



JÖNKÖPING INTERNATIONAL  
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# **ePM: Project Management transposed online**

The use of information communication tools to support  
inter-organizational project work

Bachelor thesis within Business Informatics

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## **Bachelor's Thesis in Informatics**

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## **Abstract**

The purpose of this bachelor paper is to analyze the different technologies used for supporting inter-organizational project work and how these technologies influence the project's overall success. The results of this research have proved that the main impact ePM tools (e-Project Management tools) have upon inter-organizational projects are in terms of time-savings and easiness of communication when in need for communicating abroad with different business partners. Various types of collaboration tools can help the communication process between organizations and provide the project participants with the means of creating and supporting a collaborative environment. Other perceived benefits of ePM tools have been resulted including: reduce project costs due to time-savings and quality of information which lowers the risks for deficiency occurrences; improve the decision-making process; improve internal and external communication; facilitate knowledge sharing and expertise exchange; and create an agile business environment characterized by innovation, flexibility, faster market reaction and ability to work efficiently. Global time zones and communication skills are challenges to creating an efficient collaborative inter-organizational environment.

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# 1 Introduction

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*This part introduces the research topic by providing relevant background information, the problem of the research subject as well as the purpose and the research questions.*

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## 1.1 Background

In today's business environment, organizations must adapt quickly or die (Duarte & Snyder, 2001). Gaining competitive advantage in a global environment means continually reshaping the organization to maximize strengths, address threats, and increase productivity (Duarte & Snyder, 2001). The dynamic nature of the business environment creates the need for organizations to become more agile and reactive to change. Organizations nowadays can harness their success better through inter-organizational collaboration on the basis of collective intelligence. This means cooperating efficiently, sharing information, generating new ideas and developing the capacity to exploit them (Filos and Banahan, 2000). In other words, these enterprises become agile entities formed as a temporary consortium of enterprises that join skills and resources, supported by computer networks (Afsarmanesh et al. 2000), to better respond to a business opportunity. Inter-organizational projects require the concerted effort of several individuals which are not co-located and do not have the possibility to meet face-to-face on a regular basis. Communication and cohesion among project members becomes vital and therefore, the transfer of information needs to be maximized in efficiency and quality. Technology supported communication tools (such as e-mail, videoconferences, information systems, information communication tools, project management tools) can influence greatly the outcome of a project, especially one that involves members from different organizations or countries. In the last decades technology has proved to be an important factor in businesses; *"nothing is going to affect businesses more than the current transformation brought on by the Internet and other advanced forms of technology"* (Goncalves, 2005, p. 362).

Electronic Collaboration and Communication Technologies represent the tools for helping project team members manage information, communicate and cooperate to each other. Without these technologies, the concept of cooperation, partnership and transfer of skills and knowledge among organizations would not be possible. Collaboration technologies can range from complex information systems that connect 'parent' organizations to their suppliers to simpler communication tools such as video-conferences, groupware or project planning softwares which enable project team members achieving their objectives without the need of having face-to-face meetings, thus cutting costs considerably. These technologies act as the enabler factor of distance partnerships among organizations and offer solutions to the challenge of managing dispersed project teams. According to Duarte & Snyder (2001) organizations that will succeed in the next millennium have found new ways of working across boundaries through systems, technology and people.

## 1.2 Problem

The dynamic nature of the business environment creates the need for organizations to become more agile and reactive to change. That is why organizations are constantly struggling to shift their competitive edge by cutting costs while maintaining quality standards and customers satisfied. Technology has played an important role in helping organizations become more efficient and better responsive to the outer environment. Technology aids organizations disseminate information and deliver it when needed. Technology has as well allowed organizational boundaries to be broken to the extent that nowadays, companies cooperate with each other in different regions of the world through the use of communication tools and systems, making it easier for project team members to cooperate and for project managers to plan and lead project activities. E-Project Management deals with the management of these types of projects that involve members from different locations or organizations.

However, despite the presumed benefits of e-Project Management, when collocated working environment is replaced by technology tools over distance, projects will inevitably become more complex and problematic. Team members across time, distance or organization boundaries need to communicate (share information) and collaborate (work together to produce a product and achieve the project's scope) using technology (Duarte & Snyder, 2001). Integration of work methods, organizational cultures, technologies, and goals make communication and collaboration more difficult. Partners may have conflicting views of project work and the appropriate way of working, especially when the project involves members from different countries. Furthermore, the success of virtual project teams depends considerably on the type of project the team works on and its scope. Suitable projects for the online environment are for example in the IT industry such as information system development projects or projects in the auto industry such as new product design and prototyping which is now made easier and less expensive with the use of special technologies. Distance from project team members can become problematic if the communication tools will not meet the needs of the project or they will not be used efficiently.

All these complexities added to the traditional project management practices makes one wonder whether e-Project Management is a realistic approach to supporting and managing projects. Therefore, the applicability of the e-Project Management is questionable and depends on various factors. However, this thesis will focus on the technical aspect mostly and on a smaller scale on the social impact. E-Project Management tools (referred to in this paper as ePM tools) are used for surpassing the extra challenges amounted to Project Management when transposed online. Their impact in terms of benefits, drawbacks and social impact will be drawn in the end, in the analysis stage.

## 1.3 Research questions

- What impact do technology-mediated communications have on achieving the objectives of an inter-organizational project?

### Sub-questions:

- a) What benefits and restrictions have companies experienced with ePM tools?
- b) What social significance do ePM tools have upon participants of inter-organizational projects?

## 1.4 Purpose

The purpose of this paper is to find the types of ePM tools that are being used within the selected companies. From thereon, the paper presents what impact ePM tools have upon inter-organizational projects and their objectives (in terms of budget, schedule, quality pr product/service) and on the social interaction between project participants. Technology and people form the collaborative environment of an inter-organizational project and each of the both areas is regarded throughout this paper.

## 1.5 Perspective

This paper will try to find out how technology is used for supporting communication in inter-organizational projects. Project Management transposed online deals with the technologies used to support the flow of information between the project initiator and its different partners. Therefore, the focus throughout this paper will reflect on the technologies and tools used for supporting these inter-organizational projects. It might be the case that one project involves more than one organization, thus the name inter-organizational project. Three types of inter-organizational projects have been identified and they are: outsourcing-project, partnership-project or cross-company-project. This thesis focuses on these three types of projects. The organizations involved in a project and its team-members will need to communicate to each other by using different sorts of technologies and systems (e.g. e-mail, teleconferences, common software applications, integrated information systems with business partners, live meetings through video-conferences and other such tools or platforms).

The difference between an outsourcing project, partnership projects and cross company project would be further discussed. An outsourcing project normally involves a consultancy company to implement a project within another company. The consultant company usually does not have much to gain from this project (in terms of skills or new knowledge), except financial benefits, unlike the project initiator company. Partnership projects involves a sense of temporary merger between two or more companies by summing up their skills and strengths (which should complement each other) for a specific purpose, in order to harness a business opportunity which neither of the parties would be able to accomplish individually and in a similar manner. A cross company project involves the same organization but from different subsidiaries most commonly in different countries (also known as multinational companies). All three types of projects use some kinds of technology mediated communications to compensate for distance issues.

## 1.6 Delimitations

This thesis intends to explore the study of e-Project Management in terms of technology used to support it and its applicability to real business activities. Only these projects which involve more than one organization, either an outsourcing project, a partnership project or cross company project will be considered. Companies that apply to these conditions are targeted for interviewing. However, a predetermined selection of companies for the empirical study will be followed.

e-Project Management has its main roots in traditional project management (collocated) though transposed to a different level, the online environment. ePM follows the general rules and steps of typical project management however, its complexity increases because of the new medium of interaction, 'virtuality'. A related concept to ePM is the



notion of virtual team which is described in the key terminology as a geographically dispersed entity, working for a defined goal and where team members have little chance to meet each other face-to-face thus working together through technology-mediated tools and communications. The relation between a virtual team, traditional PM and e-Project Management is that a virtual team, in order to be managed successfully, it needs to complement traditional PM techniques with ePM practices and tools.

The domain of application of this thesis does not apply entirely to a virtual team, as its relevance to the actual real business life is hard to find, companies that work virtually by using virtual teams as described earlier will not be the target of the empirical study. Inter-organizational project work has its roots within virtual teams; both use communication tools to communicate. A virtual team is constrained to the virtual environment while an inter-organizational project is not.

e-Project Management will be regarded in this paper as the inter-organizational glue that brings people and organizations closer through the use of technology. Such technologies will be evidenced throughout this paper and they are attributed several names including: ePM tools, technology mediated communications or information communication technologies. Different models and examples of types of technologies will be described in this part of the theoretical framework. Needed communication skills and specific management styles for the virtual environment will be explained in order to highlight the intangible aspects of this environment and what impact technology has upon it.

## **1.7 Interested Parties**

This thesis aims at any person interested in e-Project Management and technology that supports ePM and virtual teams: students who want to develop their knowledge about the key issues defined in the key terminology defined below; teachers who teach about any of these issues or professionals such as Project Managers who deal with projects and need to work with team members from different locations by using different types of technology mediated communications. The outcome of this research can facilitate companies in acknowledging possible problems and opportunities related to technologies that support the management of inter-organizational projects.

## 1.8 Definition of Key Terminology

**Project Management:** The application of knowledge, skills, tools and techniques to project activities to meet the project requirements (PMI, 2008).

**Virtual Project:** A project which involves team members from different locations or organizations which need to communicate through the use of technology and work together while being apart from each other.

**Virtual Team (or Dispersed Team):** A group of persons with a shared objective who fulfil their roles with little or no time spent meeting face to face. Various forms of technology are often used to facilitate communication among team members (PMI, 2008).

**Inter-organizational project:** A project in which takes part several organizations (subsidiaries, suppliers or customers) that need collaborate in order to benefit from a business opportunity and make use of e-Project Management tools to outweigh the challenge of communication at distance.

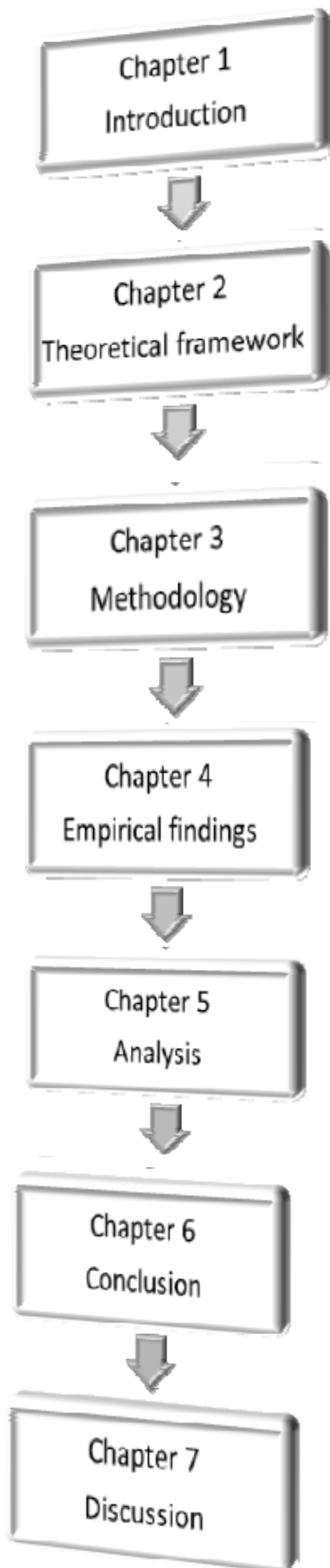
**e-Project Management (or Virtual Project Management):** The application of knowledge, skills, tools and techniques necessary to meet the inter-organizational project requirements while project members are apart from each other and need to use communication tools (ePM tools) to interact.

**e-Project Management tools:** ePM tools refer to information communication technologies or technology mediated communications and Project Management tools that support the collaborative environment within a inter-organizational project or more advanced in a virtual team.

**Information Communication Technology (ICT):** Communication technologies that support team members of virtual teams and inter-organizational projects in creating a collaborative environment and enabling them to interact with each other (Goncalves, 2005).

**Project Management Information System:** An information system consisting of tools and techniques used to gather, integrate, and disseminate information such as outputs of project management processes (PMI, 2008).

## 1.9 Disposition of Thesis



This part introduces the background and problem of the research subject as well as the purpose of this paper and the research questions.

Part two includes descriptive knowledge and theories that exemplifies basic concepts and frameworks related to Project Management, Inter-organizational projects and e-Project Management (and ePM tools).

The reader will be further familiarized with the research strategy that has been selected for this specific research scope. The knowledge aimed to be included and generated is described as well as the research approach and the data collection strategy.

Part four of this paper presents the empirical findings from the interviews. Identified ePM tools and respondents' opinions are described.

In this section the information from the empirical findings is further analysed, accompanied by secondary data in the form of phenomenon that has been observed in the literature study. However, a more in depth search for new patterns and theories from the information collected through own observations and reflections will occur.

The conclusion part presents the results of the research analysis regarding the impact of ePM tools upon inter-organizational project work. The technology aspect and social aspect of ePM tools from the analysis part are summarized.

The last chapter is represented by the discussion part where personal reflections regarding the research process and propositions for future research are developed.

