the second with most priority.
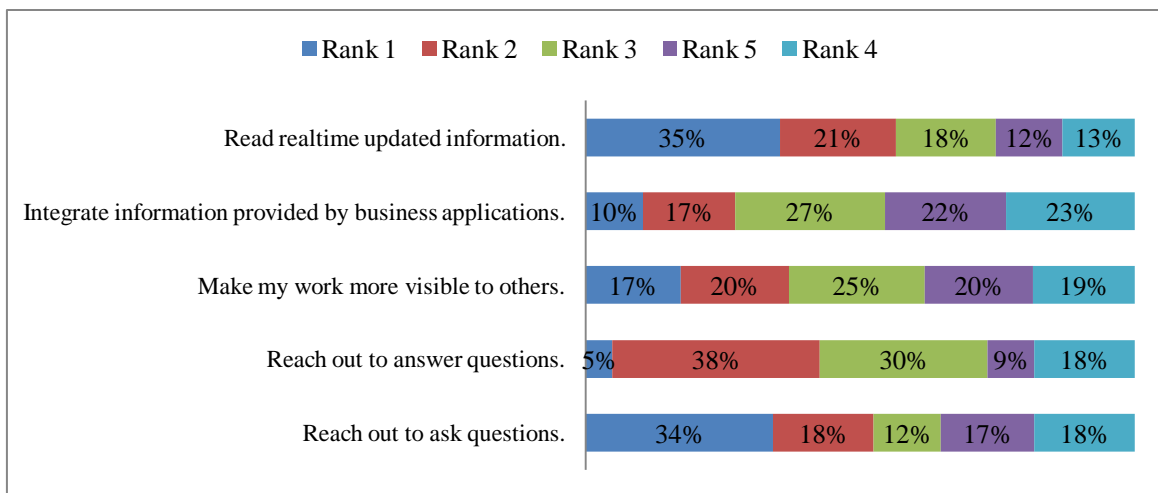
Figure 10 – ESN main objectives.

Table 5 shows the descriptive statistics for ESN Objectives to complement previous figure data.

Table 5 – ESN Objectives: descriptive statistics

Statistic\Variable	Reach out to ask questions.	Reach out to answer questions.	Make my work more visible to others.	Integrate information provided by business applications.	Read real time updated information.
Valid cases	82	82	81	77	99
Mean	3.34	3.12	2.96	2.70	**3.55**
Std. error of mean	0.17	0.12	0.15	0.15	0.14
Variance	2.33	1.10	1.89	1.63	1.96
Std. Deviation	1.53	1.05	1.37	1.28	1.40
Variation Coefficient	0.46	0.34	0.46	0.47	0.40
rel. V.coefficient(%)	5.04	3.70	5.15	5.39	3.97
Skew	-0.30	-0.45	0.01	0.23	-0.53
Kurtosis	-1.38	-0.51	-1.14	-0.91	-0.99

According to this table it is evident that *Read real time updated information* is the most important objective of an ESN. This result improves the importance of studying Activity Streams as the main mechanism to publish real time messages in ESN platforms. In addition, the survey's respondents considered that ESN is a platform to *reach out to ask/answer questions*.

Previously in this research project it was presented a set of questions about critical success factors (CSF) for Activity Streams' adoption in enterprise context, which are included in the survey that supports this study.

Based on the survey responses the mean of each CSF was considered, to rank the CSFs, through the mean, and this originated the proposed list. Table 6 illustrates the results (please refer to Table 2 for the CSF acronym and full designation and origin in the literature review).

Table 6 – CSFs analysis of mean

Position	CSF	N	Mean	Std.Dev.	Position	CSF	N	Mean	Std.Dev.
1	**EC3**	181	4.34	0.78	19	MF4	185	4.01	0.79
2	**EC1**	183	4.33	0.79	20	IT1	184	3.99	0.81
3	**EC2**	183	4.28	0.78	21	PA2	182	3.99	0.72
4	PA6	181	4.24	0.71	22	M2	184	3.98	0.71
5	PA8	184	4.22	0.71	23	SP2	185	3.97	0.90
6	SP3	181	4.19	0.79	24	M1	184	3.97	0.69

7	PA4	181	4.14	0.72		25	MF9	184	3.95	0.78
8	SP1	185	4.13	0.77		26	PA7	183	3.92	0.80
9	PA9	184	4.11	0.80		27	MF6	184	3.91	0.79
10	PA3	183	4.10	0.76		28	TE2	179	3.90	0.70
11	MF2	184	4.10	0.72		29	IT2	184	3.90	0.85
12	MF3	185	4.10	0.72		30	MF8	185	3.87	0.68
13	MS2	187	4.07	0.78		31	MF7	185	3.87	0.86
14	C1	182	4.07	0.87		32	MS3	187	3.83	0.78
15	TE1	181	4.06	0.68		33	MF5	184	3.82	0.90
16	MS1	186	4.05	0.75		34	R2	183	3.79	0.83
17	PA5	182	4.03	0.79		35	R1	184	3.78	0.74
18	PA1	184	4.03	0.69		36	MF1	184	3.67	0.85

Through the analysis of the previous table it can be concluded that *Effective Communication (EC)* is the most important area of CSFs for the survey respondents. This area comprises the following CSFs: *Promoting better communication (EC3)*; *empowering employees by giving them a voice within the company (EC2)* and *encouraging employees to share information (EC1)*. The top ten is also completed with factors from *Processes and Activities (PA)* and *Strategy and Purpose (SP)* areas. These factors include the following CSFs: *promoting information sharing (PA6)*; *collaboration (PA8); aligning project goals and objectives with strategic business goals (SP3); knowledge management (PA4); better coordination (PA9); clear strategy (SP1)* and finally *problem solving (PA3)* to implement an Activity Streams project. The mean value is greater than 3.6 for all of the CSFs analyzed. It is clear that all CSFs relevant for other Information Systems' implementations, and that have been identified through the literature review, have been considered relevant by the majority of the survey respondents.

In order to analyze the relationships between CSFs, a statistical method called Factor Analysis was used. Factor analysis is a statistical method for investigating whether a number of variables of interest are linearly related to a smaller number of unobservable factors (Malhotra, 2009). This is an interdependence technique in which an entire set of interdependent relationships is examined without making the distinction between

dependent and independent variables. This method is used in this research analysis to identify underlying dimensions or factors that explain the correlations among a set of variables (CSFs).

Table 2 listed thirty six critical success factors grouped in ten different areas. These CSFs were included in the survey. Respondents should select one of five-point Likert scale option; for each one it was assigned a score *(Strongly Disagree (score: 1), Disagree (score: 2), Neither Agree nor Disagree (score: 3), Agree (score: 4), Strongly Agree (score: 5)*. Each critical success factor represents one factor analysis variable to study.

186 total responses for the set of questions related with CSFs have been collected. After rejecting incomplete responses, 152 valid responses for this statistic test were identified. Before beginning the factor analysis test it is mandatory to verify the correlation levels between variables to guarantee the success of this analysis. For this purpose it were calculated both the Bartlett's test of sphericity and Kaiser-Meyer-Olkin (KMO) test. The Bartlett's test of sphericity is a statistic test used to examine the hypothesis that the variables are uncorrelated in the population. If this hypothesis cannot be rejected, then the appropriateness of factor analysis should be questioned. According to Table 7, sig (P) value for this test analysis (0.000010) is less than 0.05. Based on this result, the null hypothesis was rejected and it can be concluded that there are correlations between CSFs identified in the table.

Table 7 – Bartlett's statistic and KMO test

ADEQUACY OF THE CORRELATION MATRIX
Determinant of the matrix   = 0.000000000005649
Bartlett's statistic   = 3578.5 (df =   630; P = 0.000010)
Kaiser-Meyer-Olkin (KMO) test = 0.90533 (very good)

Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is an index used to examine the appropriateness of factor analysis. High values (between 0.5 and 1.0) indicate if

factor analysis is appropriate. Small values of KMO statistic indicate that the correlations between pairs of variables cannot be explained by other variables and that a factor analysis may not be appropriate. According to Table 7, the KMO test is 0.90533 and it can be concluded that a factor analysis is appropriate for this statistic test.

To perform the factor analysis, first it was determined the *eigenvalues*, representing the variability of each component and the percentage of variance. The number of factors in this analysis was defined using the determination method based on *eigenvalues* (Table 8). In this approach, only factors with *eigenvalues* greater than 1.0 are retained (Malhotra, 2009). An *eigenvalue* represents the total variance explained by each factor.

Table 8 – *Eigenvalues* and variance for tested factors

Factor	Eigenvalue	Variance (percent)	Percent cumulative	Factor	Eigenvalue	Variance (percent)	Percent cumulative
1	13.830	38.417	38.417	19	0.250	0.695	68.508
2	1.993	5.536	43.952	20	0.233	0.648	69.156
3	1.246	3.461	47.413	21	0.227	0.629	69.786
4	1.164	3.234	50.647	22	0.216	0.601	70.387
5	0.882	2.450	53.097	23	0.207	0.576	70.963
6	0.688	1.911	55.008	24	0.201	0.559	71.522
7	0.579	1.607	56.616	25	0.189	0.525	72.047
8	0.538	1.495	58.111	26	0.149	0.413	72.460
9	0.460	1.278	59.389	27	0.123	0.340	72.800
10	0.408	1.132	60.522	28	0.116	0.321	73.121
11	0.377	1.048	61.570	29	0.113	0.313	73.435
12	0.377	1.046	62.616	30	0.091	0.253	73.688
13	0.350	0.971	63.587	31	0.083	0.231	73.919
14	0.321	0.893	64.479	32	0.069	0.193	74.111
15	0.312	0.867	65.347	33	0.034	0.096	74.207
16	0.309	0.859	66.206	34	0.033	0.092	74.299
17	0.302	0.839	67.044	35	0.025	0.070	74.369
18	0.277	0.768	67.813	36	0.014	0.040	74.408

To minimize the number of variables with high loadings on a factor, thereby enhancing the interpretability of the factors, it was used the varimax procedure. Factor loadings are simple correlations between the variables and the factors (Malhotra, 2009).

Table 9 represents de varimax factor loading for each factor previously identified. It is presented the communality value for each variable too. Communality is the amount of

variance a variable shares with all the other variables being considered. This is also the proportion of variance explained by the common factors (Mingoti, 2005). All the factors identified can be interpreted in terms of the variables that load on it. To identify the most significant variables for each factor it was considered variables with loading value greater than 0.5. The variables with the highest coefficients are more correlated with the factor (Mingoti, 2005).