## 2 Theoretical Framework

*The theoretical framework comprises of descriptive knowledge and theories that will be presented throughout this part, initiating the reader to the basic concepts and frameworks related to Project Management, Inter-organizational projects and e-Project Management.*

### 2.1 Project Management

A project is a temporary endeavor that has a specific objective in creating a unique product, service or result (PMI, 2008). A project differs from operations in that operations represent an ongoing-repetitive process (PMI, 2008) to produce the actual product or service that sustains the business over time. A project might be to develop a new product while operations represent the after-project life cycle. A project can also be seen as a consequence to the environmental changes the company has been influenced by. In order to bring alignment between the changing environment and the company itself, the company needs to venture into new ways of thinking, functioning or organizing. These changes are made through projects, for example technology, product or service development or internal re-structuring projects.

According to the Project Management Institute (PMI), the study of project management represents the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements (PMI, 2008). Within the Project Management ‘book’ (PMBok, 2008) developed by the PMI, there are five main processes that a project needs to follow and apply, comprising of: Initiating, Planning, Executing, Monitoring and Controlling and Closing of a project (PMI, 2008). Nine areas of knowledge are also presented in detail in the PMBok suggesting Activity Inputs, Tools and Techniques and Outputs for each action taken within each of the nine described areas of knowledge. The Knowledge areas are: Project Integration Management; Project Scope, Project Time, Project Cost, Project Quality, Project Human Resource, Project Communications, Project Risk and Project Procurement Management.

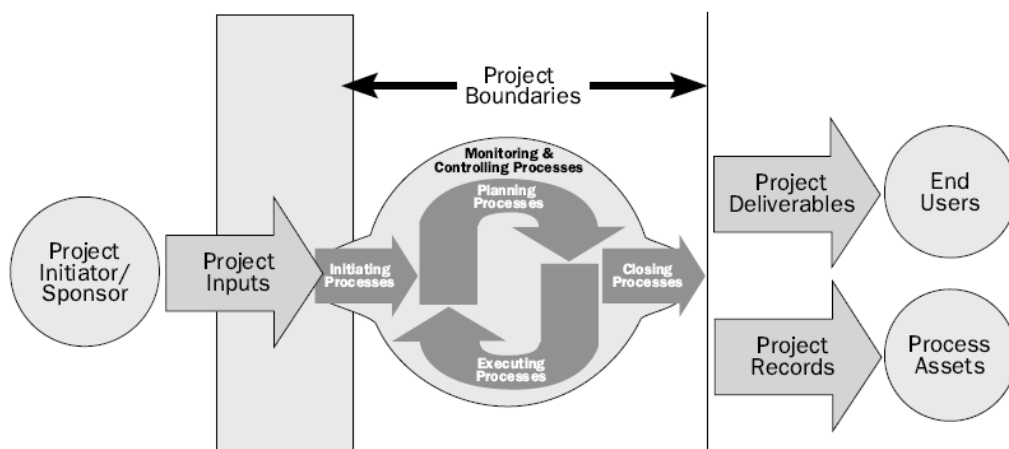


Figure 2.1: Project Boundaries (PMI, 2008)

A project is generally initiated by the Project Sponsor while several other stakeholders in the organization(s) are involved such as the project manager and project team, functional managers or other business partners. Requirements for the project need to be specifically defined as they will be used for defining the scope of the project, followed by activities to define the project's budget, schedule, quality, resources and risks. According to the PMI(2008) these represent the constraints of a project.

The methodology of conducting a project and the necessary steps needed to follow as explained in the PMBok will not be discussed in this paper as these methods describe the actual work flow of a project in detail, which is not the purpose of this paper. However, it would be helpful and relevant to describe some specific techniques of the PMBok that increase in importance for the inter-organizational projects within the virtual environment. These techniques include the: WBS (Work Breakdown Structure), essential for every project development, PERT and CPM techniques and Gantt charts for developing project scheduling and management. The last three techniques can be developed with the help of practical software such as Microsoft Project.

A project can be of many kinds and with different range of purposes. Projects are not necessarily constrained to the organizational environment. One can state that his/her project, though on a smaller scale, is to participate and finish the Vasaloppet. The project initiator needs to define exactly his/her objective, thus implying a series of steps such as training, timescale for the achievement of this goal and budget for procuring different products or services to facilitate the training process. While another example of a project, although on a completely larger scale, would be the construction of the A380, Airbus's biggest aircraft project. This project involves sub-projects each of which involves different stakeholders from different organizations and from different countries. This higher level of complexity brings the challenge of project management's planning, monitoring or executing processes to a whole new level. Interaction, communication and cohesion in the project's plan and sub-plans are key successful factors in accomplishing the overall goal.

### **2.1.1 Inter-organizational projects**

At the organizational level, a project implies an action towards change. Projects at the organizational level can be internally developed making use of internal resources or internally initiated but externally developed with the help of outer-organizational parties such as consultancy firms, business partners or suppliers. These types of projects can be referred to as inter-organizational projects (such as partnership projects, cross-company projects or outsourcing projects) as described in the introduction part.

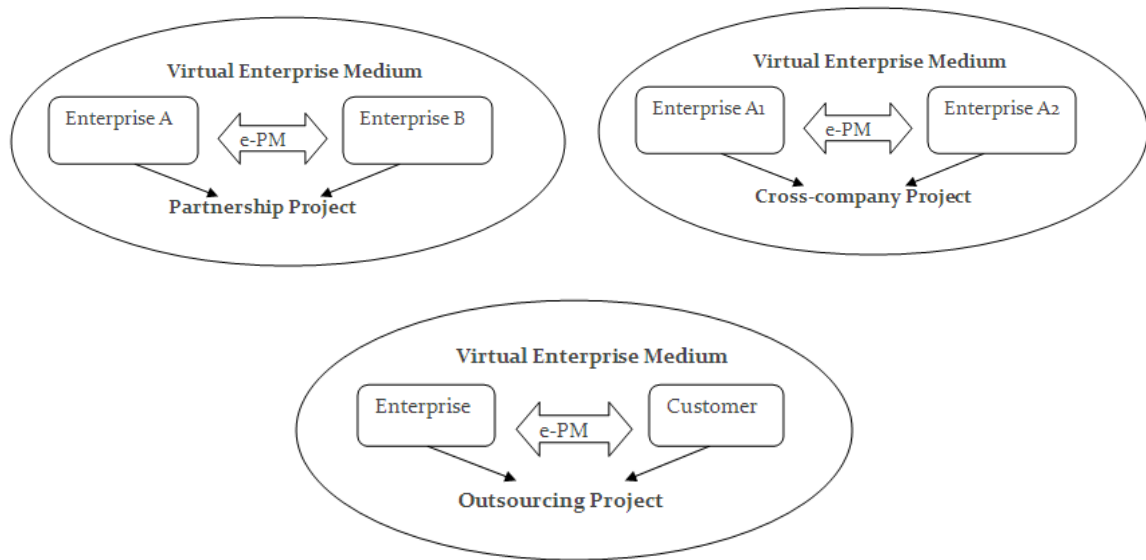


Figure 2.2: Three identified types of Inter-organizational projects and their connection with e-Project Management and the Virtual Enterprise Medium.

Organizations nowadays can harness their success better through inter-organizational collaboration on the basis of collective intelligence. This means cooperating efficiently, sharing information, generating new ideas and developing the capacity to exploit them (Filos & Banahan, 2000). Organizations need not to build barriers against the outside; the more isolated one becomes the bigger impact upon it when change occurs. An organization is influenced considerably by the environment in which it functions, therefore, the faster the organization can react to changes the better it can leverage these factors in its own benefit. Instead, an organization should look outside of its boundaries; try to find new opportunities, skills or knowledge, all of each leads towards a higher capacity to predict the future and its assumed implications upon the organization. New opportunities triggered by the business environment consequently lead to new skills and knowledge. However, sometimes these new skills are imported from or developed together with other organizations through collaboration and partnerships business projects. Instead of dedicating a large amount of resources and energy into creating or building a full developed product in-house, organizations preferably work in partnership with other organizations for that specific goal.

A realistic example of this concept put into practice would be the Airbus consortium of several European major aircraft machinery manufacturers located in four different countries (UK, France, Germany and Spain) and working collectively for a well defined purpose, building the world's biggest aircraft, the A380 and other plane models. Assembling the different parts produced in each country would be the challenge of this mission, therefore, efficient communication supported by different technology tools and information systems would play an important role in the success of this major project.

### 2.1.2 Balanced Scorecard for Project Management

The balanced scorecard and its four levels of measurement (financial, customer, processes and development) can be applied to the study of Project Management. The project goals and strategies can be defined from the creation and analysis of the Project Scorecard and its four areas inter-related. The Project Scorecard (PSC) must be built on communication, compliance, continuous improvement and cooperation (Niebecker et al., 2008). Steward (2001) argues that a project can be considered as an organization with a vision, and strategies to meet project objectives (cited in Niebecker et al., 2008).

Goncalves (2005) believes that instead of utilizing the usual approach of balanced scorecard, a virtual team (in this context a inter-organizational project) can employ a more effective method by answering the following questions each dedicated to one of the four areas within the scorecard:

1. Financial Perspective: What financial objectives must we accomplish to ensure the success of our project?
2. Customer Perspective: By working on this project, what customer objectives will be met?
3. Internal Perspective: To achieve our customer objectives which process will have to be worked on?
4. Learning Perspective: To achieve our project goals, how must our team learn and innovate?

The project team should brainstorm about these questions above and create a strategy map to facilitate the visualisation of the cause and effect relationships between business objectives (Niebecker et al., 2008). In a collaboration project with several organizations involved, the project scorecard should develop into a collaborative project scorecard. Niebecker et al. (2008) argues that the collaborative project scorecard “*aims to increase the project’s transparency within the project members in networked structures, increase the efficiency of the monitoring and control of cross-company projects due to collaboratively defined key processes indicators, project strategies, and measure while allowing each partner to use individual internal project management processes.*” With this concept of Collaboration Project Scorecard (CPS), it assures alignment to business strategies and project goals of each partner, stakeholder commitment and measures defined and taken collaboratively (Niebecker et al., 2008).

### 2.1.3 The collaboration framework

*“The insights from organizations that are achieving major benefits from collaboration are the core of this report and have been codified into the Collaboration Framework to help companies on the journey to become collaborative enterprises. The Collaboration Framework consists of two components: the Collaboration Vision and Strategy component and a second component that consists of three organization enablers”* (Collaboration Consortium, 2009, p. 5).



Figure 2.3: The collaboration framework

*“The collaboration strategy outlines the sequence and types of collaboration actions that are required to capture the business value of collaboration. Implementation of the strategy is done through a collaboration operational plan, which describes in detail the future state of business processes targeted for performance improvement via collaboration”* (Collaboration Consortium, 2009, p. 5).

The inner values of the collaboration environment are the three enablers evidenced in the framework above. People and their skills, processes and technology foster and sustain the value of collaboration within inter-organizational projects.

1. People and culture. *“This is the human element of collaboration and describes the approaches to foster desired collaborative behaviours. Issues to address this element include management and execution guiding principles, employee workspace policies, the collaboration profile of employees, and individual performance metrics”* (Collaboration Consortium, 2009, p. 5).
2. Process and governance. *“This is the set of business systems to implement and manage collaboration. It includes the internal business model to operationalize collaboration: staffing and funding, support services, and the change management approach and the organizational model that internally governs the evolution of collaboration”* (Collaboration Consortium, 2009, p. 5).
3. Technology. *“This element describes what collaboration technologies are required, how they will be evaluated and introduced, and how they will integrate with and be supported by the broader technology architecture”* (Collaboration Consortium, 2009, p. 5).



## 2.2 e-Project Management

e-Project Management (ePM) represents the virtual environment and management of a project enhanced and supported by technology mediums. Accordingly, the project manager coordinates the project through technology communication tools from distance based on and through the online (internet or intranet) environment. Therefore, the challenges of an e-Project Manager will increase. Members of a virtual team congregate and interact through technological means such as Intranets, Extranets, Web portals, IM, or phone conferences or fly to a remote office when needed (Goncalves, 2005). The e-Project Manager needs to make sure that the virtual team works properly and that everyone is involved and the objective of the project will be met, by gradually tracking the progress of the team and the development process. Some of the responsibilities of an e-Project Manager include: *“carefully select the virtual team members that will participate in designing and setting up the virtual workspace; organise and secure the operation of the virtual project offices by coordinating the cooperative work, actions, and activities related to the virtual project; secure project management and communications technologies, maintenance and support; training and coaching; and evaluating results.”* (Goncalves, 2005, p. 278)

### 2.2.1 Agility

Agility is defined by Goransson (1994) as the ability to recognize and rapidly react and cope with unpredictable changes in the environment (cited in Afsarmanesh et al., 2001). The concept of Virtual Enterprise (VE) is defined by Afsarmanesh et al. (2001) as a temporary consortium of enterprises that join skills and resources, supported by computer networks, to better respond to a business opportunity.

In this context, a virtual enterprise suggests, in principle, an inherently agile organization which sums its strengths with other such organizations for a defined temporary project to harness a business opportunity, which they would not be able to achieve independently in a similar manner. However, the actual presence of agility in a virtual enterprise depends on a number of technical (need for highly flexible, secure infrastructure), legal (laws regarding cooperation agreements and contractual regulations which may vary among countries), cultural and socio-organizational factors such as building a culture of cooperation, trust, bridging inter-cultural differences, redefining the internal organization, new internal roles (Afsarmanesh et al. 2001).