Table 9 – Varimax factor loadings

Variables	Factor 1	Factor 2	Factor 3	Factor 4	Communality
MF5	0.763	0.170	0.164	0.143	0.659
MF3	0.719	0.114	0.313	0.052	0.631
MF6	0.692	0.127	0.250	0.097	0.567
MF4	0.637	0.247	0.075	0.107	0.484
MF7	0.612	0.109	0.072	0.276	0.467
MF2	0.599	0.212	0.330	-0.006	0.513
PA3	0.594	0.224	0.261	0.371	0.608
PA4	0.587	0.143	0.153	0.366	0.523
PA5	0.547	0.178	0.150	0.394	0.509
MF1	0.537	0.250	0.187	0.048	0.387
PA6	0.534	0.184	0.226	0.464	0.586
PA8	0.532	0.214	0.236	0.367	0.519
PA2	0.520	0.347	0.447	0.233	0.645
PA9	0.468	0.325	0.082	0.314	0.430
MF8	0.397	0.353	0.041	0.295	0.371
C1	0.388	0.097	0.136	0.225	0.229
M1	0.236	0.710	0.207	0.099	0.612
R1	0.200	0.692	0.114	0.259	0.599
R2	0.136	0.667	0.157	0.119	0.502
M2	0.238	0.652	0.300	0.104	0.583
PA7	0.343	0.575	0.142	-0.019	0.469
TE1	0.355	0.492	0.243	0.331	0.537
IT1	0.079	0.449	0.210	0.356	0.379
IT2	-0.008	0.424	0.081	0.392	0.340
TE2	0.211	0.326	0.130	0.226	0.219
MS2	0.273	0.203	0.667	0.158	0.586
SP3	0.112	0.296	0.654	0.411	0.697
MS1	0.294	0.162	0.610	0.100	0.495
MS3	0.280	0.082	0.570	0.099	0.420
SP1	0.235	0.363	0.537	0.232	0.529
PA1	0.430	0.413	0.471	0.172	0.607
SP2	-0.023	0.355	0.439	0.389	0.471
EC2	0.264	0.154	0.300	0.641	0.595
EC3	0.313	0.178	0.209	0.597	0.529
EC1	0.422	0.119	0.271	0.525	0.541

MF9	0.303	0.326	0.015	0.444	0.395
Sum of Squares	6.765	4.459	3.588	3.422	18.233
Percent of Variance	18.792	12.386	9.965	9.505	50.647

After identifying factors and correlated variables, the next step includes the interpretation of the results. Table 10 summarizes factors and correlated variables.

Factor 1 contains variables from two different areas: *(MF) Motivational Factors and User Acceptance,* and *(PA) Processes and Activities*. Variables associated with *MF* area are related with Activity Streams' performance to improve daily working and activities. This area includes relevant information and updated information available too. The second area, *PA,* shows processes and activities in an organization, such as: Problem Solving, Knowledge Management, Innovation, Collaboration and Management. Factor 1 should be interpreted as **Working Improvements** provided by Activity Streams' platforms.

Factor 2 includes three CSFs areas identified previously in this research study. These areas are: *(M) Measurement, (R) Resources* and *(PA) Process and Activities.* The variables in this factor should be interpreted as **Organizational Support,** such as: financial support *(R1)* human resources plan to implement an Activity Streams project *(R2)*, data integration from other organizational applications *(PA7)* and initiative value that needs to be measured *(M1* and *M2)*.

Factor 3 should be interpreted as **Management Support and Strategy** based on their two areas of critical success factors *(MS) Management Leadership and Support* and *(SP) Strategy and Purpose*. These variables put the Activity Streams' project in the center of organization's strategy *(SP1)* assuming that the promotion of this initiative should be a top management responsibility *(MS1, MS2)* and it should be aligned with strategic business goals *(SP3)*. Managers should promote their own vision of using Activity Streams in a top-down structure *(MS3)*.

Factor 4 is related exclusively with **Communication Improvements**. These variables consider an Activity Streams' initiative as an improvement project to communication inside organization. Social tools promote better communication *(EC3)* and encourage employees to give their opinion *(EC2)* and share information *(EC1)* within the organization.

<div align="center">Table 10 – Factors identified by the factor analysis test.</div>

Factor 1 – Working Improvements	
MF5	Working faster when using Activity Streams' platforms.
MF3	Making available relevant content inside Activity Streams' platform.
MF6	Working easier when using Activity Streams' platforms.
MF4	Making available content updated real-time.
MF7	Making Activity Streams tool a centralized information platform.
MF2	Making Activity Streams tool an easy and intuitive use platform.
PA3	Problem solving.
PA4	Knowledge management.
PA5	Providing Innovation.
MF1	Making Activity Streams tool a necessary platform for job.
PA6	Promoting Information sharing.
PA8	Improving collaboration.
PA2	Management supporting.
Factor 2 – Organizational Support	
M1	Collecting data that gives useful information about a particular situation or activity to be measured.
R1	Emphasizing financial support for technological investment.
R2	Defining Human Resources Plan to coordinate and manage the implementation process of Activity Streams.
M2	Collecting data that demonstrates the value and worthiness of an Activity Streams initiative.
PA7	Making available integration with core enterprise applications such as CRM, ERP, sales information system.
Factor 3 – Management Support and Strategy	
MS2	Achieving the support of senior management for accomplishing project goals and objectives.
SP3	Aligning project goals and objectives with strategic business goals.
MS1	Promoting executive involvement to implement Activity Streams.
MS3	Managers to promote their own vision of using Activity Streams.
SP1	Defining clear and well-planned strategy to implement Activity Streams.
Factor 4 – Communication Improvements	
EC2	Empowering employees by giving them a "voice" within the company.
EC3	Promoting better communication.
EC1	Encouraging employees to share information.

These results give information to test and validate the research hypotheses identified previously:

H1. It is possible to identify the critical success factors for implementing Activity Streams' mechanism in an enterprise context**.**

H2. Activity Streams' mechanism helps and improves working activities.

H3. Communication improvement between collaborators is a key factor to implement an Activity Streams project in organizations.

H4. The IT department assumes the leadership for an Activity Streams implementation project in organizations.

The analysis related with the ESN characteristics and objectives concluded that the study of social tools for enterprises application is relevant. The analysis of mean for each CSFs complemented with the Factor Analysis confirmed that *it is possible to identify the critical success factors for implementing Activity Streams' mechanism in an enterprise context*. **H1** is tested and confirmed.

Regarding the factor analysis results, Factor 1 contains a set of variables related with working activities such as: *Problem Solving*, *Knowledge Management*, *Collaboration*, and *Management*. This factor also includes variables which refer working improvements as *MF5 – working faster*, *MF6 – working easier* and *MF2 – easy and intuitive*. This analysis confirmed that Activity Streams' mechanism helps and improves working activities. **H2** is tested and confirmed.

Communication Improvements was one of the factors identified in factor analysis. Activity Streams' projects promote communication as one of the main goals by sharing information and empowering employees by given them a "voice" within the company. The mean statistic for CSFs also illustrates that Communication is the most important factor according to survey respondents. Therefore, **H3** is tested and confirmed.

The results of factor analysis don't include IT area in the main factors identified. Analyzing *Factor 3 – Management Support and Strategy,* Activity Stream project should be a responsibility of top management. Managers should promote this initiative in organization. Consequently, IT departments are not the owners of Activity Streams' implementations but Top Managers should assume this role. **H4** is tested but not confirmed.

Chapter 5 – Conclusions

The present research work aimed to analyze the critical success factors for implementing Activity Streams' mechanism in an enterprise context. For that, a survey was created and shared through several channels. The survey also included some questions related with ESN platforms, and Activity Stream main features.

5.1.   Main Conclusions

From the four hypotheses stated in the beginning of this document, three where confirmed based on the survey analysis. The hypotheses confirmed that Activity Streams' mechanism is helpful in daily activities and it can improve communication between employees. Otherwise the Activity Streams project should not be seen as an IT responsibility. Top management should assume the project's leadership.

The most relevant results of this survey were the critical success factors for the implementation of Activity Streams in enterprises. Since there aren't any studies concerning this evaluation, these preliminary results should provide a platform to identify the problems and the needs of both the employers and employees regarding this implementation. Based on the literature review a set of thirty-six critical success factors divided in ten different areas were identified. These CSFs were included in the survey.

The survey responses have been statistically analyzed firstly through an univariate analysis, and secondly through a Factor Analysis.

The univariate analysis showed results for each CSF analysis higher than 3.6 and this demonstrate that for the survey respondents, all CSFs are relevant. Since these CSFs have been identified from the literature on Information Systems' implementation (i.e. from various implementations of different system types), we can state that these are also valid for Activity Streams' implementations. From all CSFs analyzed, the top ones were in the *Effective Communication* area.

After applying a factor analysis to the survey responses the following four unobservable areas where an Activity Streams project has impact, were identified: **Working Improvements**, **Organizational Support**, **Management Support and Strategy**, and **Communication Improvements**.

These results must be considered to create a CSF framework to support an Activity Streams project in an enterprise context.

5.2. Limitations of this study

One of the points that did not have much success during this process was the dissemination of the survey through Europe.

Although it was used a massive method for sharing the survey through SNS, the number of responses was lower than expected.

In the beginning of this study, one of the aims was to compare the data from Portugal with other countries from Europe. This study was not feasible due to the very low number of respondents from other European countries.

5.3. Future Work

Although these survey answers led to an appropriated statistical analysis with strong results, more studies in this area are required to confirm these preliminary results.

This survey should be disseminating in other countries and continents to do a comparative study.

Enterprise Social networks are still emerging and are not yet a need in an enterprise context. However, several enterprises have already adopted these platforms and their case studies, although mainly from a commercial/vendor perspective, demonstrate the importance of their existence. Scientific case studies should be conducted to showcase their importance, with CSFs emerging as a whole and differently for specific industries, where applicable.

This is an emerging area that requires more research to explore all of its potential.

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APPENDIX A – Survey Structure

Enterprise Social Networking Tools – Usage and Acceptance *
(only for Enterprise Social Networking Users)

Question Group	Literature Reference
Experience as an Enterprise Social Networking User.	(Zhang, Cody, 2010)
Relevant information.	(Hart-davidson *et al.*, 2012)
Helpful for daily working activities.	(Zhang, Cody, 2010)
Usage and collaboration	(Hart-davidson *et al.*, 2012)
Characteristics of Enterprise Social Networking implemented in organization	(Hart-davidson *et al.*, 2012; Turban *et al.*, 2011)
Main objectives of Enterprise Social Networking platform	(Zhang, Cody, 2010)

Types of questions:

    Close-ended questions:
    Two types of five-point **Likert scale**:
    (Never, Rarely, Sometimes, Most of the time, Always)
    (Strongly Disagree, Disagree, Neither Agree or Disagree, Agree, Strongly Agree)
    Rank order scale question (1 – top priority, 5 – less priority)

    Open-ended question:
    (Respondent suggests relevant objectives to enterprise social networking applications)

Activity Streams – Application Features

Question Group	Literature Reference
Updates provided by multiple sources	(Hart-davidson et al., 2012; Soulier *et al.*, 2012)
Alerts about new updates	(Guy *et al.*, 2012)
Search stream messages	(Guy *et al.*, 2012)
Aggregated view of data streams	(Guy, Ronen, 2011; Guy *et al.*, 2012)
Filter feed activities	(Guy, Ronen, 2011; Hong *et al.*, 2010)
Subscribe and organize feeds	(Bernstein *et al.*, 2010)
Activity generated by business applications	(O'Driscoll, 2011; Soulier *et al.*, 2012)

Types of questions:

    Close-ended questions:
    One type of five-point **Likert scale**:
    (Not all important, Very unimportant, Neither Important nor Unimportant, Very Important, Extremely Important)