### 2.2.2 The SACE-CSCW model

The goal of this framework is to design and implement an integrated distributed multimedia environment to support inter-organizational projects (Santos et al. 2001). This framework will serve as an example of how virtual work is supported by technology and offers a model behind the concept of computer supported cooperative work. SACE-CSCW is an acronym for *‘synchronous asynchronous common environment for computer supported cooperative work’* (Santos et al. 2001) and represents an infrastructure to support inter-organizational projects. The tool applies to real life approaches towards technology mediated communication that organizations make use of, in different situations and manners. Such situations may be identified in the empirical findings where real-business situations of asynchronous and synchronous tools are described and can be related to the SACE-CSCW model.

As mentioned earlier, agile organizations need to interact with each other and most often this is realized through the use of information technology and dedicated software and applications for this kind of purpose. The main challenge that an inter-organizational project need to cope with is distance and therefore, efficient communication tools need to be implemented. An IT architecture is therefore, needed. Computer supported cooperative work tools when applied to the core values of the organization, its structure, people and tasks can help organizations become more responsive, innovative and adapt faster to the market needs (Santos et al.2001).

Another critical factor of the framework would be that effective decision making capacity needs to be achieved through the use of computer supported tools. The SACE-CSCW model is concerned with the design, construction and implementation of a common environment of tools intended to support the decision making process of organizations using a virtual solution (Santos et al. 2001). Such tools can help organize the management of information and knowledge that are developed within a project.

The model identifies the different stages of the decision making process such as “*creation of groups, meetings, brainstorming session, organization and voting; and resources for writing an action plan* (Santos et al. 1997)” identified in the Appendix.

A business meeting, supported by a technology mediated tool, can be characterized by the following stages: “*create group, create meeting, run topics, create action plan and create record*”. Each meeting should have a set of agenda or topic issues and an action plan with its strategies assigned to the member responsible for each program (Santos et. al 2001). Each topic can have three sessions: brainstorming, organization and voting. A brainstorming session can be public or closed. When utilizing a public brainstorming approach the users are aware of others’ work or ideas, thus, everyone is aware of the overall environment of work contribution and who is behind it. In the opposite direction, the closed brainstorming approach does not allow users to access other member’s work or make any remarks or comments. After the brainstorming session the members can run a session of “*organization*” (ideas editing and compiling) which is managed by the group leader. In the “*voting*” process the members can vote their preferred ideas that they think solve the organization problems by assigning grades or ranking scale. All these activities, represented through the SACE-CSCW model, can be facilitated by using different sorts of technology mediated communication tools that can complement each other in the pursuit of creating a collaborative virtual environment. Some of these tools will be illustrated in the empirical and analysis sections.

Within the CSCW tool there are three types of users: “*super user, group leader and ordinary user*”. The roles of these users differ in terms of access rights and responsibilities. As Santos et al. (2001) explain, the role of the super user is to insert ordinary members and their groups’ leaders in the system. The group leader, most often as the Project Manager, defines meetings and agenda. The system covers three specific activities:

- production (the main concern is to generate ideas)
- coordination (to set agenda and to organize ideas)
- communication (chat and videoconferencing system)

Sharing and privacy issues are defined by the group leader. Sharing gives the possibility for users to read, write and send ideas and remarks about other publications and see

votes of other users while privacy involves constraining users to do so for legal or policy reasons in case sensitive or valuable data needs to be transferred.

The functionality of the tool mainly contributes to the decision making process in a virtual environment regarding an inter-organizational project constituted by members dispersed regionally.

### 2.2.3 Workgroup tools

The approach of collaborative and cooperative intelligence applies to the concept of inter-organizational projects. These projects are mainly based on the integration of competencies among independent enterprises, working together to produce a product or service, which could not be offered with an attractive cost and time elements by any of the cooperation partners alone (Mundim & Bremer, 2001). The co-operative environment for inter-organizational projects is supported through information technology. The ubiquitous use of modern information technology enables a significant reduction on transaction cost, making the VEs economically viable (Mundim & Bremer, 2001).

Mundin & Bremer (2000) identify four action modules of the computer co-operative environment: *a. Generation of new ideas/approaches*; *b. Project Planning*; *c. Information exchange*; and *d. Problems Solving*, each of which is supported through several technological communication workgroup tools. The four communication tools evidenced are: *1. e-mail*; *2. Videoconference*; *3. Data transfer*; *4. Application sharing*. The first two are used for personal communication while the last two represent a transfer environment of information objects. They have been categorized by Mundim & Bremer (2001) into *Asynchronous* and *Synchronous* communication tools. The difference between these two is that the interaction between participants takes place either in the live mode (synchronous such as videoconference and application sharing) or at different times (asynchronous such as e-mail and data transfer).

The first co-operative environment, *Generation of new ideas* can be fulfilled by the workgroup tools: data transfer, videoconference and application sharing. These tools however, need specific characteristics of group work such as: flexibility, autonomy, training to work co-operatively at distance and adaptation to a constant changing environment (Mundim & Bremer, 2001). The second type of co-operative action, *Project Planning*, needs exchange of information, files correction and reach of consensus to be communicated among partners. These needs can be solved by means of e-mail and data transfer, by personal communication which is quick and cheap and can support a great amount of data exchange, like digitized models and agendas. The third action of co-operative communication identified by Mundim & Bremer (2001) is the *Information Exchange*, needs to provide access of information and knowledge to physically distributed people by means of e-mail and data transfer. Contact with external people about any encountered problems or just simple doubts take place as well as part of the Information Exchange action. The fourth and last type of co-operative actions is the *Problems Solving* which usually requires discussions about complex aspects which need to draw to an eventual solution or decision. This type of action is most commonly enabled through the use of videoconferences or live interactive meetings.

The ubiquitous nature of the Internet nowadays has encouraged the development of such working environments through different applications and communication tools and offers support for the four action types of the co-operative environment within the '*virtual environment*'.

## 2.2.4 Knowledge Management

In order to take advantage of new ideas and technologies, ideas must be turned into knowledge and knowledge must be thereon, turned into a tangible deliverable that can be quantified and easily transferable. Information needs to be organized, categorized and selected according to its value. As one can argue for, quality is superior to quantity. In this case, quantity of information is more of a hassle than beneficial if not managed properly.

*“Raw and unfiltered information flowing through ePM communication channels is often of limited value. Knowledge management can help assess the quality of communication and information. Knowledge management strategies can be of great value in ePM by allowing for the collection, management and dissemination of best practices (Goncalves, 2005, p.249).”*

The interpretation of raw data is important otherwise information generated from it will remain unutilized and thereon knowledge cannot be developed. Knowledge management tools such as project enterprise portals can simplify the process of sharing information and knowledge and promoting collaboration and learning. However, *“technology will enable it but not deliver it”* (Goncalves, 2005). The project manager needs to harness the value and utility of KM tools for supporting the project work. It is the project manager’s responsibility to localize and distribute valuable information to whoever needs it.

As Goncalves (2005) argues, *“knowledge management portals can be a tremendous help in PM as an effective strategy to deliver a customizable, multidimensional interface to enable searchable access to data, reporting and applications.”*

## 2.2.5 Communication skills

In his book *“Managing Virtual Projects”*, Goncalves (2005) argues for the benefits that e-Project Management could bring, mentioning a few such as flexibility, attracting best workers independent of location, cutting costs, global workdays (24 hours as compared to only 8 if the project involves team members from different time zones). If an organization has the means and possibility to harness these benefits, then it would be a sign of consideration and intelligence to try to address them.

The challenges however, increase proportionally with the benefits sought after. The practice of ePM brings new challenges. Inconveniences may arise due to distance and communication issues. Most projects require the concerted effort of several individuals and when distance becomes a factor, cohesion between the project members becomes vital therefore, the transfer of information and work units needs to be maximized in efficiency. If the team is dispersed geographically with little chance of meeting each other face-to-face, socio-cultural challenges of enabling virtual teams may outnumber the technical challenges (Goncalves, 2005). The project manager’s aptitudes and managerial skills should therefore, apply to these new challenges.

Communication skills such as coding and decoding are very important (Henderson, 2008). “Encoding refers to all of the activities involved in transforming information into messages. Speech and writing are encoding activities in communication. Decoding involves the transformation of sensations into meaning. In communication, decoding activities include listening and reading. Perception of nonverbal signs is also a decoding

activity” (Henderson, 2008). Dulewicz & Higgs (2000) argue that complementary to coding and decoding skills is emotional intelligence which plays an important role in group and team settings as well (cited in Henderson, 2008). Mayer and Salovey (1995) define EI (Emotional Intelligence) as the capacity to process emotional information accurately and efficiently (cited in Henderson, 2008).

These skills have implications upon the project and organizational level. Being a good listener, writing and expressing ideas in an understandable and clear way, generally saying the right thing at the right time and quickly responding to messages (Henderson, 2008) will increase the level of efficient communication and collective intelligence in written and speaking skills, thus the higher chance to succeed. Alexander, Penley, and Jernigan (1992), in their study found that managers’ decoding skills were consistently related to their managerial performance (cited in Henderson, 2008). Surprisingly, within the virtual context, Lu, Watson-Manheim, Chudoba & Wynn (2006) have shown that geographic distribution of team members does not have significant influence on team performance (cited in Henderson, 2008). However, the same study concluded that extensive use of different information and communication technologies across different team environments, while essential for virtual work activities, also leads to a reduction in performance.

According to Goncalves (2005) critical factors in managing virtual projects include good reporting techniques (e.g. quality control, planning, defining roles and responsibilities) and cohesive virtual teamwork. *A project manager nowadays must be able to lead teams with unprecedented vision and execution to keep pace with evolving technology and customer needs* (Goncalves, 2005, p. 351). Goncalves also states that project managers need to be smarter, faster, more innovative, more adaptable and have a good practice of management and leadership skills. Instead of commanding, project managers must be able to coach, counsel, manage conflict, inspire loyalty and enchant subordinates with a desire to remain on the team and work fruitfully (Goncalves, 2005). Such skills required from a project manager will reach a new level when technology is the medium of displaying or using them. The new technology medium level will imply a higher devotion and aptitude towards these skills.

## 3 Method

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*In this section the scientific research approach will be presented and motivated. The research approach and data collection study will act as the backbone of this thesis from where further decisions will be made.*

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Method should provide the researcher with guidelines for the collection of data and represents the strategic choices that have been made for defining the scope and objective of this research. Saunders et al. (2007) state that a research method is the technique that a researcher uses when collecting data for empirical study. The research approach that has been chosen to address the scope of this paper as well as the data collection strategy will be presented below.

### 3.1 Research Approach

#### 3.1.1 Characterization of knowledge

Generation of knowledge represents the scope of any research endeavour, one way or another. There are several existing types of knowledge that a research paper can produce such as exploratory, descriptive, explanatory knowledge. These types of knowledge depend mainly on the pre-established research questions as well as on the research approach adopted by the researcher.

Exploratory research- aims to find out a phenomenon that has not yet been discovered or fully explored.

Descriptive research – establishes a more detailed description of a phenomenon to provide with a clear understanding of the researched field. Usually ‘why’ or ‘what’ questions tend to develop into descriptive research.

Evaluating research - aims at reflecting upon benefits and drawbacks of a certain phenomenon.

Explanatory research – illustrates cause-and-effect analyses.

According to Saunders (2007) an exploratory study is a valuable means of finding out what is happening; to seek new insights; to ask questions and to assess phenomena in a new light. The research question of this paper can be categorized in the exploratory type of knowledge: *‘What impact do technology-mediated communications have upon achieving the objectives of an inter-organizational project?’*

Descriptive knowledge, according to Saunders (2007), is intended to portray an accurate profile of persons, events or situations. Descriptions of concepts, previous theories about ePM, inter-organizational projects and technology mediated communication tools are portrayed within this paper hence, offering a descriptive background into the subject of e-Project Management. Evaluating knowledge is developed by answering the first two sub research questions. By evaluating the benefits (functionalities and value) and drawbacks (complexities or restrictions) of ePM tools, measurements of these evaluations can therefore, be made. The third sub research question deals more with the social aspect of virtual interaction and develops explanatory knowledge. The factors that impact social interaction between participants when using communication tools will be discussed and analysed.

### 3.1.2 Inductive or Deductive Research

The process of systematically developing new knowledge can be categorized into two different approaches: the deductive and the inductive approach (Saunders, 2007). Using a deductive approach the researcher starts by formulating a hypothesis from existing theories and then test it through the empirical data collected. Whereas the inductive approach follows the pattern of collecting data first through the empirical study after which a theory is developed. The figure below identifies the cyclical pattern between the inductive and deductive approach.

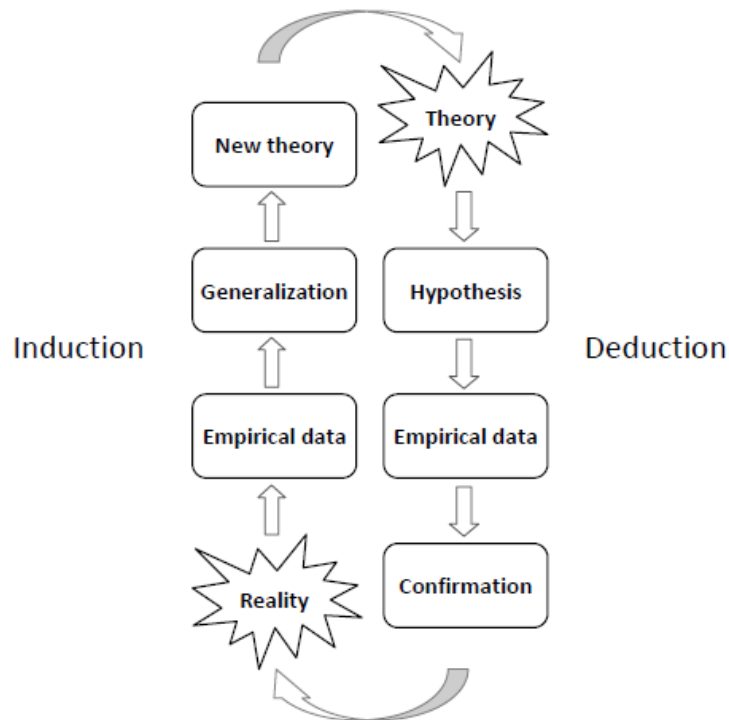


Figure 3.1: The inductive and deductive approach as a cycle (Seigerroth, 2007).

The main research approach adopted within this paper is the inductive approach. The first step is to gather and study secondary data such as books, articles or reviews about the research topic in order to gain a deeper knowledge and refine it purposefully. Thereafter, suitable theories and models related to Project Management and collaboration tools will be selected and described within the theoretical framework. Regarding the empirical study, interviewing methods will be conducted in order to collect primary data and a qualitative study of this data will be adopted. Information will be analysed and presented thereafter, from a general understanding and in relation to the previous theories presented. Patterns and new theories will be formulated after these stages. Moreover, these findings will give answers regarding the impact of e-Project Management environment and the collaborative technologies upon inter-organizational project work and its participants.

### 3.1.3 Qualitative or Quantitative Research

There are two main categories of methods for collection of research data: quantitative and qualitative methods. Quantitative methods generally aim at transforming information into numbers and quantities from where statistical analyses can be carried out. Qualitative methods focus on providing rich descriptive reports of individuals' perceptions, attitudes, beliefs, views and feelings (Hakim, 2000).

While the purpose of this thesis is not to provide numbers and statistics, the suitable method to be adopted is therefore, the qualitative method. Theories and empirical data will be presented and analysed, thus, facilitating a deeper understanding of the research area in discussion. More flexibility and openness is available when using the qualitative method and the writer can therefore, unfold his or her findings in a descriptive way. However, descriptions are biased to personal interpretation, thus, narrowing down the objectivity of the results as compared to the quantitative method.

Applied to the scope of this paper, the qualitative method helps obtain a fruitful description of issues such as partnerships among organizations through projects, supported by e-Project Management tools. Previous theories from secondary data are explored and new theories will be developed after the collection and analysis of primary data. The qualitative method serves best the purpose of this paper.

## 3.2 Data Collection

The time dedicated for collection of data and evaluation represents an important part of the research process. The researcher needs to inform himself/herself well in order to decide which way to follow, what to write about precisely and how to reach the targeted purpose. This process is usually time consuming and cannot be disregarded. There are two sources of data that a researcher usually focuses on within his/her work. Primary data is said to be the most reliable data because it derives from primary literature also known as 'grey literature' which is the first occurrence of a piece of work (Saunders, 2007). They include published sources such as reports, thesis or other publications which are based on new findings or new information. Usually, primary data results from conducting empirical study methods such as interviews, observation or questionnaires. Secondary data, on the other hand, represents already published data which a researcher can use as a source of information in order to strengthen his/her knowledge in a specific area. Secondary data derives from secondary literature such as books or journals which are the subsequent publication of primary literature (Saunders, 2007). Both types of data will be used within this thesis.

### 3.2.1 Literature Study

A literature study is the process of finding, examining and analyzing information that is already available (Theorell & Svensson, 2007). Searching for literature is one of the first things a researcher immerses in when trying to decide his/her research subject. Searching for publications is only possible when you have at least some idea of the area in which you wish to undertake your research (Saunders, 2007).

After reading and analyzing relevant research studies such as books or articles, the scope of the research can be further refined and an overall picture of what needs to be accomplished and how to get there can be portrayed. Reviewing relevant literature will help familiarize oneself with concepts, theories and terms specific to a research area. For example, Project Management is a wide research area that contains many subparts



such as IS Project Management or Virtual Project Management, therefore, the writer needs to focus on the specific area that he/she is interested in and try to obtain valuable knowledge that apply to the scope of the research.

According to Saunders (2007) the objectives of a research study need to pass the SMART test. They need to be Specific (have a well-defined scope), Measurable (define ways to measure performance), Achievable (resources vs constraints), Realistic (ability and capability) and Timely (enough time to achieve the objectives before the deadline).

The literature study effort varies according to the type of research approach one adopts. The purpose of the theoretical framework is to introduce the general concepts and theories about Project Management, Inter-Organizational Projects and e-Project Management, in order to provide a better understanding of what these concepts imply, and create a hypothesis to be tested through the empirical study.

The literature study has been guided by these key words. Books have been chosen according to their level of applicability to the research topic and articles have been retrieved from a different range of scholar databases such as 'International Journal of Project Management' or 'International Journal of Managing Projects in Business'. Secondary literature has been difficult to identify because of the scarcity in resources in the specific domain, especially books. Previous studies that I have come across in my literature study have mainly been descriptive, aiming at describing the nature of virtualization (teams or projects) and the concept behind it without explaining how it actually works in reality. Such studies include: '*Managing virtual teams*' by Marcus Goncalves (2005) or '*e-Business and Virtual Enterprises*', a collection of articles based on European studies and written by several authors. The book was compiled and edited by Matos, Afsarmanesh & Rabelo (2001). These literatures were completed by article, other research studies such as thesis and general web information (which was intended only for informative purposes).

### **3.2.2 Strategy for conducting interviews**

Interviews are the main source of primary data within this paper. According to Saunders (2007) the use of interviews can help you gather valid and reliable data that are relevant to your research question(s) or objectives. He also states that interviews may be highly formalized and structured, using standardized questions for each respondent, or they may be informal and unstructured conversations.

Structured interviews use questionnaires based on a predetermined and standardized set of questions that do not allow the respondent to talk freely and in depth about a specific subject. These types of interviews are also known as quantitative research interviews (Saunders, 2007) and they will not be used within the empirical study of this paper.

On the other hand, unstructured interviews are informal and non-directive. The interviewee is given the opportunity to talk freely about events, behavior and beliefs in relation to the topic area (Saunders, 2007). In between these two extremes are the semi-structured interviews where the interviewer will have a list of themes and questions to be covered but they may vary in order (flow) depending on respondents or circumstances.

This thesis will follow a semi-structured method of interviewing as it provides with strengths from both sides of unstructured and structured. The chosen approach will al-

low flexibility and at the same time structure. The interviewer should prepare a set of questions to be used as guidance through the interview while he/she can apply them to each respondent accordingly (depending on the respondent's specialization area or expertise). In case of using a structured approach it would be more difficult to carry out the analysis due to the complexity of the information gathered. However, I believe that the advantages of using this approach are higher than the drawbacks. This way, respondents can develop their answers and thereof, more information will be elaborated which will help the researcher understand and analyze better the empirical data. Consequently, the more information the higher level of informed decision making.

Interviews will be conducted by testing different types of technology mediated communications such as teleconference, videoconference, e-mail, face-to-face or simply by phone. The reason behind these choices was to experiment these communication tools and reflect upon their impact on the flow of communication and understanding between people. In some cases, the interview was constrained by distance therefore, a technology mediated communication tool was necessary.

Within the empirical study of this thesis, personal interviews will be conducted with companies from different industries and countries. These companies are/have been involved in inter-organizational projects (either outsourcing, partnership or cross company project) and the respondents' jobs are related to the field of Project Management. The companies were selected on a pre-determined basis.

The interview manual acts as a guide to the interviewer when conducting interviews and it contains the questions which should be addressed to the interviewee. The questions that the interview manual contains are designed to find answers to the research questions of this paper. Therefore, some questions will be similar to the research questions, however, divided in sub questions in order to clarify better their intended purpose as well as to obtain more detailed information from the interviewee. The interview manual can be found in the appendix section of this paper.

### **3.2.3 Selection of respondents**

Respondents for interviews have been selected from different business sectors and according to two criteria: their degree of involvement in the field of Project Management and internationalization of the company for which they work for (multinational companies that have business relations with subsidiaries, partners, or customers either located in the same country or abroad). Companies that are internationally focused will be contacted as my interest is to find out how they undergo and manage inter-organizational projects when distance becomes an issue. Respondents that have been contacted, occupy positions related to the field of Project Management. Project Managers have been the main interest when trying to find respondents. However, consultants in different areas were also contacted. Furthermore, companies from different industries or business areas were contacted, as long as they meet the first two criteria mentioned above. Examples of industries can range from consultancy firms (such as IT consultancy firms) to auto industry companies (car manufacturers or their suppliers). A minimum of 3 respondents is the aim of this research study. The main language of interviewing will be English.

### 3.2.4 Analysis and Interpretation approach

Due to the fact that this thesis follows an inductive approach, a qualitative study of the data will be adopted. According to Saunders et al. (2007) there are several inductive strategies to analyze qualitative data including the template analysis. Data can derive from different kinds of sources such as interviews, observations or a written questionnaire (Saunders, 2007). Interview transcript will be elaborated as part of the analysis section of this paper.

Once the interviewing process is finished, information will be summarized and categorized according to each company. The analysis part includes patterns found from the interviews in terms of similarities and differences of approaches and technologies used in each company. Benefits and drawbacks for the technologies used will be further drawn. Furthermore, new findings or theories can thereon be established in terms of technology their impact on the project work in general and the communication process (socially).

### 3.2.5 Research Credibility

*Reliability* of data is a necessary precondition for validity and it implies that data collected through the empirical study (interviews and observation) should be absent of errors. This can be achieved by designing the interview guide before the interviews and by compiling the interview findings fast after the interview. A fast compilation of data increases the chances of a correct interpretation of the empiric material and it gives the opportunity to review the compilation afterwards to correct any mistakes made (Home & Solvang, 1997). In order to get more precise answers in the interviews, it is important to send the interview manual with the questions in advance to give time to respondents to prepare. The interview guide can be found in the appendix section.

The concept of *validity* determines whether the empirical data created through the interviews succeeds in what it is meant to describe (Saunders, 2007). In other words, if a question was intended to trigger a specific answer and this answer was not realized then the empirical finding loses its validity. In order to achieve this, the right questions need to be asked and they need to fit the accounted respondent.

*Generalizability* of a certain study determines how that specific study reflects reality and whether it is applicable to a general population. The generalizability of this paper has been established by selecting respondents for interviews or observation from different business sectors. Due to the fact that the empirical data is not represented only by one industry sector, the credibility of the results will increase. The interview results will not be dependant on one area or country only. Results will also be applicable to more than one region, as the interviewees are located in different countries including Sweden, Switzerland and Romania and respondents work in different industries including IT and automotive industries.

## 4 Empirical Findings from Interviews

The empirical data collected through the semi-structured interviews will be presented below and organized according to each of the six interviewed companies (Sogeti, IBM, Calsonic Kansei & Renault-Nissan Group, ISI Group, PDB and Saab). Respondents' jobs are related to the field of Project Management and they all have experience in working with inter-organizational projects (outsourcing, partnership or cross company projects).

Different types of interviewing methods have been used during the data collection such as phone, teleconferences, videoconferences or face-to-face meetings. The reason behind these choices was to experiment these communication tools and reflect upon their impact on the flow of communication and understanding between people. In some cases, the interview was constrained by distance therefore, a technology mediated communication tool was necessary.

### 4.1 Sogeti

#### Sogeti Interview 2010-04-28

Respondent: Hanna-Maria Verdonck Pihlstrom  
Title: Project Manager

Interview: Teleconference  
Location: Jönköping, Sweden

Sogeti Sverige AB is an IT consultancy firm which offers a full range of technologic knowledge and expertise such as Application Management, Infrastructure Management, High-Tech Engineering and design of IT solutions. Sogeti operates in over 20 locations in Sweden and employs over 1000 people. Globally, Sogeti employs over 20.000 and operates in over 200 locations, in Europe, US and India. Sogeti is a wholly-owned subsidiary of the French company Cap Gemini S.A. and is also a Microsoft Gold Certified Partner and an IBM Premier Business Partner. Since 2003, the company has won numerous awards for technical and quality excellence (Sogeti, 2010).

The respondent works as a Project Manager at Sogeti, Sweden and has been involved in inter-organizational projects with other subsidiaries and employees across Sweden. These types of projects have been defined as cross-company projects. However, before starting working for Sogeti, she has been working internationally, more specifically in the Netherlands, involved in projects in different industries such as web design and web marketing. She has been working with people from abroad and was not able to interact with them face-to-face, because of distance and high-costs for travelling, therefore was constrained to use technology mediated tools to communicate.

Verdonck also mentions an experience she had with one inter-organizational project that involved people from Europe and US and makes reference to the time difference impact. She relates that *"the project worked very well. They were planning what needed to be done and then send it to us. We were developing during the day and then we had a conference call, every day, when we shared and discussed what we've been working with. It worked very well and I see this way of working as an advantage than a disadvantage"*. The reasons given for the success of this inter-organizational project were that the time difference between Europe and US are not that big. When people in Europe finished work, their counterparts in America were only starting their day therefore, they had a short interval when they could discuss the advancements of the project using communication tools such as teleconferences.