    Open-ended question:
    (Respondent suggests relevant features supported by an Activity Stream platform)

Enterprise Activity Streams – Critical Success Factors	
Question Group	Literature Reference
Management leadership and support	(Sumner, 1999; Wong, Tein, 2007; Wong, 2005)
Strategy and Purpose	(Maan, 2012; Nah *et al.*, 2001; Sumner, 1999; Wong, Tein, 2007; Wong, 2005; Zeiller, Schauer, 2011)
Culture	(Wong, 2005)
IT	(Sumner, 1999; Wong, 2005)
Effective Communication	(Wong, Tein, 2007; Wong, 2005)
Motivational factors for User acceptance	(Wong, 2005; Zeiller, Schauer, 2011)
Processes and Activities	(Chow, Cao, 2008; Turban *et al.*, 2011; Wong, 2005; Zeiller, Schauer, 2011)
Training and Education	(Sumner, 1999; Wong, 2005; Zeiller, Schauer, 2011)
Resources	(Wong, 2005)
Measurement	(Wong, 2005)

Types of questions:

Close-ended questions:
One type of five-point **Likert scale**:
(Strongly Disagree, Disagree, Neither Agree or Disagree, Agree, Strongly Agree)

Open-ended question:
(Respondent suggests relevant critical success factors to implement an enterprise activity stream application)

APPENDIX B – Research Survey

INTRODUCTION

My name is Luís Carlos Silva and I am a Master student at ISEG – School of Business and Economics, Lisbon - Portugal.

This short questionnaire regarding Enterprise Social Networks and Actvity Streams implementation, is for my master thesis dissertation.

The research aims to identify and classify how these new social tools could be implemented in enterprise context.

The questionnaire therefore asks general closed and open questions regarding features and critical success factors for activity streams development and implementation in enterprise context.

It will take approximately 15 minutes to complete.

If you are not familiar with these topics you can learn about Enterprise Social Networking and Activity Streams concepts. You just click here to assist Prezi presentation (4 minutes).

Your participation in this study is completely voluntary and there are no foreseeable risks associated with it. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point. It is very important for me to learn your opinions.

As a small thank you for taking part in my survey I am running a prize draw to give 1 Amazon gift card (50€). If interested, you will be asked at the end of the survey to share your e-mail address. Participation in prize draw is not mandatory.

Your questionnaire responses will be strictly confidential and data from this research will be reported in the dissertation anonymously. If you have questions at any time about the survey or the procedures, please contact me.

Email: luiscarlosrsilva@gmail.com
LinkedIn: http://pt.linkedin.com/in/luiscarlosrsilva

Thanks for your collaboration.

PERSONAL INFORMATION

Q1 Please select your age range.
- ○ 18 and Under (1)
- ○ 19 to 24 (2)
- ○ 25 to 34 (3)
- ○ 35 to 44 (4)
- ○ 45 to 54 (5)
- ○ 55 to 64 (6)
- ○ 65 and Over (7)

Q2 Please select your gender.
- ○ Male (1)
- ○ Female (2)

Q3 Please select your country.
(List of Countries)

PROFESSIONAL INFORMATION
Q4 Please select your professional experience (in years).
- ○ 1 and Under (1)
- ○ 2 to 4 (2)
- ○ 5 to 9 (3)
- ○ 10 to 14 (4)
- ○ 15 to 19 (5)
- ○ 20 to 24 (6)
- ○ 25 and Over (7)

Q5 Please select your Enterprise's Industry.
(List of Enterprise's Industry)

Q6 Please select your job functions.
(List of Job Functions)

SOCIAL NETWORKING SITES
Q7 Do you use Social Networking Sites for your personal communications?
- ○ Yes (1)
- ○ No (2)

Q8 From the following Social Networking Sites select the ones that you know.
- ○ Facebook (1)
- ○ Twitter (2)
- ○ LinkedIn (3)
- ○ Pinterest (4)
- ○ MySpace (5)
- ○ Google Plus+ (6)
- ○ DeviantArt (7)
- ○ LiveJournal (8)
- ○ Tagged (9)
- ○ Orkut (10)
- ○ Other (11) _____

Q9 From the following Social Networking Sites select the ones where you have a user account.
- ○ Facebook (1)
- ○ Twitter (2)
- ○ LinkedIn (3)
- ○ Pinterest (4)
- ○ MySpace (5)
- ○ Google Plus+ (6)
- ○ DeviantArt (7)
- ○ LiveJournal (8)
- ○ Tagged (9)
- ○ Orkut (10)
- ○ Other (11) _____

Q10 Do you use Enterprise Social Networking platforms in your organization? (Your enterprise implements Enterprise Social Networking platform such as Jiive, SocialCast, Yammer, Zyncro, Bluewiki, or other tool)

- ❍ Yes (1)
- ❍ No (2)

ESN TOOLS –USAGE AND ACCEPTANCE

Q11 Following group questions are related with your experience as an enterprise social networking user in your organization. Please answer based on your daily activity.

	Never (1)	Rarely (2)	Sometimes (3)	Most of the Time (4)	Always (5)
Personal social networking software experience (like Facebook, Twitter, Google Plus) helps you to understand enterprise social networking implemented in your organization. (1)	❍	❍	❍	❍	❍
How often do you find relevant information in enterprise social networking software implemented in your organization (2)	❍	❍	❍	❍	❍
Enterprise social networking software implemented in your organization helps you in your daily working activity. (3)	❍	❍	❍	❍	❍

Q12 These questions are cover the activity related to Social Networking Software. Please answer based on your daily activity.