It wasn't the same situation when working on project together with people from Japan. Verdonck states that *"it was more difficult to schedule online conferences because of the bigger time difference."* Plus, some of their Japanese counterparts were located in the same company so the need to interact online through a live mode was reduced. Therefore, the main technologies used for communication were e-mails. For some projects the respondent also used MSN Messenger to stay in contact with other team members. *"It was easy to use, fast and efficient."*

As a Project Manager at Sogeti, Verdonck uses a communication platform, Microsoft Sharepoint TRoom, to keep track of project files and support the management of projects. The platform has many advantages and functions. You can also make use of the desktop sharing application when doing teleconferences. These three tools put together (file sharing through the platform and desktop sharing when talking in live mode) can considerably help the project's flow of information and quality of communication. As the interviewee explains *"Troom is a Microsoft Sharepoint solution for handling project documents"* and some of the functions explained include: *"By using this system I can select what it is that I want to show and share. I can summarize certain points in the project and what we are working with; add events such as meetings; organize a calendar and a list with what needs to be done and the current status of a certain activity; add discussions; control who can access what; check earlier versions of documents and how they evolved. The tool is working internally as well as externally when certain customers need to be given access."* However the respondent makes reference that *"This technology is not used for coding or developing the actual project. Its purpose is to communicate and share information in order to help the project manager manage the project better, keep track of documents and share them with project members and even the customer."*

The respondent also states that usually everything works fine and there are no problems with the technology or the technical parts of the tools. Sometimes, technology such as teleconferencing does not work properly, or the invitation with the right selections is not done correctly, which may not give the chance to hear each other when speaking. Overall, Verdonck explains that the need for technology differs from project to project but *"if the tools are sufficient for achieving the goal of a project then it is ok."* Problems might appear when the tools at hand for communication and project managing are not sufficient or do not work as intended.

Overall, the respondent gives a 10 grade out of 10 for the importance of technology for the project work and explains that: *"Technology mediated communications are a necessity nowadays, because we are not working with the client locally anymore. These are the realities that we live in. If we didn't have these technologies than we had to work within the client's environment, locally, which will increase the costs considerably. We are an IT company so we are taking advantage of working with IT maybe more than other companies. But we need to have at least a mobile phone and e-mail in today's way of communicating."* That is why Verdonck gives 10 out of 10 of the importance of technology on achieving the objectives of a project.

Regarding communication skills people need when communicating through technology and what social impact they have upon project work, Verdonck explains that cohesion among team members is important and with technology intermediation it might take longer to *"take a feel of each other"* than as meeting in person. She also explains that, if possible, at the beginning of a project it is important to meet each other in person.

Brainstorming should use face-to-face meetings, because as Verdonck explains, body language is an important part of communication, “*we are not communicating only with our voice*”. There are many elements that convey a message that you need to feel and observe. That is what technology cannot offer similarly to face-to-face meetings.

## 4.2 Inter System Informatik

**Inter System Informatik AG** Interview 2010-04-22

Respondent: Sake Timmermans

Interview: Skype

Title: Senior IT Consultant

Location: Basel, Switzerland

The respondent works as a Senior IT Consultant at Inter System Informatik AG in Switzerland, an IT company that offers consulting services in different industry sectors such as: Banking, Pharmaceutical, Assurance or Telecommunication industries. The respondent works in the field of system development, integrating and connecting systems. When describing his job at ISI, Timmermans explains that he works as a solution IT architect completing different tasks for projects that involve migrating software from the US to Switzerland, and adapting it and integrating to the Swiss environment or in other words “*as an integrator between the software provider and the local customer.*” One type of inter-organizational project that Timmermans has been involved in is with Credit Suisse, in the banking sector, for which he worked with the client locally and its other subsidiaries from abroad, thus the project qualifies as a cross company inter-organizational project as well as outsourcing.

The inter-organizational projects that Timmermans worked for in his career, involved people from the US, India, Italy, Germany, France, the Netherlands and Switzerland. When asked about the technology mediated communications used for these projects he answered that teleconferences and e-mails are the most common tools and sometimes videoconferences but not that often. “*Videoconferences are sometimes unefficient because of the technical impact which affects the quality of voice and image. It costs more money and you do not gain any more information if you see people.*”

Regarding the security issue of communicating information through the web, the respondent explains that sometimes they need to use an Internal Security Channel or encrypted channels. Secure channels are used to make sure that no one else has access or interpret confidential data transferred through virtual communication channels. “*It’s very important that the rest of the world doesn’t know what you are doing. Sometimes you might need to send important files such as contracts by post.*”

Another tool Timmermans uses is desktop sharing which brings benefits in showing the participants how to use a specific software or anything you would like to share on the desktop with others.

There are two factors that affect communication in the virtual environment. First there are the people behind the computers and then there is technology, such as communication tools used for interacting. Quality of technology affects the flow of information and its accuracy. People play an important role as well because they are filtered through the communication tools. Sometimes peoples’ communication skills affect the overall communication process, and if technology does not work properly, then the situation gets even more frustrating. Timmermans explains that “*if communication is not good, in the sense that you do not feel comfortable because of different reasons then you just*

*don't do it or you try some other ways.*" In some situations live meetings are not efficient because some participants cannot express themselves in English or formulate their ideas in an understandable way. That is when the switch to other communication tools is made, such as e-mails. Overall, the respondent evaluates the impact of communication technologies upon an inter-organizational project's success on a scale of 8 out of 10.

### 4.3 Saab

**Saab** Interview 2010-04-26

Respondent: Michel Chedid

Interview: Face-to-face

Title: Technical Project Manager; Researcher

Location: Jönköping, Sweden

Saab serves the global market with world-leading products, services and solutions from military defence to civil security (Saab, 2010). The respondent works as a technical project manager and researcher at Saab, Sweden within the Training and Simulation business unit; dealing with system engineering and market analysis projects (e.g. strategic research, industry trends and evolvement of market). Chedid has experience in both areas of hardware and software development. He has been involved in internal and external development projects, thus, qualifying as a participator in inter-organizational projects. Saab Sweden has close business relations with their subsidiary in the US (cross-company projects) with whom they work closely together and therefore, need to communicate through technology mediated communication tools.

In the interview, Chedid mentions that sometimes customers have special needs and require certain functionalities for a specific project (product). A project therefore, involves the specification of the project and the established requirements; the developments phase which can range from one month to maybe one year; followed by the manufacturing phase. E-mails, teleconferences and shared PowerPoint presentations are the most common communication tools used to interact with the customer. However, Chedid argues that it is important to meet the customer face-to-face at the beginning, in the project specification phase to be able to discuss in depth and reach an agreement and two way understanding. *"Technology mediated communications can replace face-to-face meetings on some level. Requirements specifications are important to have face-to-face meetings, need to be accurate and thorough. Otherwise, it will demand rework if terms are not well established from the beginning"*.

Communication and use of technologies reach a more in depth level between the Saab subsidiary in Sweden and the one in the US. Currently, Chedid works for a project that involves both parties.

Videoconferencing is one of the main communication tools used. *"It is required once a week, but sometimes we make video conferences two or three times a week. The system also includes remote desktop sharing in order to show a presentation on both sides. The screen is divided in two parts, one for the presentation and the other for the video. This way you can reach a two way interaction and feedback giving"*.

Chedid also argues that videoconferences offer a better connection with the other person compared to teleconferences. *"You can see their facial expressions and you can tell if the people you are talking to are actually understanding or not. The quality of sound and image is good, therefore no problems when it comes to technology. But when some-*

*thing actually happens, problems are usually fixed by the IT department. IT related problems are not that big compared to regular project problems. IT problems are easily fixed, and usually fast solutions are given by the IT department.”* One minor issue with videoconferences is that, compared to face-to-face meetings, informal message passing to the other side is not possible: *“if you remember something, you cannot pass a message in a subtle way to the other side without interrupting the videoconference”*. As for telephone conferences: *“the discussion is not flowing as in video conferences and you put more effort in coordinating. It is harder to recognize the people you are talking to, if there are more than two and you don’t really know for sure when the other is finished talking”*.

Saab also uses an internally developed system (a platform for information sharing) for project management support. The system offers several functions that help the communication environment and eases management’s responsibility for managing projects. Chedid explains that the system includes project management tools for: *“Scheduling, meeting protocols, action lists, design documents, requirements, work breakdown structures (WBS). You can see who is participating in a specific project, what needs to be done and how long it will take. You can find information and presentations from past meetings. Documents and reports developed after each meeting are attached on the platform. You can also see solved problems, risks and their impact on schedule. Overall the system helps manage and keep track of time issues.”* The respondent highlights the importance of the security issues for this system and mentions that only people involved in projects can have access to it.

Chedid argues that a project manager should be able to keep track of the projects’ resources such as information and documents. This can be achieved through a platform that supports the overall process of project management. He believes that *“This will save a lot of time.”*

Besides videoconferences and the internal system, which play an important role in communication supports, other, more common, technologies are being used such as E-mails, Scanning, Faxing and sometimes even regular mail. Microsoft Office is used for creating project related documents and communicating them externally.

Overall, the impact of these technologies is reflected in the time savings of a specific project. *“You can reach results faster. And less time implies less costs”*. *You also need good communication skills to express yourself correctly; this becomes harder when dealing with foreign languages.”* However, in this situation both parties have a good knowledge of English, therefore, no problems occur because of language. On a more general aspect, Chedid believes written language is sometimes less accurate than oral language. *“When speaking you get more information than when writing.”*

The respondent believes the impact of technology mediated communications upon the project’s success is graded at 7-8. *“When you work with people from abroad, you need these technologies; otherwise it would be quite hard. However, the functionality of the product is the same. The established requirements must be met”*. You need to meet the client’s requirements, no matter what the circumstances (working virtually, in inter-organizational projects or with partners from different continents). *“In the military market, we cannot say that we offer two products at the price of one”*.



## 4.4 Calsonic Kansei

**Calsonic Kansei** Interview 2010-05-04

Respondent: Simona Leontescu

Interview: Videoconference

Title: Design and Process Change Coordinator

Location: Ploiesti, Romania

Calsonic Kansei is a Japanese manufacturing company with subsidiaries all over the world. They produce and supply car components such as radiators, air conditioners for the Auto industry. CK Romania is the assembling plant that outputs the finite product on the market. They supply these products to Dacia automobiles (the biggest car manufacturer in Romania owned by the Renault-Nissan Group), to Suzuki in Hungary and export to countries such as Morocco, India, Venezuela, through intermediary companies.

CK Romania (CKRO) has inter-organizational relations with other CK subsidiaries around the world (cross-company projects) that provide input for constructing the end product. These subsidiaries are located all over the world, in Japan (the head company that supervises all others), UK, Taiwan, Thailand, Spain and France to mention a few. CK Romania also has business relations with external suppliers (Shenzhen, China) and their customers (Dacia, Suzuki and external clients) with which they need to communicate and thus, make use technology mediated tools.

The respondent of the interview works as a Design Change and Process Manager in the Project Management department at CK Romania. Changes made in any process of any product in the company and new developments are coordinated by Leontescu. She works together with another employee as part of the newly established Project Management department in CKRO. The projects they deal with are either new projects or changes in already implemented and manufacturing products. Examples of projects can be opening a new manufacturing line for a special kind of radiators or air conditioners ordered by one of their customers. When dealing with these changes Leontescu needs to communicate with other CK subsidiaries from abroad, especially with partners from the UK and Japan. The 'parent' company in Japan supervises the whole CK consortium in terms of changes, projects and plans. Communication among different CK subsidiaries is therefore mandatory.

There are several technology mediated communications that Leontescu mentioned during the interview, and useful input has been made for each of them. The most important ePM tools used by Leontescu are e-mails and teleconferences (one-to-one or many-to-many) to communicate abroad. The company uses a system internally, Lotus Notes, which offers different functions such as e-mail and creation of team rooms to keep track of documents and files developed for a specific project. The team room function is an important part of project management and information management. This function can help organize and make available the information for a specific project. You can see who is involved in the project. Documents are posted onto the platform, a date can be seen when a document has been uploaded and people affected by the specific documents are informed through e-mails. These are some functionalities of the Lotus Notes team room.

Teleconferencing is also another valuable communication tool but as Leontescu argues it is mostly used for important issues or problems that involve participants from several

countries. Leontescu mentions that CK uses special phone numbers for teleconferencing that several people in the company can use. *“Sometimes is frustrating to try to make a call with the teleconference number and hear other people talking when connected.”* The reason behind this issue is that the same teleconference number and the password is used by several people in the company. A more organized system for teleconferencing needs to be implemented so that people can see the schedule for a certain teleconference number and who has planned a meeting and at what time.

The videoconference technology is also available but not used as often as teleconferencing, because as Leontescu states: *“videoconferences do not bring any other benefits, usually you are too busy to be bothered because it takes more time to organize than teleconferences. Overall, videoconferencing is used for meetings of high-importance. Normally, quality is good and there are no annoyances caused by technology or connection to the Internet.”*

When asked how vital these technologies are for the project work, Leontescu gives a 10 out of 10 grade adding that she could not manage without these technologies as she works closely together with other subsidiaries from abroad, makes phone calls every day or have teleconferences, most often in the UK, regarding different aspects of the project work. Leontescu specifies that she prefers a written proof (such as e-mails or attached documents on the Team Room) after talking on the phone or in a teleconference, to make sure people are on the same page, supported by a written proof. With Japan, because of the time difference, Leontescu usually uses e-mails: *“sometimes it’s more complicated to call, at 10 am in Romania, in Japan is already 4pm and people leave work”*.

Both calling and e-mailing require good communication skills. However, e-mailing is more convenient because people usually have more time to think, formulate their ideas and express themselves better than in live meetings. There are situations when people cannot really express themselves on the phone or simply cannot make them understood as a reason to their fluency in English or accent. *“That is when e-mails come in to save the situation”*. *Before starting a live meeting the most important is to have a plan in mind and an agenda with the questions to ask and issues to solve”*.

Because of the international nature of work within the Calsonic Kansei environment, that involves many cross-company subsidiaries and also their customers and suppliers, technologies are a vital part of the everyday functioning. *“If technologies are available for use and they are working properly then people make use of them and benefit from these technologies. It depends from case to case, company to company and project to project. But in our days’ working environment these communication technologies are indispensable; therefore I give a maximum importance, which is 10 on the scale given.”*

#### **4.4.1 Renault- Nissan**

On a more special inter-organizational project level that Calsonic Kansei is involved in is with Dacia owned by the Renault-Nissan Group for which they supply car components such as radiators and air conditioners. They have a close business relationship and are connected through an internally developed information system and several communication collaborative tools. Renault-Nissan Group uses such tools to connect with their partners and suppliers.

In order to save time when carrying out projects and, most importantly, in order to be more reactive, new tools have appeared on the market which are currently used by designers for vehicle projects (co-design involving Computer-Aided Engineering-CAE and section applications) and support teams (support involving CAE software).

The Alliance New Product Quality Procedure (ANPQP) platform gives access to certain actors within the supplying or partnering companies that are involved in the actual inter-organizational projects with Renault. The purpose of this Information System “*is to specify the methods and responsibilities whereby the supplier is required to develop new products to achieve the Alliance targets for Quality, Cost & Delivery (QCD), and associated customer expectations ANPQP is the Alliance requirement for suppliers from the initial project planning phase through Standard Operating Process (SOP) and into full volume production. ANPQP should be used for changes to product and/or process, which may occur throughout the life of the product*” (Renault, 2004). In other words the system is used to (according to Renault, 2010):

- Facilitate the application of ANPQP standard for vehicle and power-train projects and during mass production.
- Share a real-time follow-up of ANPQP activities between Renault and the supplier.
- Assure the traceability of the ANPQP deliverables received from the suppliers and the input data sent by Renault.
- Provide the ANPQP file folder available and uploaded it in mass production.
- Realize multi-files, multi-projects and multi-plants reporting.

*“Renault’s transition to global engineering centers spurred the need to use Web 2.0 and new media tools to enable collaboration between employees located in engineering centers and plants around the world. eRoom (an online document-sharing solution) and eConf (a virtual meeting solution) are two key collaboration tools to address this need for globalizing operations. Part of Renault’s collaboration methodology includes an approach to encourage collaboration practices—such as how to manage documents, how to establish communities of practice, and how to share information”* (Collaboration Consortium, 2009, p. 22).

eConf is a real-time collaborative work tool which allows you to organise and hold remote, real-time meetings. It is indeed possible to present, share or work on the same document or the same application with contacts all over the world whilst sitting at your own computer.

***“It is just as though the various collaborators were all sitting together in front of the same computer”***(CAE EE Contact, 2004)

The tool can be used in many different situations:

- hold real time meetings without anyone having to travel
- monitor the progress of a project
- share 3D images in order to finalize a modification (on PC)
- finalise a document (specifications, presentations, business plans)
- present slides during a remote intervention in a seminar.
- introduce others to a new product (document, software)

As part of its project monitoring processes, Renault has implemented a document sharing tool to take part in discussions and exchanges with partners and suppliers. The tool will be named eRoom in this paper. This solution allows the Renault-Nissan teams to work with their suppliers and partner with no time or place constraints. It is secure web-based internet work tool which enables teams to communicate and share documents, and makes coordinating a team's work far easier. eRoom can be considered to be a "virtual desktop" reserved for a team of people who are strictly identified by a personal IPN number (Renault username) and authenticated by a personal password.

eRoom notably enables users to:

- Share documents such as texts, Excel Files, Slides, Planning documents, 3D view.
- with update contents,
- Exchange alerts and notification.
- Consult regularly update files, databases, schedules.
- Carry out project management tasks.
- Favour the use of approvals as part of the decision making process,
- Manage simple operations (Task monitoring, LUP, Project schedule)

*“More than 45,000 people are registered users of eTool, including 10,000 users outside France located in over 40 countries. eTool has been very rapidly adopted by users and departments. It has become “the way people work, and very important for the company,” according to Jean- Marc David.”* (Collaboration Consortium, 2009)

Another such tool (‘Meeting’) allows an application to be shared in real-time mode by different stations, in intranet form or with partners (it is currently used on extranet with selected partners). During these meetings, the business applications are regularly shared to validate technical points. On the other hand the Meeting allows to gather more easily the various speakers around the same view, to understand better a specification, to resolve a technical point and also improve the quality.

## 4.5 IBM

**IBM** Interview 2010-05-04

Respondent: Anneliese Hüttner

Interview: E-mail

Title: SAP Senior Consultant; Project Manager

Location: Bucharest, Romania

IBM is one of the biggest IT suppliers in the world, providing with IT solutions in various industries such as telecommunication, education, automotive health sector or financial services and offers infrastructure services, hosting services, and consulting services in areas ranging from mainframe computers to nanotechnology (IBM, 2010). The respondent works as an SAP Consultant for IBM Romania located in Bucharest. Most often this is not the respondent’s everyday working environment as the SAP projects are outsourced to the client’s location where the IBM team works closely together with the local team in order to implement a new SAP system. Therefore, the IBM team needs to relocate where the client is located. These types of inter-organizational projects are described in this paper as outsourcing projects. Hüttner has been involved in three international projects with three different clients: Petrom-OMV (fuel industry),

BMW (automotive industry) and Pepsi (food industry). For the first mentioned project, Hüttner was the manager of the project and coordinated the implementation process of a special SAP solution for that specific type of industry.

For all three inter-organizational projects mentioned above, technology mediated communications have played a “*vital role*”, according to Hüttner. The respondent argues that nowadays distance does not represent a big problem and the challenges can be overcome by the use of technology. Within the SAP environment, it is common to talk about the virtual working environment or “*remote inter-action*”, especially for programming consultants and developers. “*This innovative way of working cuts costs, traveling costs will be eliminated, and will eventually harness higher profits. Even though the IBM team is located at the client’s base, they often need to communicate with other subsidiaries that the customer works together with from abroad*”, therefore, virtual work cannot be avoided.

The communication tools used by IBM include e-mailing, through Lotus Notes. Sometimes it might be the case that the IBM consulting team needs to use the client’s internal e-mailing system as well. Other tools include “*Phoning and teleconferences are the most usual virtual live meetings; videoconferences are not that common as the client’s technical infrastructure sometimes does not provide the necessary tools to use videoconferencing.*” Besides these traditional communication tools, some projects may involve specific tools as well. If the client has access for certain systems or communication tools, there are also internal IBM tools that the client cannot access. These communication tools include:

*Rational Portfolio Manager (RPM)*: Many projects use this system for project scheduling, planning and tracking. The financial part of the management of projects (costs, profits) are defined and documented with the help of this internal system. MS Project can be used for similar purposes.

*WVER* (expense reimbursement): With this system, IBM employees can introduce their spending accounts, such as travelling dedicated costs. This information is then transmitted to the financial department virtually without the need for paper-based administration.

*Intranet Labour Claiming*: This IBM internal system keeps track of the hours spent working on the client’s site of a particular project member, hours spent for training, the days off taken. In the end, the percentage of how much a person has been working will be resulted. Normally, the better usage of employee resources the higher the efficiency as well as the profits.

*IBM Marketplace*: This internal tool offers the possibility to find suitable human resources for a specific project from around Europe. It works as an internal network environment where IBM employees share their curriculums, experience and interests. At the same time, the candidates can find information about what types of projects exist in different IBM centers and they can apply for them virtually.

*Sametime* is an incorporated messenger tool within Lotus Notes through which IBM employees can make calls and send files in the live mode.

The respondent believes that these technologies are vital for the proper functioning of a team, “*without these tools a project’s time flow will take so much longer, if not impos-*

ible in some cases”. When it comes to security issues, usually the leader of the project centralizes data, from which confidential information such as budget, costs or profits will be directed to the management level only, through these tools mentioned above. The actual quality of the project, reflected through quantitative data (costs, profits) can be seen in the end through the output of these communication tools which hold detailed information about a specific project.

*“At the management level, it should be known what the client needs, who is available to work, how much time and at what budget. Therefore, the decisional making process is greatly influenced by these technologies. The more accurate the information is and accessible in terms of time and quality, the faster the management can react. As a realistic example, a simple Excel file with the timesheet of a project member can tell how efficient that person is or whether more resources are needed for coping with the project work. Then the management checks the RPM system, described above, to see whether the budget of the project allows to buy-in extra resources. In case of a positive answer, the Marketplace would be the location to search for available resources and information is given for the general conditions.”*

One problem that may arise with these internal IBM systems would be that the client most often does not have access to these tools, which leads to double work in order to inform the client. Sometimes there is also a difference in document formats between what IBM and the client require.

Hüttner adds that *“if technologies work properly, most often project managers would not find these tools as an impediment to the success of a project, but the more sensitive issues such as cultural differences or time difference between team members”*. Overall, the respondent believes the impact of these technologies upon the project work is of great importance and that *“without these technologies, especially for an international project, it would be very difficult to manage. Because of their importance and effect upon the overall project work, I would give maximum 10 out 10 for their impact.”*

## 4.6 PDB

**PDB Interview 2010-05-06**

Respondent: Svante Bolin

Interview: Face-to-face

Title: Senior Consultant; Project Manager

Location: Jönköping, Sweden

The respondent works as a senior consultant at PDB, an IT consultancy firm based in Jönköping, Sweden that offers IT solutions for “Småländska”. Bolin has experience within the business side of IT consultancy and has previously worked as a marketing manager, business developer with an interest in e-commerce and e-trade. Currently he works as a consultant for Husqvarna AB and dedicates most of his working time at the client’s location. His consulting job is to provide service management expertise for an e-commerce application that Husqvarna AB wants to enhance (outsourcing project as a consultant). Bolin works closely together with other Husqvarna AB subsidiaries globally, in Germany, Australia and the US (cross-company project within the client’s environment).

When asked about the types of communication tools used when working for a specific project, Bolin explains that *“when you are not far away from each other you prefer to have face-to-face meetings. But even in this situation, for smaller issues such as status project upgrades, follow up meetings it is easier and faster to use project tools such as e-mails or phone conferences. However, at the beginning of the project it is better to have face-to-face meetings, to get things started, to define the scope of the project and what needs to be done.”*

*“Videoconferences are the best second option to replace face-to-face meetings but overall it is more complicated and more expensive. Sometimes it might be the case that not all subsidiaries have the technology for supporting videoconferences, therefore they participate by phone only. Another problem with the videoconferences is that there is only one conference room that you need to book and plan ahead.”*

Another important tool that the respondent uses to support project work is Webinar for web conferences. As Bolin lays down the benefits of webinar he explains: *“You can do a PowerPoint presentation and everyone can see it while talking on the phone. The upside of this tool is that everyone can sit at their desktops, no need to use the special video conference room, as long as they have a phone and a computer, the tool will work. You can share your desktop, make drawings and share every type of documents and pictures therefore it brings a two way interaction. Sometimes technical problems can appear, as an example, for a scheduled conference of fifteen people, not everyone was able to log in and participate losing a lot of time because of this. Eventually the problem was solved but time is lost.”*

The respondent explains that *“webinar meetings and phone conferences are the most common communication tools used; they are easy to use and inexpensive at the same time. But if you try to be creative, find new solutions or ideas through brainstorming and workshops, then it is a good idea to use videoconferences because people interact better. However, if you have a strict agenda, clear objectives, and things to follow up then teleconferences are easier to use.”*

Bolin mentions that he also uses a project management tool as part of the project that he works for at Husqvarna AB. This tool is rented by the company and is used online, *“in the cloud”*. This platform helps organize project information and gives structure to the overall project tasks. Bolin explains the different functionalities of the tool: *“you can publish the timeline of the project in a Gantt scheme. You can see all tasks that need to be done and who is responsible behind these tasks. The tool helps make public the general scope of the project for people who are involved in the project, locally and from abroad. If the tool is managed properly it can help people catch up in case they miss some project work. If it is not structured in the right way then it will take longer to find the information needed. The project manager is responsible to organize the system and bring information flow and direct it to the right places. Overall, the tool gives structure to the project; it organizes its resources (in terms of people and information) and planning as well. An example of such type of tool described above is Microsoft Project. From all the functions the tool provides “you can choose what parts of the tool to be used depending on the complexity and dimension of the project”*. Bolin points out that it is everyone’s responsibility to search for the needed information within the platform. Follow up meetings to make sure that people are updated with what happens in the project are also an important complementary necessity for the ePM tool. Bolin believes that

*“It is important to have project meetings on a regular basis. The longer you wait the more questions you have and miss problems when they appear at an early stage”*

The respondent explains that *“for a big project, these technologies are more important than for a small project. Even if you would prefer face- to-face meetings you wouldn’t be able to have them anyhow, that is when technology compensates to overcome the challenges even though the quality of communication might decrease as opposed to live meetings in person.”* Bolin also points out that *“if technical problems appear with one communication tool there are other options to use from. It wouldn’t get in the way of solving the actual problems.”*

When it comes to communication and inter-personal skills needed for using these technologies, the respondent believes they are similar with face-to-face meetings such as ability to express themselves and good language skills but mentions that *“usually, when there is a lack of these skills, they appear more obvious in videoconferences and face-to-face meetings.”*

For global and more complex projects, the respondent believes these technologies are very important and gives a grade of 8-9 out of 10. Bolin believes that *“without these tool, especially for a project that involves many people and from different countries, the project manager would have more challenges, if not impossible, to communicate information and make it available for others.”* However, for local projects, project management technologies are important (especially if the project involves many people) but not vital and therefore, a grade of 4 out of 10 is given.