	Never (1)	Rarely (2)	Sometimes (3)	Most of the Time (4)	Always (5)
How often do you read POSTS in your enterprise social networking software (1)	❍	❍	❍	❍	❍
How often do you read COMMENTS in your enterprise social networking software (2)	❍	❍	❍	❍	❍

Q13 Following question covers main characteristics of enterprise social networking software.Please answer based on your opinion:Enterprise social software implemented in your organization is…

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Ease of use (1)	❍	❍	❍	❍	❍
Effective (2)	❍	❍	❍	❍	❍
Useful (3)	❍	❍	❍	❍	❍
Reliable (4)	❍	❍	❍	❍	❍

Q14 Please rank the following objectives of the Enterprise Social Networking applications according your preference. (1 - top priority to 5 - less priority)
- ❍ _____ Reach out to ask questions. (1)
- ❍ _____ Reach out to answer questions. (2)
- ❍ _____ Make my work more visible to others. (3)
- ❍ _____ Integrate information provided by business applications. (4)
- ❍ _____ Read realtime updated information. (5)

Q15 Please suggest other relevant objectives of the enterprise social networking applications.

ACTIVITY STREAMS – APPLICATION FEATURES

Q16 There are many tools supported by enterprise social networking platforms. Activity Streams mechanism is one of these tools. To understand the best features supported by an activity stream tool, please select the importance given to each aspect, for the following questions, based on your opinion: Activity Streams applications...

Shows updates and activities provided by multiple sources such as user profiles or other enterprise objects.
(Example of Activity Stream message: "John created a new Task for Project X @ 01/02/2013 10:00:40")
- ❍ Not at all Important (1)
- ❍ Very Unimportant (2)
- ❍ Neither Important nor Unimportant (3)
- ❍ Very Important (4)
- ❍ Extremely Important (5)

Alerts you about new activities and updates.
(You receive notifications about new activity stream message)
- ❍ Not at all Important (1)
- ❍ Very Unimportant (2)
- ❍ Neither Important nor Unimportant (3)
- ❍ Very Important (4)
- ❍ Extremely Important (5)

Helps you search an activity based on few details such as author or keywords.
(There is a search page where you can search an activity stream based in their author or an associated keyword)
- ❍ Not at all Important (1)
- ❍ Very Unimportant (2)
- ❍ Neither Important nor Unimportant (3)
- ❍ Very Important (4)
- ❍ Extremely Important (5)

Enables you to look at an aggregated view of the activity stream or a subset of it to gain broad insights.
(Activity Stream messages are aggregated by related keywords or topics.)
- ❍ Not at all Important (1)
- ❍ Very Unimportant (2)
- ❍ Neither Important nor Unimportant (3)
- ❍ Very Important (4)
- ❍ Extremely Important (5)

Helps you to filter feed activities and updates by your preference.
(You can define your own filters based in your preferences such like update date, specific topic, keyword or author)
- ❍ Not at all Important (1)
- ❍ Very Unimportant (2)
- ❍ Neither Important nor Unimportant (3)
- ❍ Very Important (4)
- ❍ Extremely Important (5)

Helps you to organize activity streams subscribed by you.
(You can subscribe and organize profiles, pages and updates by your preference)
- ❍ Not at all Important (1)
- ❍ Very Unimportant (2)
- ❍ Neither Important nor Unimportant (3)
- ❍ Very Important (4)
- ❍ Extremely Important (5)

Shows recently activity generated by another enterprise applications.
(Activity streams as a central system that unifies every piece of corporate information. Integrates all enterprise applications such as CRM, ERP, Sales systems. Example of Activity Stream message generated by CRM application: "New customer has created @ 01/01/2013 09:20:00")
- ❍ Not at all Important (1)
- ❍ Very Unimportant (2)
- ❍ Neither Important nor Unimportant (3)
- ❍ Very Important (4)
- ❍ Extremely Important (5)

Q17 Please suggest other relevant features supported by an Activity Stream platform.

ENTERPRISE ACTIVITY STREAMS – CRITICAL SUCCESS FACTORS
Q18 Critical success factors analysis is a fundamental process in every information systems implementation. Rockart (1979) defines critical success factors as "...the limited number of

areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization".

To understand which factors and categories successfully affect an enterprise activity stream implementation, please answer based on your opinion:

Management leadership and support	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Promoting executive involvement to implement Activity Streams. (1)	❍	❍	❍	❍	❍
Achieving the support of senior management for accomplishing project goals and objectives. (2)	❍	❍	❍	❍	❍
Managers to promote their own vision of using Activity Streams. (3)	❍	❍	❍	❍	❍

Strategy and Purpose	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Defining clear and well-planned strategy to implement Activity Streams. (1)	❍	❍	❍	❍	❍
Developing a business plan for this purpose. (2)	❍	❍	❍	❍	❍
Aligning project goals and objectives with strategic business goals. (3)	❍	❍	❍	❍	❍

Culture	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Implementing organizational culture based on social collaboration and sharing promoted in social networking sites. (1)	❍	❍	❍	❍	❍

IT	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Obtaining IT top management support for the project. (1)	❍	❍	❍	❍	❍
Obtaining professional development of the IT workforce. (2)	❍	❍	❍	❍	❍

Effective Communication	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Encouraging employees to share information. (1)	❍	❍	❍	❍	❍
Empowering employees by giving them a "voice" within the company. (2)	❍	❍	❍	❍	❍
Promoting better communication. (3)	❍	❍	❍	❍	❍