## **4.7 Observations**

It is important to mention that the collected data from respondents is prone to be dependent on the respondents’ current main activities. For example, if an IT consultant, during the period of the interview, worked for a customer and dedicated most of his/her time at the client’s location, he/she would mainly talk about this situation during the interview. This type of project would be categorized within the “outsourcing” type. It might also be the case that before this project the respondent worked for other types of projects that can be identified with yet another inter-organizational project category. These situations have been identified in the case of Sogeti and ISI Group, where respondents have had different kinds of experiences in their careers. Due to lack of time and a need to focus on one type of project only, data could not be gathered in its full complexity and therefore, is prone to subjectivity and misguidance. However, an interesting insight from these companies can still be made. In all cases of inter-organizational projects mentioned above, technology tools are used for communication and information sharing, which fully fulfils the purpose of this thesis paper. These will be discussed further while assessing and analysing their technical and social impact.

The facts and information gathered from interviews have been structured in such way to provide with the most interesting ideas explained within the interviews and the ePM tools behind these ideas. A pre-established analysis of data gathered has taken place within the empirical findings. I believe this way would suit best the exploratory nature of this thesis, and that word-by-word interviews transcripts would have not given readers as much insight and understanding.



## 5 Analysis

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*In this section the information from the empirical findings is further analysed, accompanied by secondary data in the form of phenomenon that has been observed in the literature study and empirical findings. A more in depth search for new patterns and theories from the information collected through own observations and reflections will occur.*

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### 5.1 Identified inter-organizational projects

After the analysis of collected data from the interviews, several forms of inter-organizational projects have been identified. All companies can be argued to belong to at least one category of inter-organizational projects (cross-company, partnership or outsourcing) or to a combination of these, if seen from different perspectives. For example, an IT consultancy firm can contract a supplier to provide with project development services or products (partnership), implement a specific project within the client's environment (outsourcing) and working together with the client's subsidiaries from abroad that have interests in the project (cross-company). The IT company outsources the project to the customer, while the customer collaborates with the IT company to implement the needed project. This difference in viewing inter-organizational projects depends on who regards the situation, the outsourcer, contractor or supplier. However, each company will be categorized to only one inter-organizational project type as focused during the interviews.

Three out of six companies have been identified as working within the “*cross-company*” group, with other subsidiaries of the same company located in different regions (or countries). Sometimes subsidiaries can play the role of suppliers (under the same company name), evidenced in the case of Calsonic Kansei. The three companies, Calsonic Kansei, Saab and Sogeti, each from different industry, have shown evidence of cross-company inter-organizational work. On a more special level, Calsonic Kansei and Renault-Nissan are involved in partnership inter-organizational projects.

The other three companies, IBM, Inter System Informatik and PDB, as concluded from the information given through the interviews, belong to the “*outsourcing*” category of inter-organizational projects. The reason behind this difference is that these three companies work as consultancy companies, and the interviewed respondents work within the customer's environment, thus the name outsourcing. They dedicate most of their time to work with the client and most often with the other subsidiaries of the client. The client might be involved in a cross-company inter-organizational project with other subsidiaries that may be affected by the implementation of the new project. That is why the outsourcing company needs to work together with the client's subsidiaries, as a cross-company project.

### 5.2 Impact on the objectives of a project

The major impact that these tools have upon inter-organizational project regards time savings. “*You can reach results faster, and less time implies less costs*” (Chedid, 2010). Knowledge and information sharing and data repositories (usually through databases that collect best practices and information developed after specific projects or processes have finalized) can have a great impact on the educational and training processes within an organization. “Necessity” or “Convenience” can be seen as the reasons for utilizing

these tools. “*You can choose what tools to be used depending on the complexity and dimension of the project*” (Bolin, 2010) “*If the tools are sufficient for achieving the goal of a project and its members then it’s ok*” (Verdonck, 2010).

However, the project needs to be achieved as required by the initial scope of the project, although constrained by time and cost issues. A project will be assessed by its quality of work and compliance with the pre-established scope. ePM tools need to reach the standards and necessities defined by the project scope and quality conditions.

In a project “*the established requirements must be met*” (Chedid, 2010) quality of work should not suffer because of the lack of capacity in using communication tools. Chedid argues that “*you need to meet the client’s requirements, no matter what circumstances*” by ensuring that the project’s scope, budget and timeline will not jeopardize the level of quality determined by sponsors and stakeholders. The timeline of a project will be mainly influenced by the communication tools used and the engagement of participants in the project.

Within Renault’s business entourage, users have observed and benefited from collaboration beyond travel cost reduction. For example, eRoom and eConf have saved valuable time in the development process. Moreover, suppliers have saved significant cost and time because eRoom and eConf have ensured that they are always working on the most recent version of engineering blueprints and documents, avoiding the costly mistakes associated with working on outdated versions (Collaboration Consortium, 2009)

“*Without these technologies, especially for an international project, it would be very difficult to manage. Because of their necessity and impact upon the overall project work*” respondents have given an average of 9 out of 10 regarding the importance of technology mediated tools within inter-organizational projects. By referring to the proximity to the maximum grade, one can conclude that these technologies are of high importance, vital, for inter-organizational projects and their influence on the project’s general objectives (schedule, cost and quality) is perceived by respondents as high.

### **5.3 Technical Impact**

The first research question: “*What benefits and restrictions have companies experienced with ePM tools?*” will be tackled in this section. The technical impact that ePM tools (or technology mediated communications) have upon inter-organizational project work can be assessed by measuring the benefits that these tools offer to the users. On the other hand, technical constraints of these tools will also be regarded. Some tools have been found similar in their purpose and functionality within different companies therefore, they are assessed as a group. Such tools are the Project Management tools that companies use for project support and information sharing. Different software providers offer different solutions, but similarities between them and their general scope can be found. Asynchronous tools do not offer a live interaction between participants. Such tools include e-mails, project management tools, social networks. Synchronous tools offer an advantage to participants in terms of a two way live communication. Both asynchronous and synchronous tools are important for supporting an interactive environment and collaboration in an inter-organizational project.

### 5.3.1 Asynchronous ePM tools

#### 5.3.1.1 E-mails

As concluded from the empirical study, *E-mailing* is the most used asynchronous communication tool along with teleconferencing. All respondents use this tool and argue for its importance: “*E-mails are mandatory in today’s business environment*” (Verdonck, 2010). The benefits with e-mails are that they are fast, it is possible to attach documents and you have more time to think and formulate your ideas as compared to synchronous tools. You also have the possibility to review the e-mail before sending. E-mail tools such as Lotus Notes offer a wide range of benefits. Some benefits mentioned by some of the respondents include: possibility to create meetings and invite people to attend, planning is also possible via e-mails, roles and responsibilities can be formulated and sent to people who are behind them. In case people do not react or act as expected, there are different ways to contact them (usually by phone) or put pressure by including their superiors in the copy of the e-mail. This usually happens with important issues and when people ignore the first e-mail received with a particular request. Leontescu makes an interesting remark towards e-mails and she mentions that e-mails offer some sort of written proof of something that has been said or done. This proof does not exist with teleconferences or videoconferences, unless they are recorded. That is why after each synchronous meeting, a summary with the points discussed and decisions made is sent by e-mail to the other participants.

On the other hand, a constraint with e-mails is the security issue. Sometimes sensitive data needs to be sent through safe channels that should not be accessed by unwanted actors or harmful applications (such as malware). This can be overcome by using internal security channels or encrypted channels. “*It’s very important that the rest of the world doesn’t know what you are doing. Sometimes you might need to send important files such as contracts by post*” (Timmermans, 2010), for legal issues and proof of signature. E-mails are also unpractical when trying to discuss complex issues, brainstorm or come up with new ideas in an interactive way of communication. E-mails are most useful for simplistic issues. Another important impact of e-mails is the positive effect it has over different time zones across the world. E-mailing is a useful tool when synchronous tools are not a viable solution or not possible.

#### 5.3.1.2 Project Management tools

*Project Management tools* are used as a support for project managers to gather information, structure it and make it available where needed. The different benefits of project management tools were described in the empirical findings. The companies that use such tools include Calsonic Kansei with Lotus Notes and Team Rooms and in collaboration with Renault with the use of eConf, ANPQP, eRoom collaboration tools; Sogeti with Microsoft Sharepoint TRoom; IBM with RPM (Rational Portfolio Manager) and Intranet Labour Claiming; Saab and PDB which did not want to disclose the name of the softwares as they were internally developed but stated that they use such types of tools and explained their benefits. To characterize the group as a whole it is important to establish the general purpose of all PM tools mentioned above. Project Management tools help structure the project and the information created within the timeframe of a specific project. Documents can be posted on this platform such as “*Schedules; meeting protocols; meeting and presentation summaries; action lists; design documents; requirements; work breakdown structures.*” (Chedid, 2010)

These types of tools help greatly to give a structure to the project, organize data and information, plan what needs to be done and spread information where it is important to reach. It can be said it represents the back-bone of an inter-organizational project. A pattern regarding such project management tools has been established from the empirical data. When working in an inter-organizational project, a project management tool is most often mandatory. Five out of six companies that have been interviewed and categorized as working for inter-organizational projects use such tools. *“Without such tool, especially for a project that involves many people and from different countries, the project manager would have more challenges, if not impossible, to communicate information and make it available for others.”* (Bolin, 2010).

### **5.3.1.3 Social Networks**

Surprisingly, only one respondent has mentioned social networks as a useful tool for sharing information and communicating with each other when working for an inter-organizational project. IBM Marketplace is one example of a social network evidenced in the empirical findings. IBM employees can find resources from external IBM offices when they are needed for certain projects that cannot cope with their assigned resources. This way the management level of a project can attract resources from different locations which is one of the many benefits that e-Project Management argues for.

## **5.3.2 Synchronous ePM tools**

### **5.3.2.1 Teleconferences**

*Teleconferencing* has been identified as the second most used tool after e-mailing from the companies interviewed. A teleconference can include either two people (phone can be used as well) or more than two people (where special software or network needs to be used). By calling someone you can get answers faster than by e-mail and you can discuss about issues without the need to wait. Teleconferences are used for more important issues, usually when having to deal with people from abroad and when more than one person needs to be participating. *“When speaking you get more information than when writing”* (Chedid, 2010).

### **5.3.2.2 Videoconferences**

*Videoconferencing* tools are more expensive to use than teleconferencing or e-mails, but offers more benefits as well. One respondent mentions that *“videoconferencing does not bring any other benefits than teleconferencing or e-mailing and it’s usually more difficult to organize”*. Sometimes quality issues interfere with the purpose of such tool. Only two companies argue for the real benefits of videoconferencing and rely on it as a regular communication tool. Some argue that it is important to see the other people when talking as it will offer more interaction and group cohesion over time. An important influence of videoconferencing is when a team wants to become *“creative, find new solutions or ideas through brainstorming and workshops”* (Bolin, 2010)

### **5.3.2.3 Desktop Sharing**

*Desktop sharing* has been an interesting discovery while collecting empirical data as several companies use this tool to share their desktop with other participants while complementing the tool with teleconferencing. This is usually used when having a presentation or trying to describe how something works on the computer while talking directly to the others. These tools are usually very effective, and in terms of costs are less expensive than videoconferencing. No problems have been related to this type of tool.

#### 5.3.2.4 Instant Messaging

Two of the six interviewed companies have mentioned they also use some sort of instant messaging as “it is easy use, fast and efficient” and helps to communicate project follow ups.

Overall, if these technologies, asynchronous or synchronous “*work properly and are not affected by hard aspects of technology, most often project managers would not find these tools as an impediment to the success of a project, but the more sensitive issues such as cultural differences or time differences between members*” (Huttner, 2010).

### 5.4 Social Impact

Regarding the second research question: “*What social significance do ePM tools have upon participants of inter-organizational projects?*” one can make reference to the collaboration framework evidenced in the theoretical framework. Besides the technical area of the collaboration framework which has been the main purpose of this paper, the social aspect of the framework is considered and analysed as well. ePM tools can be regarded as the tangible part of a complex system. A system is dependent on its physical part (hardware) and cannot function without it but the success of the system depends on much more than the physical parts. The intangible resources of the system, such as the software, represent the core value of the system, the triggering power of the hardware. Peoples’ skills, knowledge and engagement in project work can be looked upon as the software of a system. Such intangible assets are required for the machine to be functioning, as wanted by the initiator. Software is the catalyst of hardware. Therefore, such soft skills are vital for a proper functioning of a system.