Motivational factors for User acceptance	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Making Activity Streams tool a necessary platform for job. (1)	❍	❍	❍	❍	❍
Making Activity Streams tool an easy and intuitive use platform. (2)	❍	❍	❍	❍	❍
Making available relevant content inside Activity Streams platform. (3)	❍	❍	❍	❍	❍
Making available content updated realtime. (4)	❍	❍	❍	❍	❍
Working faster when using Activity Streams platforms. (5)	❍	❍	❍	❍	❍
Working easier when using Activity Streams platforms. (6)	❍	❍	❍	❍	❍
Making Activity Streams tool a centralized information platform. (7)	❍	❍	❍	❍	❍

Defining new ways of information dissemination on Activity Streams platform. (8)	❍	❍	❍	❍	❍
Networking with partners. (9)	❍	❍	❍	❍	❍

Processes and Activities	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Making available integration in daily work-flow. (1)	❍	❍	❍	❍	❍
Management supporting. (2)	❍	❍	❍	❍	❍
Problem solving. (3)	❍	❍	❍	❍	❍
Knowledge management. (4)	❍	❍	❍	❍	❍
Providing Innovation. (5)	❍	❍	❍	❍	❍
Promoting Information sharing. (6)	❍	❍	❍	❍	❍
Making available integration with core enterprise applications such as CRM, ERP, sales information system. (7)	❍	❍	❍	❍	❍
Improving collaboration. (8)	❍	❍	❍	❍	❍
Improving efficiency through better coordination. (9)	❍	❍	❍	❍	❍

Training and Education	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Improving effective user training and user support. (1)	❍	❍	❍	❍	❍
Promoting workshops. (2)	❍	❍	❍	❍	❍

Resources	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Emphasizing financial support for technological investment. (1)	❍	❍	❍	❍	❍
Defining Human Resources Plan to coordinate and manage the implementation process of Activity Streams. (2)	❍	❍	❍	❍	❍

Measurement	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Collecting data that gives useful information about a particular situation or activity to be measured. (1)	❍	❍	❍	❍	❍
Collecting data that demonstrates the value and worthiness of an Activity Streams initiative. (2)	❍	❍	❍	❍	❍

Q19 Please suggest other relevant critical success factors to implement an enterprise activity stream application.

Thanks for your collaboration.

Your questionnaire responses will be strictly confidential and data from this research will be reported in the dissertation anonymously.

If you interested to participate in 1 Amazon Gift Card (50€) prize draw enter your email address and click Next button to finish survey, else just click Next button to finish survey.

APPENDIX C – Survey Tests

Tester	Time Disp.	Malfunction / Understanding Problems	Global Evaluation
IT Team Leader	10 min	Q25. You can select improperly many options for each factor	Globally, it seemed very clear. Prezi presentation is important but you can change text exposure in a more graphical presentation. Can be a good supporting to this research study
PhD student	15 min	Q25. You can select improperly many options for each factor	I think the survey is simple and not boring, in fact for anyone who is within the subject should not take more than 10 min to respond. I recommend improvements in some questions' structure.
IT Professional	15 min	Q25. It's a very extensive question. Maybe you can aggregate by topics.	Simple and crystal clear. It gives a quick and clear understanding of the subject concerned. The prezi presentation is useful to understand the subject.
Software Developer	12 min		Outlined in a simple, intuitive and easy way to answer.
IT Consultant	25 min		Relevant. Should have a Portuguese version. I do not have extensive knowledge on this matter so I cannot evaluate the usefulness of the survey.
Telecomunications/ Engineering (social networking user)	15 min		Simple and intuitive. Should have a Portuguese version. It seems to me a matter relevant subject. The presentation helped to realize the concepts of enterprise social networks and activity streams applied in the survey.
IT Consultant (enterprise social networking user)	20 min	Q12. Q13. You can select improperly many options for each factor. Q25. It's a very extensive question. This question can be discouraging to continue survey.	It is quite understandable and relevant.
IT Project Manager	12 min		Quite useful for my company where is being given to the implementation of this kind of tools.
Software Developer	14 min		Relevant. But I had some difficulties to interpret the section of critical success factors, due to lack of thorough knowledge of this area.
Banking IT Consultant (ESN user)	12 min	Q12. Q13. You can select improperly many options for each factor.	Relevant and intuitive. It is simple and it is noticeable. As an enterprise social networking user I think that most important factors are discussed in this survey.