A system needs to be regarded in its complexity and understand the relationships among its components and the environment. To be able to understand a system, Churchman (1984) argues that all pieces that influence the system need to be found and put together in order to create a manageable and understandable picture of the system as a whole. “*The effect of an event in one piece spreads to other pieces through the relationships among them*” (Langefors, 2005, p.71). This can however, become an endless task as time does not stand still and the system and its related ‘pieces’ change constantly. An accurate diagnostic is therefore, unlikely.

This theory I believe applies as well to the purpose of this thesis (more specifically the third research question), when trying to define the social impact of ePM tools. Suppositions and theories can however, be drawn from the collected primary and secondary data. These will offer an interesting view of what impact technology mediated tools have upon the communication process and the social interaction between ePM tools’ participants. ePM tools will however, be treated as a group (asynchronous or synchronous) as the theories regarding the social impact are intended to be applicable to the whole group.

Some technical benefits make reference to social impact as well. Information and knowledge sharing can bring cohesion within a group. Easiness of communication when being separated by distance can encourage active participation and engagement in the project. Without these tools the social impact is minimized as no interaction will occur, therefore no socialization. Project management tools such as Sharepoint or Lotus Notes as some respondents have evidenced, make it easier for project participants to get hold of structured information, referring to the pieces that make up the system of communi-

cation as whole. Consistency of knowledge can be helped and organized by Project Management tools.

All respondents have highlighted the importance of ‘good communication’ skills when using ePM tools. When asked about the necessary communication and inter-personal skills one should have when communicating online, most respondents have claimed that similar skills are needed as compared to face-to-face meetings. Some of these skills include: good language skills; clarity in expression; active and engaged in the project work; trust-worthiness and professionalism. However the complexity of reaching these aptitudes when being filtered by technology brings up new challenges. One of the interviewed respondents argued that *“if communication is not good, in the sense that you do not feel comfortable because of different reasons then you just don’t do it or you try some other ways”* (Timmermans, 2010). Therefore, when there is a lack of understanding between participants when using one communication tool, other options are available for overcoming the challenge. If other options are still not viable then the communication process suffers and participants will usually avoid interacting any longer.

Online participation is another important aspect that relates to the use of ePM tools. *“Online participation is a process of learning by taking part and maintaining relations with others. It is a complex process comprising of communicating, thinking, feeling and belonging, which occurs both online and offline”* (Hrastinski, 2008, p.1761). Engagement and active participation can harness better the benefits of ePM tools.

According to Langefors (1995, p.72), Wittgenstein argues that written and spoken communication is possible to reach the level of perfection where no misunderstandings occur: *“Everything that can be put into words can be put clearly”*. In other words, Langefors explains that *“Communicating with computers, technology, we could develop our way of talking so as to be logical and unambiguous”* (1995, p.72). However, Langefors also relates to the philosopher Karl Popper who illustrates that *“it is impossible to express oneself in such a way that one cannot be misunderstood by those who want to misunderstand.”* (1995, p.73). This is caused by the complexity of systems in general and the lack of information and understanding of people.

Elimination of inconsistencies in communication is important as well as using precise statements. *“In order to have a chance to successively eliminate inconsistencies in a verbal description which cannot be transformed into formulas, one will have to try to obtain precise statements of the essence of some piece of text”* (Langefors, 1995, p.75). Ambiguity makes one change his perceptions within time. The more time we have, the more information we accumulate therefore, the better we understand and contradictions with what we have believed before occur.

Strict formulations of stated knowledge may be very complex and take a very long time even for simple explanations. *“No matter how much work we put into formulating strict, and unequivocal, statements, they will only provide correct information to receivers who have the required pre-knowledge”* (Langefors, 1995, p.77).

Genuine communication helps organizations understand that the problems that arise among people are generated by a misunderstanding of each other’s intentions, ideas and meaning (Goncalves, 2005). *“Communication is not a technique; it is an expression of thinking”* (Goncalves, 2005). Progressive leaders and managers should push themselves in being creative and look at the benefits that lay outside of the organization. They

should also improve their thinking skills and subsequent communications skills (Goncalves, 2005) to be able to create an interactive and collaborative work environment that encourage knowledge sharing and innovation.

Consequently, one can argue for which of the hardware or software part of a system is more important. In the end both, hardware and software, need to co-exist and complement each others' needs and skills. Continuous improvement and enhancements of the hardware part while being complemented by the development, training and coaching of people, represent the best practice of co-existence between hardware and software assets.

## 6 Conclusion

The main impact that ePM tools have upon inter-organizational projects are in terms of time-savings and easiness of communication when in need for communicating abroad with different business partners. Various types of tools can help the communication process between organizations and some have already been identified and analysed within this paper. E-mails and teleconferences are the main tools used by all interviewed respondents followed by Project Management tools (such as Lotus Notes, Microsoft Project or other internally developed systems), desktop sharing, videoconferences, instant messaging and social networks.

These tools provide the project participants with the means of creating and supporting a collaborative environment. People make use of them to communicate and interact with peers from distance by engaging themselves in using such tools. The impact of these tools would be perceived as tremendous if for some reason, they would no longer be existent. Regression is not an option, at least not a realistic one. One should consider the ways to increase even more the impact of such tools. Progression in terms of user friendliness, enhancements, quality of functioning and reliability of such tools need to be addressed further. The perceived impact upon users and their scope for using ePM tools will be inextricably linked with the improvements in technology capabilities for such tools.

The greatest benefits from an investment in collaboration tools comes when people and content intersect, whether in real time, asynchronously, or both. Collaboration through ePM tools brings value to a business in terms of:

1. *Facilitate interaction* between business partners (inter-organizational projects) in meetings, virtual conferences, or project teams which facilitate expertise exchange.
2. *Improve communication* (internally and externally).
3. *Organize information* in databases, working documents, and archives which offer a greater amount of *shared knowledge* and best practices.
4. *Reduce costs* by cutting down travel expenses and reducing the timeline of project development.
5. *Enhance quality* of information that improves the decision-making process and lowers the risks for defect occurrences.
6. *Accelerating speed* for the time cycle of project development and facilitates the transfer of information where necessary.
7. *Create business agility* in terms of improved reaction to market needs, innovation, flexibility and ability to work efficiently.

All these benefits that are resulted through the use of ePM tools and creation of a collaboration environment offer organizations the differentiator factor that all strive for, *business value*. Shaping a collaboration strategy should be strived for in organizations in order to be able to create a platform to drive business performance.

On the other hand, challenges towards creating an efficient inter-organizational environment and collaboration between project participants have been resulted:

1. Different *time zones* create an impediment to interaction between collaborators and to synchronous communication.
2. Lack of *technology capability* or proper functioning stops or lowers the interaction between project participants.
3. Poor *communication skills* among participants represent an impediment to efficient communication.

In today's global business environment, such tools are vital, they help achieve the objectives of an inter-organizational project faster and with less costs. ePM tools offer the possibility of a bigger cluster of opportunities and solution provision regardless of where they are situated, in a neighbouring country or on the other side of the world.

Socially, the impact of ePM tools lays in the challenge to offer similar social "opportunities" as in real life face-to-face meetings. People have similar expectations towards social encounters regardless if it's a real or virtual environment. Good communication skills (written and verbal), engagement, active participation, professionalism are expected when using ePM tools. People's behaviour and their expectations are unlikely to change, therefore technology itself needs to compensate the lack of similar "social" opportunities when communicating virtually.

## 7 Hypothesis

The use of technology mediated communications to support business collaboration projects is mandatory for the proper functioning of the inter-organizational environment. The use of ePM tools have a major impact on inter-organizational collaboration in terms of: accelerating speed; reducing costs; enhancing quality of information; facilitating an interactive environment; sharing knowledge and best practices; improving communication facilitation internally and between business partners and creating business agility through all the benefits that selected ePM tools can harness, when applied to the requirements of inter-organizational projects.



## 8 Reflections

It may have been more interesting to limit this research thesis to only one industry, and try to find more companies for interviewing in that particular field in order to gain a deeper understanding on how ePM tools are used. Initially, I wanted to conduct a case study about a specific inter-organizational project between Renault and Calsonic Kansei in Romania, and the tools they use to communicate to each other. They use special tools such as eConf, eRoom or ANPQP, for which assigned people from both companies have access and enable them to send documents and orders and support the supply chain between the two companies.

However, I also wanted to interview companies from Sweden, in the IT domain and other domains as well, to be able to make the study generalizable within more than one industry. I knew that it would be hard to contact car manufacturer in Sweden such as Volvo or Saab and focus on the auto industry only. So, I decided to find companies in any domain that are involved in any type of inter-organizational projects, to broaden the sample and therefore, have better chances to involve as many companies to interview and find out what special tools they use. In total, I contacted approximately 20 companies to participate in the study in three European countries from which 6 have agreed upon the interviews.

When trying to contact companies, sometimes it was problematic because I did not have the contact details of the people that I wanted to interview and therefore, I had to send e-mails to the general contact person such as public relations. I think this strategy is not effective as these contact people do not usually forward the e-mail and bother the people that you want to interview, it is better to have their contact details and contact them directly.

When writing e-mails to companies it is important to know for sure what you want to ask and with what person in the company you would like to make the interview. There is the chance that you change your strategy after some time in your thesis and then you need to change the already given information to the contacted companies. Time-consuming e-mails with long explanations, I think are not a good first impression. Therefore, I decided to contact the companies directly by phone. In case they were busy or forgot about my issue then I would remind them by e-mail or phone until I received a concrete answer. Interviews were made during a two week period at the end of April 2010 after I completed the interview guide with the questions and had a good understanding of what to expect from the interviews and the thesis as a whole.

When conducting interviews I used different types of communication tools in order to test them and discover the differences regarding their impact on communication flow and general understanding of the interview. Face-to-face interviews were the most rewarding, followed by teleconferencing, videoconferencing, e-mail and skype interviews. The reason why Skype is on the last place is that the quality of sound was poor during the interview which affected the flow of information, communication and social ability as the understanding between participants was affected. However, this cannot be seen as the rule, more as the exception. The ranking of the ePM tools used for interviewing are only valid for this particular study and its interview strategy.

There might also be interesting to use a different approach in making interviews. If one has a good knowledge about the types of communication tools they use in companies, it is interesting to categorize such tools and ask the respondents what they think about the

tools that you mention even though they do not necessarily use such tools within the company. The respondent might have previous experience that can share regarding the tools that you are interested in and can discuss about how collaboration is regarded within the company and externally in general and what technologies support it. Therefore, the constraint of focusing on one specific project or technology that the respondent can and want to talk about, can be eliminated thus, giving a more generalizable result.

## 9 Further Research

Further research in the area of Project Management and Virtual teams would be interesting to conduct, especially with a liaison between these areas of study including:

- Virtual teams: How to successfully manage a virtual team?
- Project Management for virtual teams.
- Project Management best practices: study case on a specific company.
- Study case of an inter-organizational project such as in the auto industry; integrated systems within this industry; how to optimize the chain between manufacturer and supplier through IS or external benchmarking.
- There is a lack of knowledge regarding virtual teams as well. One would think that as we move towards a more virtual globalized era with social media networks and different sorts of applications for communication facilitation through the web, virtual teams would progress towards perfection. This is not the case as information and research papers regarding virtual teams and their management is scarce. Questions such as: What do virtual teams imply, what benefits and drawbacks they have and how could the challenge be minimized and harnessed more effectively? would be interesting to consider as research topics.
- Networked organizations and collaborative communication.
- Computer-Aided Engineering (CAE) tools for the Auto industry
- A virtual team study case in a company which uses such work environment.
- Best practices for virtual teams in a specific industry.
- Online participation and engagement required for the success of virtual teams.
- Social interaction transposed online.

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## Appendix A: Interview Guide

Name:

Company:

Position:

Date and location:

### Interview Questions:

1. Please describe your job in company X and in what way it relates to the field of Project Management?
2. What experience do you have in this field by relating to examples of projects you have worked for (different industries, countries)?
3. Have you been involved in any inter-organizational (outsourcing, partnership or cross-company) project between the company you work for and other enterprises (e.g. subsidiaries, suppliers, business partners, customers)? If yes, please elaborate.
  - i. How did the project team members or partners manage distance?
4. What types of technology mediated communications (tools such as e-mail, video conferences, platforms for information transfer) have been used for project support? Please describe how they work.
5. In what way do you think the technologies presented earlier affect the project's schedule, budget and overall objectives? Please explain.
6. In your opinion, how do these technologies affect the project's quality of information?
7. Can you describe what sorts of problems occurred within the project work related to the technologies described earlier? How were they dealt with?
8. What differences would you find in managing a collocated team compared to a dispersed one using communication technologies?
9. What sort of skills does one need to use these technologies (communication, inter-personal skills)?
10. In general, what impact do you believe technology mediated communications have on the project work?
  - i. On a scale from 1 to 10, 1 meaning that the project's work could have been equally successful without the use of these technologies and 10 meaning that they are vital for project's success, what impact do you believe technology medium communications has on the project work?

**Thank you for your participation!**