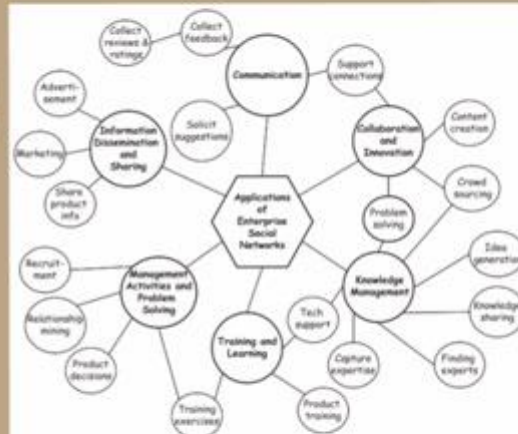**APPENDIX D – Prezi presentation: ESN & Activity Streams**
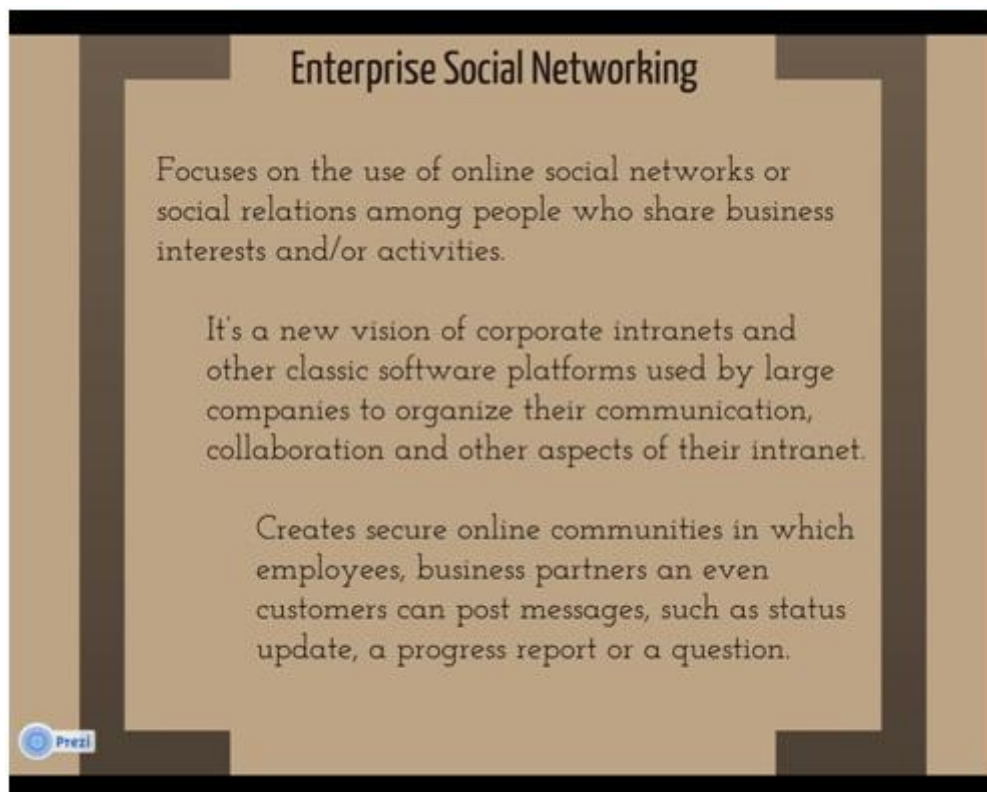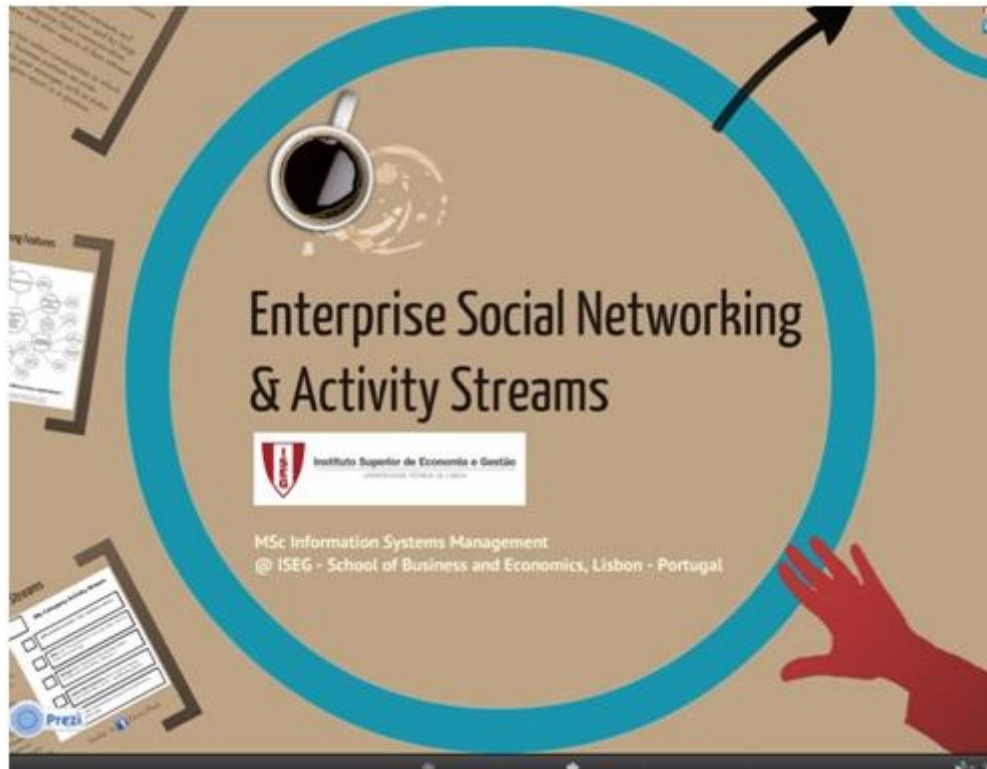
Enterprise Social Networking Features

An enterprise social network looks, feels, and functions very similar to public social media sites like Facebook

... but with one purpose:

use social interaction to support valuable business outcomes and get work done.

Categories of Enterprise Social Networking applications*

* Turban, E. et al. 2011. Enterprise Social Networking: Opportunities, Adoption, and Risk Mitigation. Journal of Organizational Computing and Electronic Commerce, 21:3, 202-220

Activity Streams

Aggregate activity stories from a wide variety of enterprise applications.

Uniting people, data, and applications in real-time in a central, accessible, virtual interface.

Shows updates from every business object such as human resources, business applications, projects or products.

My Company Activity Stream

John *updated document "Sales Application Review".*

Mary *said "I'm working from my home today. Call me if you need anything".*

Michael *said "Marketing team meeting today, 03:30pm @ London Room, 08th floor".*

Siebel CRM Application *processed data backup successfully. More info @ ...ssa/dbackup_log.txt .*

Chris *is now following Project X and Information Technology.*

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This presentation is also available online in the following link:
http://prezi.com/mimfblq2xan8/enterprise-social-networking-activity-streams/